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# Mean and Variance Volatility Spillover from Commodity Market to Stock Market of Pakistan, China and India

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## Abstract

*The focus of this study is to understand the volatility and its spillover from Crude Oil and Gold Market to the stock markets of the countries selected. This is a univariate analysis where only one direction of volatility spillover has been examined. GJR GARCH Model has been used for the purpose of analysis. The findings of the study reveal that ARCH effect exists in the Oil and Gold Market but not in the Stock Markets Selected. Further, Mean Volatility do not exist but Variance equation shows volatility. And, no evidence of spillover was found in these stock markets.*

**Key words:** Crude Oil, Gold Market, Stock Prices, GARCH, ARCH

## Introduction

Stock market is affected by many economic factors such as crude oil prices, gold prices etc. (Awais, Ellahi, & Sher, 2019). In literature, very complex relationships among these factors were observed. It means that stock prices are more affected by these variables, i.e. crude oil prices, gold prices, and volatility of both. As Crude oil is one of the essential elements of an economy and considered as the driver of the economy (Ali & Kazmi, 2020). Thus Fluctuations in oil prices fundamentally affect business, yet additionally on trade markets and the overall economy. This influence on market exists due to the import of large quantity of oil to meet the daily requirements of different sectors of economies. Number of studies such as (Ansar & Asghar, 2013; Fatima & Bashir, 2014; Ji & Fan, 2012) has confirmed this argument.

Similarly, Bhunia et al., (2013) indentified several reasons for the vitality in gold prices in an economy. Gold prices of the country represent its healthy economy. While, Najaf et al. (2016) declared a strong relationship between the stock market and gold prices and express Gold as a risk-free investment. In addition, gold and inflation are positively correlated therefore gold is considered as a good hedge against inflation (Bampinas & Panagiotis, 2015). On the other hand, low volatility in gold prices leads to a safe investment environment (Baur, 2012). Therefore, Ciner et al. (2013) declared gold as diversified product for the portfolio due the low correlation with other assets which leads to reduce risk of the overall portfolio. On the other hand, fluctuations in gold prices can warn and expose investors to risks, which in turn stimulate investors' interest in understanding the stock market's response to fluctuations in gold prices.

Number of studies such as (Ali & Kazmi, 2020; Baur 2012; Ciner et al., 2013; Kanjilal & Ghosh, 2014; Najaf et al., 2016; Raza et al., 2016) have been carried out to check the impact of crude oil prices and gold prices on economies of the different emerging, and developed markets such as Europe and America, as they are the main producers of crude oil but is dearth of studies on Asian countries in the literature. Many empirical researches have analyzed and confirmed the association between oil and stock markets. For instance a study conducted by

Arfaoui and Rejeb (2017) aimed to examine the global perspective where the researchers studied oil, gold, US dollar and stock prices interdependencies. Similarly, Ansari and Sensarma (2019) studied the impact of US monetary policy, oil and gold prices on the stock markets of BRICS economies. The findings of the study reveal mixed results such as for gold, South Africa shows negative and Russia and Brazil shows positive impact. The current study conducted by Mensi et al (2023) in Canada, Japan and USA and out of emerging markets BRICS economies. The findings of the study reveal co-movement between the crude oil and the stock markets has been intensified during the global financial crisis and covid-pandemic periods.

In emerging markets of Asian countries such as the stock markets of China, India and Pakistan represent dynamic landscape in the Asian region. Each country's stock market represents unique characteristics and complexities. India's stock market that is Bombay Stock Exchange and National Stock Exchange is known for its diversity and robust regulatory framework. China's stock market i.e. Shanghai and Shenzhen Stock exchanges are considered as a powerhouse in the global financial arena. China's stock exchanges have seen a rapid growth reflecting the huge economic expansion of the country. In contrast Pakistan's stock market i.e. PSX is operating in a developing economy. The challenges faced by the country such as geopolitical uncertainties and political turmoil have a huge impact on it. However, it has turned out to be resilient even in these tough times. The analysis of these markets with the Gold and Crude Oil interplay offer valuable insights into the regional economic dynamics as well as the cross market analysis. Due to fluctuation in oil and gold prices, the macroeconomic indicator does not remain constant. Hence the objective of this study is to understand the volatility and its spillover from Crude Oil and Gold Market to the stock markets of the countries i.e. Pakistan, Indian and Chinese Stock Markets.

## Research Questions

- Is there any spillover from Gold Market to Pakistan, Indian and Chinese Stock Markets?
- Is there any spillover from Oil Market to Pakistan, Indian and Chinese Stock Markets?

## Research Objectives

- To investigate the spillover from Gold Market to Pakistan, Indian and Chinese Stock Markets?
- To examine spillover from Oil Market to Pakistan, Indian and Chinese Stock Markets?

## Literature Review

Efficient Market Hypothesis (EMH) by Eugene Fama (1960) and Market Portfolio theory (Markowitz, 1991) provide the theoretical base for the underlying study. On one hand where EMH emphasizes the timely link between information and prices of stock. The fluctuations in the other markets may have a contagion effect on the stock markets. (Awais, Ullah, Sulehri, Thas Thaker, & Mohsin, 2022). Further, the investment opportunities in the other markets can provide investors opportunity to diversify their portfolio cross market. However, in order to optimize the benefits, it is necessary to understand the dynamics of relationship these markets offer.

Nadal et al. (2017) investigated time-shifting linkages between the crude oil market and the S&P500 stock market index. The researchers used DCC GARCH model to analyze the data. The findings of the study reveal that the connections exist between the returns of the crude oil and the stock markets. Moreover, Bein (2017) also studied the timing shifting linkages and the vulnerability transmission from oil market to the stock markets of Baltics and four European countries. The researcher also used DCC GARCH model to obtain results. The findings of the study reveal that the transfer of risk exists more in Baltic countries as compared to the European nations.

Awartani et al. (2018) used DCC-MIDAS model to find out the linkages between the oil prices and the stock markets of MENA (Middle East and North Africa) countries. The findings of the study show that an increase in oil prices leads to a reduction in the risk in the stock markets of Saudi Arabia. However, this increase in the oil price may cause other business sectors to become instable.

Another study conducted by Pandey et al. (2018) used the EGARCH model to examine linked between Gold and crude oil into BRICS' stock markets and found irregularity for fluctuation. Furthermore, this research also studied the extent to which the 2008 financial crisis affected the spillover of volatility. They concluded that spillover was significantly positive for both gold and crude oil volatility. BRICS stock market affected volatility in Crude Oil

and Gold prices. Likewise, Mokni and Youssef (2019) used copula model to study the dependence structure between crude oil and the GCC (gulf cooperation council) equity markets. The findings of the study show that positive relationship exists between the returns of both markets. Further, the equity market of Saudi Arabia show high level of persistent dependence with the oil prices. It further shows that there exists greater upper-tailedness as compared to the lower-tailedness in the markets selected, showing positive relationships in the extreme positive movements. Fina and Tourani-Rad (2019) studied the transmission of volatility from the crude oil market to stock returns in the US and Saudi Arabia using VAR method. The study showed that asymmetric pattern exists between the markets where the oil market fluctuations affect the stock market returns depending upon the direction of the movement.

Liu et al. (2019) revisit the relationship of worldwide crude oil costs with Chinese stock exchange returns. It has been deduced in the investigation that there is solid proof of respective transmission of mean and instability among Chinese stock market and worldwide benchmarks. Furthermore, high time-shifting relationship is seen between the thought about business sectors.

Wei et al. (2019) used non-linear limit co-integration to examine the impact of oil market fluctuations in the stock market of China. Their findings show a long-term relationship between the two markets. However, the disruption in this long-term relationship can be seen in 2008 and 2012. Jie (2019) show the linkage between the oil market and the Sino-US equity market during the trade war using BEKK and VAR Model. The study show no significant evidence of existence of spillover during this period. However, there are indications of weak risk transmission during the trade war period in the Chinese equity market.

Sinlapates et al. (2021) studied the volatility linkages between commodity and stock markets. The researchers selected the stock market of Thailand and Oil and Gold Market for the purpose of the study. The study employs BEKK GARCH model. The findings of the study reveal that volatility transmissions were different during different time periods. The study took financial crisis pre and post period to examine the volatility and spillover behavior. To sum, the above studies provide a comprehensive overview of the evolving research on the subject under study. It shows the intricate relationships between crude oil markets, global stock exchanges across various regions with different time periods and different methodologies.

## Methodology

Daily closing prices were obtained for all the five markets (Two commodity markets i.e. Gold & Crude oil) and three financial markets (Pakistan, India, & China). The reason of selection of these three stock markets is to ensure the representation of diverse economic landscapes in the Asian region. India and China, particularly, are recognized as the emerging economies with substantial impacts on the global markets. On the other hand, Pakistan being a developing country provides a valuable contrast. Analysis of these diverse market dynamics will offer insights in the context of Gold, Oil and Stock market interactions. The duration of the data has been January 04, 2010 to December 30th 2019. Data for the financial markets and crude oil market was obtained from investing.com. In addition, Gold Market data was obtained from eia.gov. Returns for all series were calculated using the natural log function and dividing the opening price with the closing price in each series.

The mean equation used for the purpose of the study is as follows:

$$R_t = \mu + \lambda R_{t-1} + \varepsilon_t$$

The variance equation used for the purpose of the study is as follows:

$$\sigma_t^2 = \omega + (\alpha + \gamma I_{t-1}) \varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2$$

## Results and Discussion

Table 1: Unit Root Test

Serial Name	Stationarity
Pakistan	0.0001
China	0.0001
India	0.0001
Oil	0.0001
Gold	0.0101

Table 1 shows the result of unit root test. The null hypothesis of the unit root test tells about the presence of unit root in the series, indicating a non-stationarity in the time series. It is to be noted that if the p-value is less than 0.05, then we will reject this null hypothesis. Therefore, in the above results as the p-value is less than 0.05 in all the cases, we may infer that all the series in the underlying study i.e. both commodity and the financial markets show the stationarity at level.

Table 2: LM Test

Serial Name	Durbin-Watson stat	LM Test (Prob.)
Pakistan	2.000684	0.1763
China	1.998825	0.3787
India	2.000676	0.3787
Oil	1.999988	0.9800
Gold	2.073750	0.000

Durbin Watson values show about the situation of auto-correlation in the data. The values fall in the range between 1.7 to 2.3. As per the DB test, these values are in range suggesting no correlation between the terms, i.e. including gold and oil prices and the stock markets of the respective countries. In addition to this, the p-value of gold in the LM test is also less than 0.05. Thus, as a result we can accept the null hypothesis and may reject the alternative hypothesis.

Table 3 Heteroscedasticity Test: ARCH

Oil	F-statistic	54.42768	Prob. F(1,3534)	0.0000
Gold	F-statistic	51.45116	Prob. F(1,3534)	0.0000

ARCH test is pre-requisite for applying the GARCH method in order to check the volatility in the data. The p-value is the indicator for making decision regarding the presence of ARCH effect or not. The p-value for the series in the underlying study is less than 0.05 that shows the presence of ARCH effect in both the oil and the gold stock return series. It therefore, suggest the need to further analyze the potential spillover effects.

Table 4 Mean Equation from Oil to Stock Markets

Series	Variables	Coefficients	P-value
Pakistan	OIL (-1)	-0.004	0.933
China	OIL (-1)	-0.004	0.93
India	OIL (-1)	-0.004	0.933

Table 5 Variance Equation for Oil Market to Stock Markets

Series	Variables	Coefficients	P-value
Pakistan	Residue (-1)^2	0.15	0
	GARCH(-1)	0.6	0
	VSOP	0	1
China	Residue (-1)^2	0.15	0
	GARCH(-1)	0.6	0
	VSOI	0	1
India	Residue (-1)^2	0.15	0.001
	GARCH(-1)	0.6	0
	VSOI	0	1

The results of mean equation for all the three stock markets i.e. Pakistan, India and China show the absence of volatility in the oil returns. However, the variance equations show the presence of volatility, which can be clearly seen as the p-value is less than the threshold i.e. 0.05. In addition to this, the beta coefficient of GARCH (-1) shows 60% volatility in the oil market.

Table 6 Mean Equation from Gold Market to Stock Markets

Series	Variables	Coefficients	P-value
Pakistan	Gold (-1)	0.174	0
China	Gold (-1)	0.104	0
India	Gold (-1)	0.117	0

Table 7 Variance Equation from Gold Market to Stock Markets

Series	Variables	Coefficients	P-value
Pakistan	Residue (-1) <sup>2</sup>	0.302	0
	GARCH(-1)	-0.816	0
	VSOP	-0.011	0.831
China	Residue (-1) <sup>2</sup>	0.52	0
	GARCH(-1)	-0.389	0
	VSOC	0.017	0.873
India	Residue (-1) <sup>2</sup>	0.51	0
	GARCH(-1)	-0.418	0
	VSOI	0.008	0.89

The mean equations for all the stock markets show the presence of volatility in the gold returns. This conclusion (existence of volatility is reinforced by the variance equations as well). For the variance equations, p-values are also less than 0.05, showing the presence of volatility. Further, the beta coefficients of GARCH (-1) shows that there is a substantial negative volatility of approximately, -81.6% for Pakistan, -38.9% for China and -41.8% for India in the gold market. The negative direction of beta in this situation shows that any changes in the markets have adverse effects over the other.

It is to be notes that although volatility exists in the respective markets, the spillover effects cannot be seen, as evidenced by the greater p-values from the threshold that is 0.05. It shows that the gold market do not significantly affect the other markets discussed in the underlying study. It means that while the volatility exists in gold returns across regions, the adverse impact of this are contained within gold market itself and do not transmit to the other markets.

## Discussion

The results for crude oil indicate lack of volatility in the mean equation for all the markets however, the variance equation shows the contradictory results. It means that the volatility does exists in the Crude oil returns. Further, as the p-values for spillover effect are all above 0.05, it shows no significance and therefore, no presence of spillover effect from the crude oil market to the stock market. The findings of the study are affirmed by Awartani et al. (2018) where the researchers used DCC-Midas in order to check the link among the oil costs and the MENA nations. Risk spillover from the oil market to MENA countries has shown weak linkages among the selected markets for the purpose of the study.

The volatility in the Gold returns across different time period show the dynamic nature of the Gold market. The results in the above in the form of negative beta coefficients show that changes in the Gold market have adverse impact on the markets. These results are supported by Awartani et al. (2018) where the researchers found weak relationship among these markets. Furthermore, the absence of spillover effect shows that Gold market volatility exists, it does not lead to a significant transmission of shocks to the stock markets. In addition, since gold is positively correlated with inflation, it is also a good hedge against inflation (Bampinas & Panagiotis, 2015). The reduced volatility of gold prices shows a safe investment environment (Baur, 2012)

## Conclusion

This research provides insight into the volatility and spillover from oil and gold prices on the stock market of the selected countries. It was found that ARCH effect exists in Oil and Gold series. Further, mean volatility was not found but volatility in variance exists in the markets. Also, no evidence was found of spillover from Oil and Gold market to the selected stock markets.

The results of the study were opposed to those of the studies conducted by Wei et al. (2019) and Jie (2019) where the researchers found strong spillover effect from the commodity market to the selected stock markets. However, the findings of the underlying study compliments the findings of Awartani et al. (2018) where weak linkages of spillover resulted after the cross market analysis. The comparison highlights the importance of contextual factors. It means that the selection of markets in these studies are not same that can be a reason of difference in outcomes.

The study may not only assist the investors but also provide a vigilant caution to all the other stakeholders as well to consider the implications that may be caused by the other markets as well. Exploring other markets shall facilitate the investors to make a better portfolio. However, the understanding of the implications regarding the other markets is necessary. Lastly, there are many opportunities for the future researchers to explore these dynamics with further advance methodological approaches for instance Machine learning and other factors that aid to the volatility and spillover.

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## Examining The Role of Laissez-Faire Leadership in Organizational Politics: A Moderated Mediated Model

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### Abstract

*Many factors are thought to be a cause of organizational politics in any organization and in past research, it is empirically tested that leadership is one of those factors. Exploitative and despotic leadership causes politics in organizations but ethical leadership discourages it. However, the role of the laissez-faire leadership style in organizational politics is yet to be thoroughly investigated. This research aims to study the role of Laissez-Faire Leadership in Organizational Politics. Moreover, it also focuses on the mediating role played by Esprit De Corps and the moderating role of Employee GRIT upon the phenomenon of Organizational Politics resulting from Laissez-Faire Leadership on the top. Data was collected through a questionnaire survey from the employees of the National Highways and Motorway Police (NHMP) a Law Enforcement Agency and a Public Sector Organization. Data analysis was done through SPSS and AMOS software. The study findings revealed that Laissez-Faire Leadership results in Organizational Politics and is positively related to it. These findings were found to be in conformity with the Conservation of Resources Theory. The results also confirmed the mediating role of Esprit De Corps in the above-said phenomenon, thus, supporting the Cognitive Evaluation Theory. It was indicated that Laissez-Faire Leadership has a negative relationship with Esprit De Corps and likewise, Esprit De Corps has a negative relationship with Organizational Politics. Moreover, it also confirmed that Employee GRIT does have a moderating effect, on the relationship between Laissez-Faire Leadership and Organizational Politics mediated by Esprit De Corps and is negatively related. This finding corroborated what GRIT theory advocates. In the end, the implications, limitations of this study, and future directions have also been discussed.*

**Key Words:** Organizational Politics, Laissez-Faire, Esprit De Corps, GRIT, Leadership, National Highways and Motorway Police

### Introduction

The presence of some sort of politics, be it in the form of diplomacy, agitation, exploitation or even highlighting the genuine issues to the proper forum has been evidenced in the organizations (Bicer, 2020). Thus, it can be clearly seen that organizations have to face many problems in case politics is there. Politics exhibited on the part of a few employees, may result in the politicization of the entire work environment (Riaz et al., 2021). After realizing this fact of the existence or presence of politics in the organizations, what is of paramount importance is that we may look into the fact of what actually it is and what are the causes that result in the cropping up of this phenomenon (Eniola et al., 2015).

Organizational Politics means all those activities that are associated with the use of influence tactics to serve personal interests instead of the interest of the organization as a whole. Many factors affect Organizational Politics; however, the role of leadership is being emphasized here because its significance is more marked.



Leadership style matters a lot if the organizational environment is somehow turbulent. Then choice of leadership style gets even more complex in the politicized environment. In a politicized environment, it is necessary to go for and maintain such a leadership style that improves employee performance (Rathore et al., 2017). According to Kapoutsis and Thanos (2018), if politics is let to creep into the organizations, the whole system breaks down and the organization is torn apart if politics is not controlled. Again multiple factors lead to the creation of politics in organizations; however, the most important one is the type of leadership on the top (Kuipers & Wolbers, 2021). Among different types of leadership, Laissez-Faire Leadership is the type that is believed to be providing for the environment, which leads to the cropping up of politics in the organization. This is so because, in such a style of leadership, there is the least interference from the leader, decision power and authority are devolved, and much space is provided for the course of action to be adopted by the lower-tier employees. So there would be grouping among the team members and each group would like to exploit the situation in one's favor (Iqbal et al., 2021). Laissez-faire style causes such an environment where politics penetrate the systems because in such situations there always arises role ambiguity and role conflict among team members which ultimately affects team spirit (Al-Malki & Juan, 2018). Such a scenario is bound to nourish the phenomenon of politics in the organization. Such a style of leadership, no doubt, has many advantages as well like giving a lot of space for innovation and creativity (Rassa & Emeagwali, 2020). However, such advantages might suit the private sector more but not the public sector of Pakistan that is already suffering from a lot of administrative, financial, and productivity-related issues. Therefore, this research shall study the relationship between these variables like Laissez-Faire Leadership and Organizational Politics in the public sector of Pakistan.

A lot of research has been done in the past regarding variables like leadership style and its connection with organizational performance in terms of different aspects associated there with (Jiménez, 2018). Likewise, Organizational Politics has also been studied in previous research in different capacities as an independent, dependent, and moderator variable in different situations. While observing the fact that to what extent, Laissez-Faire Leadership acts as an important factor in bringing about the element of politics within an organization, what would be the interest is to look for any other such factor that could mediate or moderate this phenomenon. Against this backdrop, the relationship between Laissez-Faire Leadership and Organizational Politics with the mediating role of Esprit De Corps is an area that needs to be looked into in the context of organizations particularly the public sector of Pakistan. Such a style of leadership, no doubt, has many advantages as well like giving a lot of space for innovation and creativity (Rassa & Emeagwali, 2020). The Laissez-Faire style of leadership is less common in both public and private sectors. The autocratic style is prevalent in public-sector organizations while the democratic style is commonly found in private-sector organizations (Ejaz et al., 2022). Therefore, the scope of study concerning the interaction between these variables in both the public and private sectors of Pakistan exists. Here the focus of this study, with regard to the role played by Laissez-Faire Leadership in creating Organizational Politics, would be the public sector of Pakistan because the public sector is comparatively worst hit so far as the phenomenon of leadership style and organizational politics is concerned (Abbas & Yaqoob, 2009). Among the public sector, the role played by laissez-faire leadership style in any law enforcement agency gains much importance because the leadership style commonly found and most suitable is commanding style. In case if there is laissez-faire leadership style in any lea, there are more chances of politics to creep in the organization.

Finally, what is important to observe is that in such circumstances where an organization has the manifestations of being entrenched in Organizational Politics, what factor, particularly a psychological one, could act as a moderator to minimize the incidence of politics within the organization or mitigate the negative effects of the phenomenon of politics. Therefore, employee GRIT shall be studied here from this perspective. GRIT has been said to be a unique personality factor that could help increase employee performance and decrease work-related stress (Haist, 2021). Such work-related stress is indirectly associated with the politicized environment. Individuals, who possess higher GRIT, can maintain focus on activities over a longer period despite challenges, setbacks, and adversity (Duckworth et al., 2007). Likewise, in another research (Riaz et al., 2021), where optimism was studied as a moderator in an environment created because of Organizational Politics, it has been emphasized that other psychological reservoirs like GRIT can also be studied as a moderating factor to mitigate the negative effects of such environment. Therefore, in this backdrop, GRIT could be taken here as a moderator

to check to what extent it could help in moderating the incidence of politics in such a scenario and if can it mitigate the negative effects of the negative environment created because if Laissez-Faire Leadership leads to the creation of Organizational Politics.

## Theory & Hypotheses Formulation

### *Organizational Politics*

Politics is considered one of the important aspects of any society and has an important role in Public Service. In Organizational Politics, there are always efforts to increase self-interest to the maximum level notwithstanding the fact that means adopted are legal or otherwise. Mintzberg (1983) and Pfeffer (1992) defined Organizational Politics as a phenomenon where power relations and influential tactics are resorted to in the Workplace. If we examine the literature related to Organizational Politics, what we see is that research into Organizational Politics has been done in the past in terms of two categories; one area concerns the nature of actual political behavior, types of tactics and strategies, and consequences thereof. The other category pertains to the perceptions of politics in the work environment by individual employees, the antecedents of such perceptions, and the consequences thereof. During this study, our focus would be on the second category i.e. on perceptions of individual employees due to the leadership style as an antecedent to politics.

Researchers laid foundations of organizational politics in the late 1970s and early 1980s. Thereafter, efforts began in the late 1980s and early 1990s to develop and validate a reliable measure of perceptions of organizational politics. The initial un-dimensional POPS scale was developed by (Kacmar & Ferris, 1989). During the last two decades, outcomes of perceptions of Organizational Politics have been a common focus. Different factors that contribute to Organizational Politics may include job ambiguity, scarcity of resources, personality traits, uncertainty, and fairness. (Ali et al., 2020) Research work (Vigoda, 2000) suggests that the presence of Organizational Politics in a workplace deteriorates the working attitudes of employees in different ways. Organizational Politics always had a direct impact on the level of performance of employees (Rathore et al., 2017).

Organizational Politics influences the environment and efficiency of the organization in different ways. First of all, it has had a marked impact on appraisal systems. The performance systems of an organization are highly prone to the phenomenon of politics (Naseer & Ahmad, 2016). Research by (Aryee et al., 2004) highlights that the presence of organizational politics in the organization reduces the perception regarding the fairness of procedures in the eyes of the employees. If such perception is developed in the eyes of the employees of any organization, those are bound to get demotivated and lose trust in the management and the systems, Likewise, the impact of Organizational Politics on employee resilience and workplace incivility was studied by (Kumar et al., 2021) and it was found to be significant.

As far as this avenue, that this phenomenon of politics has both positive and negative aspects is concerned, there are arguments in literature both for and against it. There are two ways of viewing organizational politics: either as a symptom of social influence processes that benefit the organization or as a self-serving effect that goes against the organizational goals (Cacciattolo, 2015). This aspect, that Politics in an organization is not always detrimental, has been highlighted by (Ortuno-Ortín & Schultz, 2005) who further explained that it is the balance of power among individuals or groups which decides its impact. This seems logical that we cannot attribute any phenomenon to totally positive or negative altogether. Buchanan (2008) described the political phenomenon as ethical and declared it a necessary change for the overall efficiency of the organization.

The public sector in Pakistan is inefficient due to many reasons but the political phenomenon is one of the main reasons for this phenomenon. Haque (1998) declared that employment in the public sector on political grounds is one of the main factors. All over the globe, efforts are being carried out to improve the public sector. In this regard, focus on leadership is also being imparted. Leaders can become the source of politics or can otherwise control this phenomenon effectively. Vigoda and Cohen (2002) highlighted the research finding that there is a high intensity of perception of politics. Likewise, various types of research have been conducted concerning Organizational Politics in the public sector (Riaz, 2013).

Previous literature regarding Organizational Politics, as indicated above, shows that although this phenomenon has already been studied from different aspects detailed concepts and interlinked factors of Organizational Politics

have gained much importance in modern times. Previous research, no doubt, did cover many aspects like certain outcomes concerning Organizational Politics or the nature and characteristics of the relationship between the two. However, there exists a lot of room for research work so far as reasons, particularly leadership styles that lead to this phenomenon, are concerned. Furthermore, this phenomenon gets even more importance if any law enforcement agency is brought under discussion. This is so because, such type of leadership style is bound to impact the incidence of phenomenon of politics because generally commanding style of leadership is suitable and found in LEAs. Therefore, in this study where sample is taken from NHMP, a Law Enforcement Agency, is going to help in understanding the link between leadership style and organizational politics.

### ***Laissez-Faire Leadership***

Leadership is a combination of specific character traits and skills that help leaders motivate and persuade others to perform certain tasks. They include enthusiasm, willingness to lead, honesty, self-confidence, and cognitive skills. (Yahaya & Ebrahim, 2016) Leadership may also be understood as activities supporting individual team members in achieving the assigned targets. Employees' professional satisfaction and success always depend upon leadership styles (Zareen et al., 2015). The question of engaging employees includes the analysis and characteristics of factors affecting the level of employee engagement (Drewniak et al., 2020). Reduced engagement, reduced emotional commitment, and mental stress may be caused by a downward shift of tasks or responsibilities that come under the domain of senior manager or leader (Einarsen et al., 2009). Failure on the part of the manager to take responsibility leads to reduced involvement on the part of employees. Reduced levels of engagement emotional commitment and stress may be caused by the style of leadership a manager adopts toward employees (Cooper et al., 2004). As per LMX theory, high levels of LMX are positively related to high levels of employee engagement. (Blomme et al., 2015). In laissez-faire leadership style, engagement and emotional commitment of leader with employees is reduced which increases the propensity of politics in the organization.

Robbins and Judge (2003) explained the Laissez-Faire style is that one in which the leader "Abdicates responsibilities, avoids making decisions". This is a very peculiar style of leadership where the leader is least bothered and concerned about what is going on down the ladder. In the literature concerning management, Laissez-Faire refers to a "hands-off, let things ride" approach (Northouse, 1999). Bass and Avolio (1994) describe Laissez-Faire leadership as "the absence of leadership" and "the avoidance of intervention.

### ***Esprit De Corps***

Esprit De Corps is basically "the selfless and enthusiastic devotion of the members of the group or to purposes of the group" (Friedrich, 1965). In the management literature, it has been defined as the sense of team spirit that pervades the organization where everyone works towards the common goal of serving customers (Jaworski & Kohli, 1993; Selnes et al., 1996) The term Esprit De Corps is found in the literature of both the Military science and that of organizational studies separately and differently. In Military literature, as per (Blaufarb, 1989) Esprit De Corps is an individual-level concept and covers aspects like enthusiasm, vigor, dedication, spirit, or devotion felt by an individual toward a cause or a goal. Moreover, team cohesion is defined as a group-level concept where bonding together of members in such a way as to sustain their will and commitment to each other and towards the mission (Gross, 2018). The term, Esprit De Corps in the context of organizational studies, is seen as the fourteenth general principle of management outlined by (Henry, 1949) in his Book "General and Industrial Management". Henry Fayol highlighted the significance of team spirit amongst employees of the organization. In organizational literature, there exists an overlap between team cohesion and Esprit De Corps. Few studies take it to be part of the psychological climate of an organization. There is general agreement, however, that Esprit De Corps involves individuals' sense of pride and a sense of accomplishment in doing a job properly. Then, there is an agreement at this level as well that the construct binding the team together at group level is cohesion. The concept of Esprit De Corps is not only applicable in the military or public sector organizations rather is equally applicable in private market settings. Esprit De Corps was studied with market orientation (Jaworski & Kohli, 1993) where it was proposed that Esprit De Corps is one of the factors that are consequences of market orientation, the other being organizational commitment (Naz et al., 2019; Schuler & Weber, 2005).

The unity of individuals in organizations, teams, and groups coupled with loyalty to the organization and team

spirit lead towards Esprit De Corps in an organization which is instrumental in achieving its goals (Watba & Farmer, 2006). This is the foundation of a strong organization. Until and unless employees have these two traits, one the Esprit De Corps and the other loyalty, the organization is not going to sustain or thrive (Stewart & Barrick, 2000). The true value of this trait is tested whenever there are tough circumstances faced by the organization. In such, situations, team spirit acts like a bond to hold employees together and plays a key role in keeping them motivated towards continuing to thrive despite the uncertain or tough circumstances (Narayanan et al., 2012).

### **GRIT**

GRIT is comprised of two components: Passion and Perseverance. GRIT is perseverance and passion for long-term goals (Duckworth et al., 2007). Passion is the main and prime aspect of GRIT. Recent research defines work passion as “an individual’s emotional and persistent state of desire based on cognitive and affective work appraisal” (Phillips et al., 2017). This highlights the fact that a constant desire for activity results in an internal emotional attachment that gradually becomes stable and persistent (Hauer et al., 2021). Duckworth (2016) argued individuals who have higher GRIT develop and pursue long-term objectives that are associated with higher-level goals. Such goals drive the behavior of the employees. High-GRIT individuals possess traits like resilience, flexibility, and willingness to adapt which help them remain focused on purpose-driven goal accomplishment (Duckworth, 2016). Second component of GRIT is perseverance where there is sustained and enduring effort as a product of internal purpose-driven desires and not the external concerns like a fear of being reprimanded. So GRIT which is basically “perseverance and passion for long-term goals” (Duckworth et al., 2007) has a lot of relevance with the behavior and attitudes of employees in organizations (Mueller et al., 2017).

So far as GRIT is concerned, it is not confined to any one specific segment of the organization. It includes right from top leadership to middle managerial level and at lower level employees. Any member of the team of any organization, right from the top leader to worker or low-level employee of the organization, is supposed to have GRIT and can possess GRIT. However, in terms of GRIT in an organizational context, most focus is on the supervisory and employee level. Findings of the research by Widodo and Chandrawaty (2020) show that both employee and supervisor GRIT have neutralizing effects when operating in politically- fraught work settings. This is so because, in situations where politics has somehow crept into the organization, until and unless all employees including supervisors and low-level employees are held together at a common agenda of dealing with the situation, good results cannot be expected.

### ***Laissez-Faire Leadership to Organizational Politics***

Leadership is always a prerequisite to achieving the mission and vision of the organization (Harris & Spillane, 2008). Organizations have to face many problems like low productivity, high turnover of employees, and an uncongenial environment because of the lack of effective leadership. It is the leadership style that takes the employees along (Al Khajeh, 2018). In the politicized environment, it becomes imperative to look for such a leadership style that improves employee performance. The relationship between authoritative and Laissez-Faire leadership styles on the thriving of employees in the workplace along with the moderating role of personality traits has been studied by once legitimate demands of employees are not met, then the environment in the organization becomes uncongenial for progress and growth. Effective leaders who possess political skills have the ability to moderate and minimize the negative effects of the perceptions of Organizational Politics. Leadership gives all employees a sense of belonging.

In modern times, the role of a leader in an organization has become more significant. According to (Mintzberg, 2010) true leaders are those who engage others. The style of management has now changed. Leaders now need to be caring, engaging, and interacting. Only such a leader can bridge the gap between the management and employees and win the hearts of all. This approach serves the purpose of any organization more effectively than the leader that adopts a Laissez-Faire style. Perceptions about the politics in an organization matter a lot so far as the impact on the organization is concerned (Ferris & Kacmar, 1992; Kacmar & Baron, 1999). The leader has to take care of the fact that how employees perceive the status of fair play and justice in the organization (Ram & Prabhakar, 2010). By taking care of the perception of politics in the organization, the leader ensures employee satisfaction. So, leadership style has a marked role in this regard (Saleem, 2015). Laissez-faire leaders make the

feeling of “internal politics within the organization” exist in employees. This affects organizational performance and job-related attitude adversely (Mathotaarachchi, 2017). Conferring from COR theory cognitive distraction among Laissez-Faire leaders would result in passivity like politics among employees. When employees face resource drain, employees often respond defensively, trying to protect their remaining resources from depletion (Hobfoll, 2001). Transformational leaders inspire their followers to convert their self-interest to the accomplishment of company goals (Bass, 1985). While transitional leaders propose a mutual agreement to the followers i.e. awarding rewards for the work accomplished (Bass, 1990). These leaders motivate employees by rewards and punish them if cannot achieve the target. Laissez-faire leadership is more toward lack of clarity, paying little attention to targets (Bass, 1990). As laissez-faire Fair Leaders are cognitively drained, employees may choose to engage in organizational politics that will effectively stop their resources loss further. In this backdrop, this can be hypothesized that:

**H<sub>1</sub>:** *Laissez-Faire Leadership (LL) has a positive and significant association with Organizational Politics (OP)*

### **Mediating Role of Esprit De Corps**

Esprit De Corps increases the morale of the employees and encourages coordination and cooperation. The absence of this factor may lead to the creation of a conflicting environment in the organization. Obviously, without team spirit, each member of the team is going to go his or her way, instead of the common way, which may be called or declared the accepted or desired way from the point of view of the organization. In such circumstances, the efforts of individuals would dissipate instead of being converged at a common point that might be instrumental otherwise for the organization. This helps in creating a bond between the employees. In the words of Henry Fayol, it is based on two theories i.e. “Unity is the strength” and “Unity of staff”. Good leaders play an important role in facilitating Esprit De Corps among members of the organization, especially in times of crisis (Fayol, 1916). Therefore, this explains the point in clear terms that team spirit among the employees of any organization is not going to be created spontaneously because many centrifugal factors operate in the system simultaneously. Therefore, there arises the role of a leader who could lead and steer the whole team along with common objectives in mind and with a common strategy to be followed.

The leader points out the direction towards which the organization has to move and devises the course of action to be adopted (Boyt et al., 2005). Although several previous pieces of research highlight the differences that leadership style makes on team-level performance literature does not cover much as to what is the impact of leadership style on virtual Esprit De Corps (Reisel et al., 2005). Likewise, the same aspect is found deficient in the literature with regard to Esprit De Corps in physical on-ground situations in the organizations. He further pointed out that, Esprit De Corps is the key to success in the organization. This factor cannot be over-emphasized because it is already an established fact that without team spirit, there is not going to be any team cohesion and without team cohesion, the organization is not going to act like an entity as a whole. While Homburg et al. (2002) have declared it to be a valuable asset for team members as well as an organization. Obviously, where other resources act in an organization as an asset for it, be it material or immaterial. Likewise, Esprit De Corps is no less than an asset for an organization though being in the form of an immaterial asset. Boyt et al. (2001) further suggested that employee performance is markedly increased if there is team spirit among the employees. Cognitive Evaluation Theory also supports this notion that the intrinsic motivation of employees is affected if they do not get such suitable external stimulus from the leader that may elevate the level of self-satisfaction in the employee. This aspect is, undoubtedly, of paramount importance because the ultimate aim of any organization is performance. If team spirit or spirit de corps is high, employees of the organizations are going to be welded together and marching towards the progress of the organization as a whole. So, the following hypothesis can be formulated:

**H<sub>2</sub> (a):** *Laissez-Faire Leadership (LL) has a positive and significant association with Esprit De Corps (EDC).*

**H<sub>2</sub> (b):** *Esprit De Corps (EDC) has a positive and significant association with Organizational Politics (OP).*

**H<sub>3</sub>:** *Esprit De Corps (EDC) mediates the positive association between Laissez-Faire Leadership (LL) and organizational politics.*

### Moderating role of GRIT

GRIT is not an easy trait to cultivate in anyone with ease rather it is often challenging to cultivate through interventions. However, some measures could be taken to decrease the effects of stress on employees. Top leadership and management have to work constantly on such interventions that could help in inculcating team spirit and GRIT in all employees. The research of Chandrawaty and Widodo (2020) shows that GRIT has a positive and significant effect, both direct and indirect effect, on task performance through mediating transformational leadership and job involvement.

This highlights the importance of leadership in creating and increasing the GRIT in the employees. Organizational politics and leadership style are closely related variables because the leadership of the organization plays an important role in shaping the overall culture and structure of the organization in terms of behaviors, attitudes, and overall working environment (Fashola et al., 2016). Here comes the role of GRIT of employees because, if there is a link between the style of leadership and the resultant organizational politics then GRIT must have some role in this interaction between two phenomena as both these inter-linked phenomena are bound to have an impact on behaviors and attitudes of employees. So, this way GRIT of employees may also be affected. The finding suggests that GRIT is a significant predictor of job performance and work-related stress (Haist, 2021). This finding further elaborates on the fact that job performance is linked somehow with the level of GRIT the employees have and it is linked with the stress level being created in the employees. This fact can also not be denied that stress itself is a factor or predictor of the level of disenchantment, frustrations, and demotivation in the employees that may ultimately lead to an uncertain environment. Such an uncertain environment, in turn, may lead to the creation of political trends as such. Many Scholars have suggested that GRIT is a potential determinant of desirable outcomes inside and outside workplaces such as good mental health, happiness, or optimal performance (Tett & Burnett, 2003).

Substantial work on the role of GRIT in education, the military has promoted GRIT as a valid and meaningful predictor of performance, detention, and success (Duckworth et al., 2007). Cawley et al. (2001) have claimed that non-cognitive personality traits can predict different outcomes such as overall satisfaction, happiness, and subjective well-being within the organization. Duckworth describes the discovery of GRIT as the answer to the question of “why some individuals accomplish more than others of equal intelligence” (Duckworth et al., 2007). The significance of a trait and its interaction should be aligned such that the individual activates the trait effectively to the situation's indications (Luria et al., 2019). Drawing upon trait activation theory (Tett & Burnett, 2003; Tett & Guterman, 2000), which argues that the relationship between personality traits and attitudes and behaviors should be stronger in weak situations, we propose that GRIT will have an adverse effect on the organizational politics especially when Esprit De Corps is high. Thus, the following two propositions are hypothesized:

**H4 (a):** Employee GRIT (EG) moderates the relationship between Esprit De Corps (EDC) and Organizational Politics (OP) in ways that this relationship becomes weak when Employee GRIT (EG) is high.

**H4 (b):** Employee GRIT (EG) moderates the indirect relationship between Laissez-Faire Leadership (LL) and Organizational Politics (OP) through Esprit De Corps (EDC).

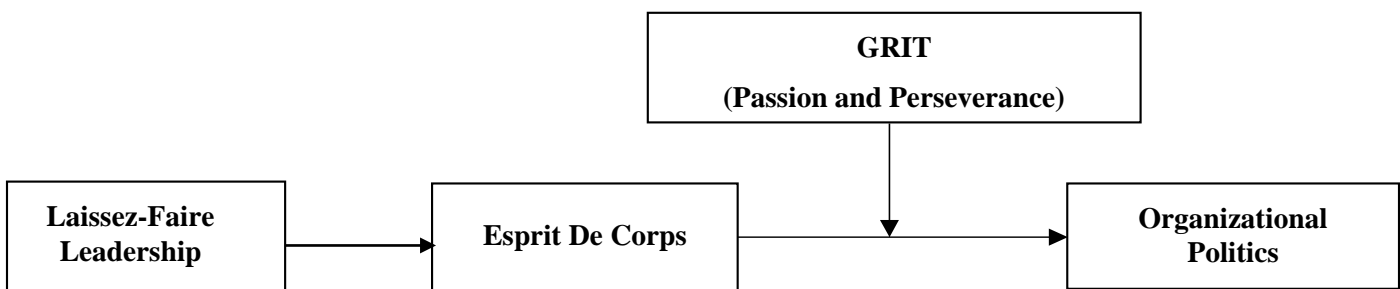


Figure 1. Theoretical Framework

## Research Methodology

### *Sample and Data Collection Procedure*

Data was collected from employees of the National Highways & Motorway Police (NHMP). Keeping in view the factor that this study was conducted during the COVID-19 pandemic period when the facility of getting feedback was available conveniently through only online Google form in the operational online working group in sectors and officer rank employees of NHMP were members of such communication group. So, the Unit of analysis in this study is confined to the officer rank employees (Senior Patrol officers / Patrol officers) who make about 2000. To get valid and authentic findings, the functional area of the department selected for this study is Zonal/Sector Level headed by DIG/SSP respectively. Data was collected from 5 Zones and 16 Sectors of NHMP having a population of at least 2000 employees ranking from Senior Patrol Officers (SPO) to Patrol Officers. The population was about 2000 NHMP Officers out of which 326 responded and were so taken as a sample. A simple random technique was adopted and a questionnaire survey was employed to collect the data responses were taken via online survey because of the prevalent COVID-19 pandemic and for the convenience of the respondents. All formalities including permission from the Head of the Department were obtained to survey the purpose of the research. Moreover, all principles and ethics of research concerning the confidentiality of data and physical or psychological protection of the respondents were followed in letter and spirit. Data was collected through a questionnaire at a time within one month. Feedback was sought from a selected sample of the population because of limited time and resources. In such a technique where there are always chances of common method bias and social desirability bias. Chances of such biases were tried to be minimized by making the questionnaires quite simple, presenting predicting and criterion variables in separate sections and ensuring anonymity and confidentiality of responses. Furthermore, the existence of CMV is checked by following recommendation of (Podsakoff et al., 2003) and performing Herman Single Factor test. Herman one-factor test results suggested that there was no general factor accounted for majority of the variable in unrotated factor structure, hence the finding less likely to suffer from CMV issues. Statistical Package for Social Sciences (SPSS) and SPSS AMOS version 22 have been used to assess the correlations between variables, reliability and validity of the constructs and goodness of model fit, and bootstrapping technique by Hayes Process macro to test the formulated hypotheses.

### **Measures**

Measures for different variables used in this study comprise of 5-point Likert scale. All the scales used here are authentic because those are adopted from already tested measures and Cronbach's Alpha value is above 0.70.

#### *Organizational Politics*

To measure Organizational Politics Perceptions of Organizational Politics Scale (POPS) (Kacmar & Carlson, 1997) was used. Out of 15 items on the said scale, 09 relevant questions were selected. Because how they are determined is so political. For measuring facets of Organizational Politics, a seven-point (1 = *Strongly Disagree*; 7 = *Strongly Agree*) Likert scale was used. (Kacmar & Carlson, 1997) reported reliability of scores at  $\alpha = .87$  when using the 15-item POPS. This has been validated in the study (Manning, 2018) with a reliability score using  $\alpha = 0.95$ .

#### *Laissez-Faire Leadership*

For measuring Laissez-Faire Leadership MLQ scale of (Bass & Avolio, 1996) has been adopted here. Originally, MLQ scale comprised 45 items regarding traits of leaders whereas in this study 09 relevant questions were selected here for the purpose. The scale adopted here has been used and validated by (Pahi & Hamid, 2016) where the reliability of the said scale was 0.844. A rater form was used to take feedback regarding leadership from employees and for measuring facets of Laissez-Faire Leadership, a seven-point Likert scale (1 = *Strongly Disagree*; 7 = *Strongly Agree*) was used.

#### *Esprit De Corps*

For Esprit De Corps measurement, a scale developed by (Jaworski & Kohli, 1993) was adopted here. This scale has been found in other studies like that of (Lytle & Timmerman, 2006) with a measure of coefficient more than (0.81). Items of scale are to be measured on a 7-point Likert scale to get a correct opinion.

**GRIT**

GRIT (passion and perseverance) was measured through (Duckworth & Quinn, 2009) seven-item scale to assess employee GRIT. This scale has been validated in previous studies like that by (Priyohadi et al., 2019) where the reliability given is 0.82.

**Results**

**Demographic Analysis**

Statistics showed that out of 326 respondents, 92.9% were males, and 7.15% were females constituting 7.1%. Most of the respondents belonged to the age bracket of 20-30 (41.1%), while fewer responses were from the respondents of the bracket 50-60 (3.4%). From the academic qualification point of view, options from Matric to Master were given. Bachelor has come out on top of the percentage of respondents (41.4%) followed by a Master’s Degree (40.8%). Respondents were categorized separately as uniformed and civilian employees. Uniformed employees constituted 87.7% of the total respondents while civilians constituted 12.3%. Four options (0-3 Months, 3-6 Months, 6-12 Months, 1 year beyond) were given so far as the tenure of posting is concerned. The highest percentage came out to be under the category of more than 1 year (77.9%).

**Measurement model**

The measurement model assessment comprises two main aspects: the reliability and validity of the constructs. The reliability of the measurement model is tested by assessing the reliability of each item in a construct and the internal consistency of the study constructs by using composite reliability and Cronbach alpha. The assignment of convergent and discriminate validity determines the validation of the measurement model. As per the criteria given by Fornell and Larcker (1981), the convergent validity of measured constructs should satisfy the three criteria that is i) all indicator loadings should exceed 0.65, ii) Composite reliabilities (CR) should be greater than .80, iii) The average variance extracted (AVE) for each construct should exceed the limit of .50. As displayed in the table below, therefore, all three conditions for convergent validity hold in the measurement model. To find the value of discriminant validity, the suggested cutoff of .90 in the correlation matrix was used as implied distinctness in construct content. As displayed in the table off-diagonal elements are estimated correlation between all constructs and their values were significantly less than .90. In addition, (Fornell & Larcker, 1981) suggested that the square root of the AVE of a latent variable should be greater than the correlation between the rest of the latent variable. As shown in **Table 1**, the diagonal elements in the correlation matrix showed that the square root of the AVE for each construct is greater than the correlations between the variables that form the construct. Thus, the measurement model holds solid discriminant validity.

**Table 1: Reliability and Validity Analysis**

Constructs	Range of loadings	CR	AVE	MSV	Correlation between constructs			
					LL	OP	EDC	EG
LL	0.87-094	0.940	0.641	0.485	<b>0.800</b>			
OP	0.62-0.74	0.937	0.624	0.485	.655**	<b>0.790</b>		
EDC	0.66-0.84	0.894	0.548	0.076	-.207**	-.276**	<b>0.741</b>	
EG	0.77-0.84	0.957	0.732	0.158	-.244**	-.397**	-.077**	<b>0.857</b>

N= 326; LL = Laissez-Faire leadership, OP= Organizational Politics; EDC= Esprit De Corps; EG =Employee GRIT

\*\* Correlation is significant at the 0.01 level (2-tailed).

Exploratory factor analysis for laissez-faire leadership yielded an Eigen Value of 1.373 with an explained variance of 85.707%. Exploratory analysis for Organizational Politics showed the largest Eigen Value of 1.570 with an explained variance of 73.018%. Exploratory analysis for Esprit De Corps presented the largest Eigen Value of 1.130 with an explained variance of 76.988%. Similarly, exploratory analysis for Employee GRIT estimated the largest Eigen Value of 1.450 with an explained variance of 91.159%. Since the stated Eigenvalues of these factors were more than one and the factor loading of each statement was near to one, the factorial validity of statements



related to the proposed study is satisfactory by accepting the related hypotheses.

Confirmatory factor analysis allows the test of fit between observed data and the aforementioned theoretical model that defines the hypothesis of the causal link between underlying variables (Gerbing & Hamilton, 1996). This proposed study shows CFA to evaluate the individuality of the measurement model through factor structure. CFA is done by maximum likelihood estimates using AMOS software version 23 to perform a four-factor CFA laissez-faire leadership, Organizational Politics, Esprit De Corps, and Employee GRIT to confirm the measurement model is an acceptable model fit to data. The measurement model produced acceptable results for key indices i.e.  $\chi^2/df$  is 2.058, CFI=0.93; TLI = 0.90; RMSEA=0.05, SRMR=.08, PNF=0.81 and PCFI=0.86 (Hair & Babin, 2006). Therefore, the overall requirement for model fitness was achieved to move further for hypothesis testing.

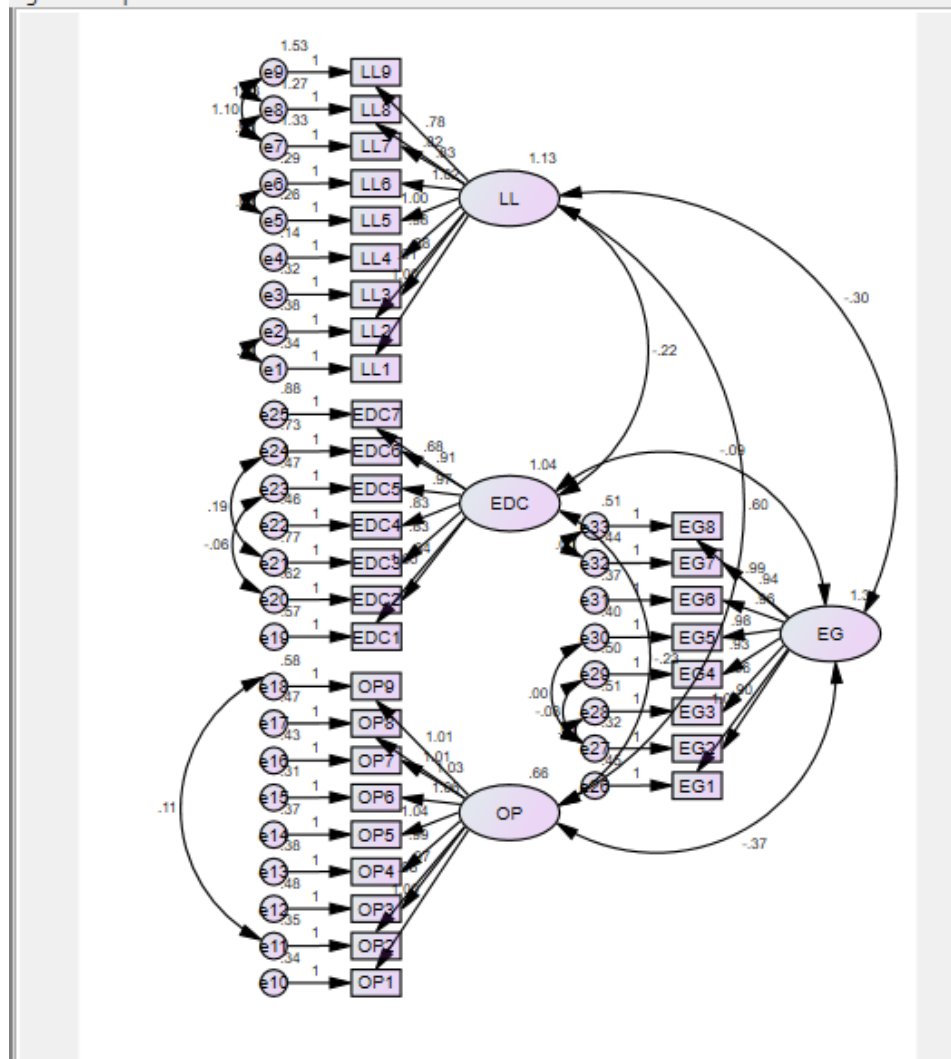


Figure 2 AMOS path diagram

The Pearson product-moment correlation was conducted to determine the association between the variables. **Table 2** shows that the correlation value between Laissez-Faire leadership and organizational politics is ( $\beta = .655$  and  $p < 0.05$ ) which is a positive and significant value. The correlation ship between Laissez-Faire leadership and Esprit De Corps is ( $\beta = -.184^{**}$  and  $p < 0.05$ ) which is a negative and significant. The value of the correlation between Laissez-Faire leadership and employee GRIT is ( $\beta = -.215^{**}$  and  $p < 0.05$ ) which is negative and significant. The value of the correlation between Organizational Politics and Esprit De Corps is ( $\beta = -.272^{**}$  and  $p < 0.05$ ) which shows that it is negative and the value is significant. The value of the correlation between employee GRIT and organizational politics is ( $\beta = -.243$  and  $p < 0.05$ ) which is negative and has a weak value. The correlation value between Esprit De Corps and Employee GRIT is ( $\beta = -.377^{**}$  and  $p < 0.05$ ) which is negative and moderate.

**Table 2: The correlation between different variables of the research study**

	LL	OP	EDC	EG
LL	1			
OP	.655**	1		
EDC	-.184**	-.272**	1	
EG	-.215**	-.377**	-.047**	1

N= 326; LL = Laissez-Faire leadership, OP= Organizational Politics; EDC= Esprit De Corps; EG =Employee GRIT

\*\* Correlation is significant at the 0.01 level (2-tailed).

### Hypotheses Testing

Regression analysis was conducted by using SPSS version 22 to evaluate all main effects. Results showed as given in (Table) that the Laissez-Faire Leadership has had a significant relationship with Organizational Politics ( $p < 0.05$ ), and the impact is 42.9% ( $R^2 = .429$ ). This supports Hypothesis  $H_1$ : “Laissez-Faire Leadership (LL) has a positive and significant association with Organizational Politics (OP)”. The relationship between laissez-faire Fair Leadership with Esprit De Corps is shown and found to be significant ( $p < 0.05$ ), the relationship is negative and the impact is slightly 3.4 % ( $R^2 = .034$ ), hence  $H_2$  (a) is accepted. The table shows the relationship between Esprit De Corps and Organizational Politics which is found to be significant ( $p < 0.05$ ) and negative leads to  $H_2$  (b). The impact is 7.4% ( $R^2 = .074$ ). Table shows the relationship between Employee GRIT and Organizational Politics and was found to be significant ( $p < 0.05$ ), the relationship is negative and the impact is 5.9% ( $R^2 = .059$ ).

**Table 3: Direct Effects**

Predictor	R	R <sup>2</sup>	P	B	T
LL (Dependent Variable : OP)	.655	.429	.000	.655	15.688
LL (Dependent Variable : EDC)	.184	.034	0.01	-.184	-3.363
EDC (Dependent Variable : OP)	.272	.074	.000	-.272	-5.097
EG (Dependent Variable : OP)	-.377	.059	.000	-.377	-4.5

N= 326; LL = Laissez-faire leadership, OP= Organizational Politics; EDC= Esprit De Corps; EG =Employee GRIT

We used the Hayes Bootstrap method to test the mediation and moderation effects (Hayes & Rockwood, 2017). Model 4 was used to check the indirect effects of LL on OP through EDC and Model 1 for EG moderates the relationship between LL and OP. Mediation and moderation are accepted if zero does not lie between lower and upper CIs. The indirect effects of Laissez-Faire Leadership affect Organizational Politics through Esprit De Corps as p-value is .00 ( $< .05$ ) and there is no 0 in between values of BootLLCI (.00) and BootULCI (.06). Thus, Hypothesis ( $H_3$ ), “Esprit De Corps (EDC) mediates the positive association between Laissez-Faire Leadership (LL) and organizational politics” is proved that Esprit De Corps is a mediator in between Laissez Fair Leadership and Organizational Politics

**Table 4: Indirect effects**

	R <sup>2</sup>	B	SE	T	p	LLCI	ULCI
<b>Outcome Variable: EDC</b>	.03						
LL		-.16	.05	-3.36	.00	-.26	-.07
<b>Outcome Variable: EDC</b>	.45						
LL		.51	.03	14.95	.00	.44	.57

<b>EDC</b>	-.14	.04	-3.76	.00	-.22	-.07
<b>Direct effects of LL on OP</b>	.51	.03	14.95	.00	.44	.57
<b>Indirect effect of LL on Op</b>	.02	.02			.00	.06

*N= 326; LL = Laissez-Faire leadership, OP= Organizational Politics; EDC= Esprit De Corps; EG =Employee GRIT*

To check the moderating effect of moderating variable Employee GRIT on the relationship between Esprit De Corps and the Organizational Politics Model-1 was used for the moderation analysis where it showed that interaction is significant because the p-value of Employee GRIT and Esprit De Corps is .00 (<0.05) and there is no 0 between LLCI (-.18) and ULCI (-.07). Hence H<sub>4</sub> (a) has accepted.

**Table 5: Moderation Analysis**

	<b>R<sup>2</sup></b>	<b>B</b>	<b>SE</b>	<b>t</b>	<b>p</b>	<b>LLCI</b>	<b>ULCI</b>
<b>Outcome Variable : OP</b>	.31						
Constant		580	.29	-.79	.00	5.24	6.36
EG		.17	.08	2.03	.04	.01	.34
EDC		.42	.12	-6.16	.00	.19	.65
Int (EDC * EG)		-.21	.03	3.53	.00	-.18	-.07

*N= 326; LL = Laissez-fair leadership, OP= Organizational Politics; EDC= Esprit De Corps; EG =Employee GRIT*

To check Moderated Mediation, model 14 of the HAYES Process Macro was adopted. **Table 6** shows that Organizational Politics is the outcome variable and other three variables (LL, EDC, EG) are predictors then the interaction is significant in the case of all three variables (LL, EDC, EG) p-value is <.05 in all cases. The index of mediated moderation is significant as there is no zero between LLCI (.01) and ULCI (.07) which confirms that there is moderated mediation. So far interaction (EDC \* EG) shows that interaction is significant as the p-value is .02 (<0.05) and there is no zero between LLCI -.27 and ULCI -.17. Thus, results show that moderated mediation is proven. Hence Hypothesis H3 (b): “GRIT (EG) moderates the indirect relationship between Laissez-Faire Leadership (LL) and Organizational Politics (OP) through Esprit De Corps (EDC)” is proved.

**Table 6: Moderated Mediation Analysis**

	<b>R<sup>2</sup></b>	<b>B</b>	<b>Se</b>	<b>T</b>	<b>P</b>	<b>LLCI</b>	<b>ULCI</b>
<b>Outcome Variable : OP</b>	.61						
Constant		-.2564	.29	8.94	.00	2.06	3.22
Esprit De Corps		.56	.09	6.20	.00	.38	.73
Laissez-Faire Leadership		.46	.03	15.73	.00	.41	.52
Employee GRIT		.29	.06	4.62	.00	.17	.42
Int_1 (EDC * EG)		-.22	.03	-8.61	.00	-.27	-.17

**Index of Moderated Mediation**

<b>EDC_M</b>	<b>Index</b>	<b>Boot Se</b>	<b>Boot LLCI</b>	<b>Boot ULCI</b>
	.04	.02	.01	.07

*N= 326; LL = Laissez-Faire leadership, OP= Organizational Politics; EDC= Esprit De Corps; EG =Employee GRIT*

## Discussion

The main objective of the present study was to analyze the relationship between Organizational Politics and Laissez Fair Leadership. This was to be seen how and to what extent Laissez-Faire Leadership proves to be one of the sources of Organizational Politics. For this reason, public sector Organization was selected for the survey because the phenomenon of Organizational Politics is comparatively more common in the public sector than the private sector (Scott & Falcone, 1998). Moreover, as the leadership style generally found in the public sector organizations of Pakistan is autocratic (Gohar et al., 2021) so, Laissez-Faire Leadership is likely to have a profound and significantly visible effect to the extent of Organizational Politics

During this research study, to determine the relationships between said variables, four Hypotheses were framed and tested separately. Findings regarding each Hypothesis are as follows: The findings of the research showed that there is a positive relationship between Laissez-Faire Leadership and Organizational Politics. This was confirmed by the regression analysis, which verified that there is an impact of about 42.9% of Laissez-Faire Leadership on Organizational Politics. The positive relationship clearly shows that an increase in laissez-faire Fair Leadership is going to increase the Politics in the Organization. Percentage shows that there are marked effects of this style of Leadership in the creation of Organizational Politics. This indicates that if Laissez-Faire Leadership is somehow found in any LEAs, it is going to create visibly marked Politics in the Organization. The same findings were found in another research study (Al Busaidi, 2020). Leadership is best characterized as a social exchange process. Therefore, leaders are effective to the extent they can motivate followers to meet the standards of performance. It is the responsibility of a leader to create a fair and healthy atmosphere in an organization that could fulfill the needs and expectations of the employees. This is what has been advocated in Social Exchange Theory (Blau, 1964). Likewise, here Cognitive Evaluation Theory also fits in which says that intrinsic motivation can be affected by external stimulus if that is in conformity with a feeling of self-satisfaction from within.

The findings indicated that there is mediation between Laissez- Faire Leadership and Organizational Politics through Esprit De Corps by direct (.51) and indirect (.02) effects. This proved H3. Mediation is partial because there is an impact of the independent variable on the dependent variable directly as well as indirectly. Mediation is complimentary because the sum is a positive sign. The correlation between Laissez-Faire Leadership and Esprit De Corps is significant with impact (-.16), has weak value, and is negatively related. It means an increase in Laissez-Faire Leadership decreases Esprit De Corps among employees. This proved H2 (a). The same relevance can be found in the findings of another research conducted earlier already done research work (Affandi et al., 2019). Likewise, findings showed the relationship between Esprit De Corps and Organizational Politics to be significant with impact (-.14). As the relationship is negative, it means if Esprit De Corps is decreased, Organizational Politics increases and vice versa. This proved H2 (b). This proposition can be supported by the findings of research conducted earlier where a positive relationship between Esprit DE Corps and job satisfaction was proved. As job satisfaction can be taken as an opposite factor of Organizational Politics, so, the negative relationship between Esprit De Corps and Organizational Politics is relevant here because lack of job satisfaction is one of the important causes leading to Organizational Politics (Ellickson & Logsdon, 2002).

Lastly, the findings of the index of moderation and interaction between Esprit De Corps and employee GRIT proved that there is a moderating effect of Employee GRIT on the relationship between Esprit De Corps and Organizational Politics i.e. relationship becomes weak when GRIT is high among the employees. This proved H4 (a). Likewise, the indirect relationship between Laissez-Faire Leadership and Organizational Politics mediated through Esprit de Corps is also proved through moderated mediation analysis, which shows that the relationship between Laissez-faire leadership and organizational politics is weakened when employee grit is high. This proved H4 (b). The moderating effect of Employee GRIT and political perceptions-citizenship behavior relationship was also established in a research study conducted earlier (Jordan et al., 2018). This finding is in accordance with the GRIT Theory, given by A-Duckworth, which advocates that gritty individuals develop complete goal hierarchies and remain motivated in achieving the goals of the Organization.

### ***Theoretical Implications***

The findings of this research study have surely added to already existing literature regarding Laissez-Faire Leadership, Organizational Politics, Esprit De Corps, Employee GRIT, and the Interplay thereof. As Organizational Politics is an established phenomenon in the Organization and always has very serious implications for the Organization as a whole (GK) This study has helped in understanding the role of leadership style in creating the phenomenon of politics in any organization . As focus here was on Laissez-Faire Leadership, the aspect, which earlier was missing, highlighted in another research study (Riaz, 2013), it has helped in understanding the true dynamics underlying this phenomenon. Moreover, this study has added the dimension of the mediating role of Esprit De Corps in this phenomenon. Determining the mediating role of Esprit De Corps in the creation of the phenomenon of Organizational Politics due to any leadership style is of importance. Moreover, this aspect becomes more important concerning Organizations like Law Enforcement Agencies (LEAs). This study, therefore, would be helpful for such Organizations to ascertain the role-played by Esprit De Corps in this regard.

Likewise, this research has also highlighted that Employee GRIT does have a moderating role upon the phenomenon of Organizational Politics being caused because of the Laissez-Faire Leadership on the top. A study of the moderating role played by psychological factors like Employee GRIT in the creation or prevention of the politicized environment is an addition to the research already done and covers the gap as highlighted in another research study (Riaz et al., 2021). Again, this aspect of theory would help organizations like Law Enforcement Agencies (LEAs) to understand true dynamics phenomenon and to respond accordingly.

This study has confirmed the already fact that Organizational Politics exists in the public sector. This has further reinforced the fact that even in Law Enforcement Agencies if Laissez-Faire Leadership appears, it becomes the source of Organizational Politics therein.

### ***Practical Implications***

As the linkage between Leadership Style and the resultant phenomenon of Organizational Politics is quite important, so, the findings of this research study become quite relevant from a practical point of view. Organizational Politics, which is a fact and cannot be ignored, always needs to be tackled in time so that Organizations may not suffer. This study has indicated that if the Leadership Style is Laissez-Faire type, it is bound to become the source of Organizational Politics. Therefore, management and practitioners shall have to keep this under consideration wherever such a phenomenon has to be tackled. Moreover, in Pakistan Organizational Politics is comparatively more common in the public sector than in the private sector (Al-Malki & Juan, 2018). In the presence of Organizational Politics, service delivery in the public sector organization cannot be expected to be good or improved. So, the government shall have to ensure that leadership in public sector organizations is not of laissez-faire type but rather needs to be participative type.

This study also established that there is a mediating role of Esprit De Corps as well in this phenomenon of the creation of a politicized environment. So, the management of organizations needs to pay attention to those factors which one way are affect the team spirit among the employees and Esprit de Corps in the Organization as a whole. As and when Laissez- Faire Leadership appears in any Organization, particularly any public sector organization as is the case here during our study, full attention needs to be given to such measures that could increase team spirit and Esprit De Corps because under such Laissez-Faire Leadership, there is always such atmosphere or environment where Esprit De Corps has all the chances to grow weaker. However, the management of any Organization particularly has to be very vigilant in such situations where Esprit De Corps is negatively affected because of somehow Laissez-Faire Leadership on the top. This is so because it may lead to grouping if not properly streamlined and steered in the right direction. In this regard, different practical measures could be adopted at the Organizational level that may become the source of increasing Esprit De Corps among the Employees.

### ***Limitations and Future Directions***

Each research study has to face some limitations or has some intrinsic limitations. First of all, this study is cross-sectional type as the responses were collected at a single point in time. Therefore, there are chances of increased skewness due to common method bias. In the future, research can be done on a longitudinal basis by collecting data

at different points in time using the time lag approach. Secondly, the questionnaires used here were self-reported type that were based on the self-evaluation of the researcher, thus, chances of social desirability bias cannot be ruled out. Future researchers can use a mixed design covering both self-reported and observation-based questionnaires through interviews. Such open-ended questions can provide more in-depth information about the variables being studied. Thirdly, this study covers a single mediator and moderator, so, future researchers may opt for other relevant variables like lack of motivation and lack of employee welfare mechanisms as mediators. Likewise, employee stress-countering measures can be taken as moderators in the place of GRIT in future studies. So far as the scope of the research study was concerned, it was to cover generally all the Organizations but it particularly focused on public sector Organizations. Among public sector Organizations, one of the Law Enforcement Agencies (LEAs) was selected for surveying so that the interlinked relationship between said variables could be ascertained and established properly with some concrete findings. The scope of study of the variables selected in this research study can be extended to other public sector Organizations for a better view of this phenomenon in other cases as well. Public sector organizations which usually deal with research and development and advertisement, where innovation is the buzzword, can be specially focused with regard to studying the role of leadership style i.e. Laissez-Faire Leadership which is thought to be suitable for such organizations. Therefore, the prevalence of Organizational Politics in such organizations could be studied in detail for clarity of theory and practical implications thereof. Likewise, the relationship between these variables could be studied in private sector Organizations separately as well as in comparison with the public sector. Research done in other organizations in this perspective is going to help in understanding the dynamics of Organizational Politics in those Organizations and in devising a strategy for adopting the proper way forward.

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## Corporate Debt, Accrual, and Real Earnings Management: A Non-Linear Relation Across Asian Emerging Economies (AEE)

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### Abstract

*This study provides empirical evidence on non-linear relation between Corporate Debt and Earnings Management (EM) across nine Asian Emerging Economies (AEE). Two widely used and accepted EM techniques are employed i.e. accrual-based earnings management (AEM) and real activities-based earnings management (REM). In order to investigate debt-EM nexus in AEE institutional settings, data of 6,128 non-financial listed firms with 60,880 firm-year observations are used from the period of 2000 to 2021. Our results, based on fixed-effects and system-GMM models, report that firms use REM in low-debt zones and AEM at higher levels of debt. The non-linear debt-AEM nexus has a U-shaped pattern whereas debt-REM reveals an inverted U-shaped relation. In sum, results show that managers exercise REM in low debt regimes and prefer to increase AEM activities at high debt level in order to avoid debt covenant violation. REM is although difficult to detect by market participants but it is still considered costly for high-debt firms since these firms have high interest and principal obligations that absorb free cash flows and leave nothing for managers for their substandard spending. The findings of the study have significant implications for investors, managers, policymakers and practitioners.*

**Keywords:** Corporate debt; AEM and REM; Non-linear relation.

JEL Classifications : C23; G11; G32.

### Introduction

In the recent accounting and finance literature, the phenomenon of earnings management (EM) has been widely debated among researchers and policymakers around the world. Several accounting scandals and corporate bankruptcies in the past provide evidence of the use of EM by firms (Draief & Chouaya, 2022). EM is the process of selecting such accounting policies and procedures that alter corporate revenue to show increased profit reported on company's financial statements (Darmawan et al., 2019). EM practices aid executives to meet analysis expectations (Gunny, 2010) evading losses on contractual agreements, or, in some cases, to fulfill their interests (Cheng & Warfield, 2005). Prior research Roychowdhury (2006); Zang (2012) asserts that there are two principal ways to manage earnings. Managers can exercise EM either by accruals earnings management (AEM) that is using the flexibility in accounting principles and estimating accruals (DeFond & Jiambalvo 1994; Healy; 1985) or by real earnings management (REM) that is altering the time and the structure of firms' operating activities. One of the important points of distinction between these two strategies is that AEM have no direct cash flow consequences where-as REM affect the cash flows of the firms. Moreover, subsequent researches (Cohen & Zarowin, 2010; Vakilifard & Mortazavi, 2016) has documented that the preference for one

strategy over the other differs between firms according to their goals and the relative costs of each form. The financial literature enumerates a set of motivations to push managers toward one or both EM strategies. One of the most relevant decisions that affect EM is debt policy.

This topic has become more relevant for Asian Emerging Economies (AEE) because of their economic growth, reformed markets, and immersion in the world economy (Hoskisson et al., 2000). Besides, firms operating in emerging economies are still questioned for their financial reporting quality and reliability (Li et al., 2014). It is also of great concern for regulatory bodies since it may threaten foreign investments and corporate partnerships in these markets (Chen et al., 2007).

The existing finance literature specifies debt to be one of the important determining variables of EM. Despite its abundance, the empirical evidence on the relation between debt and EM is mixed and inconclusive. The empirical literature generally reports two opposing views on the debt–EM relation (Cheng & Liu, 2008; Costa et al., 2018; Ghosh & Moon, 2010; Trung et al., 2020; Valipour & Moradbeygi, 2011). One view assumes a negative impact of debt on EM in the spirit of the debt control hypothesis by Jensen, (1986). This view argues that the use of debt reduces the level of EM in the firm (Poretti et al., 2020) because debt acts as a disciplinary mechanism at the firm level that monitors the information disclosed by firm managers. In other words, creditors enhance their monitoring activities to ensure the fulfillment of debt covenant requirements. The opposing view, however, hypothesizes a positive impact of debt on the EM activities of firms in the spirit of debt covenant hypothesis by Watts & Zimmerman (1986). When debt level exceeds a certain limit, an increase in debt triggers more EM practices in the firm due to factors like pressure from debt providers, risk of high financial distress cost, and risk of violation of debt covenant that leads managers to indulge into EM activities (Lazzem & Jilani, 2018; Thanh et al., 2020). In view of these conflicting evidences, Costa et al. (2018) note that the relation between debt and EM could possibly be non-linear.

Following these developments, a recent line of research has been conducted on the non-linear relation between debt and EM (Cheng & Liu, 2008; Ghosh & Moon, 2010; Valipour & Moradbeygi, 2011; Wang & Lin, 2013; Costa et al., 2018; Trung et al., 2020). However, all these studies use AEM as a proxy for EM. The only study that discussed the impact of financial leverage on AEM and REM is by Khanh and Thu (2019) but they considered a single Asian market to track the non-linear relation between the debt and EM. Our study extends this literature to a large sample of 9 Asian Emerging Economies (AEE) over the period 2000 to 2021. An interesting element of the trade-off between AEM and REM is also discussed in our study which was ignored by Khanh and Thu (2019). By doing this, our study contributes to the existing literature in several ways. First, although the existing literature provides evidence on the behavior of the AEM, these studies overlook the behavior of REM at different debt levels. Most of the researchers provide evidence of a non-linear relation between debt and AEM. This study hypothesizes that debt could influence both AEM and REM in a non-linear way. Second, this study simultaneously investigates AEM and REM in association with debt because firms may use AEM and REM as a substitution for each other (Zang, 2012). Third, this study is based on a large sample of 9 AEE to investigate this relation. Most of the studies on debt and EM have considered developed stock markets like the United States and Europe (Ghosh & Moon, 2010; Anagnostopoulou & Tsekrekos, 2017). To the best of our knowledge, a very limited number of studies can be found on the selected AEE. The existing studies on AEE mostly consider only one Asian emerging market and hence leave scope for a panel data investigation. It is worth mentioning that corporate debt in AEE firms has increased significantly after the global financial crisis and some Asian economies have weak investor protection as well as poor enforcement of creditors' rights (La Porta et al., 1998). Therefore, it is essential for firms operating in emerging economies to determine the debt levels to map the managers' behavior and avoid bankruptcy risk.

The remaining of our study is structured as follows. Section 2 presents a literature review and hypothesis development. Section 3 focuses on research design and methodology. Section 4 presents and discusses our main results. Finally, section 5 offers conclusions along with some important policy implications.

## Literature Review

The existing literature on the relation between debt and EM brings competing empirical outcomes on the subject. This literature can be divided into two streams based on their underlying hypotheses about the effects of debt on EM. These include the ‘debt control hypothesis’ and the ‘debt covenant hypothesis’. Here, This study briefly explain both these hypotheses and report some selected studies testing the empirical validity of both these hypotheses across different countries.

### *Debt Control Hypothesis*

According to the corporate finance and governance literature, debt is recognized as an important tool for solving agency problems. As per the agency theory perspective, debt imposes monitoring checks on managers and hence limits managerial discretion and non-optimal investment policy use. Several studies including Jensen and Meckling (1976); Jensen (1986) argue that debt behaves as a disciplinary mechanism at the firm level because it enhances the monitoring activities as well as lending restrictions of debt providers on managers, thus reducing earnings management activities in the firm. This is named ‘the debt control hypothesis’. Jelinek, (2007) empirically tests the debt control hypothesis by examining the impact of leverage on EM across five years period for the firms-level data available on Compustat. The sample consists of firms that undergo an increase in leverage and a control group of highly leveraged firms. The result suggests that increased leverage reduces the EM in the firm.

Researchers employ varying EM techniques to confirm the results with existing literature or theories. Rodríguez-Pérez and van Hemmen (2010) examine the nature of the relation between debt and AEM for non-financial listed Spanish firms. The study found that increased debt level leads to a reduction in AEM activities in the case of less diversified – more transparent firms and vice versa. The study by Alsharairi and Salama (2012) posits that creditors play an imperative monitoring role in enhancing the credibility of financial reports as well as restricting the discretions of managers before any special event like mergers and acquisitions. In support of the same argument, Anggraeni and Wardhani (2017) investigate leverage concerning REM and the moderating role of International Financial Reporting Standards (IFRS) convergence for 6 Asian countries. The study finds no relation between leverage and REM for developing countries whereas, for developed economies, leverage curtails REM under the positive influence of IFRS. Recently, Phuong et al. (2020) examine short-term as well as long-term debts in association with earnings quality. The findings confirm the debt control hypothesis, particularly for long-term obligations.

### *Debt Covenant Hypothesis*

On the other hand, debt also serves as the main reason for employing EM activities by firm’s managers. According to the debt covenant hypothesis of positive accounting theory Watts and Zimmerman (1986), debt-driven EM can be expected for two motives. First, different earnings management strategies allow for acquiring more debt and negotiating at the cost of debt. Second, when debt level exceeds certain limits, it involves debt agreements and hence EM practices help managers to avoid debt covenant violations. To test the empirical validity of this argument, Franz et al. (2013) examined the EM behavior of the US firms approaching the violation of debt agreement as well as the ones not closer to this debt agreement violation. The findings of the study report that firms nearer to violation of debt agreement are engaged in high levels of AEM, REM, and, total earnings management as compared to firms far from this violation. Lazzem and Jilani (2018) and Campa (2019) test the same relation for their selected samples of French firms. The results of both these studies confirm firms’ involvement in EM activities when the debt levels exceed certain limits. Khanh and Thu (2019) take the sample of Vietnamese firms to investigate the impact of leverage on AEM and REM. Their findings report that overall leverage increases AEM practices in the firms to avoid debt covenant violation, nevertheless, highly leveraged firms prefer REM. Pittman and Zhao (2020) describe the association between debt covenant restriction and financial misreporting under the moderating role of auditor monitoring. The results provide

evidence that debt covenant restriction increases the fudging of financial statements. Moreover, this positive association between covenant constraints and misreporting is weakened when the auditor has more experience with debt covenants, has greater bargaining power over the client, or faces greater litigation risk. Dyreng et al. (2022) examined the tradeoff between EMs (both AEM and REM) and debt covenant violation as well as its impact on future accounting and stock market performance. The findings reveal that the EM practices held for avoiding debt covenant violations are in the best interest of shareholders. Heise (2021) reports a significant positive relation between AEM and leverage for whole sample of listed German firms as well as for highly leveraged firms whereas the REM model provides mixed results.

### ***Non-linear relation between Debt and Earnings Management (EM)***

Given the dual role of debt in determining firms' EM activities, some authors argue that the nature of the debt–EM relation could be non-linear. To this end Kate Jelinek (2007) reports that leverage changes and leverage levels have different impacts on EM activities in the firm. For example, firms with low debt levels have lower EM practices due to several reasons. First, managers may have fewer incentives to manage earnings and hence they report high-quality earnings. Second, low debt in firms has low financial distress costs that leave the managers with very little or no incentive to perform EM (Thanh et al., 2020). Third, managers want to report high-quality earnings to reduce the cost of debt (Ghosh & Moon, 2010). However, when the debt level of firm exceeds a certain threshold level, managers become more inclined towards manipulating the earnings to lower the borrowing cost or to avoid the risk of debt covenant violation (Thanh et al., 2020). The empirical testing of this non-linear relation between debt and EM brings mixed outcomes. To illustrate, the studies by Cheng and Liu (2008); Costa et al. (2018); Ghosh and Moon (2010); Trung et al. (2020); Valipour and Moradbeygi (2011); Wang and Lin (2013) find a U-shaped pattern of debt–AEM relation for their sample economies. This shows that at the beginning when the debt level increases from negligible levels, AEM reduces. However, when debt levels are considerably high, managers opt for high AEM practices. Mendoza et al. (2020) provide evidence that leverage and short-term debt have a non-linear impact on EM practices for Latin American firms. To the best of our knowledge, a very limited number of studies test the impact of different debt levels on AEM and REM together. For instance, Vang and Tran (2021) analyzed both AEM and REM concerning short-term debts. The results demonstrate a U-shaped relation between debt and AEM and an inverted U-shaped relation between debt and REM, consistent with the financial distress hypothesis. It indicates managers prefer REM at low debt levels and exercise AEM at high debt levels. Based upon the above discussion of debt control and debt covenant hypotheses as well as the theoretical possibility of a non-linear relation, this study argues that the impact of debt on AEM and REM could be non-linear.

*H1a: There exists a non-linear relation between debt and AEM.*

*H1b: There exists a non-linear relation between debt and REM.*

At low debt levels, managers are less likely to involve in AEM as predicted by the 'control hypothesis' of the agency theory (Jensen, 1986). Creditors pre-commit high-quality information because of lower borrowing costs or lower financial distress costs. Thus, managers have a very limited incentive to mask the true performance of the firm through accounting discretions (Ghosh & Moon, 2010). So they prefer REM instead of AEM at low debt levels (Vang & Tran, 2021). Accordingly, when the level of debt exceeds certain limits, an increase in debt level leads to an increase in AEM in the firm (Thanh et al., 2020). In high debt zones, both increased borrowing costs and the high cost of violating debt agreements increase managers' incentives to manipulate accruals to avoid debt covenant violation (Watts and Zimmerman, 1990). Though REM is difficult to detect as compared to AEM, it is a costly activity for financially distressed firms (Zang, 2012). High obligations of interest and loan repayment absorb the free cash flows as well as lending restrictions from creditors along with restricting managers' ability to perform non-optimal investments (Jensen, 1986). Hence, it becomes difficult for firms to exercise REM for firms working at high debt levels (Angraeni & Wardhani, 2017).

Based on the above discussion, it can be deduced that at low levels of debt, managers may use less AEM and more REM. By contrast, in high debt level regimes, managers would possibly prefer AEM over REM. Therefore, it is hypothesized that

*H2a: The relations between debt and AEM reveal a U-shaped pattern for the AEE.*

*H2b: The relation between debt and REM reveal an inverted U-shaped pattern for the AEE.*

Another point of concern has been highlighted by Zang (2012) that how managers trade off these two strategies based on the fact that whether the costs that managers bear for manipulating accruals affect their decisions about REM. Based on the large sample, he found that managers' trade-off decisions are influenced by the costs and timing of earnings management activities. This study also undertakes the methodology followed by Zang (2012) concerning the analysis of tradeoffs among EM strategies for the firms belongs to AEE.

## Data and Research Methodology

For investigating the non-linear relation between debt and EM, this study has constructed unbalanced panel data set for the sample of nine AEE reported on MSCI emerging market index. The sample economies include Pakistan, China, Indonesia, India, South Korea, Malaysia, Philippines, Taiwan, and Thailand. It is worth mentioning that the empirical testing of the non-linear relation between debt structure and EM has been rarely conducted for the AEE.

Table 1: Sample economies and number of firms

Country	Number of firms
China	1660
India	832
Indonesia	466
Malaysia	591
Pakistan	325
Philippines	125
South Korea	750
Taiwan	843
Thailand	536
Total	6128

This study used secondary data. The sample includes all non-financial industry-firms available on the Thompson Reuters data stream, listed on the respective stock exchanges of the AEE during the period 2000-2021. This sample period is selected on the basis of data availability and it is also covering the current and latest scenario. Following (Berger & Ofek, 1995), financial firms, insurance firms, and utility firms are excluded from the sample as they operate under different regulatory regimes. Another reason of excluding financial firms is that these firms have greater leverage and have high sensitivity to financial risk (FAMA & FRENCH, 1992). Furthermore, all firm-year observations on any variable used in regression with missing data are removed from the sample, this actually eradicate the firm/id of that particular year from the data. The final sample consists of 6128 firms with 60880 firm-year observations.

While estimating the impact of debt on EM, an important task is to calculate the proxies of our dependent and independent variables. Concerning our dependent variable, there are multiple ways of estimating EM but this study relies upon two widely accepted methods, namely, Accrual Based Earnings Management (AEM) and Real Activity Based Earnings Management (REM). EM environment may only be fully comprehended by evaluating the use of both AEM and REM since managers aiming to manipulate earnings may use both EM techniques

concurrently (Fields et al., 2001). Prior researches provide evidences that firms substitute or complement these two EM techniques to manage earnings (Anagnostopoulou & Tsekrekos, 2017; Draief & Chouaya, 2022; Khanh & Thu, 2019; Naz & Sheikh, 2023)

### **Accrual-Based Earnings Management (AEM)**

The proxy of AEM is discretionary accruals (DACC). To estimate DACC, we use Modified Jones Model proposed by Dechow et al. (2015). The calculation of AEM using this model involves four steps. In the first step, we calculate the value of Total Accruals (TACC) using the following formula:

$$TACC_{it} = \Delta CA_{it} - \Delta CASH - \Delta CL_{it} + \Delta DCL_{it} - DEP_{it} \quad (1)$$

for  $i = 1, \dots, N$  and  $t = 1, \dots, T$ , where  $N$  and  $T$  denote the cross-sectional and time-dimension of the panel, respectively. The dependent variable,  $TACC_{it}$  represents total accruals,  $\Delta CA_{it}$  captures the change in current assets,  $\Delta CASH_{it}$  represents the change in cash and cash equivalents,  $\Delta CL_{it}$  shows the change in current liabilities,  $\Delta DCL_{it}$  is for the change in debt in current liabilities and, lastly,  $DEP_{it}$  is depreciation and amortization expenses.

The second step is to estimate the following regression equation for total accruals (TACC):

$$\frac{TACC_{it}}{A_{t-1}} = a_0 + \beta_1 \frac{1}{A_{t-1}} + \beta_2 \frac{(\Delta R_{it} - \Delta AR_{it})}{A_{t-1}} + \beta_3 \frac{PPE_{it}}{A_{t-1}} + \varepsilon_{it} \quad (2)$$

The DACC are the residuals  $\varepsilon_{it}$  of equation 2.

where  $A_{t-1}$  is lagged value of total assets,  $\Delta R_{it}$  is the change in revenue,  $\Delta AR_{it}$  is the change in accounts receivables and  $PPE_{it}$  is property, plant, and equipment.

This study has employed the absolute value of discretionary accruals AEM. Our choice of absolute value comes from the fact that the hypotheses under investigation are not intended to predict any direction of EM (Cohen et al., 2008; Cheng & Liu, 2008; Wang & Lin, 2013; Khanh & Thu, 2019; Awuye & Aubert, 2022).

### **Real Activity-Based Earnings Management (REM)**

The second method to estimate EM is real activity-based earnings management (REM). Following the literature, this study is implementing ‘The Roychowdhury Model’ for estimating REM (see Roychowdhury, 2006). Our selected model has three main components: abnormal cash flow from operations (AB\_CFO), abnormal production cost (AB\_PROD), and abnormal discretionary expenditures (AB\_DISEXP). The three components of Roychowdhury (2006) models of REM are as follow:

i. *Abnormal cash flow from operations (AB\_CFO)*

$$\frac{CFO_{it}}{A_{t-1}} = a_0 + \beta_1 \frac{1}{A_{t-1}} + \beta_2 \frac{sales_{it}}{A_{t-1}} + \beta_3 \frac{\Delta sales_{it}}{A_{t-1}} + \varepsilon_{it} \quad (3)$$

Where  $CFO_{it}$  represents cash flow from operating activities,  $A_{t-1}$  is the lagged value of the firm’s total assets,  $sales_{it}$  is the current period sales and  $\Delta sales_{it}$  is the change in the current period sales.

ii. *Abnormal production cost (AB\_PROD)*

$$\frac{Prod_{it}}{A_{t-1}} = a_0 + \beta_1 \frac{1}{A_{t-1}} + \beta_2 \frac{sales_{it}}{A_{t-1}} + \beta_3 \frac{\Delta sales_{it}}{A_{t-1}} + \beta_4 \frac{\Delta sales_{it-1}}{A_{t-1}} + \varepsilon_{it} \quad (4)$$

Where  $Prod_{it}$  shows production cost consisting of the cost of goods sold along with the change in inventory ( $CGS + \Delta INV$ ) during the period and  $\Delta sales_{it-1}$  is the change in sales during the previous period.

iii. *Abnormal discretionary expenses (SG&A and R&D): (AB\_DISEXP)*

$$\frac{discexp_{it}}{A_{t-1}} = \alpha_0 + \beta_1 \frac{1}{A_{t-1}} + \beta_2 \frac{sales_{it-1}}{A_{t-1}} + \epsilon_{it} \tag{5}$$

Here,  $discexp_{it}$  is representing Discretionary Expenses (Sum of selling, general & administration expenses (SG&A), and research and development expenses (R&D)). Following the study by (Cohen & Zarowin, 2010), AB\_CFO and AB\_DISEXP are multiplied by a negative one to ensure uniformity. Real manipulating activities are indicated by the value of these REM matrices.<sup>1</sup>

Table 2: REM MATRIX

REM1	AB_CFO(-1) + AB_DISEXP(-1)
REM2	AB_PROD + AB_DISEXP(-1)
REM3	AB_CFO(-1) + AB_PROD + AB_EXP(-1)

Our main variable of interest, debt, is measured using two indicators; total financial debts and total liabilities. Total financial debts include all the interest bearing loans whereas total liabilities include all the financial obligations of the company that involve interest bearing as well as non-interest bearing payables. The control variables of this study include firm size, cost of debt, volatility of cash flows, volatility of sales, operating cycle, and revenue growth (Costa et al., 2018; Dechow & Dichev, 2002; Ghosh & Moon, 2010; Thanh et al., 2020). Regarding the trade-off between AEM and REM, we follow Zang (2012) and add the unexpected real earnings management (UNREM) when discretionary accruals are the dependent variable in equation 8 mentioned in section 3.3. so the new econometric model to test the trade-between AEM and REM is represented through equation 10 (section 3.3). The UNREM is calculated as the estimated residuals from equation 9 (given in the section 3.3) when the comprehensive measure of REM3 is the dependent variable.

Table 3: Data and Measurement:

Variables	Symbol	Measurement
Total financial debt	TFD	Ratio of total financial debts to total assets
Total liabilities	TLD	Ratio of total liabilities to total assets
Firm size	SIZE	Logarithm of total assets
Cost of Debt	COST	Interest expense to total financial debt
Volatility of Cash Flows	SD_CFO	Standard Deviation of operating cashflows / Average Total assets
Volatility of Sales	SD_SALES	Standard Deviation of Sales / Average Total assets
Operating Cycle	OC	Logarithm (Accounts receivable outstanding + Inventory Outstanding) where <i>Accounts receivable outstanding</i> = 360 / (sales/accounts receivable) <i>Inventory outstanding</i> = 360 / (Cost of goods sold / inventory)
Revenue Growth	RG	Logarithm of Firm revenue or sales
Unexpected REM	UNREM	Estimated residuals of equation 10 (see section 3.3 Econometric models) where REM3 is the dependent variable

<sup>1</sup> For more details regarding the calculation of these variables, see (Cohen et al, 2008); (Zang, 2012); (Alhadab & Nguyen, 2018); (Jiang et al., 2018) (Khanh & Thu, 2019).



**Econometric Models**

Using all these variables, our econometric models take the following form:

$$DACC_{it} = \beta_0 + \beta_1 Debt_{it} + \beta_2 Debt^2_{it} + \beta_3 SIZE_{it} + \beta_4 COST_{it} + \beta_5 SdCFO_{it} + \beta_6 SdSALES_{it} + \beta_7 OC_{it} + \beta_8 RG_{it} + f_i + y_t + \varepsilon_{it} \tag{8}$$

$$REM_{it} = \beta_0 + \beta_1 Debt_{it} + \beta_2 Debt^2_{it} + \beta_3 SIZE_{it} + \beta_4 COST_{it} + \beta_5 SdCFO_{it} + \beta_6 SdSALES_{it} + \beta_7 OC_{it} + \beta_8 RG_{it} + f_i + y_t + \varepsilon_{it} \tag{9}$$

$$DACC_{it} = \beta_0 + \beta_1 Debt_{it} + \beta_2 Debt^2_{it} + \beta_3 UNREM_{it} + \beta_4 SIZE_{it} + \beta_5 COST_{it} + \beta_6 SdCFO_{it} + \beta_7 SdSALES_{it} + \beta_8 OC_{it} + \beta_9 RG_{it} + f_i + y_t + \varepsilon_{it} \tag{10}$$

**Research Method**

To analyze the impact of corporate debt on EM for the firms listed on stock markets of AEE, descriptive statistics, correlation and regression analysis are conducted. At first, the study employs few diagnostic tests like multicollinearity, Heteroskedasticity, autocorrelation, and endogeneity. Fixed effect model is used to generate the regression estimates. This study also employs a two-step-system GMM approach to address the possible endogeneity caused by the omission of important variables or the two-way relation between the dependent and independent variables (Roodman, 2009; Santana et al., 2019). System GMM is used for the estimation of dynamic models, with p values of autocorrelation tests and Hansen test provided to make sure that the results are valid for statistical interpretation.

**Results and Discussion**

Table 4 reports the summary statistics of earnings management variables, debt ratio, and other control variables. The mean values of both AEM and REM are close to zero which indicates the correct model estimations. Consistent with several studies, our paper incorporates the absolute value of discretionary accruals (AEM residuals) to predict the magnitude of EM (Awuye & Aubert, 2022; Cohen et al., 2008; Lemma et al., 2012; Lazzem & Jilani, 2018; Li, 2019; Maurice et al., 2020; Mendoza et al., 2020; Saenz Gonzalez & Garcia-Meca, 2014). Hence our hypothesis doesn't require the prediction of EM direction. The mean value of AEM is 9.3% of total assets with a standard deviation of 0.11, illustrating that on average firms deviate around 9.3% from their optimal accrual level.

Table 4: Descriptive Statistics for the sample over the period of 2000 to 2021

Variable	Obs	Mean	Std. Dev.	Min	Max
AEM	54750	0.093	0.109	0.000	4.242
AB_CFO	54750	-0.001	0.084	-0.164	0.165
AB_PROD	48801	0.003	0.126	-0.285	0.221
AB_DISEXP	48801	0.005	0.099	-0.259	0.112
REM1	48801	0.005	0.132	-0.423	0.276
REM2	48801	0.007	0.198	-0.544	0.333
REM3	48801	0.007	0.239	-0.709	0.497
TFD	60879	0.249	0.203	0.000	1.735
TLD	60879	0.473	0.250	0.023	2.753
SIZE	60879	16.43	3.000	10.34	25.25
COST	56368	0.066	0.102	0.000	1.870
SD_CFO	53923	0.054	0.050	0.001	0.545
SD_SALES	53923	0.122	0.140	0.001	1.481
OC	60857	5.078	0.719	2.944	9.112
RG	60870	0.263	2.221	-0.994	73.10

Note: Zang (2012) has confirmed that the measures of earnings management can have different number of observations.

The average value of sales manipulation (AB\_CFO) is -0.1% of total assets whereas the values for production cost (AB\_PROD) and discretionary expenses (AB\_DISEXP) variables are 0.3% and 0.5% of total assets,

respectively. Likewise, REM1 lies between -0.42 to 0.27 with a mean value of 0.005, whereas REM2 ranges from 0.54 to 0.33 and, REM3 ranges from -0.71 to 0.49 with a similar mean value of 0.7%. The average values of AEM and REM indicate more use of accrual-based earnings management than real earnings management for our sample economies. The total financial debt ratio (TFD) of firms has a mean value of around 25% of total assets whereas the value of total liabilities (TLD) is approximately 47%. These average values are similar to that of (Thanh et al., 2020) and (Maurice et al., 2020) for their respective sample economies. The variations between the values of debt indicate high use of financial debt and liabilities. The interest expense as a percentage of financial debt (COST) has an average value of 6.6%. The value of SIZE is 16.4, which is relatively high but with low variation, as shown by its standard deviation. Concerning the other control variables, the average value of sales volatility is 12.2% whereas cash flow volatility has a mean value of 5.4%. Lastly, the mean of the transformed logarithmic value of the operating cycle is 5.08 with a standard deviation of 0.72.

Table 5: Correlations matrix

Variable	AEM	REM1	REM2	REM3	TFD	TLD	SIZE	COST	SD_CFO	SD_SALES	OC	RG
AEM	1.000											
REM1	-0.034	1.000										
REM2	-0.033	0.844	1.000									
REM3	-0.014	0.929	0.944	1.000								
TFD	0.007	0.268	0.196	0.237	1.000							
TLD	0.067	0.172	0.131	0.190	0.780	1.000						
SIZE	-0.112	-0.054	-0.009	-0.016	0.136	0.159	1.000					
COST	0.063	-0.034	-0.057	-0.057	-0.154	-0.056	-0.030	1.000				
SD_CFO	0.242	0.027	0.028	0.055	0.025	0.093	-0.126	0.096	1.000			
SD_SALES	0.211	0.047	0.062	0.115	0.039	0.145	-0.073	0.088	0.367	1.000		
OC	0.074	0.121	0.001	0.039	0.013	-0.023	-0.225	-0.003	0.042	-0.191	1.000	
RG	0.094	-0.027	-0.006	-0.005	0.001	0.024	0.011	0.015	0.061	0.083	-0.079	1.000

Table 5 reports the correlation matrix of our selected variables. A negative correlation is found between AEM and all three proxies of REM, indicating the use of AEM or REM as a substitute in the firms. It is worth mentioning that both techniques are not employed simultaneously by the firms. Next, all three proxies of REM are positively correlated with each other (Quang V & Van, 2021). This implies that firms use these REM measures altogether in a very flexible way. A high correlation value between the measures of REM is mechanical and is due to the use of all REM components in constructing REM proxies. AEM and REM are positively correlated with both proxies of debt (TFD and TLD), indicating a high association of these variables with debt. A high correlation between TFD and TLD is obvious because the former is derived from the latter. Finally, size is negatively correlated with all the EM measures.

Table 6: Non-linear relation between Debt and Accrual Based Earnings Management AEM

Dependent Variable: AEM	TFD		TLD		TFD		TLD	
	(1) FE	(2) SYS GMM	(3) FE	(4) SYS GMM	(5) FE	(6) SYS GMM	(7) FE	(8) SYS GMM
AEM <sub>(t-1)</sub>	N/A	0.359*** (0.079)	N/A	0.720** (0.041)	N/A	0.164*** (0.038)	N/A	0.759*** (0.118)
DEBT	-0.036*** (0.010)	-0.283** (0.139)	-0.016* (0.009)	-0.057* (0.032)	-0.020*** (0.006)	-0.164** (0.079)	0.002 (0.666)	-0.065* (0.036)
DEBT <sup>2</sup>	0.049*** (0.011)	0.300** (0.151)	0.026*** (0.006)	0.031* (0.018)	0.038*** (0.000)	-0.125** (0.054)	0.018*** (0.000)	0.038* (0.023)
SIZE	0.003** (0.001)	-0.009 (0.065)	0.003** (0.001)	-0.006 (0.008)	0.002 (0.126)	-0.060** (0.028)	0.001 (0.216)	0.004 (0.008)
COST	0.009 (0.007)	0.054 (0.106)	0.013** (0.007)	0.090 (0.074)	0.013*** (0.008)	-0.061 (0.077)	0.016** (0.001)	-0.006 (0.008)
SD_CFO	0.302*** (0.015)	0.717*** (0.249)	0.302*** (0.015)	0.095*** (0.083)	0.310*** (0.000)	0.807*** (0.218)	0.310*** (0.000)	0.042 (0.094)
SD_SALES	0.110*** (0.007)	0.048 (0.093)	0.109*** (0.007)	0.101*** (0.022)	0.097*** (0.000)	0.026 (0.127)	0.096*** (0.000)	0.102*** (0.026)
OC	0.005** (0.002)	0.011 (0.033)	0.004** (0.002)	0.005** (0.011)	0.005** (0.002)	0.072* (0.038)	0.006** (0.002)	0.010 (0.009)
RG	0.011*** (0.002)	0.008 (0.030)	0.011*** (0.002)	0.020*** (0.004)	0.013*** (0.002)	0.050** (0.023)	0.013*** (0.002)	0.008 (0.019)
UNREM3	N/A	N/A	N/A	N/A	-0.020*** (0.000)	0.100 (0.063)	-0.021*** (0.000)	-0.003 (0.007)
Constant	0.004 (0.025)	2.229 (7.131)	0.004 (0.024)	0.038 (0.174)	-0.002 (0.94)	-0.851 (4.511)	-0.003 (0.86)	-0.113 (0.177)
AR1	N/A	0.073	N/A	0.046	N/A	0.000	N/A	0.035
AR2	N/A	0.180	N/A	0.162	N/A	0.289	N/A	0.162
Hansen (p value)	N/A	0.705	N/A	0.316	N/A	0.431	N/A	0.168
Observations	50,036	36,738	50,036	36,738	44,781	36,738	44,781	36,738
No of firms	5,757	4612	5,757	4612	5405	4,828	5405	4,828

Table 7: Non-linear relation between Debt and Real Earnings Management REM.

Dependent Variable: REM	REM1		REM2		REM2		REM3		REM3			
	(1) TFD	(2) TLD	(3) TFD	(4) TLD	(5) TFD	(6) TLD	(7) TFD	(8) TLD	(9) TFD	(10) TLD	(11) TFD	(12) TLD
REM <sub>(t-1)</sub>	N/A	0.102* (0.151)	N/A	0.306*** (0.116)	N/A	0.162 (0.112)	N/A	0.478* (0.284)	N/A	0.240* (0.127)	N/A	0.361** (0.150)

DEBT	0.185*** (0.012)	0.739** (0.334)	0.071*** (0.009)	0.405** (0.159)	0.121*** (0.017)	1.168*** (0.332)	0.068*** (0.013)	1.243* (0.688)	0.296*** (0.022)	1.893*** (0.580)	0.178*** (0.017)	1.210*** (0.549)
DEBT <sup>2</sup>	-0.087*** (0.013)	-0.549*** (0.341)	-0.025*** (0.005)	-0.199* (0.115)	-0.054** (0.022)	-0.609* (0.362)	-0.017** (0.007)	-0.533* (0.155)	-0.140*** (0.026)	-1.422** (0.697)	-0.054*** (0.009)	-0.641** (0.265)
SIZE	0.003* (0.002)	0.256*** (0.056)	0.007*** (0.002)	0.061* (0.035)	0.015*** (0.003)	0.163*** (0.055)	0.017*** (0.003)	0.130 (0.241)	0.010*** (0.003)	0.245** (0.090)	0.013*** (0.003)	0.083 (0.106)
COST	-0.017*** (0.006)	-0.045* (0.124)	-0.043*** (0.006)	-0.224* (0.163)	-0.017** (0.007)	0.058* (0.142)	-0.032*** (0.007)	-0.146* (0.203)	-0.039*** (0.010)	0.200** (0.191)	-0.073*** (0.010)	0.076 (0.190)
SD_CFO	-0.106*** (0.016)	-0.165 (0.637)	-0.112*** (0.016)	-0.623 (0.391)	-0.068*** (0.019)	-0.108 (0.144)	-0.072*** (0.020)	-2.809** (1.368)	-0.136*** (0.027)	-0.161 (0.145)	-0.147*** (0.027)	-0.220 (0.220)
SD_SALES	-0.003* (0.006)	0.469** (0.210)	-0.003* (0.006)	0.313* (0.162)	0.002* (0.007)	0.114*** (0.037)	0.002 (0.007)	0.407 (0.363)	0.024** (0.010)	0.194*** (0.048)	0.023** (0.010)	0.069** (0.341)
OC	0.022*** (0.002)	-0.118 (0.089)	0.026*** (0.002)	-0.088* (0.046)	0.016*** (0.003)	-0.239*** (0.067)	0.018*** (0.003)	-0.273 (0.169)	0.025*** (0.004)	-0.142 (0.087)	0.030*** (0.004)	-0.172 (0.108)
RG	-0.010*** (0.003)	-0.076 (0.054)	-0.010*** (0.003)	-0.039 (0.025)	-0.009*** (0.002)	-0.080** (0.033)	-0.009*** (0.002)	-0.093 (0.065)	-0.010*** (0.003)	-0.073 (0.049)	-0.011*** (0.003)	0.029 (0.063)
Constant	-0.193*** (0.030)	-4.958 (7.630)	-0.250*** (0.029)	-1.425 (1.644)	-0.341*** (0.044)	3.856 (13.156)	-0.378*** (0.044)	-9.070 (4.465)	-0.350*** (0.054)	-1.591 (14.165)	-0.435*** (0.054)	-1.041 (3.000)
AR1	N/A	0.006	N/A	0.000	N/A	0.000	N/A	0.004	N/A	0.000	N/A	0.000
AR2	N/A	0.107	N/A	0.215	N/A	0.413	N/A	0.435	N/A	0.107	N/A	0.162
Hansen (p value)	N/A	0.368	N/A	0.108	N/A	0.151	N/A	0.132	N/A	0.192	N/A	0.192
Observations	44,781	39,220	44,781	39,178	44,781	35,803	44,781	35,699	44,781	35,685	44,781	35,803
No of Firms	5,405	4,971	5,405	4,968	5,405	4,781	5,405	4,782	5,405	4,781	5,405	4,781

Note: Standard errors in parentheses\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 8: Non-linear relation between Debt and three components of Real Earnings Management (REM)

Dependent Variable: REM	AB_CFO TFD		AB_CFO TLD		AB_PROD TFD		AB_PROD TLD		AB_DISEXP TFD		AB_DISEXP TLD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	FE	SYS GMM	FE	SYS GMM	FE	SYS GMM	FE	SYS GMM	FE	SYS GMM	FE	SYS GMM
REM <sub>(t-1)</sub>	N/A	0.202** (0.096)	N/A	0.240* (0.137)	N/A	0.360** (0.155)	N/A	0.280** (0.135)	N/A	0.790*** (0.102)	N/A	0.493*** (0.105)
DEBT	0.168*** (0.007)	1.290*** (0.256)	0.097*** (0.006)	1.026*** (0.223)	0.111*** (0.012)	0.726** (0.354)	0.106*** (0.009)	0.834** (0.343)	0.010*** (0.003)	0.319* (0.166)	-0.039*** (0.006)	0.600** (0.264)
DEBT <sup>2</sup>	-0.083*** (0.007)	-1.079*** (0.296)	-0.032*** (0.003)	-0.216** (0.107)	-0.053*** (0.015)	-0.744* (0.449)	-0.029*** (0.005)	-0.259* (0.156)	-0.001 (0.003)	-0.416* (0.215)	0.012*** (0.004)	-0.247** (0.109)
SIZE	-0.005*** (0.001)	-0.135*** (0.035)	-0.002** (0.001)	-0.016 (0.039)	0.006*** (0.002)	0.146** (0.061)	0.007*** (0.002)	0.047 (0.067)	0.009*** (0.001)	0.043* (0.022)	0.010*** (0.001)	0.039 (0.039)
COST	-0.025*** (0.005)	0.189** (0.089)	-0.045*** (0.005)	0.209* (0.114)	-0.022*** (0.006)	-0.399** (0.196)	-0.030*** (0.006)	0.030 (0.104)	0.005** (0.002)	0.021 (0.082)	-0.002 (0.003)	0.058 (0.064)
SD_CFO	-0.069*** (0.012)	-0.139* (0.083)	-0.075*** (0.013)	-0.175 (0.350)	-0.031** (0.015)	0.127 (0.248)	-0.036** (0.015)	-0.196 (0.349)	-0.037*** (0.005)	-0.188 (0.288)	-0.037*** (0.009)	-0.616** (0.262)
SD_SALES	0.024*** (0.004)	0.074* (0.030)	0.023*** (0.004)	0.063 (0.131)	0.027*** (0.006)	0.197 (0.137)	0.026*** (0.006)	0.277** (0.131)	-0.025*** (0.002)	0.178 (0.141)	-0.024*** (0.004)	0.037 (0.030)
OC	0.010*** (0.001)	0.087** (0.038)	0.012*** (0.001)	0.048 (0.050)	0.003* (0.002)	-0.138** (0.058)	0.005** (0.002)	0.040 (0.027)	0.013*** (0.001)	-0.015 (0.019)	0.014*** (0.002)	-0.086** (0.039)
RG	-0.001 (0.001)	0.020 (0.024)	-0.002 (0.001)	0.003 (0.030)	-0.000 (0.001)	-0.049 (0.034)	-0.001 (0.001)	0.020 (0.020)	-0.009*** (0.000)	-0.008 (0.015)	-0.009*** (0.002)	0.024 (0.023)
Constant	-0.027 (0.018)	7.023 (5.147)	-0.074*** (0.018)	-2.438 (2.295)	-0.157*** (0.030)	0.822 (6.619)	-0.184*** (0.030)	-0.988 (2.807)	-0.184*** (0.009)	0.164 (2.179)	-0.194*** (0.022)	-1.302 (4.401)
AR1	N/A	0.000	N/A	0.092	N/A	0.000	N/A	0.000	N/A	0.008	N/A	0.000
AR2	N/A	0.398	N/A	0.607	N/A	0.125	N/A	0.280	N/A	0.219	N/A	0.225
Hansen (pvalue)	N/A	0.439	N/A	0.544	N/A	0.303	N/A	0.111	N/A	0.195	N/A	0.546
Observations	50,036	39,220	50,036	39,178	44,781	35,803	44,781	35,685	44,781	39,178	44,781	43,945
No of Firms	5,757	4,971	5,757	4,968	5,405	4,781	5,405	4,781	5,405	4,968	5,405	5,391

Note: Standard errors in parentheses\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 6 reports the results of panel fixed effect (FE) and two-step system-GMM models for the selected economies. The Hausman specification test statistic is statistically significant at the level of 0.01 (Hausman Prob>chi2 = 0.0000). Hence, the model is estimated using the fixed-effect hypothesis. The relation between debt and AEM is analyzed using two proxies of the debt variable. Specifications 1 and 2 present the impact of

total financial debt (TFD) on AEM whereas the next two specifications (3 and 4) present the impact of total liabilities (TLD) on AEM. As our hypothesized relation between debt and EM is nonlinear, we also include square terms of the debt variables in all the models. Model 1 and 3 report the results of the FE model using TFD and TLD as debt proxies, respectively. These results provide evidence of a nonlinear relation between debt and AEM. More specifically, the findings report a negative and statistically significant coefficient of debt, indicating that debt reduces the AEM in its low regimes. Here debt acts as a control mechanism that involves external monitoring by the creditors (VAKILIFARD & MORTAZAVI, 2016). However, the square term of the debt variable has a positive and statistically significant coefficient in both models, confirming the fact that a higher level of debt increases AEM. All the control variables have a significant and positive impact on EM for both TFD and TLD. Briefly, this suggests that big firms with increased sales volatility, CFO volatility, and cost of debt have stronger EM for both debt measures. Likewise, the significant and positive coefficients of OC and RG variables show that the firm may attain growth in revenue by exercising more EM practices. These results are consistent with previous empirical work including Ghosh and Moon (2010); Mendoza et al. (2020) and Thanh et al. (2020).

To account for the endogeneity problem between debt and earning management, the study tests the same relation using system-GMM models. To this end, specifications 2 and 4 of Table 6 report the results using both the measures of debt. Both of these models include the lagged value of EM ( $AEM_{(t-1)}$ ) as a control variable to represent the dynamic behavior of EM. A positive and significant value of lagged dependent variable specifies the impact on past EM over current EM practices. Consistent with our results of the FE models, the findings provide evidence of the existence of a non-linear U-shaped relation between debt and EM. To illustrate, the negative and significant coefficient of the TFD variable in specification 3 shows that an increase in TFD by 1% leads to a decrease in EM practices by 0.283% whereas under a high debt regime (squared term) EM practices increase by 0.3%. Indeed, at low debt levels, the cost of borrowing and the probability of debt covenant violation are considerably low, therefore, managers have very little or no incentive to manipulate earnings. However, when the debt level exceeds certain limits, the risk and cost of debt covenant violation become high. To avoid debt covenant violation, managers prefer to manipulate earnings rather than presenting the true economic performance of the company (Watts & Zimmerman, 1986). For TFD, only CFO volatility is showing a significant positive estimate indicating that firms with high CFO volatility engage in high EM practices. However, when TLD serves our dependent variable, all the control variables including CFO volatility, sales volatility, OC, and RG have a significant positive impact on EM.

Another important finding of Table 6 is the presence of a tradeoff between AEM and REM that has been established by the inclusion of the UNREM3 variable (specifications 5–8). To analyze this trade-off between these techniques, we rely upon the estimation methodology of (Zang, 2012). The results of the FE model support the presence of managers' trade-offs between AEM and REM for the sample economies. Consistent with the findings by Zang (2012), the coefficient estimate on UNREM3 is negative and significant, indicating that managers of highly levered firms rely more on the use of AEM whereas REM turns out to be unexpectedly low during the year and vice versa. For instance, managers use more AEM as compared to REM for highly indebted firms primarily because of the cost and benefits associated with particular EM techniques under such circumstances. Effectively, REM is very costly for firms with higher debt levels as the respective firms are already under the pressure due to high interest and principal payments. Hence AEM becomes a preferred choice by the managers for reporting the desired results.

Table 7 reports FE and system-GMM results using REM as our variable of interest. As mentioned earlier, REM1 is the sum of abnormal cash flows from operating activities and abnormal discretionary expenses, REM2 is the sum of abnormal production cost and abnormal discretionary expenses and REM3 is the sum of all the three components of REM, following Roychowdhury (2006) model. One major difference from the AEM model results is that in both FE and system-GMM models, the outcomes reveal an inverted U-shaped relation between

debt and REM. The positive coefficients of the debt variable indicate that more debt will lead to high use of REM in the low debt zone. However, beyond a certain limit, more debt will lead to poor REM, as shown by the negative sign of  $DEBT^2$  coefficients. This is because higher obligations are generated due to higher leverage for making the payment of interest and principal amounts to the creditor. Thus, managers are left with a very limited cash flow for non-optimal spending. Hence fewer cash flows are available to the firm for non-optimal spending which further limits the ability of the manager to practice REM (Zang, 2012).

Concerning the control variables under FE and system-GMM models, a significant positive value of the size variable indicates that big-size firms have stronger EM. The coefficient estimates of the cost variable are negative and significant suggesting that an increase in the cost of debt reduces the REM activities by the firms. This is because of the unavailability of free cash flow for non-optimal spending. High leverage in the firm increases the interest payment or cost of debt. These results show the effects of debt on overall REM, however, in our robustness analysis, we also report the individual components of REM. This has been done to compare our results with the previous studies including Anagnostopoulou & Tsekrekos (2017); Tulcanaza-Prieto et al. (2020); Zamri et al. (2013) who rely upon individual REM measures. The results of our REM components are reported in Table 8. The overall results support our main findings of a nonlinear inverted U-shaped relation between debt and all the individual components of REM.

## Conclusions

The results of this study conclude the existence of a U-shaped relation between debt and AEM Cheng and Liu (2008); Costa et al. (2018); Ghosh and Moon (2010); Thanh et al. (2020); Trung et al. (2020); Valipour & Moradbeygi (2011); Wang & Lin (2013) supporting debt control hypothesis at low debt regime and debt covenant hypothesis at high debt regime. On the other side, an inverted U-shaped relation is found between debt and REM, similar to the findings of (Vang & Tran, 2021). Managers exercise REM in low to medium-debt regimes, but when the debt levels become considerably high, managers prefer to increase AEM activities to avoid debt covenant violation and, to meet the earnings targets. REM is although difficult to detect by market participants still considered costly for high-debt firms since these firms—have high interest and principal obligations that absorb free cash flows and leave nothing for managers for their non-optimal spending. To further confirm these outcomes, we also estimate a tradeoff and its results also support the argument that at a high debt level, managers exercise more AEM activities than REM.

These results have some important implications for policymakers and practitioners of the sample economies. For instance, these results can help creditors or financial agents while designing such debt covenant to protect their investments. Our findings on regime dependency between debt and EM provide direction to the creditors to include the compensation or premium for the risk related to EM. Our results can also support the investors to assess the EM behavior of firms in the AEE region in making better investment decisions by differentiating companies based on their capital structure. Policy-makers can also get insights from this research concerning the flow of information, credit policy, and disclosure of financial information to control the EM by firms. Researchers who are interested in cross-country analysis can use the same sample of AEE to study EM practices in association with many firm-specific/country-specific factors like asset pricing, mergers, acquisitions, etc. For regulators, these results are important for designing policies aimed at strengthening institutional and financial development.

Our study relies upon the utilization of the debt square term to capture the non-linear relation between debt and EM. The study can be extended while considering some more sophisticated panel threshold models such as the dynamic threshold model by Kremer et al. (2013) which gives endogenously determined threshold levels of debt and separately calculates the coefficients of low and high debt regimes. Several other proxies of AEM have also been used by the recent line of research. It may be worthwhile to compare the relation between different proxies of AEM and debt. Lastly, the selected AEE also has institutional diversity in terms of legal origin, laws

of investor protection, and degree of legal enforcement (La Porta et al., 1998). This relation is also influenced by these country-level institutional features (An et al., 2016). Studying this non-linear relation between debt and EM under different institutional regimes of AEE also presents a promising avenue for future research.

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## Application of Mincerian Equation to the Higher Secondary Schools Teachers in District Abbottabad, KP, Pakistan

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### Abstract

*This study is some sort first in the area investigates the statistical and Econometric relationship of academic years, experience and income. The schooling is a very significant determinant of personal income based on experimental and academic studies. Study tests the application of Mincerian equation to the higher secondary school teachers of district Abbottabad, KP Pakistan. The study is based on cross-sectional data of the year 2022. Data collected from the (Education Directorate Office Abbottabad. This study used a sample of 250 teachers. Log-linear model used for the estimation of parameters. and to concludes the results of regression. Results reveal the positive association of income with education and job market experience. Higher education has the greater contribution in income comparatively experience and academic years. One-year increase in higher education results 7 % increase in income level. The higher education returns for male teachers is 6% while for female 10%. The policy recommendation is to improve and invest in higher education.*

**Keywords:** Mincerian Equation, Income, Higher Education, Experience, Log-Linear Model

### Introduction

The positive association between academic years and labor market earnings is well established relationship in labor economics. This argument of building human capital by schooling and training is more used for poverty reduction policy makers in developing world (Solangi et al., 2015). More than the last half century labor economics has undergone a principal change. Labor economists presented that labor is a collection of diverse human beings having different skills and job efficiencies. These days labor economists stress on how economies improve worker efficiency employee-by-employee in the course of inspiring workers to attempt and to invest in human capital (Mohsin et al., 2004). Issues that manipulate a person's income have a long tradition. Most writers have accomplished that education is an extremely important determinant of labor remuneration, based both on experimental and academic studies. In the similar way, the majority of econometric studies on this topic are based on human capital theory, dignified by (Becker, 1962) due to its advantages in clarification and experimental verifications. Because of these reasons, considering in mind education as the main determinant of individual income has extensive academic support.

Human capital approach suggests that workers have higher income who has visited schools and other forms of educational institutes than those workers who do not invest in their education (Romer, 1989). An influential work done by Jacob Mincer in 1974 has made a great contribution in evaluation of a wage equation where the log-log model represents hourly wage is function of education years, experience, and squared of experience. In this

context, the coefficient of academic years is interpreted as the expected gains from one more academic year in terms of increased wages. The basic model explains the theory of human capital (Mincer, 1974).

The earning potential of a person comes from the knowledge gained in each year of schooling and experience. The marginal return from education gives the percentage growth in income as per dollar investment in educational years. The slope of the wage ( $\Delta w/\Delta s$ ) determines by how much earnings increase if the person stays in school one more year (Borjas, 2005). Human capital is based on two ways: one is education and second one is learning by doing or job experience. It is difficult to quantify human capital: similarly, a person's working potential is also hard to measure. But the level of education is generally perceived as an important indicator and good alternate variable (Shuaibu, 2016).

Education is a valuable investment in human capital because it puts together human potential, which is a very fundamental component in building nations. Without gaining a convinced level of literacy, one cannot think of satisfying the vision of socio-economic expansion of the country. Education plays a very important function in the formation of human capital as human capital theory suggests an educated person possesses high efficiency and high level of ability competence as contrast to an uneducated person. Economic growth is not achievable without education as it is a significant feature in the progress of a nation (Mohsin et al., 2004).

Investments in education are estimated by rate of returns to educational investments. This helps to boost labor market earnings that are associated with marginal return to education yearly. The individuals acquire benefits from higher level of education in term of higher earnings. These externality benefits include higher growth rates, improved living standard and great civic, social and political participation (Tansel, 2017). Earnings boost with each extra year of schooling, it offers more skills and technical abilities that show the way to increase the earnings level. There are some other factors that might be associated with education and earnings, e.g. inherited abilities. Wage distinction among the more and less educated are merely the compulsory reimbursement to adjust for the additional costs gained in receiving more human capital (Krueger & Lindahl, 2001).

Teachers constantly help to change society via improving the standard of living of persons in the perspective of a quickly altering prospective and rising uncertainties. The request made to upgrade and improve their knowledge and experience (Araujo et al., 2016). Teachers can help to motivate people and society to provide those capabilities, inspiration, and tools mandatory for long-lasting learning. They are requested to realize and made better educational reforms systems (Chetty et al., 2014).

Experience endorses efficiency level, and it is attained over time which enhances the skills, knowledge and productivity level of teachers. Teachers are untired and unselfish driving force of transformation and improvement as well as custodian of tradition. Professional obligation, care and love for students are some qualities which are associated with teachers (Rice, 2013).

Education is an investment like financial investments and people make investment in education where it is based on cost and expected profits in term of earnings. Education is not effortlessly accessible and as a result there is a need to allocate educational resources. Education relay upon human resources, which is essential for economic and social changes (Burnell, 2017). It is generally established that education generates better citizens and helps to increase societies living standard. Consequently, constructive social revolution is related to the qualitative community (Olaniyan & Okemakinde, 2008).

Education is consumer good, and everyone has basic right to attain education. It is well identified that earning is a multifaceted procedure in which numerous factors get involved. Usually, the factors are clustered on two bases: job characteristics and worker characteristics. Practically, it seems that wage determination depends more on employee characteristics than on job characteristics. The former is very subjective, while the latter are comparatively easier to describe and to compute. Education has a key role in an individual's life and prosperity of societies. It is a primary factor of employment and economic progress of advanced economies. Ignoring the new economic dimension of educational systems would lead to compromise the prosperity of future generations by consequences of future poverty and deprived social security systems. There is essential need to focus on reforms in educational systems and outcomes, rather than realization (Woessmann, 2016).

From the point of view of the human capital theory, education is a necessary part in investment of human capital and building unit also, that will support the equivalent allocation of income (Schultz, 1960) and (Becker, 1962) Based on educational strength and development, it was realized that the growth in education help to reduce the income inequality gap however, it is calculated by the adjustment of labor demand curve with the development (Ahluwalia, 1976) and (Knight & Sabot, 1987). Yet, income differs within built factors even if extrinsic circumstances (such as education, business, and line of work, service and region) are like.

### ***Objectives of the Study***

This study explores the relationship among education, experience, and earnings. For this very purpose we have selected teachers at higher secondary schools in the district Abbottabad as the target segment. This study analyzes whether the schoolteachers are being compensated with increased qualifications.

1. To estimate the impact of academic years on income of the higher secondary schools' teachers.
2. To estimate the impact of higher education on the income of the higher secondary schools' teachers.
3. To estimate the impact of experience on the income of the higher secondary schools' teachers.

### ***Significance of the study***

This study explores the statistical relationship between academic years, experience, and income among higher secondary school teachers in Abbottabad District, KP Pakistan, using the Mincerian equation. Utilizing cross-sectional data from 2022 and a sample of 250 teachers, the research reveals a positive association between income, education, and job market experience, with higher education contributing more significantly to income levels than experience. Notably, each additional year of higher education results in a 7% increase in income, with male teachers experiencing a 6% increase and female teachers a 10% increase. These findings, being the first of their kind in this region, have important policy implications, highlighting the need for greater investment in higher education to boost economic benefits and reduce gender income disparities. The study provides a data-driven basis for educational policy improvements and serves as a benchmark for future research in educational economics in Abbottabad District.

### ***Literature Review***

In the past a range of research writers carried out their research on the relation of schooling, and experience as the problem under their consideration. Ramessur and Jugessur (2024) assesses the relevance of the Mincerian Equation in Mauritius. Using CMPHS data, the basic equation is augmented to cater for wage responsiveness to changes across different schooling levels. However, the use of the standard linear regression method does not take into consideration the endogeneity of the variable years of schooling and sample selection bias (Cappelli, Ridolfi, & Vasta, 2023). In the context of education and human capital theory, skills, broadly speaking, refer to the knowledge and capabilities students acquire that prepare them for future learning and successful performance in the workplace. Quispe-Mamani, Hanco-Gomez, Carpio-Maraza, Aguilar-Pinto, Mamani-Flores, Flores-Turpo, and Alegre-Larico, (2022) applied the Mincer equation for the impact of education on the household's income in Peru

Becker (1962) proposed that schooling or training move up the efficiency of personnel by attaining valuable information and abilities i.e. education is associated to worker's efficiency. Human capital theory proposes that education or training uplifting workers' future living standard by raising their lifetime income. The results draw a vital difference between all-purpose education and firm-specific training.

Mincer (1974) made analysis on the relationship of additional year of schooling and log of personnel earnings. This study found that the time spent in school is the most attributing determinant of earnings. This study empirically proves that education has more explanatory power along with years of experience for same clusters. The years of experience without considering the age interpreting the variation level in earnings. Card, (1999) argues that schooling perform a vital role in current markets. A lot of research done in different time and countries established that well-educated person be paid privileged earnings, subject to less joblessness, and work in more high-status professions than their less-educated equivalents.

Chen and Hamori, (2009) aimed to investigate the economic return to schooling. This study used data from China Health and Nutrition Survey questionnaire that covers 288 villages. This study is based on the Mincer equation model. By using OLS (ordinary least square), instrumental methodologies, logit and probit model the results exhibits that economic return to schooling for men is slightly greater that is 8.06% than comparable for women that are 7.67%. This paper suggests that educational policies should be made specifically for rural dwellers and help to facilitate the rural employment level.

Salehi-Isfahani et al. (2009) explored the returns to education of urban cities for three countries which are Iran, Egypt and turkey. This study covers the time period 1980 to 2006 by selecting the sample aged between 20 to 54 years. Existing markets focus on secondary and higher education rather than technical and vocational income. Except Turkey rest of two countries shows the lower returns to vocational education and higher for academic years. The results exhibit the increasing returns for schooling years. Păuna (2009) estimated the mincer model for the years 1995 and 2000. The result contradicted mincer theory and shows the negative relationship between education and income. The outcomes for male and females' sample are 5.9% are 7.18% in 1995. In 2000 the values are 8.3% and 9.75 respectively. On the other hand. this represents that Romanian labor market has increased the level of attainment of education.

Warunsiri and McNown (2010) investigated the educational returns for Thailand for time span 1964 to 1967. The sample selected those who born between 1964 to 1967. The results show that there are returns for education to overall analysis is 14% and 16%. The women's have greater returns as compared to males. Moreover, employee belongs to urban areas have greater returns to education as relatively rural areas. Akgüç (2011) used log-linear function to estimate the different educational level primary, secondary and higher for wages. The data gathered from a survey regarding observed variables for analyzing Mincer equation. The results demonstrate that different levels of education is significant in the relation to income and output per employee. This study also confers that higher education is the dominant element in all educational levels. The level of returns is significant and lies between 11 to 13 %.

Güriş and Çağlayan (2012) employed the mincer wage equation and robust regression to analyze the returns to education, experience, and gander for the dependent variable wages. This study used ordinary least square for analyzing Turkish data. The results exhibit the returns to educational years and returns to experience are greater for female employee as compare to males in years 2003 and 2006. Harberger and Guillermo-Peón (2012) examined the association between duration of educational years and wages for Mexico. The study analyzes the benefits obtained from primary schooling, high schooling, and higher education for the survey data over the year 2010. The result demonstrates the confirmation of net present value and returns to investment concerning consecutive steps of educational grading.

Purnastuti (2012) explored the private returns to education for Indonesia by employing Indonesia Family Live Survey data. The study specified that returns to education for females are statistically significant and greater as compared to returns to education for male employees. By employing OLS and Mincer model this study shows an extra year of education increase the employee salary by 566%. This study suggested to increase the investment in educational attainment. Ion (2013) calculated the returns to education relationship to income in 2009 for Romania. This study based on Mincer model and used OLS. The sample observation is 16,570. The returns to males are higher 26.58% than females because the sample observations for male are more than females. The variables included in the analysis are experience, squared experience workplace and gender in a relationship to income. The results indicate returns for educational years are 11.29%. The results demonstrate the positive change towards educational attainment as value of returns to education improved over the last few years which shows the society altered by giving importance to knowledge and skills.

Wannakrairoj (2013) analyzed the link among education, experience, and wages for urban and rural dwellers for Thailand. This study used cross-sectional data from 19,000 employees. By employing OLS regression this study confirms the positive relationship between experience, education, and income of employees for both markets. Moreover, experience has more diminishing returns for urban as compared to rural markets. This study used the mincer model and suggested improving the education level.

Magdalyn (2013) inspected the relationship of experience, experience square and duration of education on income of the employees. This study analyzed the mincer model by using survey that covers the 206 households and 726 workers in the year 2012. The result shows that increase in education leads to increase income by 778.68 and the returns for female are higher than males. The returns to education for urban are higher than rural areas. The returns to education are higher for married as compare to unmarried individuals. Comola and De Mello (2013) investigated the factor effecting income for Indonesian economy. The study employed OLS and Mincer model for analysis. The results demonstrate that educational qualification, age increase income and the results show higher returns for male as compared to females. The data gathered in this study about 75.371 households or 237 employees. The people having high education does not prefer low salaried jobs and education is dominant factor in labor market.

Purnastuti et al. (2013) made comparison regarding the education levels and their corresponding wage rates for Indonesia economy. The return to education is decreasing between the time span 2007 to 2008. This irregular growth pattern would be improved or change into profitability by increasing the demand for qualified graduates with different level of schooling. Okleley (2013) investigated the relation among different educational years and earning for Ghana. This study employed Mincerian equation and OLS method. The results confirmed the direct and positive returns to duration of years to the earnings level of employees. The results exhibit disparity in returns to education for gender. The returns to education for female are twice higher than male. Moreover, the agricultural sector has a higher return compared to nonagricultural sector.

García-Suaza et al. (2014) inspected the rate of returns to higher education in Colombia. This study used Colombian survey data from 2001 to 2005. This study employed cost benefit analysis and internal rate of return (IRR) that used a measure the profitability of investment in education. The technical and vocational higher education has positive return and increases the gender gap. The results reveal that return to higher education and efficiency rate are different lies between 0.074 and 0.128 for gender and significant differences found for gender in Colombian market. Varly et al. (2014) estimated the primary, secondary, and high level of educational returns and impact on earnings. This study employed the survey data and Mincerian model. The results show that returns to duration of schooling years are 7.9%. the returns for 14 years of education are 51% and for higher level PhD is 42%. Saqib et al. (2016) studied the impact of education, experience, skills, and income for Nowshera, Pakistan. This study inspects the observe relationship by using Simple and multiple regression that is estimated by OLS. The results exhibit that education and experience are significant factors while skill is insignificant. A unit increase in education and experience variable results increase in 563.94 rupees and 899.59 rupees in earnings respectively. This study suggested that government should promote vocational and technical education that would increase the skills level for improvement of earnings and eradicate the unemployment level. Tansel (2017) investigated the impact of educational expansion on educational outcomes and return to education based on gender whose age from 15 to 64 for Turkey. This study used data from a household labor force survey conducted over the years 2002 to 2015. By using instrumental variables method, OLS and 2SLS techniques the results indicate casual effect of education on earnings. The result exhibits that there is found statistically positive return to education for both comparatively less for female and greater for male. This study suggested to policy makers that there might be made investment in education diversely.

Aydemir and Kirdar (2017) investigated the returns from education for males and females over the Turkish survey data that is collected by making birth cohort regarding the 1997 educational reforms. The result demonstrates the returns to an additional year of schooling is almost 7–8% for females and for males these returns are 2–2.5%. Ismail and Awang (2017) aimed to examine the link among performance of teachers based on their professional education, training, experience, and earnings for Malaysian economy. This study employed secondary data collected from a national survey (2012) which covered 400 primary and secondary schools. 8,000 questionnaires were also distributed 8,000 questionnaires among teachers with the rate of return is approximately 84%. This study used cost benefit analysis and survey method directed by the human capital theory. The results show that the education of teachers is highly correlated with experience and earnings level. The private rate of return of teacher's income regarding each additional year of education found between 3% and 4 % per year.

Limam and Hafaidh (2018) inspected the determinants of income, examining the private returns of education and heterogeneity problem associating these returns for Tunisia. This study used data from Tunisian Labor Market Panel Survey (2014) and 1561 respondents participated aged 15-64. By using interactive model, the results indicate education is key determinant of private returns and these returns increase systematically with the levels of education. This study recommends schools to work conversion plans that will increase employment and earnings. This study also gives directions to support the role of community policies regarding the reduction of inequality in opportunities for both years of education and income.

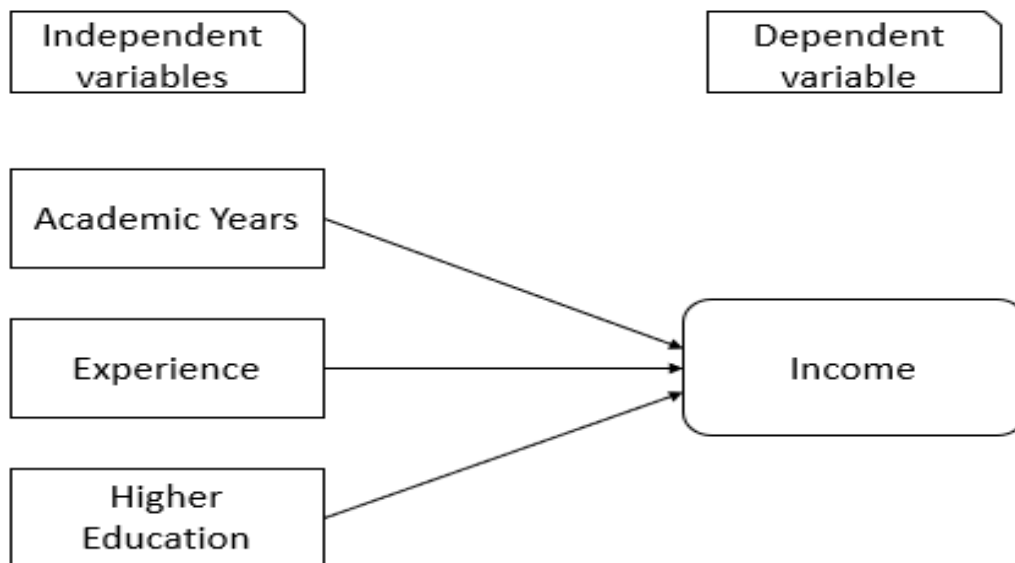
Wang and Wu (2018) analyzed the returns of education for rural and urban areas in China. This study used Mincer’s model for calculation of rate of return of education. OLS was used for regression analysis. The empirical results indicate that rate of returns to education overall is (13.9%) which shows the value of education increasing day by day. The returns of education for rural area were (3.7%) and for urban area were (25.6%). The results for gender equality exhibit that returns for education of female is 9.1% which is significantly greater than males that are (2.5%) in rural areas. This analysis presented the results for educational investment, educational inequality based on gender and areas.

Patrinos et al. (2019) used Mincerian equation and finds out the association between years of education and wages for Turkey. This study gathered data from a survey and includes 400,000 peoples in analysis. This study employed OLS and outcomes show the return from Primary 39%, Secondary 34%, and Higher education are 16%. Females returns to education are greater from males. Return to education are higher for public sector compared to private sector.

**Human capital Theory and Mincerian equation**

The Human Capital Theory, developed by economists such as Gary Becker and Theodore Schultz, posits that individuals invest in education and training to enhance their productivity and future earnings, akin to investments in physical capital. The Mincer equation, formulated by Jacob Mincer, quantifies this relationship by linking earnings to years of schooling and work experience. The equation typically includes terms for the natural logarithm of earnings, years of schooling, and both linear and squared terms for work experience to capture diminishing returns. This model empirically validates Human Capital Theory by showing that each additional year of education and experience increases earnings, though at a decreasing rate for experience. The empirical results from the Mincer equation underscore the importance of educational investments and provide valuable insights for policymaking aimed at enhancing workforce productivity and earnings potential through education and training programs.

Fig: 01 Conceptual framework



## Data and Methodology

### *Sampling Techniques*

Sampling technique from survey system .com is applied for the proportionate sample of male and female teachers.

### *Model Specification*

This study uses regression analysis. The aim of this analysis to test empirically the relationship among academic years, job market experience and earnings, and to test it earnings or income is a dependent variable in the study while academic years and job market experience are the independent variables. This study used (Mincer, 1974) earning model as the base of our study which has been subsequently followed by many researchers in different parts of the world. (Mincer, 1974) function is using to identify the relationship between the education, job market experience, job market experience and income. Following is Mincer's earning function:

$$\text{Income} = f(\text{education, job market experience, job market experience squared})$$

Equation form

$$\ln W_i = \beta_0 + \beta_1 \text{SCH}_i + \beta_2 \text{EXP}_i + \beta_3 \text{EXP}_i^2 + \mu_i \dots \dots \dots \text{(Mincer, 1974)}$$

Based on earlier discussion, the following regression model is identified for estimation. The model used in this study is given below:

$$\text{Log}(Y)_i = \alpha_0 + \alpha_1 (\text{Acad Years})_i + \alpha_2 (\text{Exp})_i + \alpha_3 (\text{Higher edu})_i \dots \dots \dots \text{equ(1)}$$

logarithm is taken for income that is independent variable and the dependent variables are academic years, experience and higher education. This is log linear model for the analysis of Mincerian equations.  $\alpha_0, \alpha_1, \alpha_2,$  and  $\alpha_3$  are the parameters.

### *Why we use log-Linear model*

In summary, the log-linear model is preferred because it linearizes the exponential growth of earnings, allows for easy interpretation of coefficients, captures diminishing returns, reduces heteroscedasticity, helps in achieving normally distributed errors, offers flexibility in model specification, and enables comparative analysis across studies. These advantages make it a powerful tool for understanding the impact of schooling and experience on income.

### *Variables*

Based on hypotheses, we have developed variables. The variables which are included in the study are dependent and independent variables. To analyze the effect of education and job market experience on earnings, education and job market experience are used as independent variables and earnings as dependent variable.

### *Hypotheses of the Study*

The hypothesis of the study based on the literature review, is that there is a positive relationship between earnings, education and job market experience. The hypotheses of the study are:

**Hypothesis 1:** *There is a positive relationship between academic years and income of the higher secondary schools' teachers.*

**Hypothesis 2:** *There is a positive relationship between higher education and income of the higher secondary schools' teachers.*

**Hypothesis 3:** *There is a positive relationship of experience and income of the higher secondary schools' teachers.*

### *Sampling*

The total population of higher secondary school teachers is 712. The female teachers constitute 313 while the male's teachers are 399. Sample is taken 30 % which is best representative of the population. Sample is representative sub part of population. The 250 teachers selected for sample which is 30 % of total population.



This study employs proportionate sampling for males and female. So, randomly selected female sample is 110 and male sample is 140. This study used Cochran, (1977) for selection of the sample size.

### Data Collection

The current study about the relationship between income, education and experience is based on the secondary school teachers of the district of Abbottabad. The data is collected from a sample of 250 through the monthly staff statements, which is the source of secondary data provided by the education directorate office of Abbottabad. This study used cross-sectional data for the analysis. The time for which the data was collected for the variables for 2021.

## Results and Discussion

### Descriptive statistics

Descriptive statistics is out lay of the actual data represented by mean, median, minimum and maximum. Frequency distribution tables and graphs were used in analysis to find the conclusions. These results are interpreted as follows.

**Table:1 Descriptive Statistics**

Variables	Income	Acad years	Exp
Mean	72968.32	15.20	20.12
Median	72000	16.00	22
Maximum	155000	22.00	39
Minimum	23800.	12.00	1
Std. Dev.	28205.62	1.603	10.18
Obs	250	250	250

The value of mean is average of the whole data values for considered variables of the study. Median is the mid value in the data. The central tendency is quantifying by mean and median. The maximum value exhibits possible outlier to the extreme end. The minimum value exhibits how much data is spread out up to the lowest end. The data is symmetrical or asymmetrical is analyzed by skewness. The measure of dispersion is shown by the standard deviation.

The table demonstrates the mean value for academic schooling years is 15.20 and median is 16. The maximum number of academic years in our sample is 22, while minimum is 12 educational years. The total figure of observations is 250. The standard deviation for academic years is 1.603. The mean value for experience is 20.12 and median is 22. The maximum number of years of experience in our sample is 39 while the minimum is 1.

The mean value for income is 72968 and standard deviation value is 28205.62 The median for income is 72000. The maximum value for income in the sample is 155000 and whereas the smallest value is 23800.

### Correlation Analysis

Correlation analysis indicates both the nature and strength of the relationship between two variables. Correlation analysis exhibits positive (direct relationship) or a negative (inverse relationship). It is a statistical technique to define the degree to which one variable is linearly related to another variable. The correlation coefficient  $r$  measures the strength of linear association. The value lies between -1 to +1. The value of  $r$  closer to +1 or -1 indicates the direction positive or negative and strength strong or weak of the relationship. The value closer to 0 indicates no relationship. This study analyses correlation analysis to assess the association between the predictand and the independent variables.

**Table:2 Correlation Analysis**

Variables	Ln income	Acad years	Exp
Ln income	1.000000		
Acad years	0.226075	1.000000	
Exp	0.767419	-0.106068	1.000000

The results from the correlation analysis among the predictand variable income and the independent variable for higher secondary school teachers analyzed. The relationship between income and education was found positive as the value 22% association between academic years and income.

Similarly, experience has a significant positive relationship with income. Although the relationship is less significant as compared to the relationship between income and education. The coefficient value of correlation for experience is 0.76 indicates the 76% association between experience and income of higher secondary school teachers. While there is found negative association between experience and academic years.

### Regression Analysis

OLS is a statistical method for analyzing variables. It helps to understand how predictand variable fluctuates with respect to change in the independent variable. It comprises many techniques for modeling and analyzing observed variables of the model. This study analyzed how dependent variable income changes due to change in independent variables academic years, experience and higher education.

**Table:3 Ordinary Least Square for whole sample**

Dependent Variable: LNINCOME				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Acad years	0.015172	0.007588	1.999580	0.0466
Exp	0.014193	0.000629	22.55231	0.0000
Higher edu	0.075854	0.024466	3.100432	0.0022
C	4.268473	0.105739	40.36791	0.0000
R-squared	0.696411	Mean dependent var	4.828087	
Adjusted R-squared	0.692709	S.D. dependent var	0.181321	
S.E. of regression	0.100513	Akaike info criterion	-1.741185	
Sum squared resid	2.485312	Schwarz criterion	-1.684842	
Log likelihood	221.6482	Hannan-Quinn criter.	-1.718509	
F-statistic	188.1021	Prob(F-statistic)	0.0000	

The first independent variable is academic years. This variable has a positive and direct association with the individual's earnings. This could be interpreted as a change in one year of education or schooling brings the change 0.015 points or 1% in income. Our regression results lead us to conclude that an additional year of academic education of schoolteachers leads to an increase in their salaries. It is explicitly evident that the value of coefficient is significant at 1% and shows the direct relationship with earnings. This confirms the first supposition of the study that there exist positive association between education and earnings. The results are similar with the study of Ismail and Awang (2017).

Mincer exhibited the positive and direct link of years of education and market working experience not for the reason that they are essentially complementary to each other, but it related to the capital accumulation e.g. the personal who invest in both pillars of human capital. Experience is also significant at 1% and illustrates a direct association with the individual's earnings. This could be interpreted as a change in one year of experience brings the change 0.014 or 1%. This means that as the experience of schoolteachers increases by one year it raises the income by 1%. The results are similar with the results of Wannakrairoj (2013) which analyzed the link among education, experience and wages for Thailand.

The coefficient of higher education is 0.075 that shows the positive relationship between higher education and income. This value demonstrates that if a person having additionally one year of higher education that would leads to increase the income by 7%. This result consistent with the study of Varly et al. (2014) that exhibits that returns to primary schooling years are 7.9%. The returns for 14 years of education are 51% and for higher level PhD is 42%.

Statistic  $R^2$  provides the model's goodness of fit and shows the statistical measure of the association between variables. The value of R-square of the model is 0.696 which shows that independent variables explain the variations in income by 69%. The value of adjusted R-squared for our model is 0.692 which has a very small difference from the value of R-squared, which indicates that the sample size is large. The value of R-squared adjusted shows the relevancy of the independent variables to dependent variables in a relationship. In our analysis the F-statistic is 188.10 with the p-value of .000 or 1% level of significance. Hence, we conclude that there is a significant association between the predictand and the independent variables.

**Table:4 Ordinary Least Square for Male teachers' sample**

<b>Dependent Variable: LNINCOME</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
<b>Acad years</b>	0.021062	0.010692	1.969906	0.0509
<b>Exp</b>	0.014267	0.000800	17.83990	0.0000
<b>Higher edu</b>	0.064318	0.035391	1.817360	0.0714
<b>C</b>	4.167913	0.149451	27.88810	0.0000
<b>R-squared</b>	0.708322	<b>Mean dependent var</b>		4.828894
<b>Adjusted R-squared</b>	0.701888	<b>S.D. dependent var</b>		0.188180
<b>F-statistic</b>	110.0894	<b>Prob(F-statistic)</b>		0.000000

**Table:5 Ordinary Least Square for female teachers' sample**

<b>Dependent Variable: LNINCOME</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
<b>Acad years</b>	0.008536	0.010550	0.809045	0.0023
<b>Exp</b>	0.014556	0.001049	13.87400	0.0000
<b>Higher edu</b>	0.101191	0.033056	3.061220	0.0028
<b>C</b>	4.368493	0.145680	29.98691	0.0000
<b>R-squared</b>	0.705748	<b>Mean dependent var</b>		4.827060
<b>Adjusted R-squared</b>	0.697420	<b>S.D. dependent var</b>		0.173046
<b>F-statistic</b>	84.74528	<b>Prob(F-statistic)</b>		0.000000

The table 4 and 5 indicates the results of regression for female and male samples separately. The results show that academic years, experience and higher education has positive impact on income for both samples. The higher education explains 6% variation in income for male teachers while the returns of higher education are more for female teachers which is 10% and results are significant at 1%,5%, and 10%. The models are significant by showing the values of F-statistics and probability of F- statistic.

Our regression results lead us to conclude that an additional year of academic education of female schoolteachers leads to an increase in their salaries. The results are similar with the results of this study Purnastuti et al. (2013). The experience of female schoolteachers increases by one year it raises the income by 1%. The results are similar with the results of this study Magdalyn (2013). This study covered 206 households and 726 workers. The result shows that increase in experience leads to increases income by 778.68. The coefficient of higher education in present analysis is 0.10 that shows the positive and strong relationship. This result consistent with the study of Harberger et al. (2012).

The academic years has positive and direct association with the individual's earnings in male teachers' sample. The returns to education years are 2%. The results are similar with the results of Patrinos et al. (2019). This study's outcomes show the return from Primary 39%, Secondary 34% and Higher education are 16%. Experience is also a significant indicator and illustrates direct association with the individual's earnings in current analysis. The results are similar with the results of Saqib et al. (2016) which shows that a unit increase in education and experience results in 563.94 rupees and 899.59 rupees increase in earnings respectively. The coefficient of higher education is 0.06 that shows the positive and strong relationship between higher education and income in our

analysis. This result consistent with the study of García-Suaza et al. (2014). The results reveal that return to higher education lies between 7% to 12%.

The outcomes of returns to higher education for both males and females are comparable by the literature studies. The outcomes of higher education for females are higher as compared to males’ teachers at higher secondary schools in district Abbottabad. The education returns for female is 10% while for males it is 6 %. The findings are similar with the findings of Aydemir and Kirdar (2017) investigated the returns from education for males and females over the Turkish survey data. The result demonstrates 7–8% for females and for males these returns are 2–2.5%. The findings of Wang and Wu (2018) are supported our results where this study analyzed the returns of education for China. The empirical results indicate that the rate of returns to education overall is (13.9%). The returns for education of female are 9.1% which is significantly greater than males that are (2.5%) in rural areas. On the contrast, these results are different from the study of Chen and Hamori (2009) which investigated the economic return to schooling for Chine. The result exhibits slightly greater returns for males are 8.06% than comparable for women that are 7.67.

**Test of Endogeneity and Heteroskedasticity Test**

As the data was cross section and primary and nor simultaneous equations so there was no chances of endogeneity that’s why we use OLS in place of 2SLS and the same was used by mincer however in these cases there are chances of heteroskedasticity ,therefore use the ARCH test below which clearly shows there is no violation of assumption of OLS

**Table:6 Heteroskedasticity Test**

<b>Heteroskedasticity Test: ARCH</b>			
<b>F-statistic</b>	0.655235	<b>Prob. F(1,247)</b>	0.4190
<b>Obs*R-squared</b>	0.658793	<b>Prob. Chi-Square (1)</b>	0.4170

The problem in cross-sectional data is heteroskedasticity due to the reason of different cross-sectional units in the data. To eradicate the problem of heteroskedasticity, this study used ARCH test. The probability value 0.41 indicates that there is no heteroskedasticity in the model.

**Policy Implications**

The policy implications of using a long-linear model to understand the impact of schooling and experience on income are substantial. Policymakers should invest in quality education at all levels to maximize economic benefits and promote lifelong learning to keep the workforce competitive. Emphasis on gender equity in education, targeted support for disadvantaged groups, and career guidance in schools is essential. Complementary labor market policies that facilitate job creation and skill matching, along with data-driven policymaking and continuous evaluation, are crucial for effective implementation. These strategies will help enhance educational outcomes, promote economic growth, and ensure equitable distribution of benefits.

**Future Research Direction**

Future research on the application of the Mincerian equation to higher secondary school teachers in Abbottabad District can explore several promising directions. Longitudinal studies would be beneficial to track changes in the relationship between education, experience, and income over time, providing insights into the long-term effects of these factors on teachers' careers. Comparative analysis between different districts or regions could identify regional disparities and contributing factors, offering a broader perspective on educational policy effectiveness. Incorporating additional variables such as teacher training, school resources, and socio-economic background could yield a more comprehensive understanding of income determinants. Qualitative research, including interviews and focus groups, would add depth by capturing personal experiences and perceptions not easily quantified. Further gender-specific studies are needed to explore the underlying reasons for income disparities and to design targeted policies promoting gender equity. Analyzing the impact of recent and future

educational policies on economic returns could provide valuable feedback for policymakers. Extending the research to include teachers at primary, middle, and tertiary levels would offer a holistic view of the education-income relationship across the educational spectrum. Additionally, examining differences between teachers in public and private schools could reveal how the sector of employment influences returns to education and experience, informing policies aimed at harmonizing income levels across different types of schools. These directions can build on the findings of this study, offering deeper and more nuanced insights into the relationship between education, experience, and income, ultimately contributing to more effective educational policies and socio-economic development.

### **Conclusion and Recommendations**

This study investigates the role of education and job market experience on the earnings of income targeting higher secondary school teachers in the district Abbottabad. Since the data provided by the education directorate comprising of the monthly staff statements that provides information on completed years of schooling therefore, this study not only estimates the Mincerian earning function also examines the returns to education in education sector. This research will contribute to improve preceding knowledge of positive correlation between educational experience and labor market outcomes in Pakistan particularly to the formal education at schoolteachers' levels in district Abbottabad (KP) Pakistan.

Many patterns emerge when examining how earnings are distributed across the selected sample. The educated people have more dimensions to earn income as compared to less educated individuals. The salaries increase but behind that there are huge expenses for attaining higher education. This investigation deliberates the direct and positive impact in education years as the coefficient value brings a 1% increase in returns for higher secondary school teachers.

The influence of job market experience is positive and significant in relation to monthly income. The addition of an extra year of experience causes 1 percent increase in earnings. The lifecycle of earnings of individual increase at diminishing rate.

While on the other hand, there is a positive relationship found between higher education and income. One-year increase in higher education brings 7 percent increase in income. Higher education has a greater contribution in income. So, findings suggested that the level of higher education is an important factor in the income determination of schoolteachers in our sample. It can significantly influence employees' income.

Our study supports the hypothesis, the fact that higher education, academic years, and job market experience have a significant impact on monthly income. Some of the policy implications in accordance with the findings could be suggested. The new enrollment should be based on higher education. The policy recommendation is to improve and invest in education years. The quality of educational level helps to increase the teacher's income level. The smallest amount of educational qualification for teacher's recruitment should up to MA/ MSc with at least one professional or technical qualification for higher secondary education with corresponding pay packages should be made certain. Respectable wage scales at special levels of education need to be defined and improved. The selection procedures and training system relevant to the educational profession should be upgraded. The new enrollment should be based on higher education. The policy recommendation is to improve and invest in education years. The quality of educational level may help increase the teacher's income level.

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# Agglomerations, Urbanization and Economic Prosperity in Pakistan: A Demographic Analysis Using Ardl Approach for Time Series Data

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## Abstract

*The current study aims to explore the relationship between agglomerations, urbanization and economic prosperity in Pakistan. The empirical analysis is based on secondary dataset i.e. World Development Indicators and Autoregressive Distribute Lag Model (ARDL) has been applied for the time period 1960-2016. The findings depicts that in the long run agglomeration economies are contributing positively more to economic prosperity compared to the share of overall urban population. However in the short run the effect of the latter variable is found negative. All these results suggest that the governments should focus on policies specifically related to the infrastructure building and the provision of basic services in the cities to improve the process of urbanization. This is the only way to increase the agglomerations in the economy and its outcome in the form of generating more economies of scale.*

**Keywords:** Urban population, Agglomeration Economies, Economic Growth.

**JEL Classification:** C32, J11, O43, Q56, R20, P25, E01.

## Introduction

Urbanization has been proven to be a key economic factor driving the economies towards growth and development not only in Pakistan but in each and every nation which has made an attempt to gain economies of scale and achieve efficient utilization and distribution of resources. Urban sectors not only play an important role in the growth of the economies but it has an influential impact towards development in each and every sector of the economy including the market structures, social reforms and welfare, manufacturing and services sectors etc. Urbanization and agglomeration economies have a direct and significant relationship with the economic growth and development factors usually in the long-run leading to the prosperity of economies (Ali & Zulfiqar, 2018; Henderson, 2010; Kasarda & Crenshaw, 1991; Moomaw & Shatter, 1993; Tripathi, 2015). It is necessary to make such long-run measures through good governance structures in the urban centers in order to sustain urbanization which may further provide much more stable economic growth and development in the long-run. Agglomeration economies not only provide economies of scale but they are considered to be the fundamental socio-economic factor which sustains Urbanization if entertained with good long-run policies formulated by the administrative bodies. On the other hand, institutional structures of the economy significantly influence the capability, productivity, efficacy and threshold of the urbanization towards stimulating the economic growth and development of the economy in the long-run, which has been critically explained in (Turok & McGranahan, 2013).

Urban cities have always been the nerve centers of the communities which were predisposed by certain historical activities that enabled the growth of the economic network amongst all the sectors of the economy (Abu-Lughod, 1991; Braudel, 1984). It is important to understand the various dynamic functions of urbanization patterns integrated with the structural changes over time in the respective regions. Since industrial revolution, urbanization have directed the accelerated economic growth which had been influenced primarily by the functional outputs from the industrial revolution as explained by the forms institutional structures working indifferently aspired by the mechanisms of imperialism and colonialism (Acemoglu, 2010) Thus, economists have declared the '*big cities*' to be heterogenous which further fosters the economies of scale (Randinelli, 1983). With the diffusion of knowledge and education and stimulating the technological aspects by research & development, division of labor and specializations; agglomeration economies have been proven to be the key driving force behind sustainable



urbanization which favors stable economic growth and development (Turok & McGranahan, 2013). Agglomeration economies or densely populated urban environment also provides the suitable conditions and capabilities to the firms and the workers in economy to be much more productive and efficient (Puga, 2010). It can be clearly stated that the role of agglomeration economies and dense urban sectors encourage productivity and efficient resource and capital accumulation which contributes significantly towards economic growth and development.

Pakistan is placed under the category of the developing nations and is currently facing a variety of urbanization problems that are also undermined in the respective cases for almost every developing nation around the globe. The nation has been always found to be in a struggle to cope up with the issues which are continuously being faced by the economy. A study has provided an estimate of 3% growth in the urban sectors of Pakistan on average while the country withholds the highest pace of urbanizing in South Asia (Kotkin & Cox, 2013). Considering the urbanization in the context of Pakistan, economists have been working hard to formulate long-run policy measures in order to resolve the urbanization problems throughout the nation but unfortunately due to multiple social and political constraints, the practical implications of the urban planning is not observed. Most of the economists have coined the main problem of instable urbanization is poor performance of local government or inadequate governance structures (Haider & Badami, 2010). Urbanization requires long-run policies and regulations while in the nation has witnessed the adverse effects of the vested political interests and inadequate market structures which hinders the productivity and efficacy of the urbanization in Pakistan. Economists have also observed the indifferent provincial functionalities and resource allocations which have created multiple problems including uncontrolled Rural-Urban migrations, Urban burden and unjust distribution of resources at various regions etc.

It is important to understand the urbanization trends and functionalities in Pakistan specifically in terms of urban areas where there is population in a large number forming agglomeration economies and areas where the population is relatively less than a million, so that we might be able to identify the role of agglomeration economies and current situation of the impact of urbanization over economic growth and development. It is fact that most of the capital accumulation and various economic activities endure in the urban sectors, while the markets in the urban areas provide relatively higher returns to the businesses (Iqbal, 2013). During the structural transformations, resource allocations are observed to be moving from the lower productivity agricultural sectors towards the higher productivity sectors i.e., industrial, services sectors etc. Hence, urban cities and the respective urban market structures, in the presence of agglomeration economies, play a role as a magnet which attracts the resource allocations as it provides higher rate of opportunities to achieve economies of scale (Hussain, 2014). Although urbanization provides multiple benefits to the economy in form of better resource utilization and economies of scale but it hampers the rural growth and development and often creates an inefficient land utilization as the fertile land that was to be used for agricultural purposes is now being used for residential purpose which lowers agricultural production. Local Governance requires to control such issues in a critical way (Hardoy, Mitlin, & Satterthwaite, 2001). Although urbanization contributes significantly towards growth and development of the nation but unfortunately in case of developing nations like Pakistan despite the rapid growth in urbanization process, the outcome is not satisfactory. This study therefore tries to explore that how does this new shift in the development strategy of our nation through focusing on sustainable cities as per the 11<sup>th</sup> goal of sustainable Development Goals (SDGs) is contributing to the overall increase in income. For this purpose both the impact of the total share of urban population and agglomerations above one million is taken into consideration. One million is taken as the threshold because the study aims to see the impact of large agglomerations as existence literature provides the guidance that cities with inhabitants less than one million are considered as small agglomerations (Deb, 2017).

## Objectives

- To investigate the impact of urbanization on national prosperity in Pakistan.
- To explore the effect of agglomerations of over one million on the national prosperity in Pakistan.

## Literature Review

Urbanization is becoming an important economic factor on which economists have been working hard to achieve sustainable urbanization as the industries are progressing rapidly in each and every sector of the economy. According to certain statistics, people have migrated to urban areas in a large number due to which the world has witnessed 39% to 52% increase in the urbanizing rates during the past three decades (Ritchie & Roser, 2018). Technological change and economic growth are positively correlated as any improvement in the technology enables the economies to be more productive and efficient (Malecki, 1997). The increase in technology have incentivized the markets to develop specifically in the developed urban sectors which are usually densely populated. This further influences the choices of the people, prompting them to move towards the urban areas which shall give them the opportunity to achieve a better standard of living. Both the globalization patterns and economic re-structuring have an influential impact over the urban economies worldwide. There has been observed an exponential growth in the services sectors and fall in the agricultural sectors which have an impact over the labor market structures enabling the polarization of the income generation at the urban areas (Hussain, 2014; Moomaw & Shatter, 1996; Un-Habitat, 2009). Most of the people in Pakistan have abandoned the agricultural sectors and moved towards those sectors which can provide better returns in order to achieve a higher living standard (Mughal, 2019). Multiple studies have also indicated that the higher urbanization level regions have been having a relatively higher GDP per capita or income levels on average. Furthermore, the developing nations tend to have a relatively higher urbanizing rates as these economies usually make a higher effort with an advantage of higher capital gains despite of retaining lower GDP per capita. There has been a strong correlation of  $R^2$  equal to 0.57 between urbanizing proportions and gross national income per capita income (Henderson, 2010). Economists have suggested that the impact of urbanization needs to be direct or positive with the level of GDP per capita and in order to achieve a positive impact of the urbanization over economic growth and development, utilization of good urban policies are vital to ensure a sustainable long-run economic growth and development (Chen et al. 2014).

Although, there is no simple linear relationship between urbanization and economic growth rates, economies have to take care of a variety of economic factors which shape the sustainable urbanization. Institutional structures functioning in the economies have a key influence over urbanization patterns while it is important for a government to keep a record of the social problems which hampers the stable urbanization growth and development and produce a number of supportive policies at both short and long-run in order to keep the impact of urbanization to be significantly positive over the economic growth (Turok & McGranahan, 2013). Urban population plays an important role in the economy as these people are found to be having a higher capital accumulation than the rural population. Rural-Urban migration had always been a key issue behind urbanization while the nations' productivity greatly influences the structural changes within the economies. People move from the rural areas towards urban areas which not only means the demographic mobility but also the sectoral shifts primarily from the agricultural sectors towards the manufacturing and services sectors.

As most of the economic resource allocations are inclined towards the densely populated areas, it creates cost-advantages and enhancing human capital in those respective regions creating them into agglomeration economies. There is a positive relationship between GDP and urbanization and an increase in the GDP per capita raises urbanization level (Moomaw & Shatter, 1993; Tripathi, 2015). Higher spatial concentrations or agglomeration economies boosts the economic growth and development but on the other side it may be the cause behind the mobilization of urban unrests (Brühlhart, & Sbergami, 2008). Agglomeration economies inspire innovativeness as it has the capability and synergy to make the research and development much more efficient and productive. Such production sectors which are knowledge-intensive have higher innovativeness while market competition incentivize the population to be more productive. Such production sectors are usually clustered in cities with large agglomerations which furthers the positive contributions of the respective urban regions towards the economic growth and development (Malecki, 1997).

Rapid urbanization does not mean that there will be an output of higher economic growth but poor urbanization policies may result in a large number of economic problems including over-urbanization i.e., over-burdening the urban cities, over-population and unemployment, higher costs of living, uprising of social and political unrests,

constrained access to efficient resource allocation patterns, lack of flexibility amongst the firms, strong environmental and ecological pressures, rise in the levels of corruption and lack of accountability, increase in the prices of real estate, biased competitions etc. (Borowiecki, 2015; Turok & McGranahan, 2013). Urbanization or urban areas which are not able to provide economies of scale to the producers may stimulate inefficient resource utilizations that further creates a variety of social, political and economic unrests in the long-run. Some of the economies which have socially destabilizing urban processes may lead towards a negative correlation between urbanization and economic growth as such form of urbanization carries a strong link with the socio-political unrests (Blanco & Grier, 2009; Goldstone, 2010). Urbanization do have a positive impact over the economic development but at some point, if the population keeps on increases with lack of control from the urban regulatory authorities might change the impact of urbanization towards economic development (Williamson, 1965). Smooth population mobility is assumed to be the pre-requisite of stable urbanization which can withstand the challenges of rural-urban migrations, inter-city movements and growth and development of the market structures inspired by good governance (Henderson, 2010).

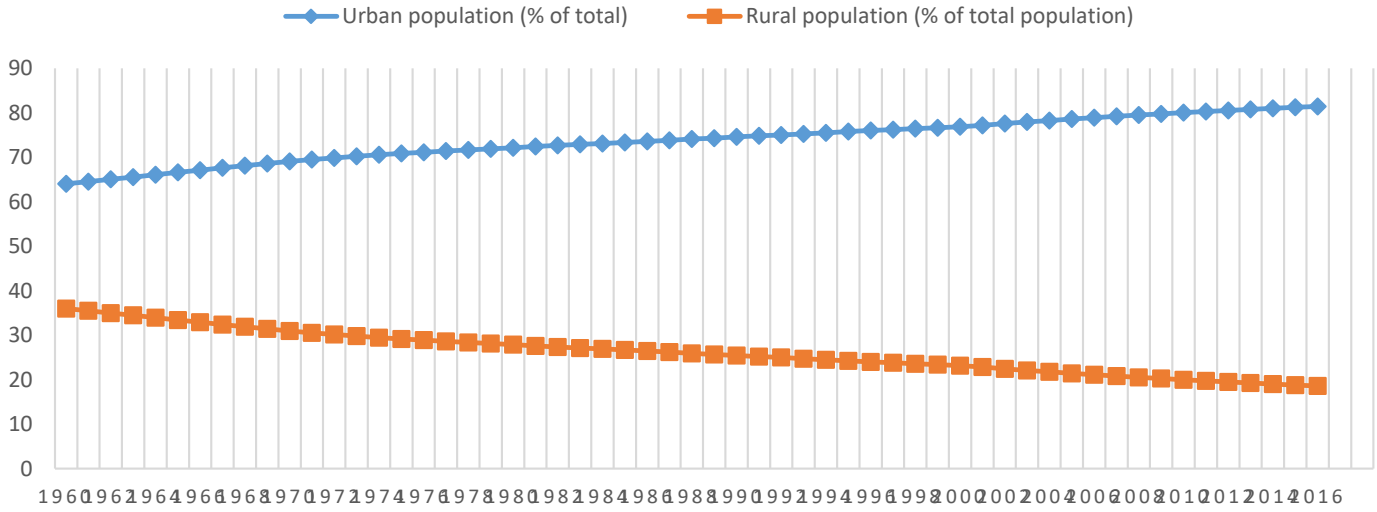
Agglomerations are also found to be having a positive and significant impact over the derived socio-economic outcomes from the firm’s efficiency and social inclusions. Agglomerations enhance the firm’s productivity while clusters of large agglomerations in different regions of the nation can greatly help improve the nations’ economic growth and development (Azhar & Adil, 2017). In Pakistan, the state of municipal services, federal and provincial resource allocations and infrastructure development have been badly hampered by the poor governance structures. There have been a variety of political tensions which have uplifted the social and economic unrests further creating instable labor mobility factors (Haider & Badami, 2010). In order to successfully resolve the urbanization problems in Pakistan, there is a need to critically analyze the key differences or urbanization patterns at different regions of the nations. A good governance has to be formulated and implemented in order to raise human capital, developing skills of labor from good education, access to knowledge, infrastructure development with a decentralized approach, linkages between agricultural sector and quality education and most importantly a good relationship between the corporate sector and civil society organizations. A good governance can be a solution to the inefficient resource allocations that creates indifferent urbanization patterns at different regions (Jabeen, Farwa & Jadoon, 2017).

As it is above mentioned that over the years, urban population has been expanding while the rural population is reducing due to a variety of factors enriched in the literature. The big thing to observe is that the trends are not the same for all the levels of income groups. Below in Figure 1, 2, and 3 are given these trends for the overall global economies while Figure 4 exhibits the same series for the economy of Pakistan soecifically. Data has been taken from World Bank to show the difference between the trends of high/middle/low-income countries and a difference can be observed in the respective trends, which clearly highlights the evidence of the impact of income levels over the urbanization. World Bank categorizes the groups of income levels under the following criteria:

Threshold	(GNI) Gross Net Income/Capita (Current US\$)
Low-Income	< 1,005
Lower-Middle Income	1,006 - 3,955
Upper-Middle Income	3,956 - 12,235
High-Income	> 12,235

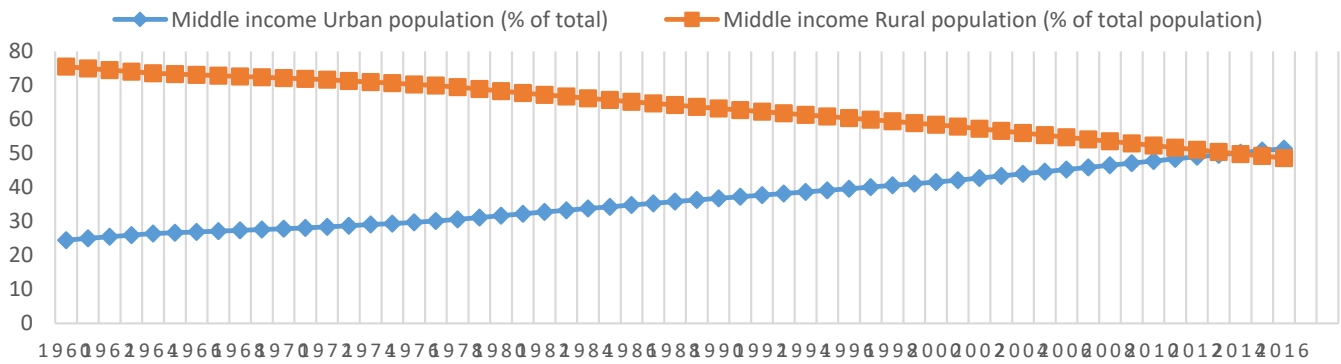
Source: World Bank data team, 2017

**FIGURE 1. HIGH INCOME COUNTRIES**  
**URBAN/RURAL POPULATION (% OF TOTAL) GLOBAL**



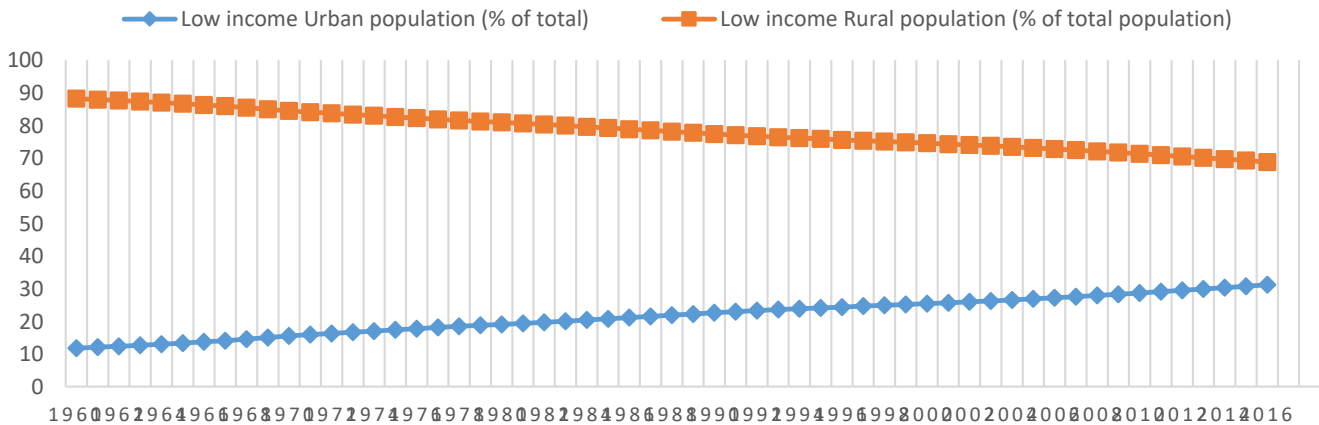
Source: World Bank, WDI (world development indicators)

**FIGURE 2. MIDDLE INCOME COUNTRIES**  
**URBAN/RURAL POPULATION (% OF TOTAL) GLOBAL**



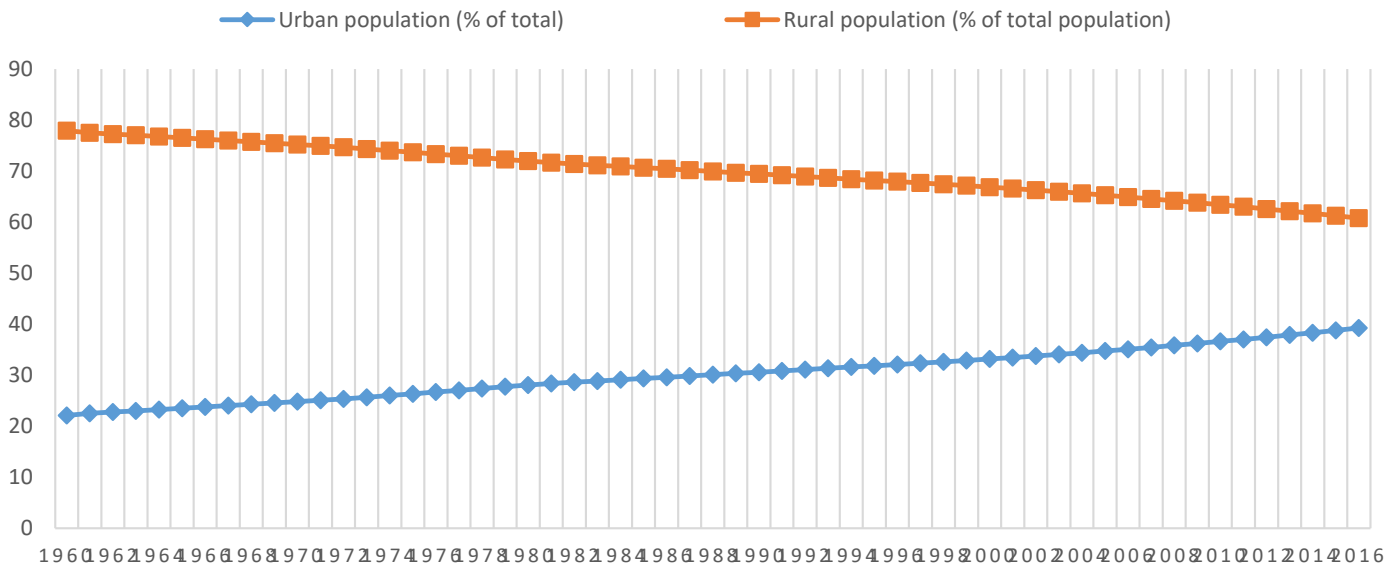
Source: World Bank, WDI (world development indicators)

**FIGURE 3. LOW INCOME COUNTRIES**  
**URBAN/RURAL POPULATION (% OF TOTAL) GLOBAL**



Source: World Bank, WDI (world development indicators)

**FIGURE 4. URBAN/RURAL POPULATION (% OF TOTAL POPULATION) IN PAKISTAN**



Source: World Bank, WDI (world development indicators)

In case of Pakistan, the trend of the urban and rural population resembles with the lower income countries which can be beneficial for future studies.

### Theoretical Framework

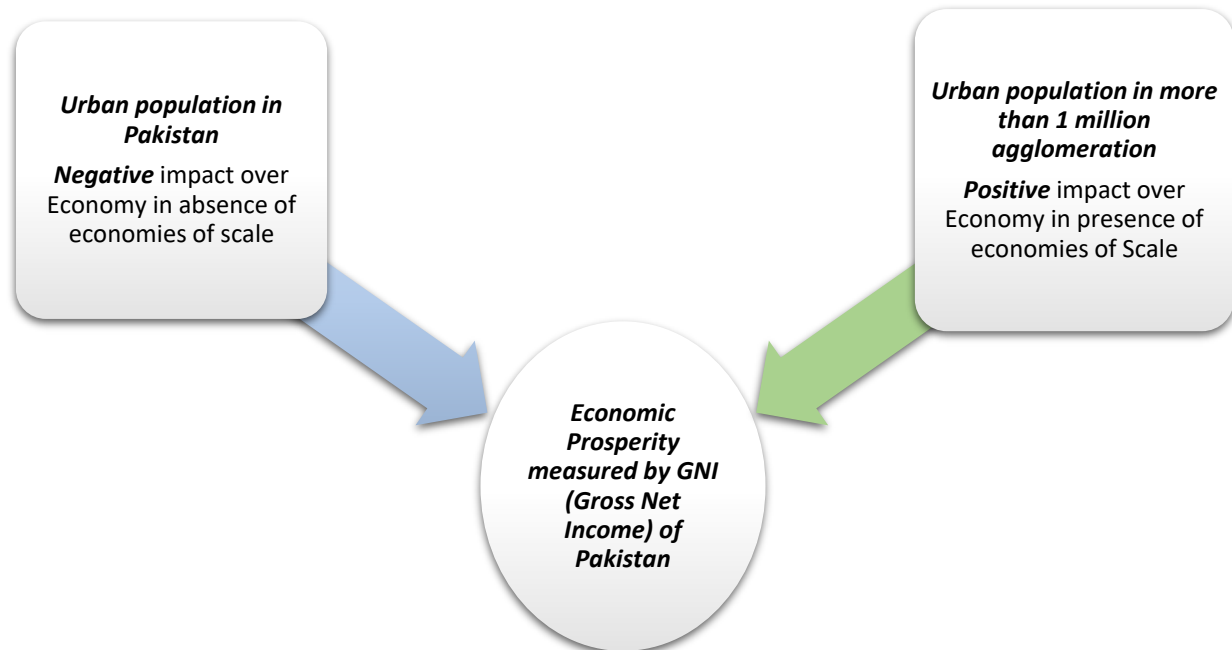
During the past few decades, government authorities and policy makers inclined their respective policies in favor of the spatial roles of populations and how the labor mobility impacts the structural and institutional changes in an economy. History have labeled the industrialization and enhancements in the manufacturing and services sectors to be the driving force behind urbanization. Urbanization with the influx of mass developments in the cities raised the income levels and economic activities in the cities which further gained the attention of the labor surplus in the rural areas or less developed urban areas to move towards the big cities (Awais, Ellahi, & Sher, 2019; Awais, Zulfiqar, Saghir, Sohail, & Rana, 2022). We can simply understand the problem by the principles of Rural-Urban migration and a large number of economists have been working over this issue (Lewis, 1954). The problem starts when a few urban cities grow into urban giants while the many cities face problems of insufficient resources or attention from the government authorities. Although the urban giants contribute significantly towards the economic growth, the rest of the urban areas which are less developed fail to be productive enough to contribute positively towards the national economy relatively. This issue was addressed by a theory which was proposed in the 1970s labelled as the Haris-Todaro Model (HTM), differentiating the expected wages and the actual wages which the people had faced after the Rural-Urban migration. Increasing the expectations of the community towards urban sectors without enhancing the actual productivity of those urban sectors and failing to provide efficient resource allocations incentivized a small portion of the economy while hampered the larger portion of the rest of the economy (Harris & Todaro, 1970). Modernization and higher living standards can be seen in the urban giants with large agglomerations but the regions which lack both the economic and non-economic incentives faced lack of growth and development while moved from these areas towards a few numbers of urban giants (Mazumdar, 1987).

Agglomeration economies can be gained by the clustering of the firms and people closer to each other and form a city with large and diverse communities and strong market structures. An example to understand this concept

is the reduction of the transportation costs. Economists state that a proper and successful urbanization is when the urban areas are able to provide higher local wage rates and higher willingness to pay. Population density or urban concentration have been found to be having a significant and positive impact over Gross metropolitan product and housing prices which indicate that such urban economies might get more pleasant to live and be more productive (Glaeser, 2010). The main driving forces behind the agglomeration economies are economies of scale and division of labor. Economies of scale primarily improves the growth and provides a variety of opportunities for development, while the internal economies of scale greatly reduce the average costs. On the other hand, the external economies of scale (also related to agglomeration economies) provides incentives to the firms and people by bringing them closer to each other and incentivizing them with a bigger and better economic network, strong market structure, low transportation costs, better communication, better research and development etc. Such agglomeration economies in big cities provide the opportunities to gain better education and learnings which further provides a much more efficient and skillful environment to firms so that they can be more productive and cost-affective. Division of labor enables specialization which also enhance the productivity of the respective economies (Turok & McGranahan, 2013).

On the basis of these theoretical footings, below in figure 5 the theoretical framework of current study is provided.

**Figure 5. Theoretical Framework**



Source: Author's own coceptulization based on edixting theoriesof urabanization

Two concepts explain the advantages of agglomeration economies or concentration economies; economies of scale and division of labor. The economies of scale enable the growth of the economic units. Internal economies of scale allow the industries to reduce cost barriers and raise economic productivity while the external economies of scale (agglomeration economies) provide the benefits to the firms and industries for being closer to other industries and gain the benefits of economic growth altogether such as bigger economic network, reduction in transportation costs etc. Cities provide superior markets which enables the economy to grow; having higher tendency of communications and technological innovations. Cities provide firms the institutes that play the role of the provision of learnings and innovation which enables the firm an environment to perform much better and raise the economies of scale. The division of labor allows specializations which raise the productivity and efficiencies of production patterns (Turok & McGranahan, 2013). Urban population in more than 1 million urban agglomerations tend to have a higher impact over the economic growth rate rather than population having less population density or the rural regions.

## Data Sources

This paper utilizes secondary source for the data collection of respective Pakistan’s economic factors. The data has been collected for the period of 1960-2016 of the variables given below in Table 1:

Variable	Code	Description (WDI metadata)	Source
<i>Economic Prosperity</i>	GNI	It is being measured by using GNI (formerly GNP) which is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. Data are in current U.S. dollars.	World Bank. WDI (world development indicators), data.worldbank.org
<i>Urbanization</i>	upop	People living in urban areas defined by national statistics, includes both World bank estimates and urban ratios from UN urbanization prospects.	World Bank. WDI (world development indicators), data.worldbank.org
<i>Agglomerations</i>	popagglo	Population in urban agglomerations of more than one million represents the country's population living in metropolitan regions that in 2000 had a population of more than one million people.	World Bank. WDI (world development indicators), data.worldbank.org

## Methodology

This study aims to find a relationship between urban population, agglomeration and economic prosperity measured through Gross National Income (GNI). To investigate such kind of relationships, existing econometric literature has abundant econometric techniques like Johansen (1988); Johansen & Juselius (1990); and Johansen’s (1995). However now the recent studies have been found in using ARDL approach for cointegration analysis and preferring this to Engle and Granger (1987), and Gregory and Hansen (1996). One of the reasons for preferring the ARDL is that it is applicable irrespective of whether the underlying regressors are purely I(0), purely I(1) or mutually co-integrated. The statistic underlying this procedure is the familiar Wald or F-statistic in a generalized Dickey-Fuller type regression, which is used to test the significance of lagged levels of the variables under consideration in a conditional unrestricted equilibrium error correction model (ECM) (Pesaran et al., 2001). Another reason for using the ARDL approach is that it is more robust and performs better for small sample sizes (such as in this study) than other cointegration techniques. The ARDL approach involves two steps for estimating long run relationship (Pesaran et al., 2001). The first step is to investigate the existence of long run relationship among all variables in the equation under estimation. The ARDL method estimates  $(p + 1)k$  number of regressions in order to obtain optimal lag length for each variable, where  $p$  is the maximum number of lags to be used and  $k$  is the number of variables in the equation. The second step is to estimate the long-run relationship and short-run bi-directional causality between running actors. We run second step only if we find a longrun relationship in the first step (Narayan et al., 2005). This study uses a more general formula of ECM with unrestricted intercept and unrestricted trends (Pesaran et al., 2001).

The following model has been developed to understand the mechanism.

$$\text{prosperity}_t = \alpha_t + \beta_1(\text{popagglo}_t) + \delta_1(\text{upop}_t) + \varepsilon_t$$

In order to standardize our variables and gain the coefficients in form of elasticities, the data has been converted into log form. Hence, we shall obtain the double-log model for national level analysis;

$$\log(\text{prosperity})_t = \alpha_t + \beta_1 \log(\text{popagglo}_t) + \delta_1 \log(\text{upop}_t) + \varepsilon_t$$

## Empirical Estimation

Before econometric analysis using ARDL Model, certain assumptions were necessary to be satisfied. Therefore, a number of tests were conducted which are detailed below along with their results. ADF Unit Root For the econometric analysis of time series data, it is necessary that the data should be stationery. Therefore, the data was transformed to logarithm and then in order to determine stationarity of the data, ADF test was used. The test checked integration order. The results of the ADF unit root test are given in Table 2. ADF test is utilized to ascertain the structural breaks alongside the stationary feature of the data in time-series form. Here we see that

automatic selection (using the Akaike Information Criterion) was used with a maximum of 12 lags of both the dependent variable and the regressors. Out of the 343 models evaluated, the procedure has selected an ARDL(6,3,3) model with 6 lags of the dependent variable Ln (GNI), and three lags for two independent variables.

As the data is time series, we need to determine the level of stationarity of the respective variables. So using the breakpoint unit root test, the variables are stationary at the following difference levels with respective specifications. As the stationarity test shows that variables are not stationary at single level of integration. Therefore OLS estimates will not be having BLUE properties. In order to satisfy the condition of consistency of means and variances ARDL method is applied. ARDL does not require the variables to be stationary at level, and can be of different levels i.e. of order I(0) or I(1) or both; while the dependent variable must stationary at 1st difference. Presence of a variable which is stationary at 2nd difference may cause the ARDL model to crash (Pesaran, Shin & Smith, 2001). Cointegration tests examines that how the time series can be paired such that workings of equilibrium forces making sure that they do not drift far away from oneself and highlights the relationship between the long-run relationship amongst the economic time series that is converging over time. Thus, a stronger empirical statistic for the error correction model is formed that brings together both the short-run and long-run information in the modeling techniques. The long-run relationship is determined by the F-stat (Wald test), when the F-stat exceeds the critical bound. ARDL is further advantageous in case of presence of multiple cointegrating vectors. Bounds Test and ARDL long-run cointegrating techniques shall allow us to evaluate the presence of long-run relationships amongst the variables (Greene, 2003; Nkoro & Uko, 2016).

**Table 2: Stationarity Results**

<b>Specifications</b>	<b>Null Hypothesis:</b> Variable has a unit root	
	<b>Trend Specification:</b> Trend and intercept	
	<b>Break Specification:</b> Intercept only	
	<b>Break Selection:</b> Minimize Dickey-Fuller t-statistic	
<b>Variable</b>	Stationary at difference	Break Date
<b>Ln Prosperity</b>	1	2003
<b>Ln UPOP</b>	0	2013
<b>Ln POPAGGLO</b>	1	1980

Table 2 shows the detailed information about the stationarity of variables. It can be observed that economic prosperity and POPAGGLO are stationary at first difference while UPOP is stationary at level. As the integration levels are different then the estimates through the Ordinary Least Square Model shall be spurious and inefficient. Therefore we shall move towards auto-regressive distributive lag model (ARDL) for estimating the Model (Greene, 2003). Using the ARDL technique, our model shall observe the lag terms of the both the dependent and independent variables. The breakpoint unit root test indicates the break dates which have been incorporated for creating dummies of the variables having ‘0’ from the initial date till the break date, and ‘1’ from the break date till the final date. So, adding the dummies into our model to obtain reliable coefficients, we shall obtain the final model for the national level estimates of the research as follows:

$$\begin{aligned} \log \Delta(\text{gni})_t = & \alpha_t + \omega_1 \log \Delta(\text{gni})_{t-1} + \omega_2 \log \Delta(\text{gni})_{t-2} + \omega_3 \log \Delta(\text{gni})_{t-3} + \omega_4 \log \Delta(\text{gni})_{t-4} + \omega_5 \log \Delta(\text{gni})_{t-5} \\ & + \omega_6 \log \Delta(\text{gni})_{t-6} + \beta_1 \log \Delta(\text{popagglo})_t + \beta_2 \log \Delta(\text{popagglo})_{t-1} + \beta_3 \log \Delta(\text{popagglo})_{t-2} \\ & + \beta_4 \log \Delta(\text{popagglo})_{t-3} + \delta_1 \log(\text{upop})_t + \delta_2 \log(\text{upop})_{t-1} + \delta_3 \log(\text{upop})_{t-2} + \delta_4 \log(\text{upop})_{t-3} + \text{dum}_{\text{gni}} \\ & + \text{dum}_{\text{upop}} + \text{dum}_{\text{popagglo}} + \text{ecm}_{t-1} \end{aligned}$$

$\text{dum}_{\text{gni}} = 1960 \text{ to } 2002 \text{ equals } 0 \text{ \& } 2003 \text{ to } 2016 \text{ equals } 1$



$dum_{upop} = 1960 \text{ to } 2012 \text{ equals } 0 \ \& \ 2013 \text{ to } 2016 \text{ equals } 1$

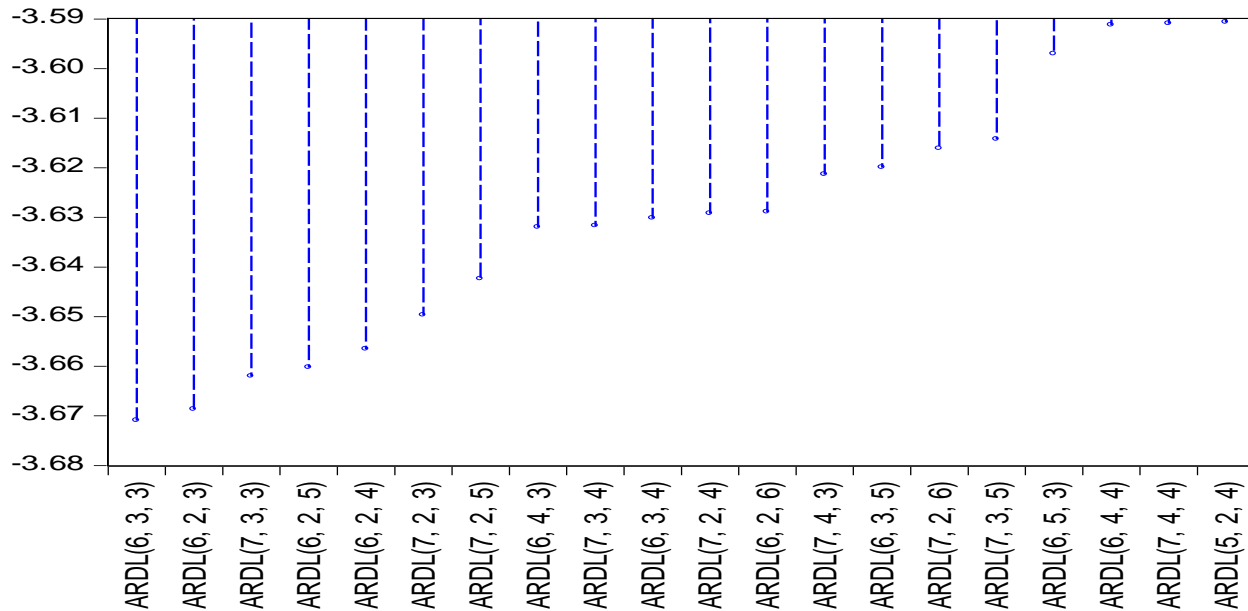
$dum_{popaglo} = 1960 \text{ to } 1979 \text{ equals } 0 \ \& \ 1980 \text{ to } 2016 \text{ equals } 1$

Now next step is to process the data for evaluating the nature of relationship among the desired variable using STATA 9 software. In this regard we will start from ARDL Bounds Test which confirms the existence of relationship.

### ARDL Bounds Test Result

After knowing the time series properties of the data, now ARDL bound test is conducted to test whether there exists any long run relationship among the selected variables. Akaike information criteria is used for the selection of lag length in the model At this length and the results revealed that ARDL (6,3,3) is the best lag combination for our ARDL model estimation amongst 20 models because the literature suggests that the model with the least AIC should always be preferred (Greene, 2003; Shivakumar & Kotreshwar, 2017). Figure 5 given below confirms this test result.

**Figure 5: Akaike Information Criteria**  
Akaike Information Criteria (top 20 models)



Source: Based on author’s estimations

Now the next step is the estimation of the long-run equilibrium relationship among the variables, and the result of the estimation is given in Table 3. The estimation results revealed that all the variables have a strong cointegration relationship as indicated by the estimated F-statistic value of 6.6770, which appears to be higher than lower and upper bounds critical values at 1 percent, regarded as more stringent. Therefore, it can be concluded that all the series are highly cointegrated, and they move together in the long-run.

Test Statistic		
F-statistic	6.6770***	
Number of independent variables (k)	2	
Critical Values Pesaran et al (2001) <sup>a</sup>	Lower Bound	Upper Bound
10%	3.17	4.14
5%	3.79	4.85

2.5%	4.41	5.52
1%	5.15	6.36

<sup>a</sup> Critical values are obtained from Pesaran et al (2001).

Now as the bound test revealed the existence of the long run relationship among the three variable i.e. income growth, agglomeration and urban population, therefore the next step is to estimate the nature of the relationship between variables and the coefficient of error correction term. Table 4 given below shows the coefficients of short run and long run estimates of ARDL Model.

<b>Table 4: ARDL Short Run and Long Run estimates</b>			
Dependent variable: (Ln prosperity)			
Method: Unrestricted ECM Model			
Selected Model: ARDL (6, 3, 3)			
<b>Short Run Estimates</b>			
$\Delta (\ln prosperity)_t$	1.2971	3.4576	0.0017
$\Delta (\ln popaggl)_t$	37.8029	2.6023	0.0142
$\Delta (\ln upop)_t$	-99.2542	-3.5303	0.0014
ECM (-1)	-2.3846	-4.4579	0.0001
<b>ECM = ln prosperity – 10.6107 (ln Popaggl)<sub>t</sub> -0.0179 (ln upop)<sub>t</sub> + 0.3520</b>			
<b>Long Run Estimates</b>			
Ln popaggl <sub>t</sub>	10.6107	3.6960	0.0009
Ln upop <sub>t</sub>	0.0179	0.4884	0.6288
Constant	-0.3520	-1.0525	0.3009

Source: Author’s calculations

This Table 4 shows both the short run and long run estimates of the variables being included in the analysis. The error correction term -2.3846 as reported in the upper part of Table 4 satisfies all the three econometric conditions of being negative, less than one, and statistically significant. The existence of these conditions confirms a long-run equilibrium relationship among the series as well (Alogoskoufis & Smith, 1991; Greene, 2003; Siddiqui, 1997). Moreover the coefficient of the error correction term -2.38 signifies that there is a solid and fast speed of convergence in case of dynamic shortrun disequilibrium back to the equilibrium position. The speed of convergence back to equilibrium position is approximately more than 200 percent every year within the sample study period. Moreover the model estimates have shown that in short run total urban population has a significant negative impact over GNI while the urban population in agglomerations of more than one million states a significant positive impact over GNI supporting the Henerson’s (2003) hypothesis that urbanization has less effect on economic growth of developing economies than share of urbanized people living in the largest city. Similarly our results are in line with Brühlhart and Sbergami (2009) who proved that agglomeration boost the economic growth. It is an evidence in support of agglomeration economies and in case of Pakistan, the agglomeration economies over 1 million population are contributing towards the national income while the only increase in the share of urban population which lacks in agglomeration economies has negative impact over the national economy. However in long run both of the variables are affecting positively to the income level but impact of agglomeration is far greater than the role of urbanization. On the basis of these results, we reject both of our null hypotheses and conclude that there is a positive and significant impact of agglomerations and share of urban population on national income in Pakistan. All these results seems quite attractive however until the post estimations do not support the model, we cannot process further in discussing the implications of the study. Below in Table 5, Diagnostics are presented related to knowing the problem of serial correlation, heteroskedsticity and omitted variable issue in the model. The F-statistics of Breusch-Godfrey and Breusch-Pagan-Godfrey test asserts that there is no serial correlation among selected variable and no heteroscedasticity. For knowing about the errors

specification or misspecification in the model, Ramsey Test is applied and F-statistics supports the null hypothesis says errors are specified accepted since the p-value of the test is insignificant.

<b>Table 5: Diagnostics of the Model</b>			
<b>Breusch-Godfrey Serial Correlation LM Test</b>			
F-statistic	1.137472	Prob. F (2,28)	0.3350
<b>Heteroskedasticity Test: Breusch-Pagan-Godfrey</b>			
F-statistic	0.363008	Prob. F (17,31)	0.9847
<b>Ramsey RESET Test (Functional Form Test)</b>			
Statistics	Value	df	Probability
t-statistic	2.856213	29	0.0078
F-statistic	8.157953	(1, 29)	0.0078
<b>Significance of the Model</b>			
R Squared		0.6738	
Adjusted R Squared		0.4781	
F-Statistic		3.4435	
Prob(F-Statistic)		0.0013	

Furthermore the lower part of the Table 5 also represents the R-square which measures the number of variations or changes in the explanatory variable that is jointly explained by the explanatory variables in the model. It shows that 67 percent change in income growth is explained jointly by the urban population and agglomerations. The F-statistic value measured all the independent variables' joint significance in explaining the dependent variable in the specified model. The estimated value of F-statistic is statistically significant, which indicated that urban population and agglomerations are jointly significant in explaining changes in income growth in Pakistan. Now the next step in ARDL analysis is to perform the causality analysis.

### Causality Analysis

Granger causality test using a VAR model has been performed to check the direction of causal relation among variables in the short run. The testing of the direction of relationship after observing the existence of co-integration among the variables i.e. income levels, urban population and agglomerations.

<b>Table 6: Causality Test</b>			
<b>Null Hypothesis:</b>	<b>Obs</b>	<b>F-Statistic</b>	<b>Direction of the causality</b>
GNI does not Granger Cause POPAGGLO	55	1.67093 (0.1984)	$GNI_t \rightarrow POPAGGLO_t$
POPAGGLO does not Granger Cause GNI	55	4.40479** (0.0173)	$POPAGGLO_t \leftarrow GNI_t$
UPOP does not Granger Cause POPAGGLO	55	6.27957*** (0.0037)	$UPOP_t \rightarrow POPAGGLO_t$
POPAGGLO does not Granger Cause UPOP	55	42.1152*** (2.E-11)	$POPAGGLO_t \leftarrow UPOP_t$
UPOP does not Granger Cause GNI	55	4.26574** (0.0195)	$UPOP_t \rightarrow GNI_t$
GNI does not Granger Cause UPOP	55	0.13077 0.8777	$GNI_t \leftarrow UPOP_t$

\*\*\* 1% level of significance, \*\* 5% level of significance, \* 10% level of significance, respectively. In

parenthesis the P-values are given. Source: Author

Table 6 shows the direction of nexus between all the possible pairs and only in case of UPOP and POPAGGLO there exists significant bidirectional relationship while in case GNI to agglomerations we find no relationship however the reverse exists. Similarly GNI is not adding to the process of urbanization but urbanization is contributing to economic prosperity i.e. national income (GNI) .

## Conclusions and Policy Recommendations

This research aimed to find the relationship between economic prosperity, urbanization and agglomerations for the economy of Pakistan. For this purpose Autoregressive Distributed lag Model (ARDL) was applied and both the short run and long run cointegrations among the selected variables is found. According to the results obtained from the model estimates, urbanization in large agglomerations have shown a direct and significant relationship with GNI both in short run and long run (Chen et al., 2014; Robinson et al., 2012). The same is supported by the findings of a recent research by Ahmad and Jabeen (2020) who tried to relate urban agglomeration with electricity consumption, construction industry and economic performance for china's economy using dataset of 30 provinces. The results showed the importance of urban agglomeration in economics performance. Our findings also supported the study by Deb (2017) who carried out the research for exploring the role of city systems of South Asian Economies in urbanization and economic growth. The author highlighted that majority of urban agglomerations in Pakistan, Srilanka and Bangladesh are seen in the cities where population is found either less than 5 million or even lesser than this and his findings purports that small and medium cities are contributing to economic growth more than primary or large cities. Therefore it can be concluded that Urbanization lacking agglomeration can be assumed to have diseconomies of scale which can further have an adverse effect over the economic performance.

Turning to the another variable i.e. share of urban population, the results showed a negative association of this variable with national income in short run but positive and significant in long run (Nguyen; 2018; Turok, & McGranahan; 2013). This also directs us to better understand the Rural-Urban migration problems in Pakistan as people leave the rural areas because they lack the opportunity to achieve economies of scale at rural areas. These people move towards the urban areas having large agglomerations as it provides them higher opportunity to avail economies of scale and higher gains which substantially increases the urban burden due to inefficient resource allocations and land-use.

On the basis of these findings, this paper recommends the policymakers and administrative bodies to re-evaluate the policies related for the promotion of urbanization. Agglomeration economies play an important role in strengthening a nation's economy while in case of Pakistan, the urban population at large agglomerations i.e. of more than 1 million urban population, can creates opportunities to achieve better economic environment for prospering the nationals. Here there are few recommendations which can be used by the policymakers for improving the process of urbanization and magnitude of urban agglomeration in Pakistan:

- Development of the cities with urban population of more than 1 million is vital as these economies contribute significantly towards the national prosperity
- The concerned authorities need to grow and develop the urban areas with controlled population so that those regions can provide balanced opportunities to achieve economies of scale and people can move to those areas. This will help in reducing the urban burden in large cities and favor equality in economic resource distributions. Improving market structures, infrastructure and development of social welfare including the provision of better health and education can help attract people to these regions specifically and making the regions dense and productive.

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## Ownership Structure and Sustainable Firm Performance: A Literature Review

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### Abstract

**Purpose:** *This study aims to explore the contemporary issues in ownership structure towards the sustainable firm's performance for strategic managerial policy.*

**Design/methodology/approach:** *This study followed the systematic literature review technique.*

**Findings:** *Results found that most of the prior literature on this subject is related to developed countries, while research on this subject in developing countries is found scant.*

**Originality:** *This study offers new propositions on contemporary issues in ownership structure. The proposition alludes to a significant positive impact of managerial ownership, institutional ownership, and family ownership toward achieving sustainable firm performance.*

**Research limitations/implications:** *This review offers insights to managers and practitioners from developing countries towards maintaining a balance between the ownership of various stakeholders towards achieving a better and sustainable firm performance.*

**Keywords:** Ownership structure; sustainable firm performance; ownership concentration; institutional ownership; managerial ownership; family ownership, strategic managerial policy

### Introduction

Ownership and control separation are the main features of modern corporations around the globe. There are several pros and cons of this separation of control and ownership. For example, it can be a reason for improving productivity and can also be a reason for agency costs due to the conflict between shareholders and managers. It is because there are chances that the agents can prefer self-interest over the interest of the principal (shareholders) (Jensen & Meckling, 1976). The shareholders can influence managers through the board of directors to act in the best interest of the shareholders. There are executive and non-executive directors on the board. The efficiency of the board depends on the interests, experience, competence, and activities of the board members. If the board members are influencing, the managers can play their roles in improving firm performance and hence can reduce agency costs. Furthermore, it will enhance the firm performance by monitoring and controlling specifically using their influence on board composition (Mehreen et al., 2020). Similarly, agency problems could be mitigated by corporate governance performance and ownership concentration in emerging economies (Rashid, 2020). However, the interest of dispersed shareholders can be ignored which could raise another agency problem. This paper aims to discuss each strand of ownership through the theoretical foundation and empirical evidence. Agency theory and stewardship theory are the underpinning theories for discussion in this study.

The crucial contribution of ownership structure in influencing the value of the firm is always been in the spotlight (Mehreen et al., 2020). Literature is enriched by the importance of ownership structure toward firm performance (Berle & Means, 1932; Mudambi & Nicosia, 1998; Pound & Zeckhauser, 2009; Qi et al., 2000; Xu & Wang, 1999; Zandi et al., 2019). The other school of thought claims that the ownership structure is only a result of financial intermediations' negotiations in a developed financial market. Additionally, the nexus of ownership structure and firm performance is irrelevant, and management proficiency is controlled by the market mechanism dynamics (Demsetz, 1983; Hart, 1983; Jensen & Ruback, 1983; Martin & McConnell, 1991). Consequently, the ownership structure and performance of the firm are irrelevant to each other (Iannotta et al., 2007; Thomsen et al., 2006).

Agency problems can be controlled through the potential of ownership concentration if it is used as a tool to improve firm performance (Khalfan & Wendt, 2020; Leech & Leahy, 1991; Zraiq & Fadzil, 2018). Ownership concentration and firm performance are positively correlated and firm performance can be better explained by ownership concentration than by any other form of ownership (Ma et al., 2010; Nguyen et al., 2015; Zandi et al., 2019). The efficient monitoring hypothesis best explains this beneficial effect of ownership concentration, which contends that large shareholders can get stronger incentives and greater power from a higher concentration of ownership at a lower cost to monitor management. Substantial empirical evidence supports the claim that large blockholders can monitor the management of the firm more competently without increasing agency costs. The decisions of top executives can be influenced by block holders and they can be better monitors (Gedajlovic & Shapiro, 2002; Khan & Zahid, 2020). A firm's financial performance can be reflected in its stock prices and firms having blockholders show higher stock prices (Claessens & Djankov, 1999). However, no common literature is found on this argument. There are contradictory claims about whether concentrated ownership promotes or impairs company performance, some researchers prove a negative association among concentrated ownership with firm performance (Jameson et al., 2014). that supports the conflict-of-interest hypothesis, in that situation block holders are bound to vote in favor of management through other lucrative relationships with the firm and can be unfavorable to dispersed shareholders and in that way, drop the value of the firm. (Thomsen et al., 2006), and (Foroughi & Fooladi, 2011) discovered an inverse relationship between block holders and the value of the firm and supported the conflict-of-interest hypothesis. while (Hu & Izumida, 2008) reported a U-shaped relationship and found that ownership concentration is negatively associated with firm performance. On the other hand, (Tleubayev et al., 2021) reported an inverse U-shaped curve for ownership concentration and performance. (Wang & Shailer, 2015) suggested a negative relationship between ownership concentration and firm value after considering endogeneity, model specification, and population difference in emerging markets.

Broadly, the literature is enriched by two schools of thought. Fama (Fama 1980) claimed that firm ownership structure is an irrelevant concept if the firm is thought to be a set of contracts. An efficient market and a strong regulatory authority can control principal-agent conflicts that may occur as a consequence of separating ownership from control and the managers can be monitored well. According to financial specialists, ownership structure does matter as it has an impact on the operations of businesses (Jensen & Ruback, 1983; Martin & McConnell, 1991). Grossman and Hart (1986) claimed that the investors of firms having dispersed ownership have a lack of motivation to take initiatives to systematically monitor the activities of management. Mitra, (2019); Tleubayev et al. (2021) found that ownership concentration structure does not matter. In other words, a company's concentrated or dispersed shareholding does not affect firm performance. Demsetz (1983) found a negative relation between the dispersed ownership values of the firm and supported the endogeneity of ownership structure. In the capital market, a form of ownership is viewed as an outcome of the choices made by minority and majority shareholders. Some scholars assert that ownership structure and profitability have no significant relationship. Instead, ownership structure emerges naturally from share transactions through value maximization (Al Ani & Al Kathiri, 2019). Moreover, a form of ownership structure will no longer exist if is not lucrative (Demsetz, 1983). Others argue that corporate governance is great when ownership is managed and consequently, it can positively affect firm performance (Abdallah & Ismail, 2017). Therefore, the performance of firms having concentrated ownership is not significantly different from firms having dispersed ownership (Holderness & Sheehan, 1988; Mitra, 2019).



Many scholars pursued the ownership structure and its effect on firm financial health for decades (Laporšek et al., 2021). However, an integrated view of the subject is missing. Secondly, ordinary financial performance is now being replaced with sustainable firm performance. It is due to the consistent propagation of Sustainable Development Goals SDGs managers nowadays consider the role of sustainability in every business decision. In that vein, the traditional firm performance which mostly deals with profitability is now being replaced by sustainable firm performance which accounts for the green environmental factors such as the role of business firms towards climate change, CO2 reduction, waste reduction, and biodiversity among others. Sustainable firm performance also aims to account for the role of firms towards social elements such as ethical financing, diversity, and human rights performance among others (Ikram et al., 2019). Therefore, This study aims to evaluate, from a holistic perspective, how family, institutional, and management ownership contribute to the achievement of sustainable firm performance. In that vein, this study aims to develop a novel proposition to explore the nexus of government ownership, institutional ownership, and family ownership toward achieving sustainable firm performance. The rest of the paper is followed by a literature review and theoretical foundation. Followed by discussion, proposition development, conclusion, and future avenues.

**Literature Review**

This literature review section of this study first explains the theoretical foundation of this study. It explains the role of agency theory and stewardship theory toward firm performance. In the second place, the literature review section explains the detailed systematic review process. The flowchart of the literature review is presented in Figure 1 below.

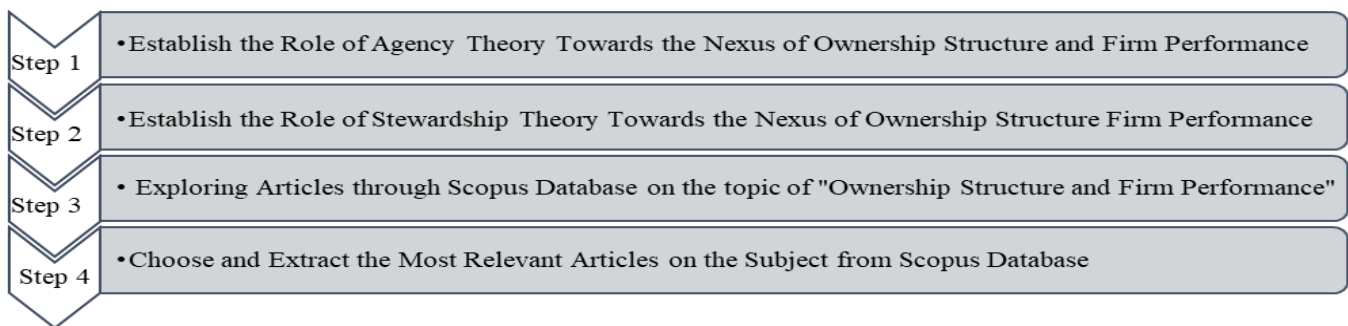


Figure 1. Flow chart of Literature Review

**The Agency Theory and Ownership Structure Towards Firm Performance**

The nexus of institutional ownership and the performance of the firm is supported by agency theory. When ownership and control are separate, there might be chances of conflict of interest. Agency theory states that managers are agents who work on behalf of the principal (owner) (Jensen & Meckling, 1976) and that the agent is supposed to work only for the wealth maximization of the principal. In consonance with that, the managers are monitored through different mechanisms to keep their interests aligned with the value maximization of the principals. Agency theory mainly deals with the reduction of agency cost which may occur because of principal-agent conflicts. The concept is explained in Figure 2 below.

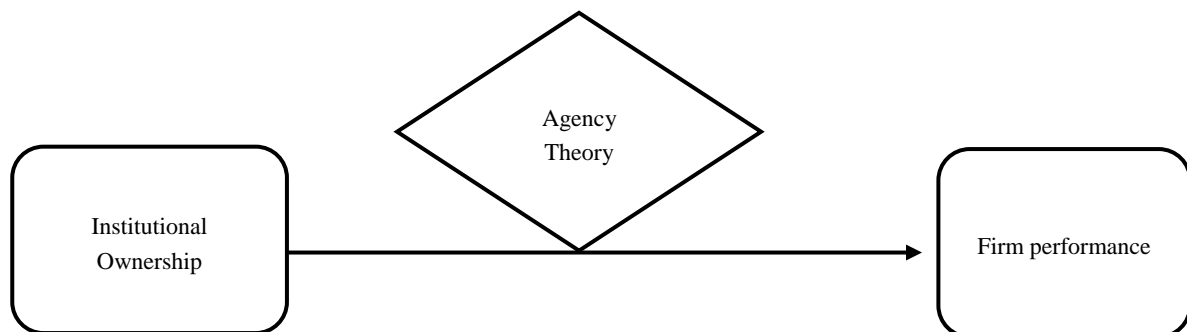


Figure 2. Agency Theory and Ownership Structure

## The Stewardship Theory and Ownership Structure Towards Firm Performance

Stewardship theory claims that managers or workers are intrinsically responsible and are motivated to work without any supervision or control. Stewardship theory supports the nexus of family ownership and firm performance (Davis et al., 1997). Stewardship theory is a popular alternative to the principal-agent theory. Stewardship theory, which contends that when managers control a company, their interests coincide with its objective (value maximisation), lends more credence to managerial ownership. In line with the above statement, the managers will act as stewards and their role will be positively reflected in the firm performance. The concept is explained in Figure 3 below.

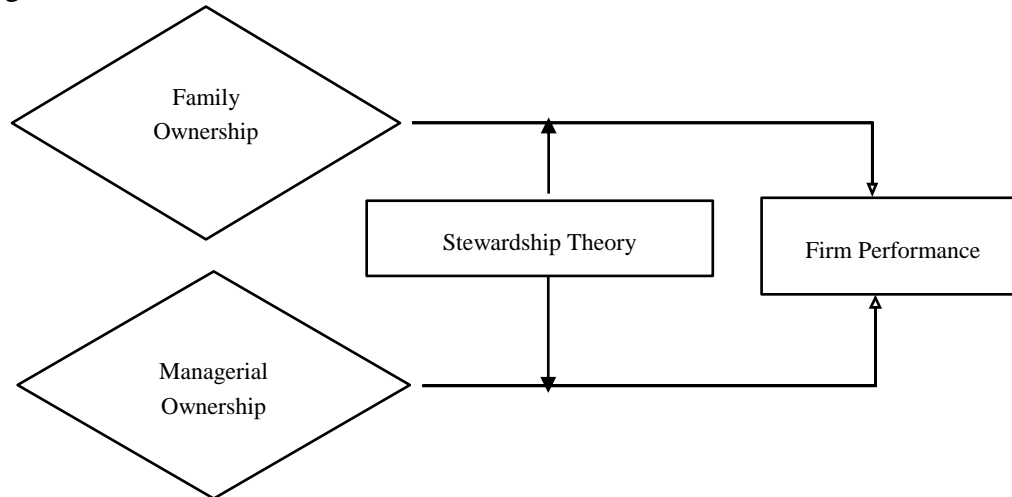


Figure 3. Stewardship Theory and Ownership Structure

### Systematic Literature Review: Methodology

This study followed the systematic literature review method for the selection of journal articles.

### Findings

The following Table 1 shows the results of the previous empirical studies that were shortlisted from the Scopus database. The literature shows mixed results depending on the nature of firms and their differences in economic structures.

Table 1: Empirical studies on ownership structure and firm performance

Author and year	Research Methodology	Dependent Variable	Key Findings	Journal Name
(Demsetz, 1983)	NA	NA	Ownership is an irrelevant concept, and it does not matter in determining firm performance.	"Journal of Law and Economics"
(Morck et al., 1988)	Regression Analysis	Tobin's Q	As the board of directors' ownership grows, Tobin's Q first rises, then falls, and eventually moves up marginally.	"Journal of Financial Economics"
(McConnell & Servaes, 1990)	Regression	Earnings per share and dividends paid out	Firms with large outside shareholders will have a higher price relative to their reported earnings	"University of Chicago Press"
(Keasey et al., 1994)	Piecewise model	Return on shareholder equity	At higher levels of ownership, management becomes more entrenched. Second, it has been confirmed that there is a non-linear link between company performance and managerial ownership.	"Journal of Corporate Finance"
(Mehran, 1995)	Ordinary least-squares (OLS) analysis.	Firm performance (Tobin's Q and ROA), Compensation structure	The proportion of managers' compensation that is based on equity as well as the percentage of equity they own are both positively correlated with the performance	"Journal of Financial Economics"
(Bethel et al., 1998)	Logistic Regression	ROA	Significant blocks of shares in highly diversified but underperforming companies were more likely to be purchased by activist investors.	"The journal of finance"
(Mudambi & Nicosia, 1998)	OLS estimation	Stock returns	Results support the entrenchment and convergence hypotheses using UK data.	Applied Financial Economics"
(Cho, 1998)	Piecewise linear Regression Analysis	Tobin's Q	Empirical data indicates that ownership structure is influenced by business value, but not vice versa	"Journal of Financial Economics"
(Claessens & Djankov, 1999)	Regression Analysis	Profitability and Labor productivity	The positive association between stock prices and ownership concentration	"Journal of Comparative Economics"
(Griffith, 1999)	Regression	Tobin's Q	CEO ownership is found to be a no monotonic function of firm value as measured by Tobin's q. Firm value as measured by Tobin's q is found to be a no monotonic function of CEO ownership	"Managerial and decision economics"
(Himmelberg et al., 1999)	Panel data techniques	Tobin's Q	No relation between managerial ownership and firm performance was found.	"Journal of Financial Economics"
(Xu & Wang, 1999)	Pooled Regression	ROA and ROE	A significant positive relationship between business performance and ownership concentration was found.	"China Economic Review"
(Qi et al., 2000)	Regression	ROE	Ownership has a positive impact on firm performance.	"Pacific-Basin Finance Journal"

(Chen, 2001)	Regression Analysis	Tobin's Q	firms' performance could be improved by domestic institutional and managerial shareholdings.	"Economics of Planning"
(Gedajlovic & Shapiro, 2002)	GLS Random Regression analysis	ROA	The correlation between ownership concentration and financial performance that we observed was positive	"Academy of Management Journal"
(Gürsoy & Aydoğan, 2002)	GMM	ROE, ROA), (P/E), and stock returns (RET)	A higher concentration of ownership adds to better market performance	"Emerging Markets Finance & Trade"
(Lemmon & Lins, 2003)	Regression Models	Stock returns in local currency, Ownership	Crises had a detrimental effect on a company's investment opportunities, which made dominant shareholders more inclined to seize minority stockholders. corporations with management who have segregated their ownership of cash flow and control, despite having high degrees of control rights, have seen 10–20 percentage points lower stock returns during the crisis than other corporations.	"American Finance Association"
(Anderson & Reeb, 2003)	Cross-sectional analysis	Tobin Q, ROA	Non-family businesses outperform family businesses. Further findings indicate that the relationship between family holdings and financial performance is nonlinear, and that performance is greater when family members serve as CEOs than when outside CEOs.	"The Journal of Finance"
(Lins, 2003)	Regression Models	Tobin's Q, Ownership	When a management group's control rights exceed its cash flow rights, the firm values are lower. The large non-management control limits on block holdings are positively related to firm value	"Journal of Financial and Quantitative Analysis"
(Lee & Ryu, 2003)	Regression Analysis	Tobin's Q	The history of the management ownership matters in determining the firm value	"Discussion Paper"
(Baek et al., 2004)	Multivariate regressions	Tobin's q as firm performance, Ownership structure,	During a crisis, differences in corporate governance measures at the firm level affect firm value.	"Journal of Financial Economics"
(Field & Sheehan, 2004)	Descriptive	Corporate block holders, Market value of equity, IPOs	There is weak correlation between ownership structure and underpricing. Several companies set up outside blocks during the IPO and keep them in place thereafter. There is no distinction between underpriced and non-underpriced enterprises in terms of acquiring new block holders.	"Journal of Corporate Finance"
(Atanasov, 2005)	OLS regression	Firm size, investor capital	The firm-level evidence suggests that weak investor protection leads to concentrated ownership lower firm valuation and lower firm growth	"Journal of Financial Economics"
(Earle et al., 2005)	Regression	Ownership structure, firm performance	When there are "too many cooks" involved in the increasing concentration, the marginal costs of concentration could surpass the advantages.	"Journal of Corporate Governance"
(Thomsen et al., 2006)	Granger causality	Bloc holder ownership, Firm value	In Anglo-American market economies, blockholder ownership has no discernible impact on firm value. inversely, in Continental Europe, high block holder ownership has had a significant detrimental effect on financial efficiency and firm value. This does not suggest that the owners are wealthy.	"Journal of Corporate Finance"

(Firth et al., 2006)	Regression	CEO pay, the performance of the firm, block holders	The CEO remuneration policy tends to be a tool used by the majority shareholders to attain their goals.	"Journal of Corporate Finance"
(Berry et al., 2006)	Regression	Compensation structure, unaffiliated block ownership, inside ownership, and board composition	Alternative governance mechanisms emerge as inside ownership declines, helping to minimize the consequent increase in agency costs.	"Journal of Corporate Finance"
(Maury, 2006)	Regression Analysis	Tobin's Q and ROA	A significant relationship between the active family business and profitability as compared to nonfamily control	"Journal of Corporate Finance"
(Iannotta et al., 2007)	Regress Analysis	Profit	While ownership concentration has little bearing on a bank's profitability, it has been linked to improved loan quality, lower asset risk, and lower insolvency risk.	"Journal of Banking and Finance"
(Farooque et al., 2007)	OLS and 2 SLS	Market-to-book value of equity ratio	When the 2-SLS estimation of a simultaneous equation model is performed, the linear and non-linear relationship between board ownership and performance disappears. A reverse causation connection emerges instead.	"Corporate Governance In Bangladesh"
(Gunasekarage et al., 2007)	Pooled Regression	Tobin's Q	The performance of the companies is negatively impacted by state ownership. Only at high levels of government ownership can such a significant negative association be. Furthermore, we discover that a well-balanced ownership structure improves firm performance, while block ownership appears to have negative consequences.	"Research in International Business and Finance"
(Hu & Izumida, 2008b)	Review paper	Firm Performance and Ownership	Concentrated ownership has linked the costs of the expropriation and the benefits of better monitoring by large shareholders. Nevertheless, in Central Europe and East Asian countries, with an average of high ownership concentration, empirical studies have found comparable results that block holders positively affect corporate performance.	"International Business Research"
(Perrini et al., 2008)	Correlation and OLS Regression	Tobin Q	The five largest shareholders' ownership concentration is favorable to the firm's value. Managerial ownership, on the other hand, is helpful only in non-concentrated firms, implying that the dominating owner might use his or her role in the company to gain personal benefits at the cost of other shareholders by hiring managers who represent its interests.	"Corporate Governance"
(Andres, 2008)	Multivariate regressions	Tobin's Q	Founding family ownership outperforms firms with other types of block holders.	"Journal of Corporate Finance"
(McConnell et al., 2008)	Piecewise linear Regression Analysis	Stock Returns	The relationship between insider ownership and firm value was found to be curvilinear.	"Journal of Corporate Finance"
(Hu & Izumida, 2008a)	Simultaneous Equation Model	Tobin's Q, ROA	Found a significant impact on ownership concentration and corporate performance	"Corporate Governance"
(Chu, 2009)	Univariate comparisons and multivariate regression analysis	Tobin's Q	Family ownership was found to have a positive and significant effect on the performance of SMEs. Generally, the findings imply that for SMEs in Taiwan, family ownership is a successful organizational structure.	"Small Business Economics"

(Schultz et al., 2010)	GMM and OLS	Total returns (TR), Tobin's Q (Q), accounting profit rate (PR) and return on assets (ROA).	There is no link between corporate governance and firm performance.	"Australian Journal of Management"
(Ma et al., 2010)	Regression Analysis	Tobin's Q	Despite who the concentrated owners are, ownership concentration improves firm performance.	"Accounting and Finance"
(Foroughi & Fooladi, 2011)	Panel least squared regression	Stock returns	Iranian listed companies' performance is adversely associated with their ownership concentration. Furthermore, the effect of ownership structure on business performance is industry-specific.	"2011 International Conference on Humanities, Society and Culture"
(Chu, 2011)	regression	Stock returns	Firm performance is positively correlated with family ownership. When family members serve as CEOs, top managers, chairpersons, or directors of the firms, the positive correlation is high; However, the relationship is weak when family members are not actively involved in the management or control of the firm.	"Asia Pacific Journal of management"
(Reyna et al., 2012)	2SLS and GMM	Tobin's Q	The country's institutional framework under which the firms were evaluated. In Mexico, businesses with a high concentration of ownership, particularly families, are looking for a better approach to safeguard their interests.	"International Business Research"
(Luo & Liu, 2014)	Correlation and Regression	Tobin's Q, a wedge of ownership and control and Family ownership.	There is a substantial inverse-U-shaped relationship between firm value and the controlling family's ultimate cash-flow rights.	"International journal of Financial Study"
(Yeh, 2014)	Probit Regression	Returns	Large shareholders can efficiently discipline entrenched management by direct involvement in economies where there is no strong takeover market.	"Corporate Governance: An International Review"
(Miralles-Marcelo et al., 2014)	Regression Analysis	Tobin Q and ROA	Size and age play a moderator in determining the effect of family control on firm performance.	"Journal of Family Business Strategy"
(Nguyen et al., 2015)	Panel data	Tobin's Q	The results support agency theory's prediction that large shareholders in marketplaces with concentrated ownership have an efficient monitoring impact.	"International Review of Financial Analysis"
(Wang & Shailer, 2015)	2SLS, 3SLS, and GMM	Accounting and market performance measure	Across countries, a negative relation between ownership concentration with firm performance was found.	"Journal of Economic Surveys"
(Lozano et al., 2016)	Regression, GMM	Returns	The U-shaped relationship between ownership concentration and firm value was found	"International Business Review"
(Abdallah & Ismail, 2017)	Regression Analysis	Tobin's Q	At low levels of ownership, the quality of corporate governance positively affects firm performance.	"Journal of International Financial

				Markets, Institutions and Money”
(Schmidt & Fahlenbrach, 2017)	OLS	ROA, Returns	A changed ownership structure causes higher agency costs.	”Journal of Financial Economics
(Martinez & Requejo, 2017)	GMM	Tobin’s Q	Family control positively affects performance	International Review of Finance”
(Su et al., 2017)	Regression	Tobin’s Q	The value of the company is negatively impacted by the existence of a dominant ultimate controlling shareholder and by the discrepancy between its cash flow rights and control. The relationship between the ultimate majority shareholder and firm value is mediated by corporate risk-taking.	”Asia Pacific Basin Review”
(Mohammed, 2018)	Pooled Regression	ROA, ROE, and Tobin’s Q	Most firms are following family-based concentrated ownership, which affects firm performance positively.	”Academy of Accounting and Financial Studies Journal”
(Machek & Kubiček, 2018)	Linear Regression	Tobin’s Q	A highly concentrated ownership structure can help reduce agency costs.	
(Mitra, 2019)	Panel regression	ROE, ROA, and Tobin’s Q	Ownership structure matters. A positive impact of foreign ownership was found on firm performance.	”International Journal on Recent Trends in Business and Tourism”
(Al Ani & Al Kathiri, 2019)	Panel regression	ROA, ROE, and MFV	In the industrial sector, ownership concentration has a significant positive impact on ROA and ROE. While there is no effect on the market’s fair worth.	”The European Journal of Applied Economics”
(Khalfan & Wendt, 2020)	Logit Regression	Dividend payout	A mixed relationship between ownership concentration and dividend payouts is found in different countries.	”Journal of Multinational Financial Management”
(Khan et al., 2020)	Panel Regression	ROA and Net Interest Margin	High concentration can help in improving firm performance. The age of the firm has a negative impact on firm performance.	”Journal of Banking and Finance Management”
(Matinez-Garcia et al., 2020)	Univariate analysis and GMM	ROA	Highly concentrated ownership structure found in GCC. Families and the state are the main controllers.	”International Journal of Emerging Markets”

Table 1 presents the findings of the shortlisted studies on the impact of ownership structure on firm performance. The tabulated literature identified several nexuses, including the following: (a) family ownership and business performance; (b) institutional ownership structure and firm performance; and (c) management ownership and firm performance. These various nexuses are discussed below for appropriate proposition development.

## Discussion and Proposition Development

### Managerial Ownership and firm performance

Firm value is greatly affected by the managers' decisions as their right decisions result in maximizing the firm performance which influences shareholders' value positively and vice versa (Khan et al., 2020). Managerial ownership is found positively associated with the value of the firm (Iwasaki et al., 2022). The relationship between managerial ownership structure and the value of the firm can be reflected in two viewpoints: agency theory and stewardship theory. In light of these theories, empirical literature stated diverse findings (Demsetz & Lehn, 1985; Hermalin & Weisbach, 1991; McConnell & Servaes, 1990). The diverse empirical findings are frequently stated to explicate the complex part played by management. When managers are stewards their interests are similar to owners and thus firm performance is positively affected. From a firm perspective, managers may be involved in pursuing their self-interests, hence, negatively affecting firm value (Berle & Means, 1932), and if a minimal ratio of shares is held by the managers, they will be unable to take advantage by maximizing the shareholders' value (Jensen & Meckling, 1976). In this case, the firm performance is negatively affected by managerial ownership through the utilization of managerial discretionary expenses (Mukaria et al., 2020).

### The Nexus of Managerial Ownership and Firm Performance; A Curvilinear Relationship

A substantial body of empirical research indicates that managerial ownership structure and the firm's value have a curvilinear relationship (De Miguel et al., 2004; McConnell & Servaes, 1990; McConnell et al., 2008; Mehran, 1995; Morck et al., 1988; Mudambi & Nicosia, 1998). This association can be enlightened by (i) the Entrenchment hypothesis (agency perspective) and (ii) the Convergence of interest hypothesis (stewardship perspective). According to the stewardship perspective, agency problems start to decline with an increase in the manager's proportion of ownership. As the interest of managers converges and gets aligned with that of shareholders, it solves the agency problem. According to the entrenchment hypothesis, when a manager has a considerable number of shares, he/she will benefit from his or her managerial post and will not be too serious about the value creation of other shareholders. Since as owners, the managers cannot monitor themselves, their interests can be different from increasing firm value. Consequently, according to the agency perspective, managerial ownership and the value of the firm are adversely correlated (Mukaria et al., 2020). Morck et al. (1988) discovered a curvilinear association between ownership structure and firm performance. If the managerial share falls between 5% and 25%, the authors discovered a negative correlation between managerial ownership and business value. The authors claimed that the relationship will be positive if the share is 5% or less. The main reason for this change is the amount of power to fulfill the managers' interest at the shareholders' cost. In the same vein, the goal of shareholders' wealth maximization is inversely aligned with the proportion of insider ownership. A similar trend of firm value increasing and then decreasing was imperially found by (De Miguel et al., 2004; Keasey et al., 1994; McConnell & Servaes, 1990; Mudambi & Nicosia, 1998).

### The Nexus of Managerial Ownership and Firm Performance; A Non-Curvilinear Relationship

Craswell et al. (1997) found a weak curvilinear relationship between managerial ownership and firm performance. (Farooque et al. 2007) claimed that the relationship between board ownership and the performance of the firm is not significant and highlighted strengthening the internal control in Bangladesh. Iwasaki and Mizobata (2020) alluded that the concentration of managerial ownership could have a nonlinear effect on business performance: where insiders are the concentrated owners, they have entreated efficient management stemmed from their consistency in management and ownership. Although they may disregard minority shareholders where insiders have assumed dominant roles, and influence from outside stakeholders will be suppressed. Then at the cost of



other investors, a large shareholder could abuse management. The results show a sign of managerial ownership of the performance of the firm. Moreover, Agency issues have a negative impact on corporate performance (Shah & Hussain, 2012).

Strategic choices are made when there is a significant managerial ownership stake and when those choices are in the long-term interests of shareholders. According to good management theory (Waddock & Graves, 1997), a company's long-term worth is increased by socially responsible decisions. According to a meta-analysis of 52 studies, (Orlitzky et al., 2003), corporate sustainability is favorably correlated with firm financial performance. Accordingly, managers with high degrees of ownership are probably supportive of company sustainability, which adds to the long-term wealth of shareholders, according to studies on incentive alignment mechanisms. Based on the above discussion, this study has developed the following proposition:

***P1: Managerial ownership has a significant positive impact on sustainable firm performance.***

## **Institutional ownership and firm performance**

Institutional shareholders are entities such as commercial banks, pension funds, mutual funds, insurance companies, investment firms, and other financial and non-financial, government and foreign institutions (Mukaria et al., 2020). Financial institutions could best monitor managerial behavior. Xu and Wang (1999) Quoted: "It is timely and vital to research corporate governance issues in light of the financial crises in East Asia. The institutional structures and procedures that enable outside investors to exert control over a company's insiders in order to protect their capital are collectively referred to as corporate governance." Financial institutions have played a remarkable part in controlling institutional ownership (Mintz & Schwartz, 1985). They control and adjust management behavior with the size and specialized knowledge they possess. Large outsider investors could play an essential part by screening and monitoring the management of the firm, and by making the right decisions in favor of increasing stock prices and improving firm value (Chen, 2001; McConnell & Servaes, 1990). In this regard, the expertise and motivation of institutional investors also improve management performance and corporate governance (Xu & Wang, 1999). Institutional shareholders play a more important role in the regions where shareholder protection is weak (Jan et al., 2021; Qi et al., 2000).

The value of the firm is positively affected when a firm is supervised by large shareholders as active monitoring reduces agency costs and enhances managers' performance (Lin & Fu, 2017; Nashier & Gupta, 2020). As compared to the other ownership structures, large shareholders could better perform in maximizing the value of the firm (Thomsen & Pedersen, 2000). Nevertheless, the literature suggests that in some cases, institutional shareholders can make alliances with the managers. Pound (1988) presented the strategic alliance hypothesis which claims that institutional shareholders might collaborate with the managers and make agreements on matters of their common interest. In line with that, institutional shareholders might not be effective in performing their role (Craswell et al., 1997). In addition to inducing firm performance and the functions of corporate governance, institutional ownership has an impact, especially on the areas of board composition, CEO duality, block holders, and diversity of leadership (Li et al., 2006).

Foreign investors play an extraordinary part as controllers. An empirical investigation into the relationship between foreign ownership and a company's performance in India was carried out by (Chhibber & Majumdar, 1999). The percentage of foreign shareholders was chosen as a control variable, and return on sales and return on assets were used as proxies for performance. The study found that firms having effective foreign control outperformed. (Konijn et al. 2011) found a negative relationship between blockholder dispersion and the value of the firm, and between complete blockholding and firm value in the US financial market. (Yu and Van 2013) claimed that in Chinese Listed Firms, block holding is better than dispersed shareholding in the presence of political support and government links. The authors found a U-shaped result among state ownership and firm value. On the other hand, (Gunasekarage et al. 2007) identified a negative correlation between a higher amount of government ownership structure and the firm performance.

According to agency theory, Because institutional investors are monitoring management, decisions are made that are consistent with the shareholders' long-term objectives. Therefore, it is likely that businesses will be

encouraged to actively participate in corporate sustainability practices by a high level of institutional ownership. Grounded on the above argument, this study has developed the following proposition:

***P2: Institutional ownership has a significant positive impact on sustainable firm performance.***

## **Family Ownership and Firm Value**

Family ownership can help in increasing the value of a firm, especially if the owner occupies an official position such as president or director (Villalonga & Amit, 2006). In contrast to nonfamily control, proactive and engaged family owners instigate benefits, which can help minimize agency problems among shareholders and managers (Maury, 2006). Similarly, family ownership is deemed to be flanking various types of institutional owners due to their broad legislative control and is especially significant where forming a dynasty is still dynamic and has influence or control over the business (Andres, 2008). Based on the significant impact of family ownership on SME operations, family ownership is recommended as a powerful corporate governance tool (Chu, 2009, 2011; Miralles-Marcelo et al., 2014; Mohammed, 2018). There was no difference in firm profitability between family and nonfamily firms after accounting for firm age and size as mediators, especially for smaller and more experienced firms. Family businesses, on the other hand, are strongly associated with bookkeeping performance while being less zealous in demonstrating efficiency. (Luo and Liu 2014) proposed an interesting opposing U-shaped relationship between the dominant family's fundamental income rights and the firm value calculated by Tobin's Q. That is, when the concentration of family ownership grows, the value of the company rises at first, then declines. This study rekindles our insight into the relationship between family ownership concentration and business value in emerging nations, such as China.

In the Mexican market, the literature demonstrates that ownership concentration makes a significant difference. In Mexico, businesses with a large concentration of ownership, particularly families, preserve their interests by looking for a better strategy. Nonetheless, because of the strong concentration in families, additional approaches, such as debts or board composition, are employed, with unexpected outcomes (Reyna et al., 2012). A high amount of family ownership and pyramid structure is found in GCC countries. Literature found more concentration in non-financial than financial firms. The authors found no relationship without the moderating role of formal institutions (Matinez-Garcia et al., 2020).

Nonfamily firms outperform family businesses. An additional examination reveals that the relationship between family possessions and business performance is curvilinear, and that performance gets better for outside CEOs when relatives step in as CEO. Minority shareholders are strongly influenced by family holdings, proving that family ownership is a sustainable authority ownership structure (Anderson & Reeb, 2003). The largely concentrated block holders proved to be better controllers than the small shareholders in the Italian Market. Although there is a significant relationship between the five largest block holders' ownership concentration and firm profitability, managerial ownership is only beneficial in non-concentrated businesses (Perrini et al., 2008). For the period 1992 to 1998, (Gürsoy and Aydoğan 2002) used a sample of Turkish companies listed on the Istanbul Stock Exchange. They looked at how an ownership structure affects a firm's risk-taking behavior and value. Based on the above discussion, this study has developed the following proposition:

***P3: Family ownership has a significant positive impact on sustainable firm performance***

## **Conclusion and Policy Implications**

In emerging markets, continued interest in the potential ownership-performance relationship has produced various conflicting outcomes within and between countries. Implicit demographic variations, sampling selection choices, and modeling preferences made by the researchers illustrate significant variability in the findings reported. Considering the environment in which the business operates, all aspects of ownership can be leveraged to improve business performance. If the country's regulations are poor, block holders and institutional investors can help to improve the firm's value by enforcing strict control and minimizing the agency cost (Nashier & Gupta, 2020). If the government is well-regulated, the ownership structure is irrelevant, and management can be managed by rules and laws. The agency problem can be addressed in this scenario. The advantages of stronger supervision and the

costs of takeover by block holders are linked to concentrated ownership. Conversely, consistent results from empirical research in relatively high ownership concentration countries in East Asia and Continental Europe suggest that block holders have significant impacts on the success of business firms. The facts allude that a level of concentration of ownership can create profit, but it can produce negative externalities at the macro level in terms of competitiveness, fiscal transparency, and allocation of resources. At the micro-level, corporate sustainability and minority shareholder interests may have unfavorable externalities. Some research has suggested an inverse U-shaped link between business value and managerial ownership, implying that insider ownership has a convergence-of-interest and entrenchment effect. However, the effect has tended to become negligible when attempts are made to control the endogeneity of ownership structure.

### **Implications for Strategic Managerial Policy Formulation**

The proposition of this study offers insights into strategic managerial policy formulation. Most of the prior literature on this subject is related to developed countries, while research on this subject in developing countries is found scant. This study offers novel propositions on contemporary issues in ownership structure toward sustainable firm performance. It insights into managers from developing countries about the role of government ownership, institutional ownership, and family ownership towards achieving sustainable firm performance through maintaining a balance between the ownership of these various stakeholders. Based on the propositions of this study offers various strategic managerial policies.

Managers with high ownership (managerial ownership) are advised to embrace sustainable business practices and Sustainable Development Goals SDGs in their business strategies. It is because the stakeholders' theory alludes that sustainable business practices improve firm performance. In that vein, managers with a high share will record a significant positive increase in their ownership. It is because based on the "convergence of interest" philosophy the interest of managers and that of the firm converge to the common point in this case, 'sustainability'. Hence, the P1 in this study insights managers with high shares to embrace sustainable business practices as it will improve their share value in a sustainable manner

Despite the possibility that not all institutional holders' opinions will always be in agreement, institutional owners influence companies to make decisions that are in the best interests of the shareholders. They have advantages over other minority shareholders in terms of information and significant voting power. Institutional owners of substantial shares are also more aware of the company's strategic choices than other shareholders because they find it difficult to quickly sell their equity without decreasing stock prices. According to good management theory, institutional ownership should have a favorable impact on a company's actions regarding its social initiatives. Institutional shareholders are willing to take a more aggressive role in sustainable business practices if socially responsible actions can increase long-term shareholder value. Institutions spend more money on businesses that perform better in terms of corporate social responsibility. Institutional investors reward companies that actively participate in sustainable business practices. Public pension funds often consider a company's long-term effects on sustainability, good corporate citizenship, and the environment when making investment decisions. We contend that while effective institutional shareholder monitoring systems have favorable effects on sustainable business practices, these effects are not linear. Depending on the amount of ownership, a slight increase in institutional ownership will impact sustainable business practices differently. A slight increase in ownership will greatly expand the monitoring role, especially when institutional ownership is relatively modest. Nonetheless, there may be overlap in the monitoring efforts of many organisations when there is a high level of institutional ownership. Under these circumstances, monitoring may not be significantly impacted by a slight increase in institutional ownership. Furthermore, a high proportion of institutional ownership generates a group of institutional investors, and this group may have "conflicting" tastes when it comes to sustainable business practices. This situation might even be harmful to CSR because it requires the unwavering support of major shareholders to be sustained. Conflicting opinions from various institutional investors could discourage such a sustained commitment to sustainable business practices. Lower sustainable business practices ratings are caused by significant levels of institutional ownership of blocks. And thus the desired level of institutional ownership is

vital to achieving sustainable performance. Accordingly, this P2 of this study insights into policy-makers to maintain a balanced ratio of institutional ownership toward positive and sustainable firm performance.

In terms of family ownership, the proposition of this study illuminates that family-owned firms can far better contribute to sustainable firm performance due to the lack of block-holding problems. The family-owned firms want to retain their power, and for that to happen they might embrace those business practices that continuously improve their business performance. The proposition (P3) of this study anticipates that compliance with sustainable business practices might lead to sustainable firm performance in family-owned firms. Thus, this study insights into the managers of family-owned firms to perform sustainable business practices which will improve their firms' performance sustainably.

## Future Avenues

The scope of the articles selected for this study is limited to the subject areas of economics, econometrics, and finance. Future research can extend the scope of the article selection to other business areas, such as management, marketing, and human resource management. Furthermore, this study selected articles from the Scopus database, future studies can extend the scope of this work by selecting articles from the WOS database.

## Statement on Conflict of Interest

The authors do not have any conflicts of interest.

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# Ranking Classification Algorithms Using MCDM Techniques for Credit Card Fraud Detection with Imbalanced Perspective

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## Abstract

*Over the last few years, credit card fraud (CCF) has emerged as a serious concern in financial risk detection. Classification algorithms are among the robust methods to detect, analyze, and predict such frauds with low complexity, pre-detection, and loss estimation. However, class imbalance—where the number of legitimate transactions far exceeds the number of fraudulent ones—adversely affects a classifier's performance, and the results become divergent for different performance measures due to their multifaceted outcomes. This poses a key challenge in ranking such algorithms. Moreover, fraud data is inherently imbalanced with non-static behavior, so a single classifier or a group of classifiers cannot provide satisfactory results for all imbalance ratios. Motivated by this observation, we analyze the impact of class imbalance through 10 classifiers and 8 performance measures, which are finally ranked by Multi Criteria Decision Making (MCDM) techniques for a unified approach. Results are analyzed for low skewed datasets, where classification algorithms outperformed for low skewed CCF datasets. Based on our findings, we present a unified approach for ranking the classification algorithms in relation to different imbalance ratios in credit card datasets. This study can be very useful for financial institutions to increase their fraud-catching rate.*

**Keywords:** classification algorithms; MCDM; class imbalance; credit card fraud.

## Introduction

Over the past few decades, credit card fraud has emerged as a significant challenge for financial institutions (Maryeme, Hatim, & Mahmoud, 2019; Singh, et al., 2024). The rapid expansion of e-commerce has further heightened the risk of fraud (Cherif, et al., 2023). To mitigate the financial losses associated with fraud, there is a pressing need to adopt advanced techniques from knowledge discovery, machine learning, and pattern recognition (Anis, Ali, Mirza, & Munir, 2020; Maira & Mohsin., 2017; Maira, Mohsin, & Amit, 2015). One promising approach is the use of classification algorithms, which can streamline the fraud detection process.

Classification algorithms are known for their efficiency in detecting fraud by employing various models such as mathematical programming (Chen & Shih., 2006; Frydman, Altma, & Kao, 1985; Peng et.al., 2008; Tseng, Liu, & Ho, 2008), non-parametric statistical analysis (Opricovic & Tzeng, 2004), artificial intelligence (Altman, Avery, & Eisenbeis, 1981; Atiya, 2001; Carter & Catlett, 1987; Desai, Conway, & Crook, 1997; Leonard, 1993; Varetto, 1998), and traditional statistical models (Opricovic & Tzeng, 2004). These algorithms are often considered superior to traditional fraud detection methods due to their higher predictive accuracy and reduced susceptibility to human error (Atiya, 2001).

However, a critical challenge in using classification algorithms for credit card fraud detection is the issue of class imbalance, where legitimate transactions vastly outnumber fraudulent ones (Anis, Ali, Mirza, & Munir, 2020; Maira & Mohsin., 2017; Maira, Mohsin, & Amit, 2015). This imbalance can significantly impair the performance of classifiers, leading to inconsistent results across different performance measures (Feng, Zhou, & Tong, 2021;

Zhu & Zhang, 2024). Consequently, ranking these algorithms becomes a complex task due to the varied outcomes produced by different evaluation metrics.

While numerous studies have focused on the application of classification algorithms in fraud detection, there is limited research on systematically evaluating and ranking these algorithms in the context of class imbalance. Most existing studies do not address how different imbalance ratios affect the performance of various classifiers, nor do they provide a comprehensive method for comparing these algorithms across multiple performance measures.

Addressing this research gap, our study investigates the impact of class imbalance on the performance of 10 classification algorithms using 8 performance evaluation measures. To achieve a robust comparison, we employ Multi-Criteria Decision Making (MCDM) techniques.

MCDM techniques are a set of methods used to evaluate and prioritize multiple competing criteria in decision-making processes. In our study, we use three MCDM techniques to rank the classifiers:

**Technique for Order Preference by Similarity to Ideal Solution (TOPSIS):** This method ranks alternatives based on their distance from an ideal solution.

**Analytic Hierarchy Process (AHP):** AHP decomposes a complex decision-making problem into a hierarchy of simpler sub-problems, each of which can be analyzed independently.

**VIKOR:** This method focuses on ranking and selecting from a set of alternatives, and determines compromise solutions by considering the closeness to the ideal solution.

Our study aims to provide a unified approach for ranking classification algorithms across various imbalance ratios in credit card datasets, ultimately aiding financial institutions in enhancing their fraud detection capabilities.

## Literature Review

Literature provides a series of studies for the ranking of classification algorithms in various domains. The approach proposed in Kou, Lu, Peng, and Shi (2012) resolved disagreements among MCDM methods based on Spearman's rank correlation coefficient. The conflicting MCDM rankings reached an agreement for the techniques employed for the study. Evaluation of clustering algorithms is fundamentally a difficult task. However, Kou, Peng, and Wang (2014) presented an MCDM approach for the evaluation of clustering algorithms used for financial risk analysis. The results show the effectiveness of MCDM methods and highlight the repeated-bisection method as a strong performer for 2-way clustering solutions in financial risk datasets.

Feature selection is crucial for text classification as it reduces dimensionality, thereby enhancing classification performance and efficiency. Additionally, it improves model interpretability by identifying the most relevant features, which aids in better generalization on small sample data. Kou et al (2020) evaluates feature selection methods for text classification with small sample datasets involves multiple criteria, making it an MCDM problem. The results of the study show the effectiveness of MCDM-based methods in evaluating feature selection methods and provide recommendations based on ranked results.

Various classifiers have been proposed for financial risk prediction, but using a single performance metric is inadequate for evaluating imbalanced classifications (Batool, Awais, Rehman, Shafiq, & Dar, 2019), (Yaqub, Rehman, Awais, & Shafiq, 2018). The study Song and Peng (2019) presented a multi-criteria decision-making (MCDM) approach to evaluate imbalanced classifiers in credit and bankruptcy risk prediction by considering multiple performance metrics simultaneously. An experimental study using the TOPSIS method over seven financial datasets from the UCI Machine Learning Repository indicates that SMOTE-based ensemble techniques outperform other imbalanced learning methods. SMOTEBoost-C4.5, SMOTE-C4.5, and SMOTE-MLP were ranked as the top classifiers based on their performance across six criteria.

Classification algorithm performance for a learned predictive model is evaluated on the training dataset for the unseen observations (test dataset). The past studies in (Anis, Ali, Mirza, & Munir, 2020; Maira & Mohsin., 2017; Maira, Mohsin, & Amit, 2015) indicate that the classification results optimal with one performance measure may not be best with the use of different performance measures. Also, there are some other factors that contribute to the divergent results obtained by these performance measures such as, class distribution, noise, dataset characteristics etc. Thus, it is not feasible to use a single performance measure. Following are some of the basic

evaluation measures used for classification algorithms (Kou et al., 2020; Kou, Lu, Peng & Shi, 2012; Kou., Peng, & Wang., 2014; Song & Peng, 2019).

### **Overall Accuracy (OA)**

Accuracy defines the overall effectiveness of the classifier by giving the %age of correctly classified instances. It is one of the most commonly used classification performance metrics and is given by where TN, TP, FN, and FP are acronyms for True Negative, True Positive, False Negative and False Positive, respectively. Here negative represents good or legitimate instances whereas positive refers to bad or fraudulent instances.

$$OA = \frac{TN + TP}{TN + FN + TP + FP}$$

TP represents the bad transactions predicted as bad.

TN represents the good transactions predicted as good.

FN represents the bad transactions predicted as good.

FP represents the good transactions predicted as bad.

### **True Positive Rate**

A True Positive Rate (TPR) is the number of correctly classified positive instances or minority instances. In this case positive instances are the fraudulent instances. TPR is also called sensitivity measure given as

$$TPR = \frac{TP}{TP + FN}$$

### **True Negative Rate**

A True negative rate (TNR) defines the number of correctly classified negative or majority instances. In this case the negative instances belong to the non-fraudulent class. TNR is also called specificity and is defined as

$$TNR = \frac{TN}{TN + FP}$$

### **Precision**

Precision (P) is the number of classified minority or positive instances that actually are positive instances. In this case precision refer to the fraudulent instances that are actually fraudulent, and given as

$$P = \frac{TP}{TP + FP}$$

### **Area under ROC Curve**

ROC refers to Receiver Operating Characteristic that represents a tradeoff between the TP and FP. ROC analysis offers more robust evaluation for the predictive performance, of the relative class, of alternative models than traditional comparison of relative error. Key assumption of ROC analysis is that the tradeoff between TP and FP tells the predictive performance of the classifiers independent of their class distributions. Area under ROC curve calculates the accuracy of classifiers. Larger area represents better classifiers with high TP rate.

### **F-measure**

F-measure is defined as the weighted harmonic mean of the precision and recall. This metric was firstly used in information retrieval and is defined as

$$F - \text{measure} = \frac{2(\text{Precision} * \text{Recall})}{\text{Precision} + \text{Recall}}$$

### **Kappa-Statistics**

Kappa statistic measures the similarity or agreement between the qualitative variables. This agreement between variables is defined as

$$\text{Kappa Statistic} = \frac{P(A) + P(E)}{1 - P(E)}$$

### **Mean Absolute Error**

It measures how much predictions are deviated from the true probability. MAE is defined as

$$\text{MAE} = \frac{\sum_{j=1}^c \sum_{i=1}^m |f(i, j) - P(i, j)|}{m, c}$$

where  $(i, j)$  represents the estimated probability of  $i$  module to be of class  $j$  that take values in  $[0, 1]$ .

As the classification algorithms are assessed over different performance measures e.g., AUC, F-measure, TPR etc, and the selection of an optimal classifier process involves several criteria (performance measures) so this can be modeled as a MCDM problem.

Multi criteria decision making (MCDM) is a process of selecting optimal alternative under a given set of criteria and their sub criteria if there are any. Over last decade, some remarkable studies have been presented to rank classification algorithms for different real-world problems (Kim et al., 2003; Kou, Lu, Peng, & Shi, 2012; Kou et al., 2005; Peng & Wang, 2010; Visa & Ralescu, 2005). These studies have also ranked classification algorithms for credit risk analysis. However, none of them consider the class imbalance in ranking classification algorithms. This study adopts the analytical hierarchy model (AHM) proposed by Kou and Wenshuai (Peng & Wang, 2010). For this study 10 classifiers will be ranked for the different imbalance ratios of credit card data sets based on their performance measures.

## **Methodology**

This study utilizes two datasets: the Australian Credit Approval (ACA) and the German Credit Dataset (GCD), each with distinct imbalance ratios. The primary objective is to evaluate and select classification algorithms for credit risk analysis across various class distribution levels.

### **Datasets Selection and Preparation**

**Australian Credit Approval (ACA):** Originally, ACA exhibits a class distribution split of 44.5% for positive cases (approved credit) and 55.5% for negative cases. To align with the study's objectives and to ensure comparability with the GCD dataset, ACA was adjusted through random undersampling of negative cases. This adjustment was made to create balanced splits of 70/30, 75/25, and 80/20 (positive/negative class ratios). Ultimately, this resulted in a dataset where only 166 observations were used for the 70/30 split.

**German Credit Dataset (GCD):** The original GCD dataset has an imbalance ratio of 70/30 (positive/negative class ratios), making it suitable for direct comparison with the adjusted ACA dataset. No further modifications were required for the GCD dataset.

### **Implementation of Classification Algorithms**

Ten widely recognized classification algorithms in credit risk analysis were implemented using WEKA 3.7.9. The classification algorithms used for this study are: CART (Classification and Regression Trees), Bayes network (BNK), Naïve Bayes (NBS), Linear logistic (LL), J48 (C4.5 algorithm), IBK (Instance-Based Learner), SVM (Support Vector Machines), RBF network (Radial Basis Function Network), Voted perceptron (VP).

### **Experimental Setup**

Each dataset variant (70/30, 75/25, and 80/20 class distributions) underwent further division into training and testing sets. For robust evaluation, 10-fold cross-validation was applied across all experiments. These distributions have been taken in to account in accordance with the past studies for the credit card fraud detection (Maira, Mohsin, & Amit, 2015; Maira. & Mohsin., 2017; Anis M. , Ali, Mirza, & Munir, 2020; Gaudreault & Branco, 2024)

**Performance Evaluation**

The performance of classification algorithms was assessed using a suite of performance/evaluation measures appropriate for imbalanced datasets, as detailed in Section 2. These measures were selected to provide a comprehensive evaluation of each algorithm's effectiveness in fraud detection scenarios.

**Primary Ranking Phase**

To rank the classification algorithms based on their performance across different class distributions, three MCDM techniques were employed: VIKOR, PROMETHEE II, and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). These methods were chosen to ensure a robust and objective comparison of algorithmic performance (Baesens et.al, 2003).

**Unified Ranking**

Finally, Multi-Criteria Decision Analysis (MCDA) was applied to consolidate the rankings generated by the MCDM techniques. This process resulted in a unified ranking of classification algorithms for each class distribution scenario across the ACA and GCD datasets.

Rankings produced after MCDM techniques are taken as an input for unified ranking phase using TOPSIS that gives a consolidated ranking for credit scoring datasets. As MCDM does not come under the umbrella of class imbalance learning and is used only as a technique for ranking, therefore for brief introduction of MCDM techniques can be found in (Brans, 1982; Hwang & Yoon, 1981)

Table 1: Summary of the datasets with their respective class ratios

Datasets	Altered class ratios					
	70/30		75/25		80/20	
	Maj	Min	Maj	Min	Maj	Min
GCD	487	212	420	140	386	94
ACA	246	106	257	86	246	62
* Majority = Maj; Minority = Min						

**Results and Discussion**

As explained before that this study is designed in three phases. For the first phase i.e. Data Mining phase, classification results for both datasets ACA and GCD are presented in Table 2 and Table 3. To understand the impact of class imbalance thoroughly on credit datasets, 3 imbalance levels are created to measure the impact of degree of skewness on the performance of classification algorithms. The degree of skewness corresponds to the ratios 70/30, 75/25 and 80/20.

Table 2: Performance values of classifiers at different class imbalance level for ACA

Class Distribution	Classifier	OA	TP	TN	Precision	Kappa statistic	ROC	F-measure	MAE
70/30	Bayes Net	0.8606	0.767	<b>0.9143</b>	0.836	0.6933	0.905	0.8000	0.1712
	Cart	0.8303	0.733	0.8857	0.786	0.6280	0.878	0.7590	0.213
	IBK	0.8182	0.717	0.8762	0.768	0.6014	0.796	0.7410	0.1836
	J48	0.8364	0.817	0.8476	0.754	0.6526	0.823	0.7840	0.1979
	LL	0.8424	0.767	0.8857	0.793	0.6571	0.904	0.78	0.2467
	NB	0.8424	0.633	0.9619	0.905	0.6361	0.913	0.745	0.1709
	RBF	0.8424	0.667	0.9429	0.87	0.6416	0.895	0.755	0.2326
	RF	0.8303	0.683	0.9143	0.82	0.6198	0.868	0.745	0.2291
	SVM	0.8606	0.833	0.8762	0.794	0.702	0.855	0.813	0.1394
	VP	0.8182	0.85	0.8	0.708	0.6233	0.864	0.773	0.1825
75/25	Bayes Net	0.86	0.767	0.914	0.836	0.693	0.902	0.8	0.1709
	Cart	0.85	0.833	0.867	0.781	0.69	0.885	0.806	0.2075
	IBK	0.836	0.7	0.914	0.824	0.635	0.807	0.757	0.1656
	J48	0.861	0.833	0.876	0.794	0.702	0.885	0.813	0.1793
	LL	0.836	0.717	0.905	0.811	0.637	0.925	0.761	0.2104
	NB	0.83	0.617	0.952	0.881	0.608	0.91	0.725	0.179

	RBF	0.842	0.65	0.952	0.886	0.639	0.916	0.75	0.236
	RF	0.836	0.7	0.914	0.824	0.635	0.884	0.757	0.2309
	SVM	0.818	0.683	0.895	0.788	0.596	0.789	0.732	0.1818
	VP	0.818	0.717	0.876	0.768	0.601	0.873	0.741	0.1818
80/20	Bayes Net	0.8545	0.733	0.9238	0.846	0.6765	0.921	0.786	0.154
	Cart	0.8182	0.683	0.8952	0.788	0.5956	0.877	0.732	0.2212
	IBK	0.8061	0.633	0.9048	0.792	0.5622	0.769	0.704	0.1959
	J48	0.8424	0.767	0.8857	0.793	0.6571	0.886	0.78	0.1994
	LL	0.8424	0.75	0.8952	0.804	0.6546	0.925	0.776	0.2117
	NB	0.8182	0.583	0.9524	0.875	0.5769	0.912	0.7	0.1877
	RBF	0.8303	0.617	0.9524	0.881	0.6081	0.876	0.725	0.2391
	RF	0.8061	0.583	0.9333	0.833	0.5522	0.849	0.686	0.2352
	SVM	0.8182	0.683	0.8952	0.788	0.5956	0.789	0.732	0.1818
VP	0.8182	0.717	0.8762	0.768	0.6014	0.888	0.741	0.1773	

Table 3: Performance values of classifiers at different class imbalance for GCD

Class Distribution	Classifier	OA	TP	TN	Precision	Kappa statistic	ROC	F-measure	MAE
70/30	Bayes Net	0.73	0.284	0.9151	0.581	0.2342	0.749	0.382	0.3366
	Cart	0.7433	0.489	0.8491	0.573	0.3529	0.738	0.528	0.3486
	IBK	0.6667	0.477	0.7453	0.438	0.2168	0.611	0.457	0.3338
	J48	0.68	0.375	0.8066	0.446	0.1905	0.554	0.407	0.3554
	Linear logistic	0.7867	0.489	0.9104	0.694	0.4368	0.818	0.573	0.2989
	NB	0.7667	0.511	0.8726	0.625	0.4056	0.793	0.563	0.2832
	RBF	0.7233	0.409	0.8538	0.537	0.2826	0.744	0.465	0.3489
	RF	0.74	0.341	0.9057	0.6	0.2822	0.735	0.435	0.333
	SVM	0.7367	0.125	0.9906	0.846	0.1539	0.558	0.218	0.2633
	VP	0.7433	0.261	0.9434	0.657	0.2485	0.798	0.374	0.2567
75/25	Bayes Net	0.723	0.273	0.91	0.558	0.215	0.708	0.366	0.3414
	Cart	0.717	0.341	0.873	0.526	0.238	0.7	0.414	0.343
	IBK	0.68	0.386	0.802	0.447	0.196	0.594	0.415	0.3206
	J48	0.713	0.33	0.873	0.518	0.226	0.676	0.403	0.3118
	Linear logistic	0.773	0.375	0.939	0.717	0.365	0.81	0.493	0.2899
	NB	0.76	0.42	0.901	0.638	0.357	0.795	0.507	0.2768
	RBF	0.733	0.341	0.896	0.577	0.269	0.744	0.429	0.322
	RF	0.71	0.239	0.905	0.512	0.171	0.733	0.326	0.3257
	SVM	0.767	0.33	0.948	0.725	0.33	0.639	0.453	0.2333
	VP	0.74	0.205	0.92	0.729	0.21	0.796	0.316	0.26
80/20	Bayes Net	0.7133	0.102	0.967	0.563	0.091	0.732	0.173	0.3224
	Cart	0.71	0.102	0.9623	0.529	0.0845	0.698	0.171	0.3364
	IBK	0.69	0.307	0.8491	0.458	0.1725	0.578	0.367	0.3108
	J48	0.7167	0.318	0.8821	0.528	0.2266	0.602	0.397	0.3016
	Linear logistic	0.7067	0	1	0	0	0.5	0.828	0.5
	NB	0.7367	0.33	0.9057	0.592	0.2702	0.777	0.423	0.2844
	RBF	0.7133	0.159	0.9434	0.538	0.1291	0.713	0.246	0.3202
	RF	0.7333	0.136	0.9811	0.75	0.1545	0.736	0.231	0.3077
	SVM	0.7067	0	1	0	0	0.5	0	0.2933
	VP	0.75	0.205	0.9764	0.783	0.2308	0.803	0.205	0.25

For the original split of GCD i.e. 70/30 LL, NB and VP are on top in terms of ROC while SVM shows promising results for the measures TN and Precision with low values of ROC and TP. LL and CART were the top classifiers

in detecting the most fraudulent cases. In ACA dataset, for 70/30, SVM and BN gave highest score for OA and ROC whereas high TP rate was achieved by VP. J48, LL and BN were the top classifiers that were able to predict more fraudulent transactions.

For the distribution 75/25, LL performs well for most performance values in GCD whereas the highest TP value is given by NB. However, in ACA, It was observed that J48 performed well for most of the performance measures, Cart and VP were also the classifiers that performed above average.

In GCD, for the ratio 80/20, VP is best classifier for Precision, OA and ROC whereas LL and SVM are the lowest classifiers in terms of TP rate. However, the highest TP rate and F-measure is attained by NB. RF is the best classifier with high TN rate. However, in ACA, VP is best for TP. Highest ROC values are attained by LL and BN and NB

In general, it is analyzed that for every class distribution in low skewness, classifier achieving good scores on one evaluation measure can be the classifier performing poor for another measure. However, there were some classifiers that consistently performed poorly for the lower skewed distributions e.g., IBK, NB.

Although some similarities are there between the two credit card datasets, no clear conclusion can be drawn which classifier will give optimal results in each class ratio. For this purpose, MCDM techniques are utilized to present a unified approach towards selection of classification algorithms.

**MCDM Phase**

This phase is further divided to two phases to get ranking of classifiers.

**Primary Ranking Phase**

In this phase initial ranking of classifiers have been achieved using 3 MCDM techniques i.e. TOPSIS (Amin, Anwar, & Adnan, 2016), VIKOR (Hwang & Yoon, 1981) and PROMETHEE-II (West & Bhattacharya, 2015 ). Initial ranking of the 10 classifiers used in this study are illustrated in the Table 4.

From Table 4, with little degree of disagreement, MCDM methods show correspondence between the rankings. Weight assigned to the MCDM methods is in accordance with the previous studies (Peng. & Wang., 2010; Visa & Ralescu, 2005). As in credit card fraud, the predictive model with highest TP and ROC values is best so these two measures are given the weight 10 while other performance measures are set to 1. These weights are then normalized such that the sum of all weights is 1. Rankings attained for both datasets in each distribution is discussed below.

Table 4: Primary Ranking for Australian and German credit dataset.

Class Dist	Classifier	Australian Credit Data Set						German Credit Data Set					
		VIKOR		TOPSIS		Promethee		VIKOR		TOPSIS		Promethee	
		V	R	V	R	V	R	V	R	V	R	V	R
70/30	BN	0.1247	3	0.667	5	0.38	6	0.5785	7	0.962	2	-0.62	7
	Cart	0.2890	5	0.842	2	1.07	1	0.0997	2	0.902	10	1.952	1
	IBK	1.0000	10	0.556	8	-1.1	9	0.6264	9	0.926	6	-0.82	9
	J48	0.5728	8	0.659	7	-0.3	7	0.5998	8	0.943	5	-0.79	8
	LL	0.0000	1	0.760	4	0.59	4	0.1993	4	0.925	7	1.211	3
	NB	0.9656	9	0.199	10	-2.6	10	0.0000	1	0.911	9	1.496	2
	RBF	0.4173	7	0.532	9	-0.4	8	0.1214	3	0.919	8	0.879	4
	RF	0.0703	2	0.714	5	0.56	5	0.3846	5	0.945	4	-0.03	5
	SVM	0.2890	5	0.842	2	1.07	1	1.0000	10	0.995	1	-3.00	10
	VP	0.1323	4	0.853	1	0.81	3	0.4846	6	0.955	3	-0.25	6
75/25	BN	0.1347	3	0.715	3	0.77	3	0.6995	6	0.967	2	-0.72	8
	Cart	0.0000	1	0.866	1	1.18	2	0.4806	4	0.947	6	-0.15	4
	IBK	0.8848	9	0.340	8	-0.9	9	0.8147	8	0.934	8	-0.99	10
	J48	0.0279	2	0.864	2	1.22	1	0.6035	5	0.952	5	-0.5	7
	LL	0.2473	4	0.565	4	0.32	4	0.1482	2	0.930	9	1.738	2
	NB	0.8293	8	0.317	9	-0.7	8	0.0000	1	0.918	10	1.907	1
	RBF	0.6761	7	0.375	7	-0.3	7	0.3467	3	0.945	7	0.384	3

	RF	0.4689	6	0.455	6	-0.1	5	0.7725	7	0.971	1	-0.96	9
	SVM	1.0000	10	0.267	10	-1.3	10	0.8843	10	0.954	4	-0.34	5
	VP	0.3367	5	0.499	5	-0.2	6	0.8607	9	0.965	3	-0.36	6
80/20	BN	0.1145	3	0.744	6	0.64	5	0.4983	7	0.910	3	-0.18	7
	Cart	0.3290	6	0.772	5	0.47	6	0.1188	2	0.878	9	2.035	1
	IBK	1.0000	10	0.515	9	-1.86	9	0.1681	3	0.892	7	0.295	5
	J48	0.7717	8	0.654	7	-0.57	7	0.0082	1	0.872	10	1.794	2
	LL	0.0291	2	0.836	4	0.90	4	0.3305	5	0.895	6	1.04	4
	NB	0.9572	9	0.225	10	-3.04	10	0.9839	9	0.917	2	-2.83	9
	RBF	0.4054	7	0.563	8	-0.58	8	0.2185	4	0.891	8	1.102	3
	RF	0.0002	1	0.876	1	1.71	1	0.4728	6	0.908	5	0.064	6
	SVM	0.2481	5	0.857	3	1.15	3	1.0000	10	0.947	1	-2.95	10
	VP	0.2208	4	0.862	2	1.18	2	0.5482	8	0.910	4	-0.37	8

For ACA, in the 70/30 distribution, LL is 1<sup>st</sup> by VIKOR and is ranked 4th by PROMEETHE and TOPSIS. Similarly, VIKOR ranks LL 1<sup>st</sup> for GCD while 7th and 3<sup>rd</sup> by TOPSIS and PROMETHEE respectively. For ACA, VP also stands among the top classifiers.

For 75/25, LL ranked 2<sup>nd</sup> best for GCD while 4<sup>th</sup> for ACA by all MCDM techniques. J48 gave the best ranking scores of 1<sup>st</sup> and 2<sup>nd</sup> for ACA while performed above average for GCD. It was noticed that IBK attained the worst rankings for both datasets.

For the last distribution i.e., 80/20, LL and Cart stand out with best rankings whereas BN also achieved good ranks of 2<sup>nd</sup> and 3<sup>rd</sup>. For this distribution also, SVM has attained conflicting rankings for both datasets. For this distribution SVM is ranked either 8<sup>th</sup> or 7<sup>th</sup> by all MCDM techniques for ACA whereas for GCD it is ranked among the top three classifiers. However, VP is performing well in both datasets and is ranked 4<sup>th</sup>. Among all distribution of lower skewed datasets, it is observed that at first NB was the worst classifier but as the skewness is leveraged for both datasets, NB started to gain higher ranks in both datasets. However, this needs to be explored further for data sets with high skewness. Similarly, SVM was the top classifier but as the imbalance ratios among the datasets increase, SVM either performed good or gave average performance.

### Unified Ranking Phase

From the primary ranking phase, results we got are tolerably different from each other in all distributions for ACA and GCD. As the goal of this study is towards finding a unified ranking, we will use the ranking scores found from three MCDM methods to the final ranking phase that uses TOPSIS. In the final ranking phase, all the MCDM techniques i.e. TOPSIS, VIKOR and PROMETHEE have been assigned equal weight of 0.33. Table 5 illustrates the final ranking of the 10 classifiers for each class ratio of ACC and GCC.

For the distribution 70/30, SVM and VP are ranked 1<sup>st</sup> and 2<sup>nd</sup> for ACA and GCD respectively whereas LL was ranked 4<sup>th</sup> and 3<sup>rd</sup> respectively. However, it is observed that for the other two distributions of low skewness LL attained top ranks being 1<sup>st</sup>. As the skewness is leveraging, J48 rank has also been improved.

Table 5: Final rank of classification algorithm in accordance with the class imbalance of dataset.

Low skewed distributions	Classifiers	Aus		Germ	
		V	R	V	R
70/30	BN	0.4140	5	0.4849	7
	Cart	0.2399	2	0.4299	4
	IBK	0.8608	9	0.7442	10
	J48	0.7009	7	0.6498	9
	LL	0.2558	4	0.4196	3
	NB	0.9378	10	0.4010	1
	RBF	0.7662	8	0.4557	6
	RF	0.3503	5	0.4083	2
	SVM	0.2399	2	0.5851	8
	VP	0.2176	1	0.4491	5
75/25	BN	0.2222	3	0.4856	5
	Cart	0.0625	1	0.4117	2



	IBK	0.8444	9	0.8257	10
	J48	0.0890	2	0.5180	7
	LL	0.3333	4	0.4177	4
	NB	0.8094	8	0.4149	3
	RBF	0.6667	7	0.3912	1
	RF	0.5182	6	0.5114	6
	SVM	1.0000	10	0.5675	9
	VP	0.4818	5	0.5418	8
80/20	BN	0.4149	5	0.5152	6
	Cart	0.5182	6	0.4008	1
	IBK	0.9107	9	0.4517	4
	J48	0.7008	7	0.4300	2
	LL	0.2726	3	0.4462	3
	NB	0.9379	10	0.5823	8
	RBF	0.7377	8	0.4553	5
	RF	0.0000	1	0.5182	7
	SVM	0.3058	4	0.5851	9
	VP	0.2051	2	0.6088	10

For 75/25, LL represents unified rank for both datasets. Whereas Cart and RF have started to excel in their ranks as the skewness is leveraged.

It is noteworthy to mention that rank of classifiers is shifting when skewness is leveraged i.e. the weak classifiers are progressively achieving good ranks and vice versa. For example, LL has shown good performance in low skewed datasets but this needs to be explored further whether LL will continue to show a similar performance as the class imbalance ratio is increased. Similarly, J48 is the average classifier in datasets with low skewness. However, further research must be conducted to assess the behavior of classifiers for different imbalance ratios of datasets.

Table 5 shows that final ranking demonstrate reduced discrepancies among classifiers, with LL consistently performing well in low-skewed datasets. However, as skewness increases, other classifiers like J48 show improved rankings, indicating variable performance under different imbalance ratios. Further research is needed to explore classifier behavior in datasets with higher skewness levels.

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## Embracing the New Normal: A Study on Employee Engagement in Pakistan's Post-Covid IT Sector

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### Abstract

*Significant changes in work dynamics brought about by the COVID-19 pandemic have resulted in a widespread adoption of remote work or telework. This study examines how employee engagement is affected by remote work in Pakistani businesses, with a particular emphasis on the IT industry. The study explores several factors, such as cultural considerations, communication strategies, and the availability of support for home office setups, that impact employee engagement in remote work arrangements through interviews with IT professionals. The results underscore the significance of adjusting to novel approaches that facilitate remote work, like digital communication instruments and organized virtual gatherings. Furthermore, the study clarifies how cultural aspects play a part and how important it is to help remote teams develop a feeling of community and team success. According to the study, remote work can improve employee engagement by lowering social loafing and interdependency. There is also discussion of the study's limitations and ethical issues. In general, the study offers significant perspectives on the connection between remote work and worker satisfaction in Pakistan.*

**Keywords:** Remote work, Employee engagement, IT professionals, Pakistan.

### Introduction

Covid-19, which is considered as the century's greatest health crisis (Naseer et al., 2023) has reshaped lives in many ways. The effect of this pandemic was a global one, impacting not only health, but mobility, travel, workforce, trade and much more (Shrestha et al., 2020). To curb the spread of virus, many governments went to extreme ends and implemented lasting lockdowns called NPIs or non-pharmaceutical interventions (Camera & Gioffré, 2021).

According to the International Labor Organization (2021), in the second half of 2020, 81% of all workers were from countries where workplace closure was either recommended or required. As per the ILOs policy framework (2020), to protect the workforce, work processes should be adjusted. ILO suggested the adaptation of Telework or what is otherwise called remote work So, that employees are not exposed to the risk of coronavirus. A survey carried out in the USA by Bureau of Labor Statistics (2022) reports that in 2020 about 38% of the respondents worked from home or at least spent some of their time working from home, which is up from 24% in 2019. According to Vyas (2022), there are going to be some trends that will persist in post-covid era. Remote and hybrid work have become the 'new normal'. However, the adoption of the new normal will depend on the type of work (Dingel & Neiman, 2020). While it's hard for the hospitality and tourism sectors to adopt remote working, it seems easily adaptable to sectors like software development, banking, and financial services.

Along with globalization and advances in ICT, the rise in the trend of remote work can be attributed to the benefits it provides. Remote working is of great advantage to employees as it gives them flexibility in work hours and helps in cutting down commute cost (Flores, 2019). A survey by flexjobs (Pelta, 2020) says that remote working also provides work-life balance.

However, remote working is not without its downturns, with employees feeling isolated as there is no face-to-face interaction with other employees (Flores, 2019). Employees have also reported facing family-work conflict, which negatively impacts their work (Xiao, Becerik-Gerber, Lucas, & Roll, 2021). From a managerial perspective, there are also the challenges of monitoring employee performance, team communication issues, in-person collaborations and data security (Golden & Gajendran, 2019). In the light of all these challenges, it is hard to discern whether employees remain engaged or not.

Employee Engagement is confusing, as there is absence of universally applicable definition. Business and academic practitioners define employee engagement differently, but generally, it is related to a positive attitude

toward the organization. Engagement can be judged by different factors such as organizational citizenship Behavior, Organizational commitment, and job satisfaction (Tikare, Sreeram, & Verlekar, 2022). However, academicians define employee engagement through multiple explanations. Firstly, Robinson et al. (2017) referred to employee engagement as a “positive attitude towards the organization and its value.”

Similarly, Kahn (1990) gave his idea of employee engagement through a Need satisfying approach. These three psychological factors were identified which made employees engaged i.e. meaningfulness, safety, and availability. Overall, meaningfulness here refers to the sense of achievement involved in the job role (Mansoor & Hassan, 2016).

Moreover, another approach is the burnout antithesis produced by Maslach and Leiter (1997). In this, it was defined that burnout and engagement are two opposite phenomena. Therefore, an individual facing burnout or feeling exhausted would be less engaged in his or her role.

The previously available studies sought to answer the question of employee engagement impacted in a remote-working environment, however, they met with multiple limitations and gaps. Firstly, there was a lack of qualitative research conducted in this area which explored the universal experiences of employees working in remote-working settings after COVID-19.

Additionally, no specific industry or sector was targeted in this research; alongside this there is an absence of these studies conducted in the context of Pakistan's IT sector.

As established before, some of the industries were quick to adopt remote working models during the pandemic and the computer and IT sector was best to adapt to this type of system (Haan, 2023). Due to this and other reasons like digital globalization, the IT sector's growth increased significantly. Pakistan's IT sector showed a growth of 25.6% per annum in FY 2021-2022, with Software development and IT enabled services making up 75% of the total (PWC, 2023). The main objective of this research is to analyze how the adoption of remote working has affected employee engagement in Pakistan's IT sector domain. Additionally, this study also aims to identify the factors that contribute to effective employee engagement in a remote-working setting. Lastly, this study will briefly analyze strategies that organizations can utilize to enhance employee engagement among remotely working IT professionals of Pakistan.

The insights from this research can help the growing IT sector of Pakistan. According to Khan, 54% of the Pakistani workforce is not-engaged, while 17% is actively disengaged (2020). As per the Board of Investment Pakistan (n.d.), the number of well english speaking IT specialists in Pakistan is around 500000, and every year more than 25000 new graduates become part of this sector. Also, there are around 21 STPs and more than 20000 IT companies & call centers in Pakistan with the number increasing by the year. This study can help these professionals and organizations in implementing policies that can make employees more effective and more engaged.

In the coming sections we will investigate the existing literature on remote work, employee engagement and related factors to contextualize our research. Then we will provide the methodology, including the way in which we collected data, the characteristics of the sample and the analytical approach used. In the end we will present our findings, contemplate them, and draw certain conclusions for theory, practice, and research in the future.

## **Literature Review**

Due to the perpetual evolution in the work arrangements over time, scholars have spent considerable time exploring the impact of remote work on employee engagement. This section will delve into the literature on adoption of remote work, implications of employee engagement for any industry and the interplay of the two, further looking into the benefits and challenges that this widely accepted working model poses to the professionals of the IT sector in Pakistan.

### **Remote Work**

Vijaya Lakshmi et al. (2023) provide the list of different types of remote work including full time and part-time remote work, telecommuting, freelancing and contract work, Remote Work for Distributed Teams, Digital

nomadism, Remote Work for Field Employees, Remote Work on a Flexible Schedule, and Remote Work during Emergencies. Each type offers a specific set of benefits and challenges and thus are opted by organizations and individuals accordingly. This research is mostly concerned with telecommuting and related models that allow employees to work out of office space.

A study by Kramer and Kramer (2020) shows the impact of the COVID-19 pandemic on the employment situation, working from home and job mobility. Studies have shown that the adoption of remote work increased during the pandemic, and high levels of adoption are expected to be maintained beyond the emergency (Galanti, Guidetti, Mazzei, Zappalà, & Toscano, 2021). These changes were driven by the need to reduce the risk of the spread of COVID-19 and major changes in the workplace and the use of ICT to support remote work (Awada, Lucas, Becerik-Gerber, & Roll, 2021).

### ***Employee Engagement***

The concept of employee engagement is multifaceted and can be defined in several ways. Purbey (2020) defines employee engagement as the emotional and psychological commitment of an employee towards their organization, leading to their willingness to invest discretionary effort in their work. This definition emphasizes the intrinsic motivation and dedication of employees to contribute to the success of the organization. De-la-Calle-Durán and Rodríguez-Sánchez (2021) propose the 5Cs Model, which defines employee engagement as a complex interaction between cognition, connection, and contribution, leading to a sense of being supported and cared for by the organization.

### ***Remote Work and Employee Engagement***

Several remote workplace factors have been found to significantly influence employee engagement. Job autonomy, engagement, communication skills, trust in co-workers, and family-work conflict have been identified as critical factors that influence both social and technical performance in a remote work environment (Zhiqiang et al., 2021). These findings highlight the multifaceted nature of remote work and its impact on employee engagement, suggesting the need for a comprehensive approach to understanding and addressing these factors.

De Klerk et al. (2021) found that remote work during the pandemic had a negative impact on employee performance levels due to increased workload, online exposure, unemployment, and failure to adapt to new ways of working from home. This is like the findings of Adisa et al. (2021), who showed the challenges of remote work, including the lack of routines, problems and long working hours that are difficult for managers to monitor.

But remote work has also benefited employee engagement. Adekoya et al. (2022) found that leadership behavior and team effectiveness have direct and positive effects on work engagement and performance, and work effectiveness on work outcomes. In addition, remote work and videoconferencing have brought new stressors into the workplace, but workers have developed strategies to reduce the impact of these stressors (Szulc, McGregor, & Cakir, 2023).

### ***Challenges and Opportunities of Remote Work in the IT Sector***

The quantitative study by Gigig and Sangeetha (2020) dissects the experiences of professionals working remotely in the IT sector. The study suggests that where network issues, unnecessary disruptions, lack of freedom in choosing tasks, and poor communication channels pose a challenge to the workers working remotely, Enhanced Work-Life Balance, Flexible Work Arrangements and Improved Productivity Methods provide employees and organizations with great opportunities.

The study conducted in Poland's IT sector by Błaszczyk et al. (2022) shows that the perceived productivity of employees increased as they shifted to remote work and thus their preference for this model also increased.

### ***Cultural and Contextual Factors in Pakistan***

Kashif et al. (2022) conducted a study on the experiences of people working remotely in Pakistan and contrasted them with their European counterparts. The findings report that, while most of the European population was familiar with remote work, a sizable percentage of Pakistani workforce found remote work as a new and uncommon strategy.

Illiteracy, poor service quality and high tariff on the internet, censorship, and lack of proper regulations from the government have widened the already existing digital divide in Pakistan.

This digital divide has serious implications on remote work culture as more than half of the population lacks access to stable internet and other digital resources (Jamil, 2020).

Pakistan's case is also unique as the access to internet and ICT devices to women is barred by families on religious grounds. These religious restrictions have not only created a gender gap but also affect Pakistani working women in many other ways (Jamil, 2021).

The study by Mushtaque and Siddiqui (2019) reports that out of the four different types of organization cultures, market culture, which is the most dominant organization culture in Pakistan, causes high stress levels and has negative implications on employee engagement.

### ***Best Practices and Strategies for Remote Employee Engagement***

The study by Ngai et al. (2020) underscores the effects of communication strategies on public engagement on social media. It is essential for organizations to adopt similar strategies to engage remote employees effectively through various digital communication channels.

The study conducted by Adisa et al. (2021) also shows the importance of virtual team building activities among UK workers during the pandemic in fostering their sense of connectedness among remote workers. Virtual team building programs such as online team building games, virtual coffee breaks, and collaboration programs can improve employee engagement in a remote work environment. Virtual Team Building programs should also be applied by organizations in the post-covid era to keep employees engaged as they work remotely.

Hyland-Woo et al. (2021) highlight the importance of government communication strategies in the era of COVID-19. Research shows that clear, transparent, and consistent communication is key to engaging remote workers. Organizations must use information technology to keep the lines of communication open, provide regular updates, and ensure employees are informed and connected.

### ***Knowledge Gaps and direction for Future Studies***

Although the current body of research offers insightful information about how remote work affects employee engagement, there are still several unanswered questions that demand more research. Initially, it is imperative to investigate the distinct contextual elements present in Pakistan's IT industry that could impact the correlation between remote work and employee engagement. This might entail looking at organizational, technological, and cultural aspects that are particular to Pakistan.

There is also lack of research on how the economic, demographic, and political factors are reinforcing the transition to remote working culture in Pakistan.

Furthermore, longitudinal research can offer a more comprehensive comprehension of the long-term consequences of remote work on organizational dynamics, mental health, and employee engagement. Furthermore, comparative studies conducted in Pakistan's various sectors and areas can provide insightful information about the contextual differences in the effects of remote work on employee engagement.

## **Methodology**

### ***Research Design***

Since the nature of the research is to understand the shift in employee engagement due to adoption of remote work after the pandemic in Pakistan, a qualitative approach has been used to delve into the experiences of the IT professionals working remotely by conducting semi-structured interviews to ensure rich-data collection all the while refraining from unnecessary deviations. Thus, this research is of ethnographic nature as it tries to explain the behavior of a specific group of people in a particular culture i.e. Pakistan. Due to the constraints of time and resources, participants were selected through convenience sampling from the researchers' network. For this purpose, 4 participants having a professional background in Information Technology and experience with both remote working and on-site environment were initially contacted through phone and were briefed about the

research topic. During the recruitment process it was made sure that all the candidates have prior on-site job experience in order to provide a well rounded perspective for research.

**Data Collection**

While half of the interviews were conducted face-to-face, others were conducted remotely via video conferencing tools to accommodate the geographical dispersion of participants. The interview guide served as the primary tool for data collection. The guide was designed to elicit insights into participants' experiences with remote work and its impact on employee engagement. We also sought the experiences of the participants with any innovative methods and their recommendations and suggestions regarding the improvement of engagement in remote environments.

**Ethical Considerations**

Ethical guidelines were adhered to throughout the research process. Participants were provided with informed consent forms outlining the purpose of the study, confidentiality measures, and their right to withdraw at any time without consequences. Confidentiality and anonymity of participants were maintained by assigning pseudonyms to interviewees and to any person that was referred to during the interview, ensuring that sensitive information was handled with care.

**Data Analysis**

Thematic analysis was employed to analyze the interview data. The interviews were first manually transcribed and then preliminary codes were assigned. Coding was done manually and initial codes were marked with the instances and descriptions from the transcriptions. Codes were iteratively refined, allowing for the extraction of meaningful insights from the data. Afterwards, the interviews were analyzed multiple times to identify recurring patterns and generate themes. A hierarchical coding framework was followed as the refined codes were then merged in to generate 5 major themes.

Themes	Frequency	Themes	Frequency
Flexibility and Work-Life Balance		Interdependence and empowerment	3
Female Responsibility	2	<b>Leadership and Organizational Support</b>	
Flexibility	6	Role of Leadership	3
Commute	4	No Extra Hours	1
Learn New Skills	2	Wellness holidays and allowance	1
Inclusivity	2	Difference Preference	1
Hybrid Approach	4	<b>Hybrid Work Models</b>	
<b>Communication, collaboration and Cultural Factors</b>		Hybrid Approach	4
Employee Interaction	5	Difficulty in Abrupt Transition	2
Digital Ways of Communication	7	No Extra Hours	1
Disturbance	1	<b>Future of Remote Work in Pakistan's IT Sector</b>	
Meeting Disruptions	5	New Hires	2
Team Cohesion	3	Internet Issue in Pakistan	1
Motivated in Ramadan	1	Future of Remote Working	5



Cultural Factors	2	E-Gaming	1
International Clients	2	Issue of Dual Employment	1

**Discussion**

As a result of our Thematic analysis, five major themes were identified- 1) *Flexibility and Work-life balance*; 2) *Communication, collaboration, and cultural factors*; 3) *Leadership and Organizational Support*; 4) *Hybrid Work Models*; 5) *Future of Remote working*. These themes highlighted both negative and positive aspects of remote working, additionally, they also provided suggestions for the improvement of the current remote working landscape in Pakistan's IT sector.

**Flexibility and Work-life balance:**

A key major benefit which nearly all the interviewees reported was Flexibility and Work-life balance. Participants reported that they had the liberty to work from anywhere and Mrs.M. (Employee at S&P Global) commented:

*We have flex-timings so I can clock out when Ml (her daughter) wakes up or she needs me but then I put in those hours by working extra.*

Factors like these provide personal flexibility which helps in improving the productivity of employees. In remote working, individuals are allowed to work from different locations away from office; therefore, there is democratization of opportunities. Mr.Mb (IT Specialist at Quantino) reported:

*In Pakistan's IT sector, remote work has really broadened the talent pool, making it easier to include folks from all over the country. This inclusivity is fantastic, but it also means companies need to double down on engagement strategies to ensure everyone feels a part of the team.*

In Work from Home, workers save time and financial resources on commuting as mentioned by Mr. T. (Employee at Systems Ltd):

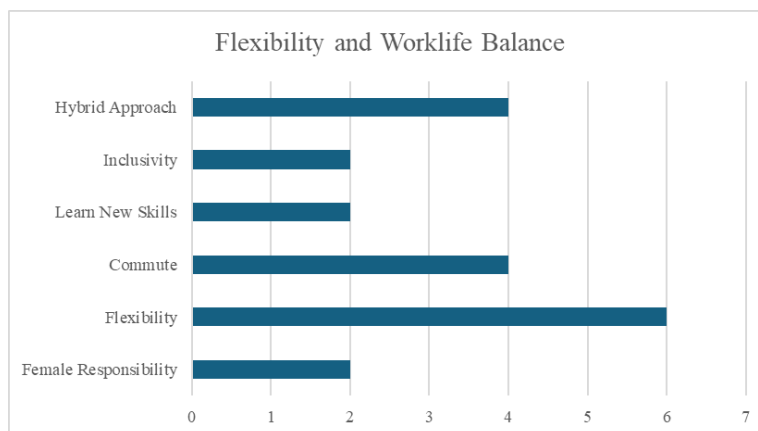
*You can invest your time into learning new technology/skills simultaneously.*

Additionally, remote based jobs in Pakistan are advantageous to Females who have to support their families. This in return has a positive effect on their engagement level. Mrs.M. (Employee at S&P Global) reported:

*I have a daughter who is a toddler. If it's a different situation I would prefer working in the office.*

Building upon this, as per the research the disturbance from their children was never a major hurdle for them performing their jobs as flex-timings allowed them to leave meetings, Mrs.M.(Employee at S&P Global) also shared:

*On the positive side our organization S&P Global is a people organization and even my boss's five year old son comes in during the meeting, he sits on his lap. So our company kind of encourages it and we feel that I am valued or my family is valued so when Ml ( her daughter) is crying I tend to leave the meeting or work for the time being.*



Therefore, the analysis clearly shows how multiple factors revolving around flexibility helps in improving engagement levels of the employees.

### **Communication, Collaboration and Cultural factors**

All the participants highlighted the ease of communication in on-site jobs due to physical interactions. Communications in office-based jobs allowed employees to have spontaneous conversations which promoted team-cohesion. On this note, Mr. T. (Employee at Systems Ltd) reported:

*When you are working remotely you cannot chase employees to join a client meeting however in the office you can look for that employee and ask him to join the meeting.*

In the same way, Mr. AB. (CEO at BuhTech) shared:

*There's something irreplaceable about in-person interactions, especially for creative brainstorming and team bonding.*

On the positive side, social loafing was countered in remote based jobs as everyone was now expected to bring forward their own work. Ms. M. (Employee at S&P Global), who is in a senior position shared:

*The connection did break but still since the dependency of my teammates reduced it gave them an opportunity to do the tasks by themselves instead of staying dependent on me fully as they used to do it previously.*

Thus, the employees, especially the seniors, were able to focus on their work. Similarly, the employees who were previously dependent on others worked by themselves, allowing them to feel accomplished.

It was also identified that with a more structured way of communication digitally the void that existed was partially covered. Employees had regular check-ins and virtual meet sessions to discuss their progress. This whole process was similar to instances faced in on-site settings. Ms. M. (Employee at S&P Global) underscored that multinational companies were already used to virtual meetings and she further shared:

*The tasks are divided fully and then we have weekly or bi-weekly meetings in which we share our progress and what were the hurdles we faced and just brainstorm in general.*

*... Since we are a multinational organization, we are used to these types of hybrid meetings.*

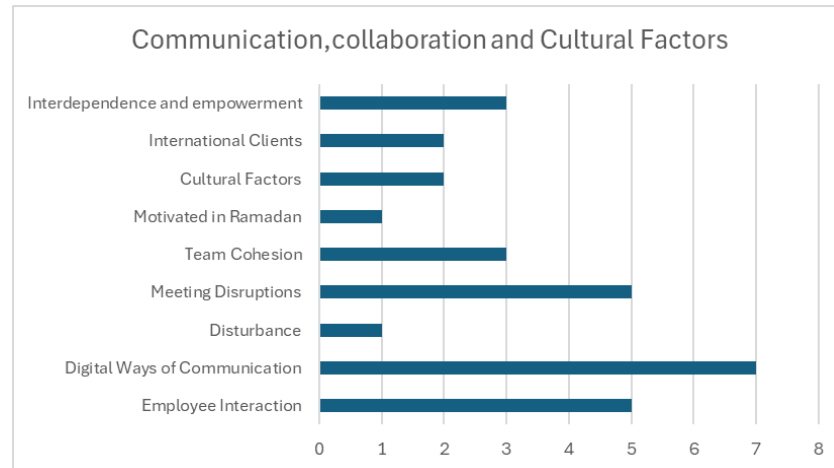
An interesting argument was raised which shared that disturbance also exists in offices as well but they are of different types. Ms. M. (Employee at S&P Global) commented:

*Yeah but it also happens in the office, for instance construction going on nearby in the office or airplane flying by. So, the disturbances are different, but they still exist.*

Moving on to cultural factors, Mr. T. (Employee at Systems Ltd) shared that he felt motivated working remotely in times such as Ramadan, alongside this Mr. Mb and Mr. AB. both shared the importance of collectivist culture that exists in Pakistan. Mr. AB. (CEO of BuhTech) shared:

*In Pakistan, there's a strong emphasis on community and relationships, so any strategy that fosters a sense of belonging and collective achievement tends to be more effective. We make it a point to celebrate cultural and personal milestones, which helps strengthen bonds within our remote teams.*

However, Mr. T. (Employee at Systems Ltd) shared that companies which work for international clients follow the client's calendar and their employees take holidays of the client; therefore, cultural factors do not play a vital role.



### Leadership and Organizational Support

All the participants highlighted the importance of leadership as effective leadership helped in creating trust, empowerment and led to better communication. Leadership strategies should vary as different employees have different requirements, Mr. T. (Employee at Systems Ltd) reported that many employees work for international firms to benefit from high salaries while some employees value the working environment and usually opt for on-site jobs.

Furthermore, some companies offer wellness allowances such as monetary compensation and holidays, and according to Ms. M. (Employee at S&P Global) these factors help in keeping employees satisfied.

Although, this might not be followed in every organization but it highlights the need for providing support to employees in their home office setup. Mr. Mb (IT specialist at Quantino) and Mr. AB. (CEO of BuhTech) both shared that organizations must adapt to new strategies that are favorable to remote working such as use of digital communications tools adequately to stay in touch with the employees and allow them to feel empowered. Moreover, Mr. T. (Employee at Systems Ltd) and Ms. M. (Employee at S&P Global) shared that leniency towards the interruption caused by children of employees has a huge impact on the motivation level of employees. Ms. M. (Employee at S&P Global) highlighted:

*Our company kind of encourages it and I feel that I am valued or my family is valued so when Ml(her daughter) is crying I tend to leave the meeting or work for the time being.*

### Hybrid Work Models

Nearly all the participants shared their preference towards a hybrid working model. Mr. T. (Employee at Systems Ltd) and Ms. M. (Employee at S&P Global) both shared that their companies were shifting to a hybrid approach, however, they are facing problems in making this transition.

In this regard Mr. T. (Employee at Systems Ltd) highlighted:

*The employees in general go into their comfort zone and even if the company asks the employee to come to the office they don't.*

Mr. AB. (CEO of BuhTech) also underscored the fact that hybrid approach leads to better ideageneration and team building skills and this model provides a healthy work life balance.

### Future of Remote working

For the future of remote working in Pakistan's IT sector according to some of the participants it does look bright and beneficial but then organizations are expected to be adaptive to new ways of leadership to ensure that inclusivity is created among the workforce. However, the downsides also exist in remote based setups which hampers the future growth of remote working. Mr. T. (Employee at Systems Ltd) and Ms. M. (Employee at S&P

Global) emphasized that new entrants must initiate their careers with either hybrid approach or on-site setup in order to benefit from the development of soft skills and in future they can transition to remote working. Additionally, in Pakistan several issues exist in the internet infrastructure. Since Pakistan is a third world country, the reliability of internet connection is lacking, hindering employees from joining the meetings with stable internet connections. Mr. T. (Employee at Systems Ltd) identified:

*In Pakistan there's a huge issue of the internet system and many employees prefer attending client meetings from the office because if their internet system is not efficient then the clients will report it to the higher management.*

Moreover, the issue of dual employment also affects the future of remote working in Pakistan's IT sector. It was highlighted that individuals who were focused on earning higher amounts indulged in dual employment. Dual employment here refers to individuals working for different companies at different times. According to Mr. T. (Employee at Systems Ltd) dual employment is a challenge for companies as employee focus would be diverted. Lastly, an interesting point came forward which emphasizes that team cohesion can be fostered in remote working through the use of E-gaming which is a fun initiative to allow colleagues to interact with each other outside of their job domains. Mr. M. (IT specialist at Quantino) highlighted:

*An innovative initiative I've seen includes virtual team-building activities, such as online escape rooms, which not only provide a fun break from work but also foster team cohesion and engagement.*

The use of E-gaming widely by management of companies can enhance employee engagement and so it highlights a bright future of remote working in Pakistan's IT sector.

## Conclusion

During the COVID-19 epidemic, companies and individuals have faced both possibilities and challenges as a result of the transition to remote work. Although working remotely has made it possible for better organized communication and virtual meetings, it has also brought attention to problems like the reliability of internet infrastructure and the possibility of distractions in domestic settings. The transition to remote work has also had an impact on organizational culture, communication, and teamwork, with both positive and negative outcomes. It's clear that remote work has changed how workers communicate and collaborate, opening new possibilities for personal freedom and task ownership. It has, however, also highlighted how critical it is to deal with internet infrastructure issues and preserve efficient communication and teamwork in a distant environment.

## Limitations

Both the small sample size and the use of convenience sampling technique may limit the generalizability of the results to the broader population of IT professionals in Pakistan. The subjective nature of qualitative research introduces the potential for researcher bias in data interpretation.

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# Impact of Bilateral Real Exchange Rate on Bilateral Trade Balance: Evidence from Pakistan and Its Major Trading Partners

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## Abstract

*This study investigates the impact of the bilateral real exchange rate on the bilateral trade balance of Pakistan with its five major trading partners, namely the US, China, Saudi Arabia, Germany, and the UK. We utilize panel data spanning from 1991 to 2018 for the six countries. We employ the fully modified OLS (FMOLS), and panel error correction model (ECM) to explore the short-run as well as long-run dynamics of the relationships among the variables. Since the cointegration procedure requires the investigation of the order of integration of variables, we employ the panel unit root test to check the order of integration of variables. Before moving on to panel unit root analysis, it is mandatory to check cross-sectional dependence. For this purpose, we employ a cross-sectional dependence test designed by Pesaran (2004) which indicates the existence of cross-sectional dependence. Since the presence of cross-sectional dependence requires a second-generation test for panel unit root analysis, therefore, we employ the Fisher-ADF panel unit root test. The results of the test reveal that the trade balance is stationary at level, while bilateral real exchange rate, domestic real GDP, and foreign real GDP are first-order integrated. Further, the results of the FMOLS test reveal that both domestic real GDP and bilateral real exchange rate harm the bilateral trade balance of Pakistan, while foreign real income has a positive impact on it. Moreover, the results of panel ECM confirm the presence of a tendency of adjustment to the long-run equilibrium.*

**Keywords:** Bilateral Real Exchange Rate, Bilateral Trade Balance, Fully Modified OLS, Panel Data, GDP, Real Income.

JEL Classification: F31, B27, C31, C33

## Introduction

In this era of globalization, economies of the world are moving on the path of trade openness to reap comparative advantages instead of relying on self-sufficiency. In the face of fast globalization, the interdependence among countries has increased and is still increasing. Although globalization has broadened the horizon of economic opportunities for countries, at the same time it has also created challenges for them, especially for the developing ones (Xia et al., 2022; Yang et al., 2021). The problem arising from deteriorated conditions of balance of payments and balance of trade has become a global one and has attracted the attention of policymakers across the globe. Pakistan is not an exception regarding this problem as it has been facing this problem since its inception, except for a few years. Nonetheless, the deficit in the balance of trade of Pakistan is widening over time despite a variety of policy tools being pursued.

A glance at Pakistan's exports and imports reveals that both exports and imports, though there are some variations, have an overall soaring trend over time. Pakistan's exports are 10.47% and imports are 21.5% of its GDP, and the trade deficit hovers around 11.38% of GDP in the fiscal year 2022-23. Moreover, variations in the growth rates of imports and exports, and their ratios to GDP are witnessed (Pakistan Economic Survey, 2022-23). So, considering the ratios of exports and imports to GDP, it is reasonable to deem that the fluctuations in the export and import prices, exchange rates, and trade balance (henceforth TB) cast a substantial impact on Pakistan's economy.



With the view to cope with the problem of deficit in the balance of trade and balance of payments, researchers have suggested various measures by evaluating the performance of tools under different conditions. The major contribution in this context is attributed to Marshall and Lerner in the form of famous Marshall-Lerner (henceforth ML) condition in literature. It posits that the devaluation of a country's currency improves its TB provided that the sum of absolute elasticities of demand for its imports and exports is greater than unit. To test the ML condition, traditional studies use aggregate data of exports and imports. Examples of these studies are Kyophilavong et al. (2013) and Ziramba and Chifamba (2014). But another argument exists that views that the traditional studies have limitations for not properly addressing the problem of 'aggregation bias' – if there is a very high elasticity of demand of one trading partner and very low of another then these will offset the effect of each other that may lead to misleading results.

The new strand of studies avoids the problem of 'aggregation bias' by using the data disaggregated at the country level. This group of studies analyzes the bilateral trade performance of countries. They investigate the relationships of bilateral TB and bilateral real exchange rate (hereafter ER) to test whether ML condition, in bilateral trade case, holds or not (Baak, 2008; Chui et al., 2010; Dash, 2013; Irandoust et al., 2006; Wang et al., 2012). They investigate the relationships between bilateral trade position and bilateral ER. In the same manner, this study explores whether bilateral real ER has significant bearings on the bilateral trade position of Pakistan with its five largest trade allies: China, Germany, Saudi Arabia, the UK and the US.

Moreover, Pakistan's exports are highly concentrated in a few markets as around half of its exports go to five countries: Afghanistan, China, Germany, the UAE, the UK and the US. Among them about one-fourth of total exports are destined to only two countries, the U.S. (19% of total exports) and China (8% of total exports). On the other hand, imports of Pakistan are also highly concentrated in a few markets as around 50% of Pakistan's imports originate from four markets: China, the UAE, Saudi Arabia, and Kuwait. Among these markets, China is the largest import supplier to Pakistan with a share of 21% of Pakistan's total imports and UAE is the second largest with a share of 10% of Pakistan's total imports (Pakistan Economic Survey, 2022-23).

Given the aforementioned discussion, it is highly desirable to analyze Pakistan's bilateral trade position with its five significant trade allies. This study aims to investigate the role of the bilateral real ER in determining Pakistan's trade position viz-a-viz its significant trading partners. Furthermore, we also address the most probable issue of 'aggregation bias,' as highlighted by various studies, by utilizing data on bilateral trade and bilateral ER instead of relying on aggregated data. Additionally, we examine the short-term and long-term dynamics of the bilateral trade position to ascertain whether the bilateral real ER, as well as the domestic and trading partners' real economic activity, play distinct roles in the short-term and long-term analyses.

The study is arranged as follows. Its second section reviews the existing works in the field and presents major streams of the existing literature, section 3 includes the theoretical framework, section 4 discusses econometric techniques employed in the study and the description and sources of data, section 5 contains results of the study and their discussion and finally in section 6 conclusion and policy recommendations are given.

## Literature Review

This section briefly reviews the existing literature in the field and classifies the literature on the basis of focus and methodology employed by the studies. A huge body of theoretical as well as empirical literature explores the connections between ERs and TB. The studies have investigated this relationship in the case of single as well as multiple countries. Different studies have employed different methods and techniques to investigate the nature of the effect of ER on balance of trade, but their findings have produced mixed results. That is why, the ER to be used as an instrument to correct the balance of trade or to improve the trade position of a country is still a matter of wide debate, especially for the developing countries. The existing literature can be classified on the basis of data, method of estimation, and findings.

Regarding the nature of data, a class of studies has used aggregate data of imports and exports of a country along with real effective ER to examine the relationship (Alessandria & Choi, 2021; Bhat & Bhat, 2021; Kyophilavong et al., 2013; Shah & Majeed, 2014; Ziramba & Chifamba, 2014). However, there is an argument that these studies suffer the shortcoming of not addressing the problem of 'aggregation bias'. It is due to the fact that these

explorations use real effective ERs which do not reflect the true effect of currency's fluctuation – an adjustment in the value of the currency of a country in relation to the currency of its one trading partner may offset the change in the value of its currency against the currency of another trading partner, thereby smoothing the overall change in real effective ER. Moreover, the proxy used for the world income may itself be misleading. On the other hand, some other types of studies like Onafowora (2003), Irandoust et al. (2006), Baak (2008), Chui et al. (2010), Wang et al. (2012), Dash (2013), Hussain and Bashir (2013), Šimáková (2014), Suleman et al. (2014), Guan and Ip Ping Sheong (2020) etc. have used disaggregated data to a country level and have investigated the bearings of bilateral ER on bilateral trade position. These explorations are also likely to encounter the same issue of 'aggregation bias'. It might be due to this reason that a recent version of studies has used the data disaggregated to a industry level (Chiloane et al., 2014; Dogru et al., 2019; Šimáková & Stavárek, 2014).

A variety of estimation methods and techniques have been employed in the studies conducted by different researchers. A strand of literature has employed ARDL and error correction models (Hussain & Bashir, 2013; Kyophilavong et al., 2013; Nguyen et al., 2021; Shah & Majeed, 2014; Suleman et al., 2014; Ziramba & Chifamba, 2014). Another type of explorations has used VAR and VECM techniques to achieve their objectives (Baak, 2008; Chiloane et al., 2014; Dash, 2013; Kodongo & Ojah, 2013; Onafowora, 2003; Šimáková, 2014). To explore short-run relationships among the variables, some studies have employed impulse response functions (Chiloane et al., 2014; Dash, 2013; Onafowora, 2003). To investigate the bilateral trade position of countries, panel cointegration has been used in most of the studies (Chui et al., 2010; Wang et al., 2012). Irandoust et al. (2006) employ likelihood-based panel cointegration technique to investigate the impact of ERs on bilateral trade position. Bahmani-Oskooee and Gelan (2018) employ bounds-testing approach to discern between the short- and long-term drivers of trade. In addition, Bhat and Bhat (2021) and Dogru et al. (2019) utilize nonlinear cointegration techniques.

There exists a chunk of literature that investigates the dynamics of trade at industry and commodity levels. For instance, Bussière et al. (2020) examine the role of price and quantity elasticities for 51 advanced and emerging economies. They inspect disaggregated trade flows among more than 160 trading partners and 5000 products. The results of the study substantiate that the depreciation of currency improves trade position. Dogru et al. (2019) analyze bilateral trade position of the US with Mexico, Canada and the UK in tourism industry, using linear and nonlinear ARDL techniques. They find that the depreciation of domestic currency cast favourable impact on TB with all the trading countries. Nevertheless, the strengthening of domestic currency deteriorates TB with Canada and the UK, but has no bearings on the bilateral TB with Mexico.

The theoretical literature suggests that the devaluing of the currency of a country makes its exports relatively cheaper than its imports. Therefore, the devaluation of a nation's currency may potentially benefit its trade position. For example, the concept of the J-curve states that the short-term effects of the decrease in the value of country's currency (devaluation) deteriorates its TB, while in the long run, it leads to an improvement in its TB. The findings of the empirical explorations are in support of this concept in some cases, but they contradict this proposition in some other cases. For an illustration, Onafowora (2003) substantiates that there exists one long-run (cointegrating) relationship among real ER, real TB, real domestic income, and real foreign income in the case of each country. However, considerable variations are observed in the results – the impulse response functions affirm the satisfaction of the ML condition in the long term and the prevalence of J-curve phenomenon in the short term.

In the same vein, Alessandria and Choi (2021) examine the J-curve type phenomenon for the US, and Kyophilavong et al. (2013) substantiate that there happens to be a J-curve type associations for Laos trade. A decline in the real value of the national currency harms the TB in the short term, but its impact remains insignificant in the long run. However, the long-term trade capability of the country is mainly driven by its domestic income. Bhat and Bhat (2021) maintain that a decline in the value of Indian currency in terms of foreign currency deteriorates TB of India in the short run while it ameliorates it in the long term, validating the existence of J-curve phenomenon for Indian trade. Nguyen et al. (2021) also confirm the presence of J-curve type trade patterns in the trade of Vietnam with the US.

In contrast, there is an argument supported by mixed findings. For instance, Dogru et al. (2019), Šimáková (2014), Dash (2013), Wang et al. (2012), Chui et al. (2010) and Irandoust et al. (2006) authenticate that the J-curve phenomenon exists in the case of some trading partners, but it does not exist in case of other trading partners of the same country. Moreover, these studies also provide evidence of the presence of an inverted J-curve for some trading partners. Besides all this, another standpoint exists that suggests that devaluation of currency worsens TB rather than correcting TB and/or has no effect on TB (Suleman et al., 2014; Shah & Majeed, 2014; Ziramba & Chifamba, 2014).

Thus, it can be concluded that researchers have investigated the connections between ER and balance of trade by using aggregated, disaggregated to country level, and disaggregated to industry-level data and employing ARDL, VAR, ECM, VECM, and panel cointegration techniques. However, in the case of Pakistan, the studies have used aggregated data and employed ARDL, variance decomposition analysis, and impulse response functions (Ahmed et al., 2022; Shah & Majeed, 2014) and disaggregated data to country level: bilateral trade with only one trading partner (Suleman et al., 2014) and bilateral trade in case of two trading partners (Hussain & Bashir, 2013). Because of all this, this study aims to inspect the connections among variables in the case of five major trading partners by employing panel co-integration.

## Theoretical Framework

One of the most pioneer attempts that provide foundations for open economy models is the Mundell-Fleming framework, owed to the seminal works of Mundell (1960) and Fleming (1962). The Mundell-Fleming framework visualizes that fluctuations in domestic currency (that might be due to any policy action or any other reason) can profoundly impact TB of a country. For instance, as a result of the depreciation of a nation's, its domestically produced goods become relatively cheaper than the foreign goods due to which foreign spending shifts to the domestic goods. Consequently, domestic economic activity flourishes while foreign output declines. Thus, the impact of a surge in the money supply of an economy in this framework is considered as “beggar-thy-neighbour” type.

Contrary to the Mundell-Fleming framework, recent models emerged in the literature on international trade and openness such as Kollmann (2001) and Obstfeld and Rogoff (1995) take into account nominal rigidities and imperfect asset substitution across countries. They argue that a depreciation of domestic currency due to an expansionary monetary shock may increase output both at home and abroad. So, in their view, the effect of a policy action causing a depreciation of domestic currency can be of “prosper-thy-neighbor” type. As postulated in the Mundell-Fleming framework, a policy action that depreciates domestic currency results in the shift in demand from foreign goods to domestic goods. Nevertheless, the effect across different time periods (intra-temporal effect) so caused may be upturned by the period-specific effect (inter-temporal effect) as initially the prices resistant to change are likely to soar in the subsequent periods. Hence, future goods become relatively more expensive than the current period goods. Owing to this reason, demand for both foreign as well as domestic goods shifts towards the present (inter-temporal switching effect) simultaneously. Given that this across-the-periods effect, which has been ignored in the Mundell-Fleming framework, comes into action, an expansion of domestic money supply boosts foreign output.

Further, for the purpose of sketching somewhat exact functional forms of demand for exports and imports of a country, the recent empirical literature suggests that exports of a country mainly depend upon foreign income (income of importing country) and real ER (Bhat & Bhat, 2021; Keho, 2021). Further, both foreign income and real ER favourably impact exports. Thus, the demand function of exports becomes:

$$X = f(RE, Y^f)$$

In the same vein, imports of a country are chiefly determined by the country's real income and real ER. Moreover, imports are positively associated with domestic income but are negatively connected with real ERs. So, the demand function of imports becomes:

$$M = f(RE, Y^d)$$

Here,  $X$  = Value of Exports

$M$  = Value of Imports

$Y^f$  = Foreign Income

$Y^d$  = Domestic Income

$RE$  = Real Exchange Rate

While the RE is calculated as:

$$RE = \frac{eP^f}{P^d}$$

Where  $e$  is the nominal ER, and taken as the worth of a unit of foreign currency in terms of domestic currency. In other words, it is the number of domestic currency units exchanged for one unit of foreign currency,  $P^f$  is the foreign price level (CPI of a trading partner) and  $P^d$  is the domestic price level (CPI of Pakistan).

### **Research Hypotheses**

H<sub>1</sub>: Bilateral real RE has significant impact on bilateral TB of Pakistan.

H<sub>2</sub>: The nature of the impact of bilateral real RE on bilateral TB of Pakistan remains same in the short run as well as long run.

H<sub>3</sub>: Domestic economic activity has a significant effect on bilateral TB of Pakistan.

H<sub>4</sub>: Foreign GDP (GDP of trading partner) has significant bearings on bilateral TB of Pakistan.

### **Methodology and Data**

This section contains the description of variables, sources of data, and econometric techniques and methods employed in this study. We use panel data for six countries: Pakistan and its five trading partners for the period 1991 to 2018. The selection of sampled countries and time period for the analysis is based on several reasons. Firstly, the countries are selected keeping in view their bilateral trade volume with Pakistan. The countries having significant (more than 10% of Pakistan's total trade volume) share in Pakistan's total trade have been selected. Secondly, the time period is selected because it constitutes a reasonably good sample to ascertain the dynamics of relationships among variables as it spans over four to five trade cycles (considering average period of a trade cycle of a five to six years). Additionally, the latest years are not included in the sample period due to nonavailability of data especially on bilateral ER of sampled some countries, and also to avoid anomalies caused by disruptions in global trade during Covid-19 pandemic.

### **Variables and Sources of Data**

Acquiring insight from the existing literature, this study uses real bilateral ERs, bilateral TB, and domestic and foreign real incomes. The ER is taken as the value of one unit of foreign currency in terms of domestic currency and the real ER is adjusted to domestic and foreign price level which is explained in the theoretical framework, given above. Real domestic and foreign incomes are the domestic GDP and foreign GDP at the constant price of 2010 respectively. The TB is measured as the worth of exports per unit of imports. Simply it is the ratio of exports to imports as used by many studies (Chiloane et al., 2014; Kodongo & Ojah, 2013; Šimáková, 2014;). The data on exports and imports is extracted from Directions of Trade and Statistics (DOTS), the data on CPI is obtained from International Financial Statistics (IFS) and the data on real GDP is taken from WDI, and on the ER is taken from the Federal Bureau of Statistics of Pakistan.

### **Descriptive Statistics**

Table 1 showcases descriptive statistics of the variables utilized in this exploration. It is apparent from the table that mean and median values of almost all the variables are approximately equal which indicates that the variables follow normal distribution approximately.

**Table 1**  
*Descriptive Statistics*

Variable	Obs	Mean	Median	Std. dev.	Min	Max
LGDPD	140	26.024	26.039	0.328	25.477	26.594
LGDPF	140	28.687	28.663	1.185	26.513	30.601
LRER	140	3.925	4.361	0.959	2.140	5.261
TB	140	1.016	0.890	0.857	0.074	3.924

**Note:** Here LGDPD is the logarithmic transformation of domestic real GDP, LGDPF is the logarithmic transformation of real GDP of foreign country (trading partner), LRER is the logarithmic transformation of bilateral real ER and TB is the bilateral balance of trade.

The coefficients of linear associations among the variables are portrayed in Table 2. It is apparent from the table that the strongest association is between bilateral balance of trade and real ER with the magnitude of correlation coefficient is 0.713, whilst the weakest association is between real domestic GDP and real ER. It is also worth noting that bilateral real ER and bilateral TB are comparatively more strongly correlated with foreign real GDP than domestic real GDP, which is probably due to the reason that our trade indicators are driven more by international factors than domestic factors. It further favours the argument that a small economy plays negligible role in international trade.

**Table 2**  
*Correlation Matrix*

	LGDPD	LGDPF	LRER	TB
LGDPD	1.000			
LGDPF	0.249	1.000		
LRER	0.045	0.294	1.000	
TB	0.080	0.534	0.713	1.000

**Note:** As for Table1.

**Econometric Model**

The authenticity and credibility of the findings of a research investigation chiefly depend on the suitability of the econometric model it employs. Further, the selection of econometric model is determined by the objectives of the study. Therefore, the empirical endeavours aiming to analyse the impact of ER on balance of trade have employed a variety of econometric techniques what they deem fit to the objectives of their explorations. For instance, one strand of literature has employed ARDL and error correction models (Hussain & Bashir, 2013; Kyophilavong et al., 2013; Shah & Majeed, 2014; Suleman et al., 2014; Ziramba & Chifamba, 2014). Another type of explorations has used VAR and VECM techniques to achieve their objectives (Baak, 2008; Chiloane et al., 2014; Dash, 2013; Kodongo & Ojah, 2013; Onafowora, 2003; Šimáková, 2014). However, to investigate the bilateral trade position of countries, many studies has utilized panel cointegration models (Chui et al., 2010; Wang et al., 2012).

Since this study utilizes panel data, therefore, it exploits panel-data econometric techniques for its analyses. There is a wide array of panel-data econometric techniques but their suitability varies under different settings of the analyses. The most widely used panel-data econometric models include fixed effects (hereafter FE), random effects (hereafter RE), panel indirect least squares, generalized method of moments (henceforth GMM), etc. The FE and RE models do not differentiate between the short-term and long-term analyses. Panel indirect least squares model is used when there is a system of equation and to address the problem of endogeneity. Dynamic panel models, such as system GMM, panel ARDL and panel vector autoregression are used when the focus of the study is to investigate the dynamic relationships among variables as these models use lag(s) of dependent variable as a predictor(s).

This paper aims to inspect dynamics of connections among the variables under investigation both in the short as well as long run. For the purpose, it utilizes fully modified OLS (henceforth FMOLS) model to examine the long-term dynamics of the connections. The FMOLS model devised by Phillips and Hansen (1990) is a better tool to estimate the cointegrating slopes of the cointegrated variables even in the presence of serial correlation and

endogeneity among the regressors (Phillips, 1995). It gives optimal and consistent estimates of the cointegrating regression. Considering these advantages of the model, we exploit FMOLS model to investigate the long-term associations among the variables. For the short-run analysis, we employ panel error correction technique.

Keeping in view the advantages of FMOLS model and gaining insight from the existing literature, we employ panel data models to analyse the impact of bilateral ER on the bilateral TB of Pakistan with its five major trading partners. The econometric form of the relationships among the variables can be sketched as:

$$\ln TB_{it} = \alpha_i + \beta_i \ln Y_{it}^f + \gamma_i \ln Y_{it}^d + \delta_i \ln RE_{it} + \varepsilon_{it} \quad \dots (1)$$

Here,  $BT_{it}$  is the bilateral balance of trade of Pakistan with the country  $i$  in time  $t$ . It is taken as a ratio of Pakistan's exports to country  $i$  to Pakistan's imports from country  $i$ . It becomes a unit-free measure of TB, as it is in the form of a ratio, and has also been used by several studies.  $Y_{it}^f$  is the real economic activity of the country  $i$  (trading partner of Pakistan) in time  $t$ ,  $Y_{it}^d$  is the real income of Pakistan in time  $t$ , and  $RE_{it}$  is the real bilateral ER in time  $t$ , measured as the real value of trading partner's currency in terms Pakistani rupee.

**Panel Unit Root**

It is imperative to determine the stationarity of data series because nonstationary series yield spurious and misleading results unless they are cointegrated (Newbold & Granger, 1974). Econometricians have developed a number of statistical tests and techniques to test the stationarity of series. However, the suitability and performances of tests differ in different situations. Owing to this reason, particularly in panel data setting, we have to check whether there exists cross-sectional dependence (henceforth CSD) or not before executing panel unit root test. In the case where there is no CSD, a first-generation test for the investigation of unit root can be used, but if it exists then second-generation tests for panel unit root are to be used. For the determination the presence the unit root of a panel-data series with CSD, the most widely used tools include a battery of panel unit root tests grounded in the works of Levine et al. (2002), Im et al. (2003) and Pesaran (2007). These tests include LLC, IPS and CIPS. To investigate panel unit root, for each cross section the ADF regression can be structured as:

$$\Delta y_{it} = \alpha_i + \rho_i y_{i,t-1} + \gamma_i t + \sum_{j=1}^{k_i} \theta_{ij} \Delta y_{i,t-j} + \varepsilon_{it} \quad \dots (2)$$

Here, the first difference of the series is denoted by  $\Delta$ ,  $t$  denotes time dimension of the series, (where  $t = 1,2,3,\dots,T$ ),  $i$  corresponds to the number of cross sections in the panel (and  $i = 1,2,3, \dots, N$ ). Suppose  $X_{it}$  is the static of unit root test of the  $i$  th group. The  $p$ -value of the statistic for  $i$  th cross-section be  $\rho_i$  asymptotically, then  $\rho_i = f(X_{it})$ , so  $f(X_{it})$  will be the distribution function of the variable  $X_{it}$ . Here, we have the null hypothesis that the series for each cross section is nonstationary that is it is the unit-root process. Whereas, the alternative hypothesis maintains that each cross section is not a unit-root process. So, we test the null hypothesis, that is  $\rho_i = 0$ . Further, in case the series are nonstationary, we must determine whether there exists a cointegrating relationship among the series with an objective to minimize the possibility of spurious regression.

**Panel Cointegration**

Since this study mainly aims to investigate the short-term and long-term dynamics of the impact of bilateral real ER on bilateral TB. It is, therefore, necessitated that there should be well-established cointegrated relationships among the variables for the long-run analyses. Econometricians have developed a number of tests to test the existence of panel cointegration, but the most widely used tests are designed by Pedroni (1999, 2004). There are major two categories of these tests. The first category includes panel  $t$ -statistic, panel  $\rho$ -statistic, panel  $v$ -statistic and panel ADF-statistic. The statistics utilized by these tests are within dimension-based, and are generally known as panel cointegration statistics. Further, the second category comprises group-statistic  $\rho$ -statistic, group  $t$ -statistic and group ADF-statistic. These statistics are between-dimension panel statistics, and are considered to

be group mean panel cointegration statistics. These statistics determine whether there exists any cointegrating relationship among the variables under investigation or not. The regression employed for panel cointegration can be represented as:

$$y_{it} = \alpha_i + \sum_{m=1}^M \beta_{mi} x_{mit} + \varepsilon_{it} \quad \dots (3)$$

Here,  $i$  is the number of cross sections (members) of the panel, and  $t$  corresponds to the number of observations. The parameter  $\alpha_i$  may allow the unit-specific fixed effects. The vector of the slope coefficient may also vary by country allowing the possibility of heterogeneous vectors across the countries for the existence of cointegrating relationships in the panel-data setting. Here in this setting, the null hypothesis to be tested is that there is no cointegration among the variables against the alternative that there exists cointegration among the variables.

**Panel Error Correction Model**

The study employs panel ECM to explore the short-term dynamics of the bearings of real bilateral ERs on bilateral TB. Moreover, this model also indicates the presence of an adjustment mechanism to the equilibrium path in the long run. The econometric form of panel ECM can be sketched as:

$$\Delta \ln TB_{it} = \alpha_i + \sum_{j=1}^p \beta_i \Delta TB_{it-j} + \sum_{j=0}^p \delta_i \ln \Delta RER_{it-j} + \sum_{j=0}^p \gamma_i \ln \Delta GDPD_{it-j} + \sum_{j=0}^p \varphi_i \Delta \ln GDPF_{it-j} + \lambda \varepsilon_{t-1} + \mu_{it} \quad \dots (4)$$

Here,  $\Delta$  denotes the first difference,  $i$  represents cross-section,  $p$  represents of lag length, and  $\varepsilon_{t-i}$  lag ECM term. For the stable long-run relationship, any deviation from the equilibrium path must disappear over the time. This sort of tendency in the adjustment mechanism requires that the coefficient of the ECM term ( $\lambda$ ) must be significant with a negative sign, and its absolute value should be less than one. It will imply that short-term drifts from the equilibrium path will be corrected back towards the equilibrium path by the dependent variable  $\Delta \ln TB_{it}$  with the speed of adjustment  $\lambda$  per period of time in the long run.

**Results and Discussion**

**Results of Panel Unit Root Test**

As the selection of panel unit root test requires the prior determination of CSD among the variables, we test CSD by utilizing the test designed by Pesaran (2004). The outcomes of the test confirm the presence of CSD in the series. Therefore, we use the Fisher-ADF test for the unit root analysis because the data-series under investigation have CSD, and also, we have a balanced panel. The outcomes of the unit root test show that only the TB series is stationary at its level as only in this case the null hypothesis can be rejected at a 5% level of significance.

**Table 3**

**Results of Panel Unit Root Test**

Variable	Level		First Difference	
	Statistics	P-value	Statistics	P-value
LTB	-1.7699	0.0308	-	-
LRER	2.2985	0.9892	-4.3799	0.0000
LGDPD	2.4950	0.9937	-4.4688	0.0000
LGDPF	1.5534	0.9398	-3.8889	0.0001

**Note:** As for Table 1.

At 5% level of significance, we cannot reject the null hypothesis for the cases of domestic real GDP, foreign real GDP, and bilateral ER. However, all these variables are first-order integrated as the null hypothesis that the series are unit-root process can be rejected at their first difference at 1% level of significance for each case.

### ***Panel Cointegration***

We use the FMOLS estimator proposed by Pedroni (2000) for cointegration analysis. Individual intercept and linear trends are incorporated into the estimation process. The findings of this analysis show that domestic real GDP harms the bilateral trade position of Pakistan in the long run which is in concord with the existing literature (Bahmani-Oskooee & Gelan, 2018; Bhat & Bhat, 2021; Dogru et al., 2019;). Moreover, a one percent increase in Pakistan's real GDP results in around seven percent deterioration of Pakistan's TB. This might be due to the nature of imports as a significant component of Pakistan's imports is comprised of input commodities.

**Table 4**

#### ***Results of FMOLS Model***

<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
LRER	-0.3116	0.0838	-3.7162	0.0004
LGDPF	2.4224	0.5691	4.2559	0.0001
LGDPD	-7.1774	0.9244	-7.7644	0.00
R-squared	0.9558	Mean dependent var		-0.4069
Adjusted R-squared	0.9499	S.D. dependent var		0.9992
S.E. of regression	0.2234	Sum squared resid		4.4946
Durbin-Watson stat	1.9058	Long-run variance		0.0559

Analogously, a rise in domestic real GDP causes a surge in the demand for imports. The bilateral real ER cast unfavourable bearings on the bilateral trade position which implies that the devaluation policy on the part of Pakistan is ineffective (Malik, Awais, Sulehri, Mohsin, & Ali, 2021). It deteriorates the balance of trade instead of improving it. It might be mainly due to insensitive demand for imports to ERs or their prices. On the other hand, foreign real GDP has a positive impact on Pakistan's TB which is in agreement with the existing literature as increased foreign real income leads to increased demand for imports (Pakistan's exports) (Bussière et al., 2020; Dogru et al., 2019; Nguyen et al., 2021). The demand for Pakistani net exports rises by 2.5% as a result of 1% increase in foreign real income.

### ***Panel ECM***

To examine the short-term behavior of variables and the adjustment process to the long-run equilibrium, we employ the panel ECM. The selection of lag length of variables plays a key role in the establishment of relationships among the variables. The most suitable lag length as suggested by Akaike Information Criterion (AIC) and other criteria is 2. Therefore, we estimate the model incorporating two lags of variables in the model. Table 5 showcases the short-term connections among the variables. It is apparent from the table that the second lag of bilateral TB and foreign real income have favorable impacts on the bilateral TB of Pakistan. The significant and positive impact of bilateral TB indicates that the variable has to some extent as it moves in the same direction. Analogously, the significant and positive impact of the second lag of foreign real GDP substantiates that the economic activity in the trading partner has lasting impact on Pakistan bilateral TB – the impact may last for some periods. The first lag of the bilateral real ER cast a negative and significant impact on the bilateral trade position of Pakistan in the short run. All this substantiates that the depreciation of bilateral real ER exacerbates bilateral trade position of Pakistan, even it does not improve the position in the long run as well. These findings are in concord with the existing literature (Suleman et al., 2014; Shah & Majeed, 2014; Ziramba & Chifamba, 2014).

The current value of domestic real GDP worsens while its second lag significantly improves bilateral trade position of Pakistan in the short run. It implies that growth in the real GDP of Pakistan instantaneously exacerbates its bilateral trade position, while with time it improves it. It might be due to the reason that the exports of goods



pass through some procedural requirements that take time. Further, it is maintained that economic activity in Pakistan takes some time to boost its exports as compared to its imports, taking the time of around one year. The ECM term shows that the process reverts to its long-run equilibrium path if there are short-run deviations. The ECM term is significant at a 5% level of significance with a negative sign and an absolute value of less than one. The coefficient of ECM term is -0.1505 which indicates that the process reverts to the long-run equilibrium path at the speed of almost 15% per period (one year).

**Table 5**

***Results of Panel ECM***

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTB(-1))	-0.0669	0.1151	-0.5811	0.5628
D(LTB(-2))	0.2616	0.1143	2.2891	0.0134
D(LRER)	-0.0787	0.1397	-0.5633	0.5748
D(LRER(-1))	-0.3249	0.1264	-2.5708	0.0098
D(LRER(-2))	0.1365	0.1372	0.9951	0.3228
D(LGDPD)	-3.1862	1.4587	-2.1842	0.032
D(LGDPD(-1))	0.2592	1.4625	0.1772	0.8598
D(LGDPD(-2))	2.5933	1.2535	2.0689	0.0455
D(LGDPF)	2.8098	1.0898	2.5783	0.0247
D(LGDPF(-1))	-0.2689	1.2145	-0.2214	0.8253
D(LGDPF(-2))	-0.5639	1.0536	-0.5352	0.5941
RESID1(-1)	-0.1505	0.0741	-2.0334	0.0455
R-squared	0.2074	Mean dependent var		-0.0020
Adjusted R-squared	0.0927	S.D. dependent var		0.2389
S.E. of regression	0.2276	Akaike info criterion		0.0039
Sum squared resid	3.9381	Schwarz criterion		0.3417
Log-likelihood	11.8254	Hannan-Quinn critter.		0.1401
Durbin-Watson stat	2.1127			

**Conclusion**

This study investigates the effect of the bilateral real ER on the bilateral trade position of Pakistan with its five significant trading partners, namely the US, China, Saudi Arabia, Germany, and the UK. To this end, we use panel data from six countries from 1991 to 2018. For the long run analysis, we employ FMOLS model designed by Pesaran (2000), and for the short-run analysis of the interactions of variables, we exploit a panel ECM model.

Since the cointegration procedure requires the investigation of the order of integration of variables, we use the panel unit root test to determine the order of integration of variables. Before moving on to panel unit root analysis, it is mandatory to check CSD. For this purpose, we utilize the test devised by Pesaran (2004) to determine CSD of the variables which indicates the existence of CSD. Since the second-generation panel unit root tests are employed when there is CSD, we employ the Fisher-ADF test. The outcomes of the unit root test reveal that the TB series is  $I(0)$  while RER, GDPD, and GDPF are  $I(1)$ . However, the results of the fully modified OLS test reveal that both domestic real economic activity and bilateral real ER deteriorate the bilateral trade position of Pakistan while foreign real income has a positive impact on it. Further, the results of panel ECM confirm the existence of adjustment tendency in the process to the long-run equilibrium path.

### Policy Recommendations

The findings of the study support the notion of a ‘small open economy’ discussed in standard international economic literature. This perspective maintains that policy decisions in small open economy do not significantly influence global economic environment. The insights derived from the study not only affirm this stance but also extend it, indicating that foreign factors are more important than domestic ones in determining trade position of a small open economy. The implications drawn from these findings suggest that business conditions in the trading partner can significantly impact the trade position of a small open economy. Therefore, economic agents of small open economy should keep a vigilant eye on the global economic developments and make their decisions accordingly in order to improve their trade position.

Based on the insights acquired from the study, it is recommended that Pakistan should reconsider its devaluation policy, particularly when it aims to address its TB disequilibrium, as depreciation of domestic currency exacerbates TB instead of ameliorating it. The more effective approach might involve alternative measures, such as bolstering export capabilities through diversification of exports and enhancement of productive capacity. The policymakers in Pakistan should keep a vigilant eye on global trends, as real GDP of trading partners has positive and significant impact on Pakistan’s bilateral trade position. They should adjust policy measures in accordance with global business trends (cycles) in order to reap advantages.

### Future Research Direction

We recommend exploration and investigation of the elements of bilateral trade for future research endeavours. The researchers may also explore nonlinear dynamics of the drivers of bilateral TB.

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## Echoes of Doubt: Unveiling Imposter Phenomenon Among First Generation Pakistani Students

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### Abstract

*This paper aims at exploring the imposter phenomenon (IP) among first-generation college students (FGCS) in Pakistan adopting a phenomenological research framework. Nine FGCS from different backgrounds were interviewed to investigate how social and cultural factors affect their IP experiences. The research focused on themes of social adaptation, motivation, university friendship, and the interplay of collectivism-individualism. Findings showed that there are multiple interactions between the traditional cultural roles and the new academic settings. Participants described IP issues when transitioning to university life, making friends, and coping with academic stress in relation to cultural demands. However, they also demonstrated resilience and motivation drawn from peer achievements.*

*The study highlighted the nature and perception of IP among FGCS in Pakistan based on their cultural background and academic environment. The conflict between collectivist values and the less collectivist university environment became an issue. However, participants' performances were characterized by great tenacity, which was often fueled by family expectations and the need to set an example for other members of the community. This research helps to fill the gap in knowledge about IP in non-Western countries and provides insights for the development of appropriate interventions for FGCS in the context of Pakistan's higher education system. It highlights the importance of culturally appropriate care and more research on IP's experiences in different cultures.*

### Introduction

Today in the age of globalization and technological development, higher education is more important than ever for economic stability and social elevation. This is especially the case in developing nations such as Pakistan in which the enrollment ratio to the higher education has been on the rise in the recent past. The World Data Atlas (2023) reveals that the enrollment ratio to higher education in Pakistan has risen by 9% between 1979 and 2018, which indicates that the role of higher education in the country's development is gradually being appreciated. With increasing enrolment of students in universities, there is an increased number of first-generation college students (FGCS); students whose parents have not attained a bachelor's degree. There is a lack of precise statistics for Pakistan; however, according to Pakistan Institute of Education, 2015-2016 academic year data, 56% of the total undergraduate students across the country were FGCS and 59% of them were the first in their family to go to college. This demographic shift in higher education has both the possibilities and the problems for the Pakistani universities and students.

Enrolling in the college system and adjusting to it are two different things, adjusting to a college environment is a psychological procedure of coping with and managing the challenges, problems and demands of daily life (Chong et al., 2014; Nasir & Maliha, 2011).

One of the significant challenges faced by FGCS is the imposter phenomenon (IP) which is described as a person experiencing feelings of being a fake and having doubts in one's abilities despite the goal accomplishment (Clance & Imes, 1978). Individuals experiencing IP often attribute their achievements to luck or mistake rather than their own abilities, leading to increased stress, anxiety, and potential underperformance. The person undergoing this phenomenon does not actually believe themselves to be intelligent or accomplished despite objective evidence of success and feel vulnerable to discovery as a fraud (Ménard & Chittle, 2023). While IP has been studied extensively in Western contexts, there is limited research on its manifestation among FGCS in non-Western countries like Pakistan. This literature gap is especially noticeable due to the growing trend in the expansion of higher education in Pakistan and the growing enrolment of FGCS in universities. Therefore, it is vital to comprehend FGCS's perspectives on IP to establish support structures and practices that will facilitate the student's academic progress and future endeavors.

The current research therefore seeks to establish the extent of IP among FGCS in Pakistan and the effect it has on their performance, as well as the strategies that these students use to deal with the issue. Hence, by analyzing the cultural background, social identity, and academic experiences of FGCS, the study aims to offer recommendations that will help in designing better support structures for FGCS in Pakistani universities. Specifically, this research addresses the following questions: In what ways do the social and cultural factors affect the imposter phenomenon experienced by first-generation college students in Pakistan? How does the FGCS in Pakistan deal with the imposter phenomenon? Thus, it is crucial to understand how the shift from collectivist home cultures to more individualistic university contexts influence FGCS' experiences of IP. How does the aspect of peer relationship and social support network influence the IP either positively or negatively among the FGCS in Pakistan?

Answering these questions, this study enriches the existing literature on IP in various cultural settings and offers useful information for educators, policymakers, and university managers who are struggling to facilitate FGCS in Pakistan and other developing nations.

## Literature Review

The occupational experiences of FGCS in higher education can potentially reinforce inequity if not clearly understood or addressed. According to Whiteford (2017), there hasn't been much investigation in occupational science research on the "[transitional] occupation of being a university student," and more investigation into this occupational perspective is warranted in the field (p. 58). Lack of published research on college students' Professional experiences start to work against the goal of encouraging social inclusion. Consequently, first-generation students who encounter IP will benefit from an occupational lens that offers a more comprehensive viewpoint.

### *Intersectionality*

Intersectionality provides peripheral insight as to why marginalized groups face adversity by extracting complex social categorizations and identities that comprise a person, such as socio-economic status (SES), ethnicity, sexuality, and other oppressed identities/experiences, while also focusing on the interdependence by which these identities interact. As a result, the origin of marginalization against an individual, group, or population can be better understood (Secules et al., 2018). Hewertson and Tissa (2022) coined the term intersectionality as a process of marginalization that is ascribed onto people's bodies and within their identity. Hewertson and Tissa (2022) conducted a student survey which aimed at studying the higher education programs that enable access to the culture of power and their study concluded with the recommendation that teachers should help build confidence in students to alleviate imposter syndrome in marginalized groups.

"There is no such thing as a single-issue struggle because we do not live single-issue lives." This is a quote by *Audre Lorde* which captures the essence of intersectionality. Furthermore, (Collins, 2015, p. 2) defines intersectionality as "the critical insight that race, class, gender, sexuality, ethnicity, nation, ability, and age operate not as unitary, mutually exclusive entities, but as reciprocally constructing phenomena that in turn shape complex social inequalities." College campus become more and more diverse as students from multiple backgrounds, cultures, and socioeconomic statuses unite under a single roof with the ambitions of achieving higher education to excel in

their respective domains (*Higher Education Statistics Higher Education Statistics*, 2024). These college students will most likely face intersectional forms of discrimination.

### ***Lived Experiences of First-Generation College Students***

In a general educational setting, there are mainly two types of students: the first-generation college students (FGCS) and the continuing-generation college students (CGCS). Among their experiences, microaggression is a widely experienced form of discrimination by these students. As per a recent study finding, 98.8% of the students report experiences of microaggression (Farber et al., 2020). Ellis et al. (2019) refers to microaggression as a form of everyday discrimination that is discrete and indirect but serves as a discriminatory remark (Ellis et al., 2019). Ellis et al. (2019) also discusses how microaggressions are the most pertinent encounters FGCS commonly face.

Many FGCS also face economic struggles which make them feel obligated to provide financial support to their families (LeBouef and Dworkin 2021). Covarrubias et al. (2019) reported that the first-generation college students coming from a low-income family made them feel more responsible to handle their own as well as their family's financial matters. The financial conditions of university students shape them into being overconfident, risk loving and impatient. As per the world economic forum, Pakistan's population comprises 64% of the pupil below the age of 30 and youth unemployment rate as high as 8.5%. Many first-generation college students continue to work to support their families and themselves, but this can also be challenging considering the amount of balance required to maintain both work and school side by side. FGCS are less likely to be involved in social activities that are conducted on-campus to entertain students such as academic and social experiences, study groups, faculty interactions, extracurricular activities, and support services for students (Engle & Tinto, 2008). There is an array of attitudes towards higher education acquisition, some families of FG (Engle & Tinto, 2008). College students perceive higher education as a path to success unlike others (Blackwell & Pinder, 2014).

### ***Support From College***

Enrollment in higher education itself is a rigorous procedure which indicates that all students enrolled in higher education have the ability, potential and skills to succeed, but many FGCS lack the social and financial resources to do so (Havlik et al., 2017). Despite the facilities for support of college students, fewer FGCS, as compared with CGCS used health services (14% vs. 29%), academic advising (55% vs. 72%) and academic support (30% vs. 37%) (RTI International, 2019). The lifesavers in these types of situations are the colleges themselves (Ellis et al., 2019). The colleges can advocate an inclusive environment for students from diverse backgrounds by training their staff and faculty likewise. Babineau (2018); Engle and Tinto (2008) provides the guideline to cater to such issues which include but are not limited to transition programs, freshman experiences, population-specific scholarships, and mentorship.

### ***Imposter Phenomena (IP)***

IP, also referred to as the 'Imposter syndrome' is a feeling of incompetency among the ones experiencing it. Furthermore, it is a sense of having deceived others about one's abilities. People with IP are shown to be associated with characteristics such as introversion, trait anxiety, over-consciousness, a prosperity of shame, and sometimes a conflictual family background as well (Langford & Clance, 1993). IP was originally developed to describe the lived experiences of high-achieving women in the workforce (Clance & Imes, 1978). The first-generation college students, who identify with IP may have shared perception of incompetency, and fraudulence in their academic environment. Literature suggests that FGCS experience IP at a higher rate and relatively more than their peer CGCS (Martinez et al., 2009; Peteet et al., 2015). FGCS who come from varying backgrounds that include the racial/ethnic minorities, low-income backgrounds and culturally backward areas have reported higher levels of anxiety, the fear of academic failure, lower self-esteem, and lower academic confidence (Peteet et al., 2015).

Current literature reports the firsthand experiences of FGCS all around the world with a specific focus on their occupational engagement and social enactment while this domain remains unexplored in the Pakistani academic environment. IP is a widely experienced phenomena but the lack of knowledge regarding the existence of this

concept creates a barrier to overcoming this. Therefore, this study aims to use phenomenological theory to explore the IP experiences among FGCS enrolled in a four-year university program in Pakistan.

## Methodology

This research is inductive qualitative research using phenomenological methods. Data was collected through interviews in a network of students who identified themselves as FGCS. The number of participants kept on increasing until the saturation point. This study utilizes a phenomenological-theory approach to unveil the existence and experiences of FGCS in Pakistan.

## Procedure

This study included nine first generation college students (FGCS) from different universities of Rawalpindi and Islamabad, where four participants were females and five were males. We used purposive sampling to ensure participant diversity in terms of geographic origin, academic program, and year of study. Inclusion criteria specified that participants had to be first-generation college students (with neither parent having completed a bachelor's degree), currently enrolled at a higher educational institute. Our sample size was determined using data saturation principles, and additional interviews were conducted until new themes emerged. Although the sample of nine participants is relatively small, this is consistent with phenomenological research practices that prioritize in-depth analysis over broad sampling (Creswell, 2013). We conducted semi-structured interviews, each lasting between 30 and 40 minutes. The interview protocol explored participants' backgrounds, experiences of transitioning to university, academic and social challenges, and narrative-linked emotions pertaining to the imposter incident (IP). With the consent of the participants, the interviews were audiotaped and transcribed. For data analysis, we used thematic analysis to identify, explore, and report patterns in the data (Braun & Clarke, 2006).

## Data Analysis

After conducting our interviews and doing extensive research we were able to gain insight on how participants and students originating from different cultural and social backgrounds face, and deal with Imposter Phenomenon after coming to university. We were able to gain insight and conduct analysis on the similarities and differences of the responses we obtained in order to get a deeper understanding of the topic at hand.

After conducting these interviews, we were able to identify a stark difference between the environment students face back at home and the one they face at their respective universities. The primary themes we identified that were mentioned repeatedly, in which the participants faced the most differences, and which contributed the most to Imposter Phenomenon were: *University friendships, social adjustment and peer relationships, motivation and goals, along with the concept of collectivism vs individualism.*

The interviews we conducted focused on how these participants navigated their social and academic lives in their universities according to the above-mentioned themes. The responses we received had both similarities and differences, particularly regarding how participants manage their social lives and peer relationships after coming to university, the concept of individualism vs collectivism, with some participants remaining isolated while others doing well in groups, along with how they perceive their lives to be when comparing it how it was back at home before coming to university.

These responses, along with the similarities and differences were analyzed using thematic analysis, as this type of analysis provided us with flexibility, adaptability, a wider range of themes originating from the original data, along with a better understanding of said data and the topic.

### ***Social Adjustment and Peer Relationships***

One of the primary challenges the Imposter Phenomenon describes is the difference between the social environments students face back home and the ones they must face when they eventually come to university. Social acceptance and positive relationships with peers often help these students become better integrated in different social environments and develop in them a sense of belonging, positively affecting their academic performance as well. On the other hand, not being able to form these positive relationships results in students



feeling alienated and alone, negatively affecting not just their academic performance but their mental health as well. Moreover, students from different backgrounds also face self-doubt, stress and anxiety when comparing their achievements to their peers, furthering their problems of social integration.

One of the respondents, described how he manages to create a positive social network in his university despite being from a completely different cultural and social background: *“Apart from this I have participated in multiple societies in my university, due to which I, once again, have developed a healthy social network.”* By actively taking part in different societies and social settings, he has managed to create a positive and healthy social network and relationships, resulting in him enjoying his life in his university. Another respondent says *‘Now that I’ve come to university, I’m participating in a lot of stuff, in societies and in sports events and other opportunities which are presented by the university itself.’* This also shows how a strong and healthy social network is formed by the respondents as this environment was not easily accessible back home.

Another respondent, provides a different perspective on how he views and navigates social life and his relationship with his peers: *“In university, friendships are confined to study behaviors. If you are a good student, you will hang out with students with good GPAs and likewise.”* He is of the opinion that friendships and social networking in university is based primarily on academics, with people of similar academic performances and backgrounds forming their own social groups and relationships.

Participants provide completely different perspectives on how they form peer relationships and navigate their social life after coming to university. While one participant actively goes out and participates in societies and social events to form a diverse and healthy social network and relationships, the other participant is of the opinion that social relations in universities are entirely based on academics and studies.

One respondent, provides her opinion on how her social life has changes after she joined her university: *“I’m participating in a lot of stuff, in societies and in sport events along with other opportunities that are presented by the university itself. So, I guess now it’s different, as I’ve discovered I’m an extrovert and I’ve made more friends than o had back then,”* By participating in various event, activities and societies, particularly sports, She has managed to form her own positive social circle and create a multitude of relationships with different people, far more than she had previously back home in Hunza, allowing her to realize her true personality has an extrovert and navigate her social life and peer relationships much more effectively.

When the topic came to how these respondents managed their stress, emotions, and feelings in regard to their academics and seeing the success and achievements of other people, all the respondents described a feeling of motivation and drive to do better.

This can be best described by the response of one participant: *“Obviously, I get motivated by other people’s accomplishments. Because I believe if people around me who are also students can accomplish great things, it doesn’t mean I can’t, so yes, it’s more of a motivating factor that pushes me to work harder and do better and outdo myself.”* Instead of giving into stress, anxiety and pessimism, he describes a feeling of motivation, drive, and a desire to do better when seeing other people’s achievements, which is a factor that ultimately leads to success and is an indication of confidence and self-efficacy.

All the participant replies show how complex the imposter phenomenon is and how much of an impact it has on students' experiences at universities. A prevalent motif discernible among the participants is the noteworthy obstacle presented by the shift from accustomed social settings in their hometowns to the ever-changing and frequently daunting social terrain of tertiary education. Students may have increased sentiments of impostorism during this adjustment period because they must learn to navigate new social norms, expectations, and peer dynamics. The subjects repeatedly stress how important peer relationships and social approval were in influencing how they experienced impostorism. Positive social network building is essential for promoting a sense of belonging and reducing symptoms of imposter syndrome, according to university societies, events, and sports participants. On the other hand, those who find it difficult to build meaningful relationships with their peers frequently experience elevated levels of alienation and self-doubt, which can negatively affect their mental and academic wellbeing.

Even if the respondents' points of view are varied, a theme about the emotional coping mechanisms used to deal with impostorism appears. Some people believe that social relationships are primarily determined by one's academic performance, while others place more value on social participation and extracurricular activities. This variability emphasizes how crucial it is to identify and accept different coping strategies that are suited to personal preferences and situations.

In order to equip students to navigate and overcome the obstacles offered by impostorism in university environments, it is imperative that these dynamics be understood in order to build tailored interventions and support mechanisms.

### ***Motivation and Goal setting***

Motivation and goal setting play pivotal roles in shaping the academic journey of students. A strong sense of motivation drives students to set ambitious yet achievable goals, providing them with a clear direction and purpose. This clarity not only enhances their focus and determination but also helps them overcome obstacles and setbacks along the way. Additionally, setting and achieving goals boosts students' self-confidence and self-efficacy, reinforcing their belief in their abilities to succeed. Conversely, a lack of motivation or unclear goals can lead to procrastination, lack of direction, and ultimately, feelings of frustration and disengagement. Therefore, fostering motivation and effective goal-setting strategies are essential in empowering students to reach their full academic potential.

One respondent, described how she feels motivated by watching others excel. For example, when she says that a group gave a good presentation before her, she would be motivated to do better as well. By having such a positive mindset, she can keep herself motivated and ready for any obstacle.

Another respondent, also shared similar views on this as he explained that he also feels more motivated and goal-oriented by watching his peers become successful in their tasks. Both respondents are generally motivated by the actions of others and feel the need to do better while in the presence of people that are successful. Another respondent, mentions how the relative grading system plays a big role in shaping students' academic journeys. She explains how in such a system, you have to at least match or surpass your peers in terms of marks to get a good grade. This grading system always keeps the students on their feet and keeps them motivated.

Overall, it can be seen that the accomplishments of others play a big role in determining the motivation levels of students. If they see that their peers are doing well, they are naturally inclined to do better with the thought that if our friends can do it, then why can't we. This thought process can be considered a good tool when talking about motivation and goal setting as it ensures that the bare minimum is done by everyone. There are some negative aspects to this as well, as this leads to a lack of personal agency and autonomy. People are less motivated to find new ideas, as they too focused on doing better than their peers. Students may find themselves pursuing goals that align more with the expectations or desires of their peers rather than their own interests and passions. This can result in feelings of disconnection from their goals and a lack of intrinsic motivation. Additionally, comparing oneself to peers who are perceived to be more successful can lead to feelings of inadequacy and self-doubt, hindering rather than enhancing motivation.

### ***University Friendships: A Journey of Doubt and Disconnection***

The sentiment expressed by the interviewees underscores a common struggle experienced by many noncitizens navigating the social dynamics of university life. The transition from familiar childhood bonds, nurtured over years of shared experiences and cultural understanding, to the transient and often superficial connections formed in academia can be particularly daunting. One participant stated: *"Before university I didn't have a huge number of friends, but I think they were the type of friends I could easily trust, now I've got more friends, but it feels like we're not that close with each other"*.

Friendships forged in university settings often revolve around shared academic goals and professional aspirations, leaving little space for the genuine personal connections prevalent in relationships outside the academic sphere. Additionally, the constant pressure of coursework and the uncertainties offered by the new place, culture, norms, and people, can further complicate the development of meaningful bonds. As described by one respondent:

*“Before university, friendships were not made based on study routines, instead we bonded over what we liked to play, what we wanted to eat. In university, friendships are confined to study behaviors. You are a good student; you will hang out with students with good GPAs and likewise. This is something that I do not like”.*

Time also plays a significant role in distinguishing university friendships from those cultivated in one's hometown. Childhood friendships back home are rooted in years of shared history and cultural understanding, whereas in university, initial years are spent grappling with cultural differences and navigating the complexities of immigration status. Just as one begins to form meaningful connections, the university journey comes to an end, dispersing friends into separate professional trajectories. This lack of continuity is articulated by one participant: *“I guess I was more comfortable with my previous social circle because I had a long friendship with people of that circle like close to 15 to 16 years, so I was very comfortable in sharing anything and everything with them. But now in university, I've known my current friends for a very short time and my first year here was very different and difficult, but now it has gotten much better but not that much, so I would have to say I was much more comfortable with my previous social circle before university based on the fact that I had known them for a longer period of time”.*

The shortage of time, the professional nature of university friendships, coupled with the inherent complexities of being a noncitizen contribute to the fact that the intentions of colleagues can be mired in mystery. As one respondent from Gilgit expressed saying *“I would say I felt more at comfort with my previous friend circle because the new people I've met, I can never know their intentions and that is a primary factor which makes me say that I preferred my older friend group”.* This uncertainty can cause distrust and can be a hurdle in the way of good friendships. And the preconceived notions about university friendships doesn't help either, *“We've created this concept that there are a lot of snakes in universities, so I guess that influences people into thinking that the friends you make in college are generally better”.*

The theme explores the complicated experiences of noncitizens figuring out friendship in college environments. It sheds light on the difficulties involved in making the shift from the enduring, profound friendships of childhood to the fleeting, frequently surface-level relationships made in academic settings. The interviewees all expressed a feeling of uncertainty and detachment from their university friendships. In conclusion, the theme draws attention to the various obstacles that noncitizens encounter when attempting to establish sincere connections in college environments. Noncitizens face challenges in establishing lasting relationships among the fleeting nature of university life, from overcoming cultural displacement to negotiating academic pressures and societal expectations. Fostering an inclusive and encouraging social environment in academics requires an understanding of these problems.

### ***Individualism Vs Collectivism***

Some common emotions that the participants of this study demonstrated were in line with personal adaptation, social integration, and cultural identity. While analyzing their responses thematically, it became almost inevitable to avoid the prevalence of the two most dominating and contrasting cultural dimensions, collectivism, and individualism. These dimensions influence individual's perceptions, behaviors, and coping mechanisms, especially in the transition from traditional closely-knit social structures to diverse academic environments.

Individualism is characterized by a focus on personal goals, individual achievements, autonomy, and self-expression. While on the other hand, collectivism is characterized by group harmony, interdependence, and collective achievements. These two contrasting dimensions are reflected in the participants' experiences.

The interviews reveal how individuals navigate through these cultural dimensions. Participants adherences'-knit communities and social circles such as in Gilgit and Kohat describe their home-culture as embedded in collectivist values where family bonds, community cohesion and traditional adherence are dominant. For instance, one participant from Gilgit reflects on the complexities of her Hunzai culture by stating:

*If we talk about the cultural environment at my house, we might say it's different from a typical household in Islamabad. Hunzai people in my opinion are quite complex, they can be liberal and conservative at the same time and in my house at least it depends on the situation.*

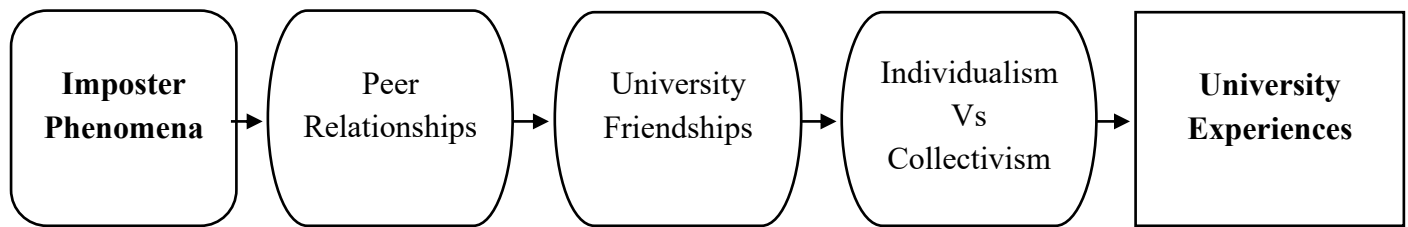
She highlights the blend of liberalism; often associated with collectivism and conservatism; often associated with individualism. Similarly, another participant emphasizes the challenges of transitioning from a closely knit social structure to a more individualistic setting, university life. He states that:

*So there definitely are a variety and people being generally more closed off and keep to themselves and unless you find a good friend group, it's difficult to survive in this environment, considering you are from a culture where you have always been surrounded by people.*

On the other hand, some participants, descending from diverse backgrounds also navigate the shift towards individualism in university settings. One respondent states that:

*Another difference is that Urdu and English are the commonly spoken language here but back home, we speak our mother tongue. I feel like people here are more individualistic, they're more focused on themselves and are invested in their own life meanwhile the cultural environment back in Gilgit is very collectivist.*

The thematic analysis of these cultural dimensions underscores their impact on individuals' academic and social performance in environments such as a university. The participants' narratives highlight the struggle in preserving adopted cultural heritage and adapting to new sociocultural norms in educational settings that prioritize individual achievement and self-expression. Conclusively, the thematic analysis shows how individualism and collectivism play a driving role in the experiences of first-generation college students faced with the reality of being outcasts, the imposters. First-generation college students face significant challenges in adjusting to a new culture and integrating into society. This tension between their collectivist upbringing and individualistic academic settings emphasizes the importance of inclusive educational systems that value cultural diversity and should be prioritized by policymakers.



**Discussion**

The research conducted above aligns with the study of Lane (2015) on IP as per which there is a heightened level of incompetence felt by individuals that experience imposter phenomenon (IP). After analyzing the data collected, it can be concluded that many participants experienced a sense of dis-belonging and over-whelming in their educational environments. In addition to the study of Lane (2015) and Gibbons at al. (2019), this research also negates some of the propositions such as lack of motivational drive in an intense environment where imposter phenomenon is prevalent among the students. As per research, participants felt motivationally driven in their educational setting and were intimidated to perform well by witnessing their peers' accomplishments. Engaging in leisure and other activities while finding support from friends and family enabled them to stay motivated and more focused towards their goals.

Intersectionality, on the other hand, provided a different perspective on the factors due to which an individual may experience the feeling of being an imposter. Intersection of cultural and social identity highlights how students from differing cultural backgrounds navigate through other aspects of their identity such as their ethnicity, gender, and race. For instance, a female student from a non-diverse cultural background may experience more obstacles in navigating social dynamics in a university s compared to a male student from the same background. Similarly, the intersection of cultural expectations with motivation and goal setting highlights the pressure that comes with the societal expectations. Regarding the support, participants tilted towards their newly formed social circles and families, they preferred self-made communities for help. This research adds to the study of Ellis et al (2019) as per which the first-generation college students benefit from support communities which enhance their sense of belonging in their communities. The support from peers and family turned out to be self-

made communities for the students which enhanced their sense of belonging in the competitive environment of their universities.

### ***Hofstede Cultural Model***

Hofstede's cultural model identifies 'overarching cultural patterns or dimensions which influence people's behaviors in significant ways' (Arasaratnam, 2011, p. 45). This framework provides a distinctive comparative approach to studying cultures by identifying and measuring defining aspects of world cultures (Hofstede, 2011). Specifically discussing the dimension of individualism versus collectivism encapsulated in this model, we analyze the degree to which a society prioritizes individual goals and autonomy over collective well-being and achievement.

Analyzing the research through the lens provided by Hofstede, the struggles of transitioning from collectivist-oriented cultural backgrounds to individualistic university environments is evident. Participants highlight the challenges of navigating a more individualistic setting of their universities, where social interactions are more transactional and less cohesive compared to the communities where they descend from. This shift can lead to feelings of isolation particularly in individuals accustomed to strong communal ties and high coherence. While some participants may face the challenges, others actively engage in social activities and networking events to bridge this gap which allows them to form diverse and healthy social networks despite the individualistic setting of their universities.

Similarly, in the context of motivation and goal setting, the influence of both individualism and collectivism is evident as per research, the participants draw motivation from observing the achievements of their peers, this characteristic aligns with the collectivist ideologies that they descend from where collective success is valued. Moreover, in context of university friendships, the research highlights the struggle in transitioning from close-knit childhood friendships to more professional relationships in academia. The struggles of adapting to a more individualistic university environment where people are focused on their individual goals and are less aligned towards forming deep personal relations is evident. This contrasts with the collectivist values that are prevalent in students' hometowns where trust and communal bonds are highly valued.

### ***Social Identity Theory***

According to the Social Identity Theory, which was put forth by Henri Tajfel and John Turner in the 1970s, people divide themselves into social groups according to traits like race, nationality, religion, occupation, or even support of a particular sports team. This theory holds that people tend to compare themselves favorably to members of other groups, known as out-groups, and get a sense of identity and self-esteem from their membership in these groups, known as in-groups. According to the thesis, people work to uphold a positive social identity by elevating their in-group's standing in relation to out-groups. This could entail showing preference to members of their own group, abiding by the norms and ideals of the group, and trying to set themselves apart from other groups. Behavior is also influenced by social identity, since people may act in ways that support and strengthen their sense of belonging to a particular group.

Furthermore, according to Social Identity Theory, perceptions of group resemblance or difference have an impact on intergroup relations. Groups are more inclined to work together and foster good intergroup interactions when they believe they are like one another. On the other hand, prejudice, discrimination, and conflict can result when groups believe they are unique or in rivalry with one another. An extensive tapestry of experiences that highlights the complex relationship between the Imposter Phenomenon and Social Identity Theory is revealed through investigating the themes of Collectivism vs. Individualism, University Friendships, Motivation and Goal-setting, and Social Adjustment and Peer Relationships. According to Tajfel and Turner's (1979) Social Identity Theory, people's sense of self and identity are mostly shaped by the social groups they belong to. This theory offers a prism through which people can see how complicated social dynamics and group affiliations are handled by people, especially in academic environments where the Imposter Phenomenon frequently appears.

The relationship between social identity and the imposter phenomenon is further explained by university friendships, social adjustment, and peer relationships. In academic settings, where perceptions of academic

performance and belonging are crucial, participants negotiate the challenges of making friends and building social networks. The experiences of participants highlight the impact of peer interactions on people's sense of self and belonging. According to Social Identity Theory, people compare themselves favorably to members of their own group to boost their self-esteem. This might make them feel like outsiders when they think they don't measure up to the expectations or norms of the group. All things considered, the topics covered provide a sophisticated investigation of the relationship between social identity theory and the phenomenon of impersonation. We may learn a great deal about the intricacies of impostors and their connection to social identity by investigating people's experiences in social settings and the impact of group dynamics on their actions and self-perceptions. Understanding these relationships is crucial to creating a welcoming and inclusive learning environment where people feel empowered to celebrate their individuality and accomplishments.

### ***Cultural Adaptation Theory***

Cultural adaptation theory explores how individuals adapt to new cultural environments and the challenges they face during this process. Cultural adaptation encompasses adjusting to various aspects of daily life, learning culturally appropriate behaviors, and acquiring necessary social skills to facilitate comfortable interactions with residents (Ward & Kennedy, 1999). It's a multifaceted framework that helps us understand the challenges and opportunities that arise when encountering different customs, values, and ways of life. Cultural adaptation is more than just learning new behaviors. It involves a complex interplay of various factors.

Cognitive Adaptation refers to the modifications people make to their thought processes and approaches to problem-solving to function in unfamiliar surroundings. This can entail picking up new legal knowledge, comprehending various social structures, or adjusting to brand-new educational initiatives. Participants shared different feelings towards the move to a new environment. Rayyan embraced the change as a positive experience, suggesting an open and adaptable mindset. In contrast, Ayesha initially struggled in a more individualistic environment but ultimately developed a new perspective and a sense of acceptance. This example highlights the challenges of adaptation but also the potential for personal growth which was discussed in *Social Adjustment and Peer Relationships*. Ayesha further exemplifies cognitive adaptation by describing a university experience where she initially faced setbacks. However, she adopted a new approach, aiming to learn and improve rather than simply compete with her peers. This demonstrates how cognitive adaptation can involve changing one's goals and strategies in response to new circumstances.

Effective emotion management is essential for overcoming negative feelings like homesickness, irritation, and anxiety. These feelings can exacerbate the imposter phenomenon by adding to feelings of inadequacy and self-doubt. The relationship between cultural adaptation theory and Imposter Phenomenon in college students can be understood through the lens of Acculturation Stress. The difficulties of adjusting to a new culture give rise to acculturation stress, which can intensify sentiments of impostorism. This process is called Affective Adaptation and can be facilitated by creating connections with people who share similar experiences and learning coping techniques. Successful adaptation hinges on developing healthy coping mechanisms to manage emotions. This could involve activities like meditation, journaling, or connecting with people from similar backgrounds who can offer support and understanding. Participants talked about the diverse population in the environment that fostered a sense of belonging in the bustling environment. As highlighted by one participant, a reduction in discriminatory practices towards students from varied cultural backgrounds fosters a more welcoming atmosphere. His observation regarding the opportunities to interact and comprehend diverse perspectives further strengthens the notion of a supportive environment. This study draws a link between the benefits of a culturally diverse environment and successful affective adaptation. It implies that opportunities for social interaction and a sense of belonging serve as catalysts, helping people control their emotions and eventually successfully adjust to a new cultural environment.

FGCS frequently compare themselves socially to their friends, especially those who are thought to be doing exceptionally well academically, which was considered in *the Goal setting and Motivation theme* that analyzes the correlation between the two concepts. It states that while peer motivation can drive academic performance, it must be balanced with individual interests and aspirations to maintain a sense of autonomy and personal

fulfillment. Finding this equilibrium ensures that students leverage both internal drive and external encouragement to pursue meaningful goals and achieve academic success. Students from minority backgrounds may find this comparison especially relevant if they believe they are not as prepared academically or culturally as their peers.

The connection between IP and cultural adaptation theory in FGCS reveals a nuanced interaction between the difficulties of adjusting to unfamiliar cultural contexts and the psychological obstacles to confidence and self-belief. Students from varied backgrounds face numerous challenges as they adjust to university life, which can intensify feelings of inadequacy and impostorism. Understanding this relationship offers institutions an opportunity to equip students with skills that empower these students to come out of their bubble and face the complexities of the real world with utmost resilience. Through collective efforts to address the Imposter Phenomenon and acculturation stress, participative learning settings can be created where each student feels appreciated, seen, and capable of reaching their greatest potential.

### Limitations

The biggest limitation to our study was the small sample size and limited data sources. Our sample only consisted of nine participants, all from the Higher Education Institutes. The population and sample size could have been larger and more diverse in order to gain a better understanding of the Imposter Phenomenon. Moreover, focused groups interviews could have been conducted which would have allowed us to gain a much better understanding of the data and the topic at hand.

### Implications

Students who face the Imposter Phenomenon may also end up facing academic difficulties, social isolation, poor mental health, and difficulty forming positive and healthy peer relationships after coming to universities. This study aims to highlight this problem and promote efforts in order to cater to these students, helping them adapt, and creating an environment where people from all cultural and social backgrounds feel safe and at home. This study also identified the similarities and differences of experiences and problems these participants faced after coming to university. These factors should be further studied in order to gain a better understanding of how to create a more friendly and welcoming environment for students coming from different backgrounds, along with how to cater to students who suffer from Imposter Phenomenon.

### Conclusion

This study examines how students from different backgrounds navigate their social and academic lives after coming to university. The results were generated based on interviews conducted from students studying in different universities in Rawalpindi and Islamabad. This study and its results highlight the difficulties faced by these students in managing their day-to-day lives, social interactions, and academic performances away from home in a completely different environment. It also highlights the efforts universities have to make in breaking barriers and creating a better environment for these students in order to make them feel more at home and to cater to students facing the Imposter Phenomenon.

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## The Influence of Behavioral and Emotional Traits on The Spread of Negative Word of Mouth

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### Abstract

*Firms invest substantial resources in creating a positive image through marketing campaigns, and any negative word of mouth undermines these efforts. It is thus crucial to comprehend and address the spread of negative word of mouth (NWOM). NWOM is driven by bad experiences, yet other segments like the consumer's personality and emotional state lead to NWOM. This study aims to elucidate the relationship between bad experiences and NWOM, with a focus on emotional trait (frustration) as mediator and personality trait (moral identity) as moderator through Andrew. F. Hayes's process model. Findings reveal that people who encounter bad experiences are very likely to spread NOWM. This relationship becomes stronger if they are frustrated. Conversely, those people who have high moral identity experience less frustration resulting in a decline in NWOM. The existing literature hardly exhibits the consumer's personality and behavioral aspects to explain consumer behavior in an online environment. This research utilizes a moderated mediation model to examine this multivariant framework. This study utilized a cross-sectional design, future research suggestion is to utilize longitudinal or experimental methodologies. Furthermore, memory-based surveys may possess limitations that could be mitigated through experimental approaches.*

**Keywords:** *bad Experience, negative word of mouth, moral identity, frustration, positive word of mouth, and neutral word of mouth.*

### Introduction

In the contemporary world, this modern era, social networking sites (SNSs) are influencing and restructuring every segment of commercial and non-commercial settings. Social networking sites have enabled consumers to voice their concerns and influence change, the change can be either commercial or social (Arya et al., 2021). During and after the pandemic, businesses gradually shifted towards digitalization. The potential for digitalization of businesses of both products and services can be observed. The advent of social networking sites is creating progressive possibilities for businesses to create word of mouth. Voice Behavior is obligatory behavior on the part of either a consumer or an employee to improve the working and progress of a business or organization (Denegri-Knott & Molesworth, 2010). It is a behavior of promotive voices to improve the change in the process enhancing the cause that causes it. Thus, they are the way of constructive opinions, and ideas about an organization (Güngör & Ozansoy Çadırcı, 2022). The promotive aspect deals with the practices and rules to improve the existing working of the organization and the prohibitive aspect of voice deals with the exciting practices and rules that may be harmful to an organization.

Giving opinions about any product on social media is very common nowadays. Consumers traditionally shared personal experiences with a small number of friends but now social networking sites allow consumers to share their experiences with a much wider audience (Moradi & Zihagh, 2022). Individual influence is significant for clients who tend to view acquaintances and family as more reliable sources than any other source. Moreover, information from relatives or closed groups is more reliable. Buying online goods is often preceded by a search for the opinions of friends. These opinions are helpful in decision-making most of the time (Yannopoulou et al., 2019). Word of mouth is a phenomenon that usually refers to the channel of communication among people expressing their feelings and emotions toward a particular idea or a project (Fuller et al., 2006). Social media depends largely on how people connect and communicate with ideas, products, organizations, and brands. Social technological advancement has enabled people to voice their concerns. The strongest tool used in today's world is word of mouth. It is not limited to the family circle because social media has given people a voice having an immediate impact. It's an important source of information for people (Izberk-Bilgin, 2010).

Word of mouth (WOM) is defined as "between consumer communication" as a probable driver of consumer decision-making (Vrontis et al., 2021). Word of mouth may be positive for satisfied consumers and it may be negative for dissatisfied consumers. Word-of-mouth affects the options of people for goods and services (Vrontis et al., 2021). WOM communication can be separated into three types: Product news, the first type, delivers information and personal experience. It is information about the characteristics and product functioning traits of the product. Providing advice, the second type, includes expression of opinion about the product or advice like which model to buy. The third type, Personal experience is a client's (user's) remarks about the use of that product or the reasons for buying. Product news is upfront and unbiased, but advice and personal experience can be positive or negative. Negative word of mouth is the dissatisfied response of consumers. It can be defined as "interpersonal communication among consumers about a marketing organization or product which denigrates the object of the communication" (Khatoon & Rehman, 2021).

Most of the negative word of mouth is related to the consumer's personal experience and as long as the consumer believes that the validity of the information is true, their attitudes will be affected by it (Belk, Devinney, & Eckhardt, 2005). Negative word of mouth could be systematic and random. Random word of mouth denotes a negative experience on the part of a consumer with the product or the company. It has no regular occurrence pattern as it is random. It can be handled by positive word of mouth. Systematic negative word of mouth happens when the same problem with the company or product is experienced by several consumers. The problems could be a quality check, product design, etc. It can have a serious impact on the organization and the image of its products. In today's business community, consumer involvement in product design and development plays a vital role in a company's performance and profit. More often clients are treated as "partial employees" who participate in the operations of organizations (Susskind, 2004).

Moreover, an unpleasant shopping experience can either be physical or virtual. A bad shopping experience can affect the quality of mood as well as future purchase intentions (Joshi & Garg, 2020). A bad experience leads to frustration. From the consumer's point of view, the reasons for their frustration and dissatisfaction are standing in the line, not getting what is ordered or paying for, receiving incomplete orders, having a poor attitude toward the service provider, and so on (Yadav & Chakrabarti, 2022). Every consumer has different expectations and dreams attached to in-store shopping. This online shopping has hitches of its own despite being convenient and time-saving for today's generations. According to Moore (2019), consumers may face several risks like finance, fraud, delivery time, misuse of personal information, and quality of the product. This leads to a bad experience faced by the consumers. A bad experience can be interpreted as a thing that comes about by the consumer doing a shopping transaction and it fails to meet consumer anticipation leading to service failure. Consumer sensitivity and feedback are of utmost importance. This bad experience will produce or lead to dissatisfaction on part of the consumer resulting in frustration and negative word of mouth (Barari et al., 2020).

A positive online shopping experience leads to positive aspects like loyalty and satisfaction for consumers as an unpleasant online shopping experience leads to negative aspects like anger, frustration, and irritation. Consumer's first reaction after dissatisfaction with any product is complaining about the unsatisfactory experience. If this aggression and anger remain unaddressed then it results in physical and verbal anger for the product and service

provider (Lee & Cude, 2011). After being frustrated from a bad experience of online shopping, spreading negative word of mouth online is often the first response. But studies show some people restrain themselves from spreading negative word of mouth even after being a victim of a bad experience. People with high moral identity are less prone to moral disagreement and spreading negative word of mouth (Ghorbani et al., 2022).

An Individual's view about their moral traits (i.e honesty, fairness, kindness, hardworking, etc) is in alignment with his/her self-conception and is defined as moral identity. Moral identity is an individual's recollection of moral values, behaviors, and beliefs (Aquino & Reed, 2002). Aquino et al. (2009) found out that when an individual's moral identity gets aligned with a company it becomes beneficial for both the company and the individual. The moral identity of consumers motivates action in association with their self-conception. The concept of moral identity differs from individual to individual, the reason being is the concept of moral identity is culturally biased. Adding the lens of culture is important while studying moral identity is important. Moral Identity depends on the context, western moral identity is individual-oriented, and eastern moral identity is socially oriented (Khatoun & Rehman, 2021).

### ***Literature Review***

The recent literature on the different aspects of negative word of mouth spread is focused on the importance of handling the negative word of mouth as well as its effect on the reputation of the firms (Mirbabaie, Stieglitz and Marx, 2023). The literature on the spread of negative word of mouth after a bad experience indicates that frustration also plays a significant role in creating negative word of mouth. The emotional aspect (frustration) is mentioned, but the behavioral aspect (moral identity) in relationship with the spread of negative word of mouth after a bad experience is a literature gap (Sun et al., 2022).

### ***Bad Experience***

A bad experience happens when the consumer gets the wrong product delivered, the consumer did not find the product on unsystematic web pages, and the checkout process is so lengthy and thorny. Bad experience leads to negative reviews that are often considered more important than positive reviews. A bad experience is unpleasant, annoying, and frustrating. In an e-commerce context, a company's failure to provide the expected product or service leads to a bad experience for the consumer (Barari et al., 2020). Unhappy consumers now have a platform to raise their voice and that is social media where they can express their concerns and spread negative word of mouth (Sun et al., 2022).

Bad experiences often lead to disappointment, a sense of discouragement, and a hesitance to form repeat buys. Whereas great encounters indeed surpass what shoppers think and anticipate and regularly lead to fulfillment, which in turn raises or flashes repurchase. Bad experiences and frustration felt by consumers affect their nervousness, long entry period, the quality of the requested merchandise that does not coordinate the demand as promised by the online vendor, harm to the merchandise when it arrives, and the damage had a vital effect on their level of agitation within the number of items (Tan & Chen, 2023). The more frequent online shopping bad experiences encountered by consumers, so more the power to push frustrated buyers to create negative word of mouth online.

Negative word of mouth is the bad or negative opinion of the consumer regarding brands or companies' products. The consumers who had a bad experience had a bad customer relationship with the supplier, that resulted in frustration because of that product. The supplier either sold out-of-stock items online or the product may be having missing functionality that generated bad experience which ultimately led to frustration. This bad experience happened to the consumer leading to negative word of mouth. This negative word of mouth can have a snowball impact on them (Amezcuca & Quintanilla, 2016). Bad experience leads to frustration, a sense of dissatisfaction, and unwillingness for purchasing. It can also have psychological implications for a consumer like Anxiety. Danner and Thøgersen (2021) also found that incidents, where the consumer had bad experiences mainly due to services, will become an active source of negative word of mouth through social channels.

### *Word of Mouth*

Word of mouth refers to the informal communication between consumers regarding the evaluation of goods and services (Murphy et al., 2007). According to Kumar et al. (2022), WOM is the most important source of influence in the decision-making power of the consumer. Pfeuffer and Phua (2021) explained that WOM transfers through different channels like blogs, magazines, or journal posts, recommendations from friends or acquaintances, recommendations from professional groups or societies, and referrals from search engines. According to Slaton and Pookulangara (2021), WOM has a powerful influence and acts as a strong force on consumers' behavior. This informal advice can be positive, negative, or neutral. Positive WOM was driven primarily by the quality of service, while negative WOM was driven by unfulfilled contact between the consumer service provider but negative WOM has a great and direct impact on the consumer's opinion.

### *Negative Word of mouth*

Negative word of mouth (NWOM) is one form of consumer response because of dissatisfaction and frustration that has been received after a bad experience with any product or service. It is a general action, and it occurs without the control of the service/product provider (Song & Im, 2017). It is the sharing of consumers' negative feedback regarding a used product or service with others. According to Kapoor and Banerjee (2020) NWOM is an action reported by a consumer who is disappointed and in anger with the usage of a specific product. Such consumer-aim to tell their experience to different people to advise them to avoid that product. Social networking sites opened a new source for an easy and fast way to spread negative word of mouth. Consumers use social media as their voice to address their issues. Although a lot of research has been done on electronic word of mouth the aspects of negative word of mouth on social networking sites are still an under-addressed issue (Matook et al., 2022). The modern online word-of-mouth interaction system today is known as electronic word-of-mouth or e-word of mouth (Kapoor & Banerjee, 2020). As a result of creative developments, these new means of communication have contributed to changes in the actions of shoppers because of the impact they encourage shoppers to apply to each other by allowing them to access or exchange knowledge about businesses, goods, or brands. In the field of shopper behavior, there have been a few prior beliefs that consumers pay more attention to negative data than positive data (Cheung & Thadani, 2012). The happiest consumers with an item or advantage tend to end up with positive e-word of mouth (Kumar et al. 2022). Which can surrender deeply competitive focal points for firms, companies, or dealers, particularly smaller ones, which tend to have fewer assets. Additionally, (e-WOM) offers businesses a way to recognize consumers' needs and indeed a cost-effective way to communicate with them. A large number of consumers communicate through social media, as a result, it has become the new medium for the spread of word of mouth (WOM). Social media plays a major role in our lives, as advantageous as it is; it has also become easier to spread negative word of mouth. Kumar et al., (2022) noted that consumer-produced negative social media communication can be viral and spread rapidly, destroying the reputation of a business in a short time period. Furthermore, when companies have little control over social media consumer interactions, NWOM can spread rapidly and reach a wide audience of people with a shared interest in the product or service. By this time social media is becoming a powerful medium and cultural phenomenon. Another set of researchers; Lichy et al. (2022) pointed out that social media is different from past communication models because it is an informal way of communication and occurs between and among the marketer and communities of consumers (potential buyers). Balaji, Khong, and Chong (2016) in their study also explained that negative word of mouth in all sense is harmful to business to a larger extent. NWOM can alter a brand image and seriously impact the buying behaviors of consumers. NWOM leads to brand image deterioration and sales decline (Chiosa & Anastasiei, 2017). Most consumers have common motivation for negative word of mouth, some use more positive and polite ways to address their inconveniences while others use more aggressive and offensive methods. The dissatisfaction of consumers leads to consumer retaliation. Understanding the process by which a consumer generates negative word of mouth is critical to creating a positive brand image (Filho & Barcelos, 2020). The dissatisfaction of a consumer becomes the influencer of the spread of negative word of mouth.

**H<sub>1</sub>:** Bad experiences have a significant impact on negative word of mouth on social media.

## Frustration

Frustration is a negative feeling associated with dissatisfaction on part of the consumer for a certain product required and product perceived. It is also found that the frustration level generates negative word of mouth for consumers. This frustration generated due to a bad online experience may vary from person to person (Azemi et al., 2020). Azemi et al. (2020) examined the theory of frustration-aggression in online word-of-mouth literature, acknowledging that a higher-order interpretation of marvels can be reinforced. Its bits of information amplified the current theory to a three-fold typology of online negative word of mouth that recognizes the negative effect consumers have on a supplier that is dominated by labels of frustration-aggression. Varieties of frustration-aggression over the online negative word of mouth motivated the creation of three kinds of consumers that lock in online negative word of mouth, to be precise online new consumers in the middle of the lane, detailed online negative word of mouth consumers, and fierce online negative word of mouth consumers.

Consumer frustration has a direct impact on consumer feedback about the products and services. The level of frustration can increase when consumers or consumers are unable to get the desired results of expected satisfaction. Lichy et al. (2022) explained that dissatisfaction arises from circumstances where the aims or desires of individuals for specific results are dissatisfied. Lack of communication between consumer and service provider results in aggression and frustration remains unhindered. For the first time in human history, consumers can share their views, feelings, opinions, and unpleasant experiences freely about goods and services via the Internet. The global network of Internet users is readily available. The Internet is becoming a kind of super-megaphone, giving every person word of mouth (WOM) reach beyond the imagination. Consumer frustration is viewed as a negative response to aversive behavior or environmental inspiration, rather than an effect that may be more properly categorized as an offensive or violent response. It believes that when a company and its agents consistently and honestly take full responsibility for their inability to deliver services to actively minimize consumers dissatisfaction, the negative emotional reactions of consumers can be minimized if they are disappointed.

**H<sup>2</sup>:** Frustration mediates the relationship between a bad experience and negative word of mouth on social media.

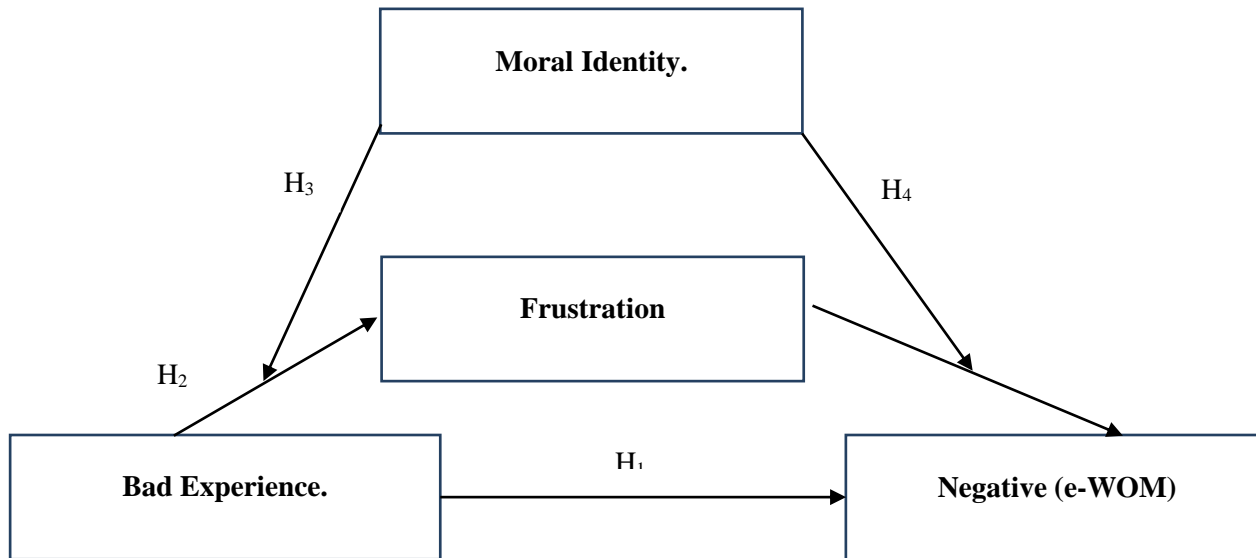
## Moral Identity

Moral Identity refers to the degree to which being a moral person is important to an individual. Moral identity concept roots back in Blasi's Self-Model. An individual's action is dependent on moral judgment and the extent to which he/she holds him/herself accountable. That judgment depends upon the self-concept of that individual which is referred to as moral identity (Pinto et al., 2016). Derryberry and Thoma (2005) also define moral identity as a self-regulation mechanism that sets standards for individual actions and motivates a moral action. The impact of character on consumer satisfaction is moderated by participation, another study believes. This research shows that this character increases with positive participation (but does not increase disappointment with a negative) and this influence arises from better performance discernments under positive participation rather than wishes (Hardy & Carlo, 2011).

Widayat, &Irfani (2020) demonstrate that for consumers to use their vote within the business center to decide the way of life they want to be part of, righteous consumers' actions can also be cruel. Prohibition is the most important case of such moral buyer behavior as voting behavior, i.e. endeavor by one or more parties to accomplish such objectives by urging consumers to refrain from making preferred purchases coordinated by going without purchasing inside the commercial center. To impose an influence coordinated by operating out of the consumer's way inside the commercial core. In this way, while consumer preferences for exit and negative word-of-mouth reactions are unambiguously but adversely influenced by the possibility of voice victory, consumer evaluations of the legitimacy of the complaint are not involved in such forms of choice. A conceivable explanation for this finding could be that clients are more likely to lock in exit and negative word-of-mouth operations when they see that if they voice their concerns, reform will not be imminent from vendors. Whether or not consumers are voicing grievances indicates that they have nothing to do with their decision to leave or use negative word of mouth.

**H<sup>3</sup>:** Moral identity moderates the relationship between frustration and bad experience, and frustration and negative e-(WOM).

**Theoretical Framework**



**Methodology**

The sample size for this research was 612 as by Cochran’s formula any value bigger than 385 represents the right accuracy for a population size bigger than 100k (Heinisch, 1965). Questionnaire is used to collect the data for this research. The questionnaire is adapted from different previous studies and published articles. The questionnaire is distributed among the people around Pakistan. The source of the collection of the responses was online. The questionnaire is attached on the last page. The first question of the questionnaire is if the respondent ever had a bad experience with an online purchase. If yes, the respondent can move further to the questionnaire. If not, the questionnaire offers thanks to the respondent and illustrates that this questionnaire is not for you and restricts the respondents to answer further questions. The questionnaire is adapted from negative (e-WOM), (Liang et al., 2012), Bad Experience (Lee & Turban, 2001), Frustration, (Susskind, 2004), Moral Identity (Aquino & Reed, 2002), and Word of Mouth Positive, Negative and Neutral (Wang & Herrando, 2019).

Descriptive analysis was employed in this study to gather information on the characteristics of this study. The study is cross-sectional and used the software SPSS 26, Macro Andrew F. Hayes, and AMOS for data analysis. A purposive non-probability convenient sampling technique is used in the research. The reason for using the purposive sampling technique is to cancel out the respondents who never had a bad experience or never purchased something online. It is one of the commonly used sampling techniques. In this technique, the researcher collects data from a conveniently available pool of respondents and segregates respondents according to their responses. The purposive sampling technique is often used in quantitative research, but it can also be utilized in qualitative research (Etikan, 2016). According to Valerio et al. (2016), qualitative and quantitative sampling approaches have feasibility when samples are observed purposefully. The participant can be observed purposefully in the qualitative research (Walker et al., 2004). The data analysis consists of the survey for accurateness, outliers, and data significance in the numerical and statistical system database. Percentages and frequency tables give a clearer picture of the collected data. Correlation, Cronbach’s Alpha, and regression analysis with Andrew F. Hayes process model 58 is used for the analysis of the moderated mediation model.

**Results**

The descriptive analysis of the data includes taking out missing values. 16 respondents provided incomplete and reckless responses that are deducted from the datasheet. The total number of responses was 368. The ages of these respondents were mostly between 18 to 30 years. An average of 69.1% of the respondents were between 18 – 25 years of age, 18.6% were 26 – 30 years of age, 3.4% were less than 18 years of age and 5.9% were between the age of 30 – 35 years. The respondents are 43.5% male and 56.5% female. The scale that is used for the test of

reliability is Cronbach’s Alpha. Cronbach, (1951) explained that the reliability of the test depends upon how the scale will reproduce the same result when used in different scenarios. Utilization of this scale is very common for the test of reliability, it shows the acceptable internal coherence of the scale (Gefen et al., 2000). Table 3 expresses the values of alpha (a) which shows the internal consistency of reliability. All the variables have values above 0.7.

**Table 3: Reliability of scales**

Constructs	Cronbach Alpha (a)
Bad Experience	0.740
Negative (e-WOM)	0.752
Frustration	0.755
Moral Identity	0.756

Multivariate outliers are deducted through Cook’s and Leverage test which is the most used test to remove outliers. The multivariate outliers are removed from the data for further data analysis. The values that are very far from the center point are 359, 194, 268, 337, 107, 49, and 362. These responses have been removed; the users that are outliers free are 368. Before moving on to hypothesis analysis the validity and reliability of each construct must be analyzed. Table 1 shows the composite reliability of all the variables above 0.7 and the average variance extracted is above 0.5 (Hair et al., 2017). Hence the constructs are valid and reliable.

**Table 1: Reliability test of AMOS**

Variables	CR	AVE	MSV	MaxR(H)	Bad Experience	Negative (e-WOM)	Moral Identity	Frustration
Bad Experience	0.720	0.531	0.228	0.629	0.658			
Negative (e-WOM)	0.753	0.512	0.229	0.761	0.450***	0.582		
Moral Identity	0.840	0.514	0.229	0.847	0.477***	0.478***	0.717	
Frustration	0.805	0.587	0.202	0.848	0.424	0.408	0.450	0.766

**Note: N= 368; CR = Composite Reliability; AVE = Average Variance Extracted; MSV = Maximum Standard Variance.**

**Confirmatory factor analysis (CFA)**

CFA (confirmatory factor analysis) Table 2 is used through AMOS version 23 to analyze the constructs. According to (Lowry & Gaskin, 2014) CR = Composite Reliability; AVE = Average Variance Extracted; MSV = Maximum Standard Variance are the constructs that are to be satisfied for an adequate model. According to Hair et al., (2017), CFI and TLI scores above 0.9 and RMSEA and SRMR below 0.07 in Table 2 are the expressions of good model fit.

**Table 2: CFA Model’s Fit**

CFA Model's Fit Indicators.								
Model	Measurement (CFA) Model	CFI	GFI	TLI	RMSEA	Chi-Square/df	P-Value	SRMR
		9.37	0.91	0.925	0.053	3.93	0	0.04

Note: N = 368; SRMR = Standardized root mean square residual; CFI = Comparative fit index; TLI = Tucker-Lewis index; RMSEA = Root-mean square error approximation.



**Model testing: mediation model (H1 & H2)**

The first hypothesis is that bad experience has a positive and significant relationship with negative (e-WOM). To test this hypothesis linear regression model is used

Table 4 shows the value of R and R<sup>2</sup>. The R-value shows a correlation of 0.392 which indicates a moderate correlation between a bad experience and a negative (e-WOM). The R-square value indicated in Table 4 shows that the dependent variable can be explained by the independent variable for hypothesis 1, which is 15.4%. It explains how the regression equation fits the data of the model. Sig value 0.00 which satisfies the condition of P<0.05. Hence it articulates that the model predicts the dependent variable significantly well. Coefficient expresses the information about how the model is fit and predicts the right values of dependent and independent variables. Both Sig. values are 0.000 which satisfies the condition of P<0.05 indicating that the model is fit. Therefore, hypothesis 1 proves correct that there is a positive significant relationship between negative (e-WOM) and Bad Experiences.

**Table 4: Model Summary Correlation**

Model Summary	R	R Square	F	Sig	B	Beta
1	0.392	0.154	67.918	0	0.427	0.392

Note: Dependent variable = NEWOM, Predictor (constant) = BEV

In this research, the mediation relationship is also expressed through the regression model. To prove frustration has a mediating relationship between bad experiences and negative (e-WOM) Table 5 is to be considered. The value of R is increased from .392 to .551 which shows that the correlation between the dependent (Negative (e-WOM) and independent variable (Bad Experience) increased with the addition of mediating variable (Frustration). R square change expresses the increase of 15%. Now the dependent variable can be explained by an independent variable with the addition of mediation is 30%. Sig. value 0.00, which satisfies the condition of P <0.05. Hence it articulates that frustration mediates the relationship between bad experiences and negative (e-WOM).

**Table 5: Model Summary Meditation**

Model Summary	R Square	R Square Change	F Change	Sig F Change
1	0.154	0.154	67.918	0
2	0.304	0.15	79.924	0

Note: a. Predictors (Constant) = BEV, b. Predictors (Constant) = BEV, FV

**Model testing: moderated-mediation model (H3a and H3b)**

The moderation relationship of moral identity between bad experience and frustration and then between frustration and negative (e-WOM) is tested by the method of Andrew F. Hayes moderated mediation model 58 of process macro (Hayes, 2012). The bootstrap was 5000 and Frustration as an outcome variable the results are presented in Table 6. In model Summary R square shows there 33.4% variable explained in this model and P-value is 0.000 which fulfills the condition of P < 0.05, so the model is significant.

**Table 6: Model Summary of Andrew F. Hayes**

Model Summary	R	R Square	MSE	F Change	P
1	0.578	0.334	0.345	62.03	0

Andrew F Hayes Model 58 of moderated mediation presented in Table 7 shows the values of Bad Experience and Moral Identity as [B=0.8484; t= 4.3461; p=0.000], [B= 1.1547; t=6.282; p=0.000]. These values express that the model fits the test. The interaction term shows that there is a significant indirect relationship between an independent variable (Bad Experience) and a mediator (Frustration). The values of LLCI and ULCI are -0.3086

and -0.3086 do not have ‘0’ in between them. According to Lowry and Gaskin (2014) when the difference between LLCI and ULCI is less than 1 there is a significant relationship between the two variables. The negative sign shows that the relationship is indirect. It can be concluded that Moral identity moderated the relationship between Bad Experiences with Frustration. More explicitly as represented in figure 2. The higher the level of moral identity the lesser will be the chances of the person getting frustrated and vice versa. According to Abdullahi et al. (2016) if ‘0’ does not fall between LLCI and UCLI that means the effect is significant. Figure 2 also exhibits similar properties as the higher the moral identity of the consumers the lesser will be the chances of them getting frustrated by a bad experience.

**Table 7: Andrew F. Hayes Model 58**

<b>Model 58</b>						
Direct Effect	B	SE	T	P	LLCI	ULCI
Constant	-0.9938	0.5808	-1.7111	0.0879	-2.1359	0.1483
Bad Experience	0.8484	0.1952	4.3461	0.000	0.4646	1.2323
Moral Identity	1.1547	0.1838	6.2821	0.000	0.7933	1.5162
Interaction	-0.1916	0.0595	-3.221	0.001	-0.3086	-0.0746

Hypothesis 4 Moral identity moderated the relationship of frustration with Negative (e-WOM) is proven by the same model (Andrew F Hayes Model 58). Table 8 expresses the values of R, R square, MSE, F Change, and P that indicate that the model is significant. The bootstrap was 5000 and Negative (e-WOM) as an outcome variable the results are presented in Tables 9 and Table10.

Further the values of this model express the values of Bad Experience, Frustration and Moral Identity are [B=0.1911; t= 3.7506; p=0.0002], [B= 0.4934; t=3.1485; p=0.0018] and [B=0.5738; t= 3.4571; p=0.0006]. These values express that the model fits the test. The interaction term shows that there is an insignificant relationship between the mediator variable (Frustration) and the dependent variable (Negative (e-WOM)). The values of LLCI and ULCI as present in Table 9 are -0.1604 and 0.022. According to Lowry and Gaskin (2018) when the difference between LLCI and ULCI is less than 1 there is a significant relationship between the two variables. Hypothesis 4 will be rejected as moral identity does not moderate the relationship between frustration and negative (e-WOM). Figure 3 also indicates the same that moral identity is not moderating the relationship between frustration and negative (e-WOM).

**Table 8: Andrew F. Hayes Model Summary**

Model Summary	R	R Square	MSE	F Change	P
1	0.6013	0.3616	0.295	52.389	0

**Table 9: Andrew F. Hayes Model 58**

<b>Model 58</b>						
Direct Effect	B	SE	T	P	LLCI	ULCI
Constant	-0.743	0.4893	-0.1519	0.8793	-1.0365	0.8878
Bad Experience	0.1911	0.051	3.7506	0.0002	0.0909	0.2913
Frustration	0.4934	0.1567	3.1485	0.0018	0.1852	0.8015
Moral Identity	0.5738	0.166	3.4571	0.0006	0.2474	0.9002
Interaction Term	-0.0692	0.0464	-1.4929	0.1363	-0.1604	0.022

**Table 10: Indirect effect in Model 58**

**Indirect Effect**

Moral Identity	Effect	BootSE	BootLLCI	BootULCI
2.8038	0.0923	0.0266	0.0459	0.1511
3.362	0.0532	0.0185	0.0202	0.0926
3.9101	0.0221	0.0183	-0.0111	0.0618

## Discussion

The notion of bad experience has been studied very thoroughly to observe the reasons for it. The research examines a different prospect of a bad experience in a purchase of goods and services and that prospect is related to emotions (Frustration) and personality (Moral Identity). The first hypothesis expresses that the bad experience leads to negative (e-WOM). There are researchers of similar nature expressing the same relationship in both spreads of negative physical word of mouth and negative electronic or virtual word of mouth on social media. The results showed a strong relationship between the two variables and the results conclude that the Bad experience has a positive significant relationship with negative (e-WOM). The second hypothesis is the introduction of an emotional element that mediates the relationship between bad experiences and negative (e-WOM). It is a common understanding that once a person has a bad experience, the emotions in response will be frustration. The results show that if we add frustration as the mediator in the framework of bad experiences and negative (e-WOM) the relationship becomes more prominent. The relationship between a bad experience and a negative (e-WOM) doubles when the variable of frustration is added to the framework.

It is concluded that a bad experience in the online purchase of goods or services leads to frustration which then leads to negative (e-WOM). But not every bad experience ends up as a social network discussion. Some people restrain themselves from spreading negative (e-WOM). To understand this perspective a personality trait is introduced as moral identity. The third hypothesis that moral identity moderates the relationship between bad experience and frustration expresses that perspective of why after a bad experience people restrain themselves from spreading negative (e-WOM). The results show that people who have a high moral identity will get less frustrated after a bad experience than people who have a low moral identity. This means that the propensity to spread negative (e-WOM) will increase when the moral identity of a person is less. And the spread of negative (e-WOM) will decrease if the person has a higher moral identity as he/she will get less frustrated and that will result in less negative (e-WOM). The moderated mediation model of Andrew F. Hayes was applied and the results show that people with high moral identity spread less negative (e-WOM) than people with low moral identity after a bad experience.

The last hypothesis was administered to see if the moral identity variable is also effective after the person is frustrated. The mediating effect of moral identity between frustration and negative (e-WOM) shows if the personality aspect works the same after the emotions of frustration are developed. The results show that this is not the case. The people who get frustrated will spread negative (e-WOM) regardless of their high or low moral identity. We can conclude that bad experience leads to negative (e-WOM). Where frustration is the emotion that becomes the reason for the spread of negative (e-WOM) and plays an important role in the framework. The people who have a high moral identity will get less frustrated after a bad experience and as a result, will produce less negative (e-WOM) and vice versa. In simple words, people with a high moral identity will be less frustrated after a bad experience than people with a low moral identity. When frustration is created after a bad experience the moral identity will not affect the creation of negative (e-WOM). This study has explored the major reasons for the spread of negative word of mouth and the relationship between these variables. The notion of how people interact on social media and show voice behavior is very intriguing. The study of social media is important at the level of society. The advent of social media was too quick and it is significant to understand its dynamics and how people raise their voices on social media.

This research has some important theoretical contributions concerning moral identity and frustration specifically in the context where it is concerning moderated mediation with negative (e-WOM). Moral identity has been studied by many researchers (Gotowiec & Mastrigt, 2019; Hardy et al., 2015) but the relation of moral identity to the creation of frustration after a bad experience was investigated for the first time in this study. The context of moral identity in the creation of negative (e-WOM) was a gap in the literature and this study attempts to address this missing gap.

The research has shown useful insight about how the moral identity of a consumer interferes as a moderator in making them frustrated, which eventually leads to negative (e-WOM). After conducting the study, the companies can take the following notes to prevent negative (e-WOM). People with low moral identity get more frustrated

and spread negative (e-WOM) after a bad experience, so techniques and modules to counter those kinds of customers can be created. Presence in every online segment should be maintained to monitor and handle responses. Literature exhibits that if a customer after a bad experience is not handled with proper care, will spread more negative (WOM). Experience sharing should be made easier for the customers so they can share their bad experiences with the company instead of social media. The research has shown useful insight about how the moral identity of a customer interferes as a moderator in making them frustrated, which eventually leads to negative (e-WOM).

### **Recommendations**

Following are some recommendations for future researchers who have an interest in the same area or to use the same model for their geographical area. The notion that bad experience leads to negative (e-WOM) is an established phenomenon. This research has shown the moderating effect of moral identity, there must be other moderating constructs that will affect the ability of a buyer to create negative (e-WOM). The other factors that can moderate the study are sub-segments of moral identity (Internalization and Symbolization), proactive personality and geographical location etc. The personality trait like proactive personality can be studied concerning promotive voice behavior and prohibitive voice behavior. Frustration can be subdivided into internal and external frustration. Brand image and brand loyalty do have some mediating effects on creating negative (e-WOM) as well.

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## Appendix

Figure 1: Conceptual Framework.

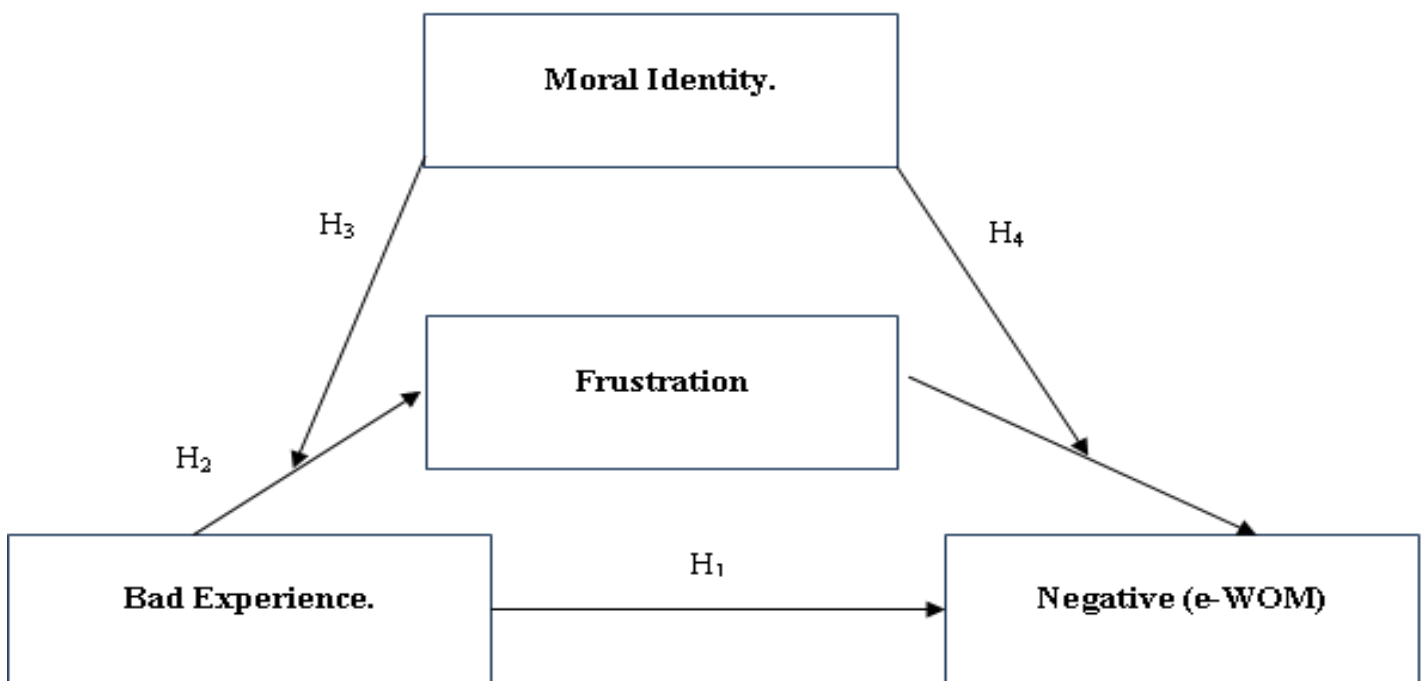


Figure 2: Frustration and Bad Experience Graph.

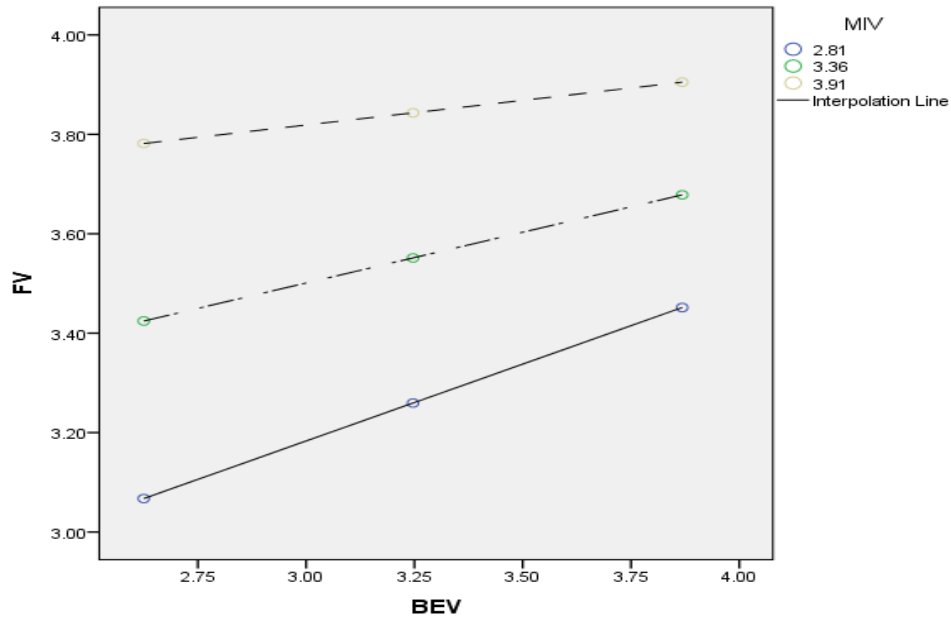
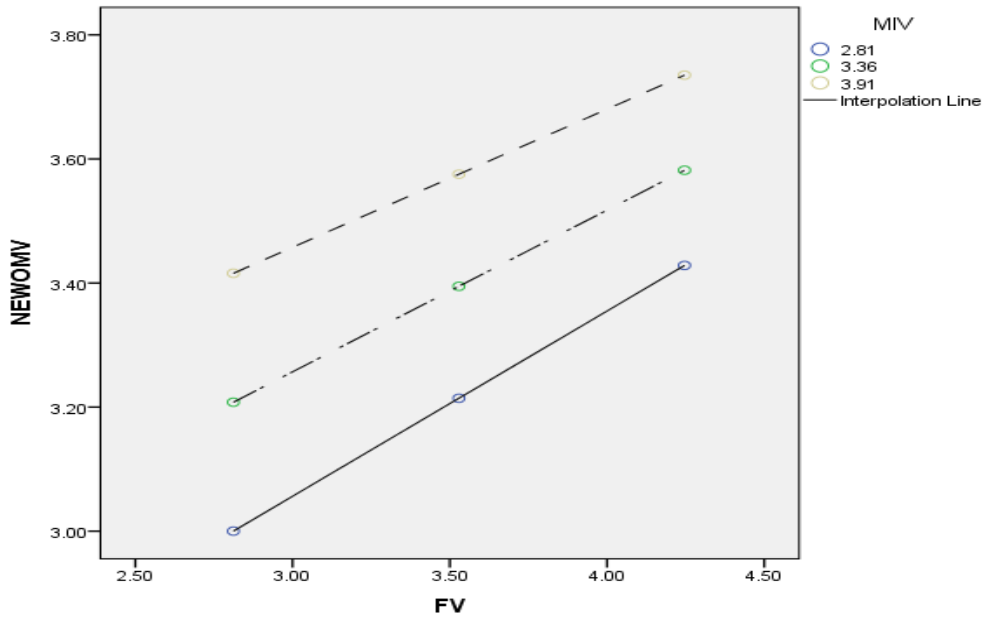


Figure 3: Negative (e-WOM) and Frustration Graph





# Psychological Well-Being in Pursuit of Prosocial Behavior of Voluntary Simplifiers in a Collectivist Society: Understanding the Role of Consumer Disposition Behavior

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## Abstract

*The purpose of the current study was to investigate the disposition behavior of voluntary simplifiers and outcome of this consumption behavior specific to consumer psychological well-being. This paper examines the attitude of voluntary simplifiers by understanding their altruistic and non-altruistic disposition behaviors in a collectivist society of Pakistan which is an emerging and developing economy of South Asia. This cross-sectional study has been conducted by collecting primary data from 234 respondents using structured questionnaires through purposive convenience sampling in sustainable products industry. The structured equation modeling was applied as a data analysis technique using AMOS. The results revealed that sense of self-sufficiency in voluntary simplifiers have a significant impact on disposition behaviors. Voluntary simplifiers adopt different methods of disposition to avoid accumulation of goods. The results have also established the role of collectivist culture positively moderating the relationship between the simplicity attitude and disposition behavior.*

**Keywords:** Consumer behavior, Product Disposition Behavior, Prosocial Behavior, Voluntary Simplicity, Psychological Well-Being, Collectivism

## Introduction

Numerous studies have shown that excessive materialism, or the desire to accumulate material possessions, can have a negative impact on an individual's psychological well-being (PWB). Anti-consumption, which involves reducing or avoiding consumption altogether, is incompatible with materialism. As materialism and PWB have an inverse relationship, anti-consumption is expected to have a positive impact on PWB. We have explored the literature on materialism, PWB, and anti-consumption to investigate this relationship (Jaspers et al., 2023; Lee & Ahn, 2016). The concept of anti-consumption in terms of Voluntary Simplicity (VS) offers a strong alternative to materialism by focusing on the reasons to not consume. Previous studies have examined the reasons for VS, but the impact of VS on psychological well-being (PWB) has not been thoroughly investigated. This study aims to explore the relationship between PWB, VS, and disposition behavior in a developing collectivist society. One crucial component of consumer behavior is consumption. Nonetheless, a number of studies have been conducted in the area of consumer behavior that are particular to voluntary simplicity as a viewpoint that opposes consumption and examines and outlines the arguments against it (Chatzidakis, 2012; Cherrier, 2009; Dalli, 2006; Hogg et al., 2009; Hook et al., 2021; Iyer, 2009; Kozinets & Handelman, 2004; Lee et al., 2009; Odou & De Pechpeyrou, 2011; Sandıkcı & Ekici, 2009). Worldwide, there is a sharp increase in the following issues: social inequality, natural resource scarcity, environmental deterioration, and psychological and mental health problems (Atik et al., 2020). For a variety of social and economic reasons, consumerism—which breeds materialism and overconsumption—is regarded as a primary cause of these problems. Understanding the social and environmental ramifications of consumption patterns increasingly requires taking into account behavioral variables related to consuming (Ahuvia & Wong, 1995; Deliana & Rum, 2019). Addressing sustainability-related challenges requires a thorough understanding of consumer behavior, specifically with regard to its psychological effects and personal attitudinal values associated to voluntary simplicity (Reboucas, 2021). Consumption patterns of consumers are

drastically evolving. Consumers' changing purchase habits are creating new consumer profiles, particularly in relation to their evolving lifestyles (Hoffmann et al., 2018). Voluntary Simplicity (VS) is one such changing consumer sector anchored in sustainable consumption. "Choosing out of free will rather by being coerced by poverty, government austerity programs, or being imprisoned to limit expenditures on consumer goods and services and to cultivate non-materialistic sources of satisfaction and meaning," is the definition given to those who choose to simplify voluntarily (Etzioni). A growing body of research links sustainable consumption behavior to voluntary simplicity and low consumption-related attitudes (Peyer et al., 2017). Due to environmental, ethical, and self-oriented viewpoints, consumers are adopting anti-consumption actions more frequently (Read, 2018). Consumers' new consumption patterns are a result of particular psychological features and lifestyle choices that give rise to anti-consumption behaviors. Customers who support minimal consumption and look for non-material means of satisfaction in life are grouped as optional simplifying agents. Voluntary simplifiers are one of the three categories of anti-consumption consumer groups that Sharp et al. (2010) identified. Consumer disposition behavior is linked to shifting lifestyle choices and values (Cherrier & Murray, 2007; Parvatiyar & Sheth, 2023). Consumer lifestyle patterns are mostly determined by voluntarily cutting back on consumption and changing one's disposition (Nepomuceno & Laroche, 2015). Due to environmental and economic considerations, they typically embrace anti-consumption behaviors. Academics and marketing experts have demonstrated a strong interest in comprehending customer behavior. Marketing efforts have focused on consumer behavior related to voluntary simplicity and disposition in recent years. Developing an attitude of simplicity can lead to altruistic and non-altruistic approaches to consumer goods. As defined and operationalized by Lee (2015), disposition means managing the product after it is no longer of use to the owner. It can be possessive (reuse or non-use) or non-possessive (sell or pass on/give away). From an ecological perspective, consumer spending habits have a strong impact. Marketers' growing concern for the environment can also be addressed by understanding dispositional behavior. Studying dispositional behavior can help marketers examine evolving attitudes toward changing consumption patterns (Saunders, 2010). As it provides insight into the preferred methods of product disposal. Consumers who care about the environment place great importance on adopting disposal methods because of the impact these methods have on society and the environment. Considering the environmental concerns associated with each type of product, marketers can suggest the preferred disposal method. Understanding the disposition method of different psychographic segments of a consumer market would help the marketers to develop tailored marketing strategies (Pralhad, 2004). Following the purchase and usage of the real product, the consumer behavior process of disposition begins (Day, 1984; Gilly & Gelb, 1982; Oliver, 1980). once using a product to a certain degree of satisfaction, consumers begin to consider how to handle the thing once it is no longer useful to them (Nicosia, 1976). In the context of consumption, disposition typically refers to the point at which the consumer no longer owns the product (Kim & Mauborgne, 2000). Studies have expanded on this limited notion, and ownership that has been discontinued is also known as disposition (Jung, 1994; Nicosia, 1976). In the realm of consumer behavior, it is commonly acknowledged that consumption and psychological well-being are related. But as civilizations have grown and lower order wants have been met, marketing scholars have shown that acquiring goods or consuming beyond a certain point may not always lead to happiness—in fact, the opposite may be true. Studies in this field have also shown that product disposal improves consumers' psychological wellbeing in addition to having an impact on the environment (Cruz-Cardenas, 2017; Ha Brookshire, 2009). Those who voluntarily simplify their lives look for non-materialistic means of achieving psychological well-being. Simplifiers center their beliefs on less consumption and non-materialistic elements, and they distinguish between subjective (feeling, pleasure) and objective (self and other directed) well-being (Etzioni, 2004). Research was done to determine whether materialism and psychological well-being were positively or negatively correlated (Dittmar et al., 2014). Research has confirmed that reducing consumption has a good impact on both the environment and people's psychological health. Customers who have straightforward lives on their own will feel extremely satisfied with their lot in life (Cruz-Cardenas, 2017; Richins & Dawson, 2017). On the other hand, little is known about anti-consumption lifestyles that are backed by certain disposition methods and their potential consequences.

Culture is a significant macroenvironmental component that influences how consumers choose products (Cruz-Cardenas, 2017). Every social setting has a context because of culture. Studies have demonstrated that setting

plays a crucial influence on consumer habits (Agrawal, 2018). Understanding customer behavior necessitates a comprehensive strategy that considers every element that might be relevant. Because it gives people access to social norms, context plays a significant role in shaping behavior (Ajzen & Fishbein, 1977). Culture is one contextual element that characterizes consumer decision-making and contextual referencing. For instance, (Cialdini et al., 1990) identified three types of norms, with cultural norms being the most significant, that affect people's behavioral intentions, especially those related to sustainability. The norms that define behavior are provided by culture (Chiu & Kwan, 2010; Torelli, 2017). Hofstede and Bond (1984) postulated two categories of cultures. Hofstede asserts that the degree of individualism and collectivism in a culture can be used to compare and assess it (Shavitt et al., 2008). According to Hofstede and Bond (1984), collectivism is a cultural feature in which adherents prioritize the objectives and ideals of their in-groups over their own personal aspirations. In this context of study, collectivism is examined as a moderating factor between well-being and voluntary simplicity through consumer dispositional behavior. The first discussion of the influence of collectivist society was provided by Yamagishi and Schug (2008). Even such, not much study has been done to examine how social norms affect collectivist culture, despite its acknowledged significance (Varshneya et al., 2017). The idea of voluntary simplicity has been thoroughly researched in the west. Research on voluntary simplifying agents has not included a sample of developing nations. Asian nations are growing in terms of their economies, cultures, and technological. Researching the idea of voluntary simplifier usage in an Asian setting that adheres to collectivist culture will undoubtedly be very beneficial. To the best of the researcher's knowledge, the phenomena of voluntary simplicity has not been examined in Pakistan, according to the review of literature. Studies on customer behavior that are unique to the Pakistani market do not provide enough attention to voluntary simplifiers. Thus, the concept of voluntary simplicity has not previously been investigated in the Pakistani consumer market, which is the gap that this research will fill.

### ***The Present Study***

In the field of marketing, researchers have made numerous scientific efforts to discuss consumer behavior from various perspectives. However, most studies were limited to the purchase phase. The research focused narrowly on the area of post-purchase consumer behavior. In particular, the area of consumer dispositional behavior has been studied myopically (Harrell & McConocha, 1992; Mowen, 1995; Saunders, 2010). One area of dispositional behavior is missing from empirical testing, as evidenced by research conducted by the authors (Ballantine & Creery, 2010; Saunders, 2010). Researchers have identified the voluntary simplifier segment. These consumers consciously and voluntarily reduce their consumption. They believe in a quality life. These consumers are not subject to economic constraints, but rather are intrinsically motivated to adopt environmentally and socially responsible consumption patterns (Chatzidakis & Lee, 2012; Lee & Ahn, 2016). Voluntary simplicity in market research from a consumer consumption perspective is a less explored area. However, in the West, more and more consumers are adopting this lifestyle (Chatzidakis & Lee, 2012). From the perspective of Asian countries, this concept is still in its infancy in research. The significance of this research lies in incorporating the cultural aspect into the concept of voluntary simplicity by studying it in Asian culture. To validate the research in this cultural context, a newly developed scale specific to the Asian context is used to empirically test this phenomenon.

### ***Contextual Background***

The promising growth of Pakistan's economy with \$18 billion in foreign remittances and large Chinese foreign investments will boost the growing consumer market. Pakistan is battling internal and external political and economic problems, overcoming structural barriers, terrorism and natural disasters. Nevertheless, Pakistan has managed to meet these challenges economically (Sherani, 2017). It is important for investors to gain exposure to the growing economy with dramatic social changes. With 63% of the population under 30 years old and 29% between 15 and 29 years old, there is promising future potential. It is important to explore this composition of a population to gain insight into their consumption-related attitudes and behaviors (Dev, Podoshen & Shahzad 2018). With the growing economic middle class, which makes up almost 40% of the population, consumption habits have changed.

As economic conditions change, consumption-related attitudes and behaviors also evolve. The influx of foreign brands and growing malls in the Pakistani economy have taken consumption to new heights. The cultural aspects of a collectivist society, based on concern for family, harmony, prosocial behavior and concern for the face, lead many people to live life with a less materialistic approach and to use the accumulated objects for their psychological well-being dispose.

### ***Conceptual Background***

Quality of life is linked to volunteer work (Krause & Rainville, 2017). Due to the strong connection between life satisfaction, volunteer work has gained popularity in research. The concept has been studied in various social and cultural settings to confirm its association with psychological well-being (Hustinx, Rossem, Handy, & Cnaan, 2015; Krause & Rainville, 2017).

The results of research focusing on volunteering and psychological well-being in different cultural contexts have confirmed a strong relationship between the two variables. Understanding the concept of well-being from an economic perspective has led to a major gap in the field in recent years that needs to be addressed (Petrillo, Capone, Caso, & Keyes, 2015). Well-being, often referred to as mental health, has three forms: social, emotional and psychological (Petrillo et al., 2015). Well-being is addressed in two categories: hedonic and eudaimonic. The perspective on well-being is not only limited to self-pleasure but also extends to the well-being of society. The eudaimonic perspective explains psychological well-being by associating it with individual goals related to society, use of resources, increased independence and effectiveness, and social relationships (Petrillo et al., 2015). The hedonic perspective measures well-being objectively, while the eudaimonic perspective measures it subjectively (McMahan & Estes, 2011).

The psychological well-being of individuals and societies is a measure of quality of life. As societies develop, consumers adopt the concept of post-materialism or anti-consumption. Individuals are committed to prosperity that extends beyond economic concerns to social benefits (Zainuddin, Dent, & Tam, 2017).

Concepts of voluntary simplicity and dispositional behavior lead to psychological well-being. Both concepts address the fundamental issue of psychological well-being by considering individual and societal benefits.

## **Literature Review**

### ***Voluntary Simplicity***

Voluntary simplicity is a consumer attitude. This attitude allows them to live a simpler life. Simplicity comes from your free will and is not limited by economic or other factors (Chang, 2016). It has long been assumed that consumers achieve happiness and satisfaction through the acquisition and accumulation of things. However, with the development of human civilizations, cultural and economic progress, consumers have paid attention not only to possessions but also to their subjective well-being.

The concept of voluntary simplicity was put forward many years ago by Elgin (1981), who derived this concept from Thoreau (1854). Voluntary simplicity was considered the preserve of religious people and therefore was not studied from a consumer perspective for a while. Overconsumption and related problems of environmental resources, hoarding, and clutter drew the attention of academics and researchers to the idea of a simple life. Values specific to voluntary simplifiers were defined by Elgin and Mitchell and they were also categorized as a separate consumer segment based on their research. Developed countries began to receive anti-consumption movements, giving rise to sustainable movements that refer to voluntary simplicity as an integral part of achieving and maintaining sustainability. Since then, research in this area has helped put the concept into practice and understand its antecedents. However, this concept has received less attention in terms of its results in translating an attitude of simplicity into behavior. The theory of planned behavior suggests that behavior follows attitude. Ajzen and Fishbein (1977) developed the Theory of Reasoned Action (TORA) (TRA), which is the most well-known and recognized Theory of Planned Behavior (TPB). A theoretical model of TPB with three variables—intentional attitude, observed and perceived conduct, and social norms—was presented by Ajzen and Fishbein in 1977. Using social norms as a constraint, the model was used to examine the consistency of behavior and attitude. Planning behavior, as its name implies, was developed to forecast intentional and conscientious behavior.

Voluntary simplifications, now a highly focused psychographic segment in multidisciplinary disciplines, are becoming increasingly popular due to their personal, altruistic, social and environmental implications. Voluntary simplifiers are considered socially responsible, simple in the sense of materialism, are more self-sufficient and have a spiritual orientation (Iwata, 1996). Voluntary simplicity develops an idea of changing consumption habits in which two facets are embedded, namely simplicity and richness (Balletine, 2010). The concept of voluntary simplicity is to conserve resources and achieve satisfaction without using materials and money. This attitude of simplicity leads to sustainable behavior (Guillard, 2018). This concept has two implications for practitioners. One is to identify the self-motivated simplifiers and expand the market for sustainable products. Secondly, it is about creating an attitude of simplicity by emphasizing the importance of social responsibility, sustainable consumption and ecological well-being and linking the results to personal well-being.

### ***Disposition Behavior***

The environment, society, businesses, and consumers are all significantly impacted by the way that consumers dispose of their products (Sandes et al., 2019). Product disposal is essential for reducing resource waste, optimizing resource use, extending product life, and selecting replacement products. Items can be kept, reused, thrown away, donated, or recycled by the consumer. Not all of these disposal options are good for the environment. Generally speaking, recycling—especially gifting and reusing—is seen as more environmentally friendly than hoarding or throwing things away (Bye & McKinney, 2007; Suarez et al., 2016a). Previous research has demonstrated that a range of internal and external factors, including age, gender, environmental awareness, lifestyle, and economics and culture, might influence consumers' disposal practices (Ballantine & Creery, 2010; Green et al., 2001; Lang et al., 2013).

The act of disposing of a product occurs after users stop using it. There are several ways to dispose of products, such as keeping, reusing, donating, re-cycling, and throwing away (Cruz-Cardenas & Arriévalo-Chiavez, 2018; Sandes et al., 2019)., each having a different impact on the environment. Typically, waste goods are burned or dumped in landfills, endangering the soil, the atmosphere, and water supplies, among other things (Sandin & Peters, 2018).

While hoarding does not directly contribute to pollution, it does hinder the circularity of the product, which is why this method of disposal is generally regarded as environmentally harmful (Bye, 2007; Suarez et al., 2016b). Reusing and recycling products reduces the overall negative environmental effects, making them better options than discarding and keeping. Furthermore, it is preferable to reuse over recycle because recycled products frequently require a number of environmentally harmful procedures in order to separate recyclable components and then create new products from recycled materials (Sandin & Peters, 2018). In contrast, reused products are typically free of environmental burdens. In conclusion, giving is viewed as a responsible disposal strategy that offers social and psychological benefits (Cruz-Cruzenas & Arriévalo-Chavez, 2018).

As societies and individuals develop increasing ecological awareness, policymakers and practitioners are focusing on the way consumers dispose of their possessions. Disposition is an important element of consumption as it predicts consumers' future purchases and behavior toward the fulfillment of needs by a particular product or brand (Lee, 2016). One reason this area receives less attention is the increased consumerism advocated and supported by marketers and consumers.

Voluntary simplifiers enters into the disposal process in order to decrease consumption and material use. According to Shaw (2002), a consumer's attempt to cut back on consumption would result in disposal actions. Customers to ensure their satisfaction. The result of the consumption thirst is typically clutter. (Nelson et al., 2007) found that when consumers move into the simplifying market or take up the voluntary simplifying lifestyle, they must declutter the items they have bought through the disposal process.

Given the evolving social and environmental problems, the dark side of consumerism has been updated and presented by the anti-consumerism movement. Anti-consumption practices involve voluntary simplicity. This suggests a connection between voluntary simplicity and consumer dispositional behavior, as simplifiers would declutter their environment to make it less materialistic while simultaneously being socially responsible,

satisfying their sense of self-sufficiency, and justifying the element of spirituality in their lives. Voluntary simplifiers strive to change their consumption patterns (Walther, Sandlin, & Wuensch, 2016). Changing values and lifestyles are associated with consumers' dispositional behavior (Cherrier & Murray, 2007). Voluntary reduction in consumption and adoption of dispositional behaviors play an important role in determining consumers' lifestyle patterns (Nepomuceno & Laroche, 2015).

**H<sub>1</sub>:** Voluntary Simplicity has a significant positive impact on Disposition Behavior

### ***Psychological well-Being***

These days, marketing research is obsessed with the well-being of consumers. According to Belk (1988) and Schiffman (2007), consumer behaviors play a vital role in expressing overall well-being. When people are content with the procurement, preparation, consumption, ownership, upkeep, and disposal of goods, both the individual and society as a whole are said to be experiencing consumer well-being (Lee and Roux, 2011). Volunteering behavior and life quality are related (Krause & Rainville, 2017). Research has shown a high correlation between volunteering and life satisfaction. The notion has been examined across diverse social and cultural contexts to substantiate its association with mental health (Hustinx et al., 2015; Krause & Rainville, 2017). In the realm of consumer behavior, it is commonly acknowledged that consumption and psychological well-being are related. Marketing experts have discovered that, contrary to expectations, excessive consumption or the acquisition of goods beyond a certain point may not lead to happiness due to the advancement of societies and the satisfaction of lower order requirements. Those who choose to simplify their lives voluntarily look for non-materialistic means of achieving psychological well-being. Simplifiers center their beliefs on less consumption and non-materialistic elements, and they distinguish between subjective (feeling, pleasure) and objective (self and other directed) well-being (Etzioni, 2004). Research was done to determine whether materialism and psychological well-being were positively or negatively correlated (Dittmar et al., 2014). Research has confirmed that reducing consumption has a good impact on both the environment and people's psychological health. Customers who have straightforward lives on their own will feel extremely satisfied with their lot in life (Cruz-Cardenas, 2017; Richins & Dawson, 2017). A situation that is considered to be advantageous to both society (at the macro-level) and individual consumers (at the micro-level) is characterized as psychological well-being. This situation is linked to consumers' experiences of goods and services, or experiences related to the procurement of goods and services in their local surroundings (Sirgy & Lee, 2006). At the individual level, psychological well-being is seen as a key component. In order for customers to enhance their quality of life, they must address two distinct sets of requirements: human needs like happiness and health and societal needs like sustainability and social responsibility (Sirgy & Lee, 2006). However, there is little evidence about an anti-consumer lifestyle based on the specific type of dispositional method used and its possible outcomes. The current study will address this gap by examining the dispositional behavior of volunteer simplifiers as a means of achieving psychological well-being. Researchers, journalists and bloggers have primarily discussed the rising trend of voluntary simplicity in lifestyles and its wide-ranging effects on sustainability; however, the academic literature has yet to provide a clear empirical definition or solid scientific proof of these benefits (Osikominu, 2020). Based on the notion of a sustainable lifestyle, this study promotes minimalism as a deliberate paradigm shift in consumer behavior and has attempted to demonstrate its effects on psychological well-being. The ideas of disposition behavior and voluntary simplicity promote psychological well-being. By focusing on the advantages for the person as well as the community, both ideas embrace the underlying subject of psychological well-being.

**H<sub>2</sub>:** Disposition Behavior will have a positive and significant impact on Psychological Well Being

**H<sub>3</sub>:** Voluntary simplicity will have significant and positive impact on psychological well-being

**H<sub>4</sub>:** Disposition Behavior will mediate the relationship between Voluntary Simplicity and Psychological Well Being

## Collectivism

An important macroenvironmental factor that contributes to consumer product disposition behavior is culture (Cruz-Cardenas & Arevalo-Chavez, 2017). Culture creates a context for every social environment. Research has found that the context of caste has a significant impact on consumer behavior (Agrawal, 2018). The study of consumer behavior requires a holistic approach to all possible factors that can be taken into account to understand the phenomenon. Context is an important factor that cast its impact on behaviors as it provides social norms (Ajzen, 2005) for individuals. One contextual factor which determines the consumer decision making and contextual referencing is culture. Culture provides the standards around which the behavior is defined (Chiu & Hong, 2006; Torelli, Rodas, & Lahoud, 2017). Two type of cultures has been proposed by (Hofstede, 1980). According to Hofstede (1980) culture can be compared and evaluated with respect to the level of Individualism and collectivism (Shavitt, Lee, & Torelli, 2008). Collectivism, as defined by (Hofsted, 1980), is a culture in which followers give greater weight to ingroup goals and values and give less priority to personal goals. In this research setting, collectivism is examined as a moderating variable between voluntary simplicity and well-being through consumer dispositional behavior. The influence of collectivist culture was originally discussed by (Yamagishi, Hashimoto & Schug, 2008). However, the influence of social norms in collectivist culture has hardly been researched even after their established meaning (Varshneya, Pandey, & Das, 2017). The concept of voluntary simplicity has been studied extensively in the West. Developing countries were not consulted to conduct research related to voluntary simplification instruments. Asian countries are developing economically, culturally and technologically.

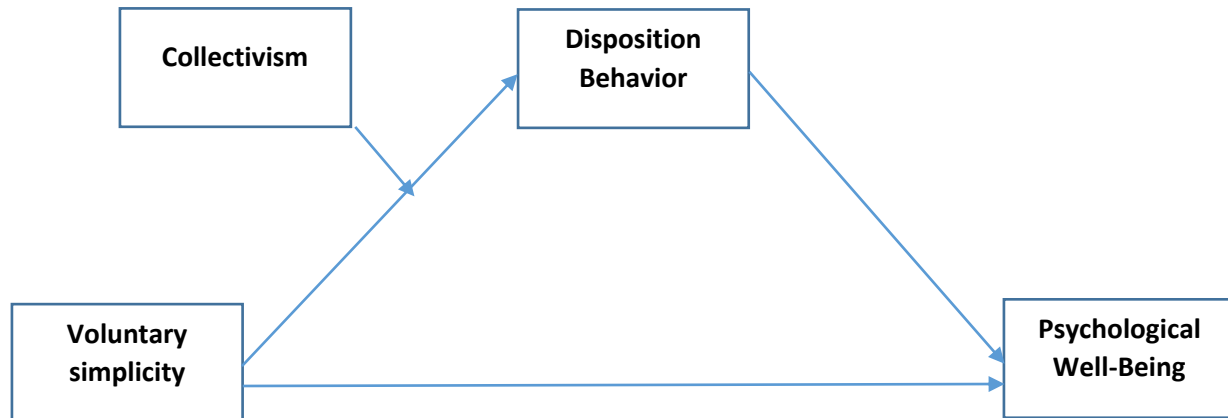
Cultural differences influence the way people perceive the environment and society around them. In a culture dominated by collectivism, the perception of the environment is dominated by the perspective of others (Torelli, Rodas, & Lahoud, 2017). However, when it comes to social belonging, it is a deeply rooted human desire around the world (Baumeister & Leary, 1995). Based on findings from Puntoni and Tavassoli, (2007); Cleveland (2015), individuals strive for conformity with their social counterparts in their consumption decisions. Whether materialistic or non-materialistic (i.e., simplistic), consumers are interested in developing their socially coherent self-identity. When discussing social conformity in collectivist culture, it is important to emphasize the well-established fact that in a collectivist culture, in-groups are preferred over out-groups. Consumers in a collectivist culture define personal values according to their social group. They attach less weight to their self-interest than to the interests of associated groups (Uskul, Oyserman, Lee, & Xu, 2013). Thus, when excessive consumption, materialism, and possessions are acknowledged in the group to which they belong, they conform to the norm of the reference group (Cleveland & Chang, 2009; Sharma, 2011) and achieve comfort and acceptance in the society or group to which they belong Their belonging forces consumers in a collectivist culture to own possessions and display materialism.

The study conducted by (Burroughs & Rinder, 2002) suggests that materialism is less common in collectivist cultures because it can be associated with self-centered values as opposed to other-oriented values. However, these results could not be generalized with the results of other studies conducted on the same research question. (Cleveland 2015; Markus & Kitayama, 1991) found a correspondence between materialism and collectivism. Ger and Belk, (1996) found that Eastern consumers are far ahead of Western consumers in terms of materialistic dispositions and consumption patterns. This emphasizes the pro-consumption element and lacks an anti-consumption aspect to consumerism.

Investigating the concept of consumer behavior of voluntary simplifiers in the Asian context following collectivist culture will indeed contribute greatly to the body of knowledge (Agrawal, 2018). Also, to the best of the researcher's knowledge, the phenomenon of voluntary simplicity has not been studied in Pakistan after reviewing the literature. Consumer behavior research specific to the Pakistani consumer market does not focus on voluntary simplifications. So, this research will address the gap in studying the concept of voluntary simplicity in the Pakistani consumer market where this concept has not been explored yet. In light of the argument put forth by the above mentioned research findings, it can be assumed that collectivism as a moderator between voluntary simplicity and disposition behavior will be a promising research area to be investigated.

**H<sub>5</sub>:** Collectivism will positively moderate the relationship between Voluntary Simplicity and Disposition Behavior

*Theoretical Framework*



**Methodology**

*Psychometric Measures*

**Voluntary Simplicity** Voluntary simplicity construct developed by (Chang, 2016) is operationalized through dimensions of; *Social Responsibility* defined as the consumers who consider the social and personal outcomes of decisions taken a consumption level and is measured with items like “Buy environment friendly products” , *Material Simplicity* defined as possessing less of the materials and is measured with items like “Only buy essential products”, *Self-Sufficiency* relying on one’s own skills and abilities and is measured using items like “Make rather than buying”, and *Spiritual Life* defined as defining one’s life in the light of beliefs and attitudes and is measured using items like “Maintain a spiritual life” . This scale is developed to measure voluntary simplicity in adult consumers. It consists of 17 items that require respondents to rate the level of agreement on a scale ranging from 1=Strongly Disagree to 6=Strongly Agree.

**Disposition Behavior** Disposition behavior has been operationalized into non-possessive (monetary/nonmonetary) and possessive (disusing/reusing) by (Lee et al., 2015) via an 11- item scale based on Harrell and McConocha (1992); Jung (1993); and Byun (2008), and the results of Jacoby, Berning, and Dietvorst (1977); Hanson (1980); and Bye and McKinny (2007). *Non-Possessive Monetary Disposition Behavior* is reselling the product and is measured through items such as “(When disposing) I will resell at second-hand stores.” *Non-Possessive Non-Monetary Disposition Behavior* is defined as giving away product as charity or without any return this dimension is measured using items like, “(When disposing of) I will put it in a clothes drop off bin.” *Possessive Disusing Disposition* involves keeping the product, measured by items such as “I will keep it for the time being.” *Possessive/ Reusing Disposition* refers to keeping the product for future use after amending or redesigning and is measured by items including, “(When disposing) I will modify it for reuse.”

**Psychological Well-Being** it is the measure of the quality of life. Psychological well-being will be measured using uni-dimensional scale comprising of 14-item Warwick-Edinburgh Mental Well-Being Scale (Tennant et al. 2007). The scale uses items like “I’ve been feeling optimistic about life”. The Cronbach Alpha for this scale is

**Collectivism** 21 item bifactor construct developed by (Lui & Rollock, 2017) assessing Collectivism among Asians on a scale of 1=Strongly Disagree to 6=Strongly Agree with items like “My actions reflect on my family” will be used.

**Population**

As economies grow, consumption has reached its highest peak in recent years. Increasing consumption has led to environmental and social degradation. These issues have caused greater concern not only among companies but also among individuals. Companies have taken social responsibility for producing environmentally friendly,



sustainable products. Individuals have begun to adopt a lifestyle that supports purchasing and using sustainable products. Given the increasing importance and critical impact of sustainable products, this study surveyed the companies that produce sustainable products and the consumers of these sustainable products.

### Sample

Elgin and Mitchell (1977) defined the consumer market characteristics of voluntary simplifiers based on their product preferences. Based on this definition, a sample of consumers who use or purchase sustainable products or environmentally friendly products from socially responsible companies was drawn. The definition of criteria for sustainable products corresponds to the definitions of (Akehurst et al., 2012;; Chen & Chai, 2010; Lee, 2008; Mostafa, 2007; Ottman, 2011; Tan, 2011). Based on the cross-sectional design, purposive sampling technique is used. A sample of 300 green consumers was drawn. The purpose of this study was to gather data from customers who utilize environmentally friendly items, are aware of green products, and patronize socially conscious businesses. A Google Form was used to create the online survey. After that, the survey form was distributed to the respondents via a link via emails and the researcher's connections on social media platforms. This sample size is appropriate as suggested and recommended by (Comrey & Lee, 1992; Hair, Black, Babin, Anderson, & Tatham, 2010).

### Unit of Analysis

Consumers who have been using products from socially responsible companies for two years. The companies included have been paying attention to social responsibility and the production of environmentally friendly products for five years. The questionnaires are distributed to adults and educated consumer groups (aged 18 and over). This population sample serves the purpose of the study as it represents the best respondents (Chan, 2001; Yadav & Pathak, 2016) and the future consumers Kim et al. (2013)

## Data Analysis and Results

### Descriptive Statistics

Data analysis was done using SPSS v.23.0 and AMOS v.23.0. Total 300 questionnaires were self-administered out of which 66 were not usable due to missing responses. 234 questionnaires incorporated responses from 101 (43.2%) female and 133 (56.8%) male. Respondent of ages 21-30 were 136 (58.1%) 31-40 were 74 (31.6%), 41-50 were 24 (10.3%).

Table 1 presents the descriptive statistics and correlation scores between voluntary simplicity and other three constructs. Correlation scores show that all scales have a significant relationship with each other and we proceeded with all the variables for further results.

Table#1

### Descriptive Statistics and Correlation

	Mean	Std. Deviation	1	2	3	4
<b>Voluntary Simplicity</b>	4.46	.72	<b>1</b>			
<b>Disposition Behavior</b>	3.69	.69	.416**	<b>1</b>		
<b>Psychological Well-Being</b>	4.63	.83	.484**	.253**	.598**	<b>1</b>

Correlation is significant at the 0.01 level (2-tailed)\*\*

Correlation is significant at the 0.05 level (2-tailed)\*

### Scale Reliability

Suitability of used instruments was established through Cronbach's alphas verifying the scale reliabilities. Table 2 presents the Cronbach's alpha along with the numbers of items of each variable.

**Table#2**

**Scales Reliability**

Construct	No. of Items	Cronbach's Alpha
Voluntary Simplicity	16	.845
Disposition Behavior	11	.720
Psychological Well-Being	13	.919

**Measurement Model**

With the estimation of the constructs, the integrated model was validated. It consisted of a total of 65 variables, of which 16 were latent variables and 29 were measurement variables or indicators. The model variables are presented in *Figure 2*, which shows the measurement model (relationships between constructs and their indicators) and the structural model (relationships between constructs) based on the theoretical framework. Corresponding to low factor loadings 6 items (measurement variables) were dropped (1 item from multidimensional construct of Voluntary Simplicity, 5 items from multidimensional construct of Collectivism and 1 item from unidimensional construct of Psychological Well-Being). The Model was modified by item dropping and defining free estimation parameters. With the estimation of the model, discriminant validity was verified (to determine whether the indicators and constructs are sufficiently different from other indicators and their constructs). Then multi-collinearity was examined using the measurement model in order to see if the variables are sufficiently distinct (Hair, Anderson, Tatham & Black, 2005; Garver & Mentzer, 1999) which were found to be satisfactory. For analysis and validation of the structural model, we determined the values for the indices RMSEA (Root Mean Square Error of Approximation), GFI (Goodness-of-Fit), AGFI (Adjusted Goodness of-Fit Statistic), CFI (Comparative Fit Indices),  $\chi^2/df$  (Chi-squared over degrees of freedom or relative), as shown in *Table 3*

**Table#3**

**Measurement Model**

	CMIN/D	GFI	AGFI	CFI	RMSEA
Original	1.813	.776	.750	.824	.059
Modified	1.696	.833	.809	.896	.049
3 Factor Model	1.813	.776	.750	.824	.059
2 Factor Model	1.972	.750	.722	.789	.065
1 Factor Model	2.028	.740	.711	.777	.066

**Path Analysis**

**Hypothesis 1**

*Voluntary Simplicity has a significant impact on Disposition Behavior*

This hypothesis is supported based on the results in Table 4. The satisfactory nature of the indexes together with the significant factor loadings between the constructs and their indicators, consolidates the strong relationship ( $\beta = 0.416$ ) found between Voluntary Simplicity and Disposition Behavior

**Hypothesis 2**

*Disposition Behavior will have a positive and significant impact on Psychological Well Being*

Hypothesis is supported, as results in Table 4 validate a strong relationship ( $\beta = .253$ ) between disposition behavior and Psychological Well-Being.

**Hypothesis 3**

*Voluntary simplicity will have a significant and positive impact on Psychological Well Being*

Results in Table 4 validate the above stated hypothesis through significant results of  $\beta = .483$ .

**Hypothesis 4**

*Disposition behavior will mediate the relationship between voluntary simplicity and Psychological Well Being*

This hypothesis is supported in our results of mediation using 1000 bootstraps at 95% confidence level. Results are given in Table#4.

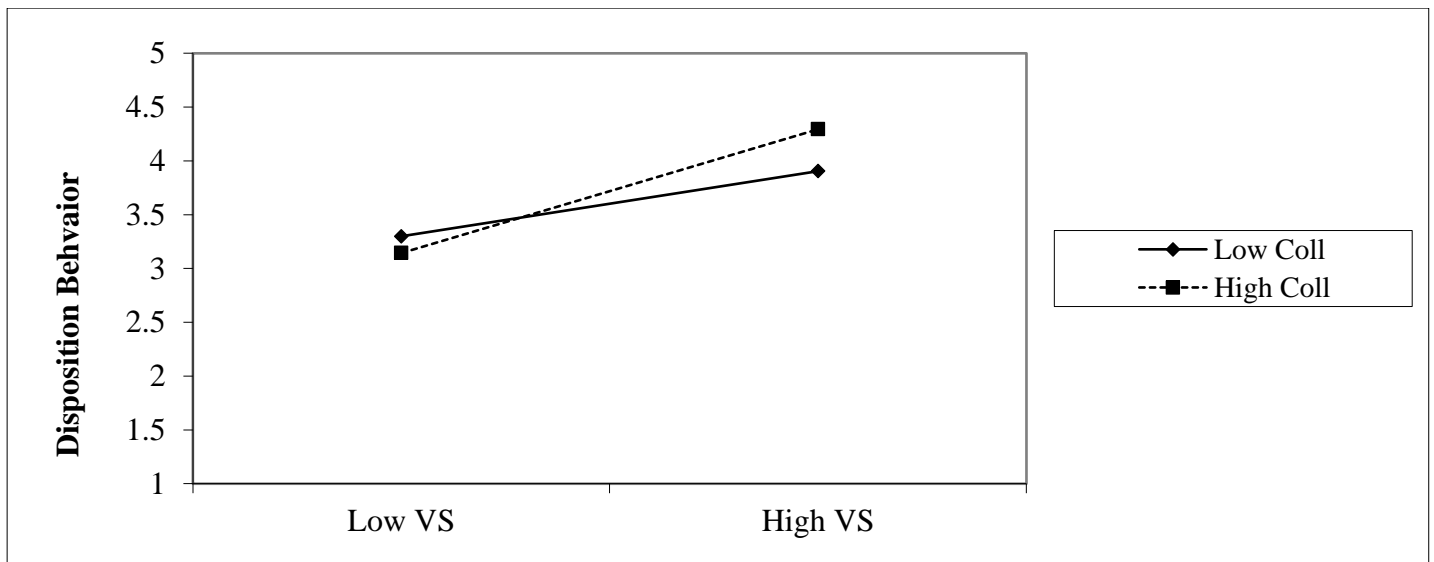
**Table# 4**

Direct Effects		B	SE	P
Voluntary <u>Simplicity</u> →	Disposition Behavior	.416	.057	***
Disposition <u>Behavior</u> →	Psychological Well-Being	.253	.077	***
Voluntary <u>Simplicity</u> →	Psychological Well-Being	.484	.066	***
Mediation Effect				
Bootstrap Result for	Indirect Effect	LL 95% CI	UL 95% CI	P
Indirect Effect	.105	.038	.175	.023

**Hypothesis 5**

*Collectivism will positively moderate the relationship between voluntary simplicity and disposition behavior*

Results in Table#5 and Figure#2 support the hypothesis ( $\beta=.957$ ,  $SE=.043$ ,  $P=.007$ ).



**Discussion**

The aim of this work was to gain insight into the dispositional behavior of voluntary simplifiers that leads to psychological well-being in a collectivist culture. Looking at the overall effect shows similar results to the study conducted by Ballantine and Creery (2010), according to which voluntary simplifiers are included in the product disposition process. Multidimensional scales were used to measure these two concepts. An in-depth analysis has revealed some important and interesting insights based on the values inherent in the attitudes of voluntary simplifiers and the dispositions they adopt. The element of autonomy in voluntary simplifiers has the greatest influence on three, namely reuse ( $\beta=.426$ ,  $SE=.086$ ,  $P=.001$ ) and non-use ( $\beta=.253$ ,  $SE=.088$ ,  $P=.001$ ) and monetary (resale) ( $\beta=.265$ ,  $SE=.088$ ,  $P=.001$ ) disposition methods adopted by consumers, excluding the non-monetary disposition method. Dimensions of social responsibility ( $\beta=.280$ ,  $SE=.061$ ,  $P=.001$ ) and spiritual life ( $\beta=.307$ ,  $SE=.064$ ,  $P=.001$ ) play a significant role in consumers' psychological well-being. These results are consistent with the findings of Kraisornsuthasinee and Swierczek (2018).

The disposition can take any form while consumers adopt the attitude of simplicity. This can involve a non-possessory disposal of money (resale). This suggests that there are opportunities for companies in the reverse supply chain and there is also the potential for a market for used products. With a focus on charitable behavior, consumers can also dispose of products by giving them away without receiving anything in return. Giving can also take the form of passing it on to friends, family or even the next generation. This ensures longer product life and concern for society. Consumers with an attitude of simplicity may also choose to reuse the product by relying on their own ability to recycle the product. The product can also be stored until the consumer no longer uses it.

These disposition behaviors need to be studied specifically for the electronic products market as it is a growing industry and the management and handling of used electronic products has become a global problem. These products are critical to economic and environmental factors due to their high-cost components and chemical nature. The shorter lifespan of technologies has become an issue of immediate concern to policymakers. It is important to identify and manage appropriate consumer behavior after purchase in order to protect individual, social and environmental concerns.

It is also important to focus on personal well-being while taking responsibility towards society. This research has also revealed the connection between voluntary simplicity and psychological well-being when using various methods of dispositional behavior. Volunteer simplifiers can dispose of the products and thereby increase psychological well-being. These results are consistent with the research of Boujbel and Astous (2012).

In a society that focuses on concern for others, prosocial behavior, and concern for the self, dispositional behavior increases significantly and positively. As constitutive elements of voluntary simplicity, attitudes would definitely have a profound influence on dispositional behavior in a society where social interests and mutual benefit and gain are paramount.

### ***Implications to Theory, Practice, Policy***

By focusing consumer research on lifestyles that target voluntary simplicity and consumption-related behavior, marketers and academics have access to a new and emerging segment of consumer markets. This segment will help practitioners in profiling consumers and thereby developing appropriate market offerings.

Large companies will understand consumers' waste-related decisions. This will provide marketers with a new area to guide consumers toward planned dispositional behavior. Focusing on resale channels will make it easier for consumers to purchase new products by properly disposing of their products and re-entering the purchasing cycle.

Brands will also be able to control their brand divestment. Ethical consumer behavior is another area that marketers can communicate and strategize. This research will also help marketers understand the motivation behind voluntary simplifications in consumer-generated communications. These company-managed consumers can be a powerful advertising and communication tool to reach other consumers.

### ***Limitations and Future Directions***

This research attempted to address a very underappreciated but important area in the field of consumer behavior. This research included newly developed scales to measure voluntary simplicity, dispositional behavior, and collectivism. The sample was collected from consumers of sustainable products in a very small geographical area. This research needs to be conducted on a diverse demographic sample. The results of the segments can be compared to derive more specific and meaningful results. Structural equation modeling was used to analyze the data. Multigroup analysis will provide more in-depth knowledge of the relationships discussed in this model. A segmentation-based study produces more interesting results when the hierarchical regression method is used. First-order hypotheses were formulated and validated. Investigating these second-order concepts using partial least squares would be a significant contribution to the field.

### ***Conflict of Interest Statement***

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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## Factors Affecting Impulsive Purchase Behaviour via the Mediating Function of the Urge to Buy via the SOR Model's Perspective

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### Abstract

*This study looks at the independent effects of innovation, promotion, trust, and enjoyment on the purchasing impulse. This study also evaluates the impact of the desire to buy on impulsive purchases. Pakistani smartphone users in Islamabad provide the major data. After a comprehensive analysis of 384 datasets, a questionnaire is utilised to gather the responses. The survey questions were developed after a careful review of the literature. Because the study is quantitative, positivist research philosophy is applied in developing the research design. Using SPSS software, data analysis procedures like regression, correlation, and descriptive analysis are carried out to determine the underlying relationship between the independent and dependent variables of the conceptual framework. The study's findings demonstrate a favourable correlation between promotion, trust, enjoyment, innovation and the willingness to buy. Furthermore, a primary driver of consumers' impulsive purchases is their urge to make a purchase.*

**Key Words:** Impulse to Purchase, Desire to Purchase, Innovation, Promotion, Trust, and Enjoyment.

### Introduction

Impulsive purchasing is the inclination of buyers toward making impulsive purchases. The need for rapid emotional or psychological stimulation usually drives these purchases. It is something that frequently happens in consumer behaviour and has a significant influence on how organizations market themselves (Abdelsalam et al., 2020). Therefore, marketing experts need to understand the elements that affect impulsive purchases to create resilient and effective advertising strategies. Traditional meanings of the word "impulse buying" placed more value on the products than on the consumer, as the product itself was a motivating factor for these sorts of purchases. Considering this, Mathur (2019) discovered the foundation for classifying impulsive buying behaviour by categorizing the action as planned, unplanned, or impulsive. This model states that a time-consuming search for information comes first in planned purchase behaviour, followed by educated decisions. Impulsive consumer buying behaviour has long piqued the interest of researchers and marketers alike. Impulse buying is the abrupt, unconscious purchase of something without prior planning or intentions. It is a complex phenomenon affected by various factors, such as psychological, social, and physical environments. Recently, there has been a lot of discussion on how invention and marketing affect impulsive buying (Do et al., 2020).

With a focus on consumer goods, especially smartphone accessories, the research topic of this study aims to investigate how marketing and innovation impact customers' impulsive buying choices. The study aims to analyze the relationship between promotion and invention and how it influences consumers' propensities for buying things



impulsively, in addition to any potential moderating impacts that significant factors may have on this connection. Promotion is crucial to influencing consumer behaviour since it increases awareness, piques fascination, and encourages purchases. Advertisers regularly employ several promotional strategies to persuade customers to make impulse purchases, including discounts, time-limited offers, and freebies (Saad & Metawie, 2015). However, little study was done on how promotions impact compulsive phone accessory purchasing habits.

This study intends to shed light on the effectiveness of different advertising methods in spurring impulsive buying of certain consumer goods. On the other side, innovation is a driving factor in the ever-changing smartphone market. Consumers are continually exposed to cutting-edge features, styles, and functionalities of smartphone accessories thanks to quick technological improvements (Ahmed et al., 2020). The study's goal is to better understand how innovation affects customers' propensity for innovative and distinctive goods while examining the impact of innovation on impulse purchases. By understanding how innovation influences impulse purchases, marketing professionals can use this knowledge to develop and advertise cutting-edge smartphone accessories that appeal to consumers' impulsive impulses.

The study intends to contribute to theoretical and practical fields by addressing this research challenge. The research findings will add to the knowledge of impulsive purchasing and shed light on the particular context of smartphone accessories. Practically speaking, the findings can aid marketers in creating powerful marketing plans and cutting-edge items that appeal to consumers' impulsive purchasing behaviours. Additionally, marketers can better comprehend the moderation function of significant factors by personalizing their marketing campaigns and adjusting them to different customer categories based on their particular traits, social influences, and situational circumstances.

### ***Literature Review and Theoretical Framework***

Impulse purchases are unplanned, spontaneous purchases undertaken by customers who are typically driven more by emotions than reason (Abdelsalam et al., 2020). It has piqued the interest of marketers and academics because of its significant impact on consumer behaviour and the retail sector. This literature review aims to summarize the corpus of work on impulsive buying habits in the environment of consumer goods, emphasizing key findings and conceptual frameworks. A review of the available research has been conducted to better understand how creativity, advancement, trust, and enjoyment affect impulsive buying behaviour.

#### ***Impulse Buying Behaviour***

Gunawan and Iskandar (2020) described purchasing on impulse as impulse purchases that are done without previous preparation to fulfil a certain need or acquire a specific product category. They described the quick, deliberate purchases made by buyers that they perceive as impulsive buys. Purchasing an unavailable item that prompts a reminder when the item is encountered is not considered an impulse purchase. Before Lee et al.'s study in 2021, the majority of reports of impulse buys appeared to be product-focused. In earlier studies, the consumer and their personalities were not included as an element influencing impulsive purchases. The following year, researchers examined the many cognitive aspects of purchasing on impulse, emphasizing personal impulsivity. When a buyer decides on impulse, they have an instantaneous, intense, and enduring desire, claim Bellini and Aiolfi (2020). Zhao et al. (2019) defined purchasing on impulse as an unanticipated behaviour distinguished by a tendency for quick purchasing of goods and hurried decision-making.

A typical description of buying on impulse is making a hasty, unexpected buy without thinking it through first. It involves making snap decisions without carefully analyzing the consequences or the alternatives. Academics have developed many ideas and hypotheses to account for this behaviour. For example, the impulsive buying tendency (IBT) model proposed by Dodoo and Wu in 2019 argues that variations in individuals play a significant role in shaping impulse buying habits. There are a variety of internal and environmental elements that might influence and shape impulse buying behaviour. Personality traits, emotions, and cognitive functions are examples of internal elements, whereas situational and environmental inputs are examples of external factors. According to Pinto et al. (2020), impulsive people are more prone to impulsive purchases. Chiu et al. (2022) also showed that emotional states, including arousal and enthusiasm, can trigger impulsive buying. The retail setting considerably encourages

impulsive buying. Retailers utilize layout, placement of goods, and display techniques to entice customers and promote impulse purchases. In-store promotions and attractive displays can significantly increase the likelihood of impulse purchases, based on an investigation by Rahman and Hossain (2023). Similarly, Bashar et al. (2022) demonstrated that store environments, such as lighting and music, may influence customers' emotions and impulsive purchasing behaviour.

### ***Effect of Promotion on Urge to Buy of Consumer***

Marketing is necessary if a company wants to modify its customers' behaviours, particularly those that entail impulse buying. According to the definition provided by Hosseini et al. (2020), the term "impulse buying" refers to the unexpected and impetuous purchase behaviour that is driven by an unforeseen need or desire. The major objective of this study is to evaluate the recent research published on how advertising influences impulsive purchases. By comprehending the underlying mechanisms and factors contributing to impulsive purchases, marketers can develop effective strategies for discounts and increasing sales. This review summarizes the pertinent research and highlights important findings on the topic. Price reductions have been shown to significantly impact buying on impulse. In accordance with an investigation by Redine et al. (2023) brief price cuts or discounts increase the chance of impulsive purchases by giving customers a sense of haste and an impression of worth. As a result of the "time-limited offer" or "sale" marketing, customers become fearful of missing out and making impulsive purchases. A more recent research study by Ittaquallah et al. (2022) that found price cuts positively impact purchasing behaviour on impulse by lessening the perceived economic danger related to buying something came to the same conclusion. It is well known that visual marketing and promotional displays significantly impact consumers' inclination to make impulsive purchases. Eye-catching packages and conspicuous shelf placement are only two examples of attractive merchandise displays that may increase impulsive purchases, based on an investigation by Shah et al. (2021). Visual cues and product positioning act as impulsive purchase triggers by capturing the interest of consumers. Tesfaye (2022) also found that in-store displays, including end-of-aisle displays and point-of-purchase materials, promote impulsive purchases by increasing exposure to advertisements and creating a relaxed environment.

According to Zafar et al.'s study from 2021, interactions that emphasize scarcity, exclusiveness, and pressure are extremely successful at encouraging impulsive buying. These communications spark the interest and desire for immediate satisfaction of consumers by provoking a sense of shortages or time urgency. Additionally, it was discovered that marketing slogans and convincing writing are examples of marketing messages that greatly impact impulse buying. Appealing to emotions in marketing communications has also increased the risk of impulsive behaviour. According to a research study conducted by Ittaquallah et al. (2020), emotional marketing that elicits positive emotions, such as excitement or delight, may enhance impulsive purchasing behaviour. Discounts may impact impulsive purchasing, but personal and social variables are also important. Wu et al.'s study from 2021 found that those with high degrees of impulsiveness are more prone to make impulsive purchases despite advertising cues. Additionally, environmental elements like time restraints, frustration, or mood may amplify the impact of discounts on impulsive purchases. The research conducted by Hayat et al. (2022) found that persons who are depressed are more prone to make impulsive purchases since advertisements momentarily lift spirits and distract from negative emotions. In conclusion, the effect of advertising on buying on impulse is a complicated phenomenon that is influenced by a variety of factors. Price promotions, advertising displays, interactions, messaging, and individual and contextual circumstances are some factors that can affect impulsive buying. Recognizing these factors can help marketers develop effective advertising strategies to capitalize on their clients' impulsive buying tendencies (Lee & Chen, 2021). By gaining a greater understanding of the psychology of customers and behaviour, marketers can create targeted promotional strategies that match their needs or inclinations.

*H<sub>1</sub>: Promotion has a significant association with the urge to buy.*

### ***Impact of Innovation on Urge to Buy of Consumer***

Technology advancements have significantly altered how consumers engage with products and make purchasing decisions. Due to online retailers, smartphone apps, and social media, consumers now have simple access to

various goods and data (Rodrigues et al., 2021). These advances have simplified impulsive purchasing by requiring consumers to complete purchases more quickly and easily. According to Awan and Abbas (2015), the usefulness and availability of online platforms have a positive effect on consumers' impulsive buying behaviour. Product upgrades are necessary to promote irrational purchasing. According to a study (Saad & Metawie, 2015), creative product features like unique looks, cutting-edge performance, and enhanced packing have been demonstrated to grab consumers' attention and cause impulsive buying behaviour. For example, introducing new smartphones with improved functionality and design usually prompts tech-savvy customers to make hasty purchases. Additionally, if consumers think a product is unique or rare, they may feel obliged to purchase it immediately (Do et al., 2020). Limited edition merchandise, special promotions, and flash reductions are a few strategies retailers use to capitalize on the impact of innovation upon impulsive purchasing behaviour.

Along with product developments, marketing innovations also significantly impact how individuals make purchases on impulse. Personalised advertising, engines of recommendation, and participatory marketing campaigns have all grown in popularity in the digital age. Because of these improvements, marketers can tailor their offers and communication to certain clients, making their marketing campaigns more enticing and convincing (Lee & Workman, 2015). Customized suggestions for goods based on an individual's browsing habits and interests may engender a sense of relevancy and urgency that may lead to impulse buying. Social innovations generated by users' material and online gurus have altered how consumers perceive and engage with products and companies. Users can express their opinions, ideas, and insights on social media platforms, which significantly impacts impulsive purchases. Widagdo and Roz (2021) assert that social factors like peer pressure and social expectations greatly impact consumers' impulsive purchases. Customers are more likely to make impulse purchases when they think their circle of friends is endorsing a particular brand or product. Individual traits, including personality traits and purchasing habits, may mitigate innovation's impact on impulsive purchasing habits (Chen & Zhang, 2015). For instance, those with a strong propensity for novelty may be more persuaded by cutting-edge products and marketing strategies. Similarly, those who use their cognition a lot might choose their purchases more carefully and logically, which would reduce the impact of innovation on impulsive behaviour (Akram et al., 2018).

*H<sub>2</sub>: Innovation has a strong relationship with the consumer's urge to buy.*

### ***Influence of Trust on Urge to Buy of Consumer***

The phrase "impulse buying behaviour" describes buyers who make impulsive, unexpected purchases without giving them much thought. It has piqued the interest of researchers and practitioners due to its impact on consumer behaviour and advertising tactics. Since trustworthiness is a key factor in consumer decision-making, it has been identified as a significant factor affecting purchasing behaviour on impulse (Hasim et al., 2018). The present literature overview aims to analyze and compile the most recent research on how trust affects impulsive buying. When it involves impulsive purchases, trust is very important in influencing customer behaviour. When a customer trusts a brand or merchant, they are more inclined to make impulsive purchases Shah et al. (2021). Trust is the capacity of a consumer to rely upon the knowledge, goodness, and honesty of an organization or store. The relevance of this relationship in understanding consumer motivations has been highlighted in several research conducted to investigate the connection between trust and impulsive purchasing. Farid and Ali (2018) conducted a study to determine the extent to which trust plays a role in making impulsive purchases in online retail settings. Widagdo and Roz (2021) investigated the relevance of trust in conventional retail settings as part of their research. According to their research findings, consumers who had a higher level of trust in the businesses they patronized were more likely to make rash purchases. The research strongly emphasizes the relevance of shop environment, salesperson skill, and perceived trustworthiness to promote trust and stimulate impulsive purchase behaviour. This was done to accomplish both of these goals.

The effect of trust in the context of advertising on impulsive purchasing behaviour was examined by Zafar et al. (2021). According to their research, customers are more inclined to make quick decisions when they believe the claims made in advertising. The research highlighted the significance of trustworthy and reputable advertising material in triggering purchases on impulse. In a social media context, impulsive buying was examined by Akram

et al. (2017). Based on their research, consumers who believe suggestions and evaluations on social media sites tend to be more inclined to make impulsive purchases. The research stressed the value of peer endorsements and technological celebrities in fostering trust and impulse buying. Vazquez et al. (2020) examined how trust affected customers' perception of salespeople. Based on their study, customers who trust salesmen have a greater tendency to make rash decisions. The study focused on the importance of a salesperson's competence, expertise, and honesty to establish confidence and promote impulsive buying.

*H<sub>3</sub>: The desire to purchase is positively correlated with trust.*

### ***The Role of Enjoyment Towards Urge to Buy of Consumer***

Impulse purchases are unplanned and unplanned purchases done by clients with prior intention or comprehensive consideration. Scientists and marketers have closely studied this phenomenon because of its significant influence on consumer behaviour and overall sales (Iqbal et al., 2017). One crucial factor that has been acknowledged as the main driver of impulsive purchasing is the role of enjoyment. The core concepts and ramifications of the research on the relationship between pleasure and impulsive spending are addressed in this literature overview (Parfenova & Romashova, 2020). Numerous research has revealed a strong positive association between pleasure and impulsive buying. Positive emotions like delight are usually present during impulsive buying activities. Customers who make impulsive purchases usually show higher levels of pleasure than non-impulsive shoppers, as Husnain et al. (2019) reported. Furthermore, Husnain et al. (2019) discovered that hedonic enjoyment caused the joy experienced during impulsive purchases.

Emotional control plays a significant role in impulse buying because people typically buy impulsively to manage their feelings. Emotions can be regulated by experiencing pleasant sensations like happiness and pleasure. To appear better and have fun, people with adverse feelings are more likely to make impulsive purchases, according to a research study conducted by Hussain (2018). Thus, pleasure serves as an emotional stabilizer to diminish negative emotions and raise positive ones. The level of satisfaction customers experience can be influenced by situational elements, such as store ambience, advertisements, and social pressure, which can affect their impulse purchase behaviour. According to studies conducted by Kiani (2020), consumers' satisfaction levels were boosted by the store environments, including the music, displays, and employees, which encouraged impulse purchases. In addition, it has been discovered that advertising strategies, like limited-time discounts or offers, increase the perceived pleasure of impulsive purchases by fostering a sense of urgency and anticipation (Hilal & Gunapalan, 2019).

Variations in personality factors moderate the association between enjoyment and impulsive purchasing behaviour. For example, extroversion has been favourably linked to satisfaction and the inclination for impulsive purchases. According to research by (Kristiyono & Gozali, 2022), people with high extroversion levels enjoyed impulsive purchases more and were likelier to make them than introverted people. According to this, it has been demonstrated that desire for sensation people, who favour unique and exciting events, appreciate impulsive purchases more (Bhuvanewari & Krishnan, 2015). For marketers, comprehending how enjoyment influences impulsive purchasing has significant ramifications. The satisfaction of consumers can be increased, and, as a result, impulse purchases can be encouraged by creating delightful purchasing experiences via store design, advertisements, and customized suggestions (Parsad et al., 2019). Additionally, specific marketing strategies that play on consumers' emotions and emphasize the pleasure and satisfaction of impulsive purchases can successfully change their behaviour. This research study has highlighted pleasure's critical role in impulsive purchasing behaviour. As an emotional stabilizer, enjoyment influences impulsive purchases beneficially. The association between enjoyment and impulsive purchasing behaviour is further shaped by situational circumstances, personality characteristics, and emotional control mechanisms (Iqbal et al., 2017). Given the significance of enjoyment in customer behaviour, marketers should intentionally plan retail spaces and marketing initiatives to raise consumer satisfaction and encourage spontaneous purchases.

*H<sub>4</sub>: Enjoyment has a strong association with the urge to buy.*

### ***Relation between Urge to Buy and Impulse Buying Behaviour of Consumer***

According to the impulse purchasing theory, customers make a purchase and acquire an item in the heat of the moment. On the other hand, the desire and phenomena that customers experience just before making a purchase are called buying impulse, also known as the drive to buy. They also discovered that there is a favourable association between these two factors. According to research done by Zhao et al. (2019), the difference between compulsive shopping and impulsive shopping is that the latter is driven by a need to satisfy a need for pleasure, while the former is motivated by a desire to alleviate emotions of anxiety. Oniomania is the name given to those with an overwhelming and obsessive need to buy. Oniomania is derived from the Greek words onions, meaning "for sale," and mania, meaning "insanity." The brain has a built-in drive to seek out novel experiences, which stimulates us and enhances our ability to learn new things. This suggests that daily, we have to battle against our hard-wired impulses to look for something novel and unique (Dibley et al., 2020). Consider the purchase of a brand-new automobile, for instance. The disposition of a consumer may influence their length of stay in a business, whether or not they make a purchase, and even whether or not they "look." The majority of large retail chains have long been aware of the need to coax customers into a more shopping-friendly frame of mind. According to Zafar et al.'s research (2021), customers are more likely to participate in impulsive purchase behaviour when they are experiencing a strong desire to obtain something. Additionally, Xiang et al. (2016) examined the relationship between situational factors, the desire to buy, and the subsequent impulsive buying behaviour. The study suggests that environmental cues like store ambience and advertising stimuli may raise a consumer's urge to buy, resulting in more impulsive purchasing. These findings provide insight into how important environmental signals are in triggering the need to purchase and, therefore, impulsive behaviour.

Numerous psychological factors may affect both the urge to shop and the behaviour of making impulsive purchases. The arousal of emotions is one of these elements. Customers' propensity to make impulsive purchases has short- and long-term consequences that should not be disregarded (Turkyilmaz et al., 2015). Customers who act hastily may feel regret or embarrassment about their choices shortly. A person's overall satisfaction with the purchase decreases due to this post-purchase dissonance, which has detrimental emotional effects. Making hasty purchases increases spending and puts strain on one's resources, as seen from a financial perspective. When comparing impulsive and non-impulsive buyers, Tesfaye (2022) found that the latter group tended to have higher levels of credit card debt. This demonstrates how hasty purchases may cause debt accumulation and financial instability, which have long-term effects on the consumers' overall financial well-being. Customers' tendency to make impulsive purchases is greatly influenced by their desire to shop, which is a key element. The strength of a person's desire may be influenced by a wide variety of situations as well as psychological considerations, which can sometimes result in rash purchasing decisions (Ünsalan, 2016).

*H<sub>5</sub>: Urge to buy is significantly related to consumer impulse buying behaviour.*

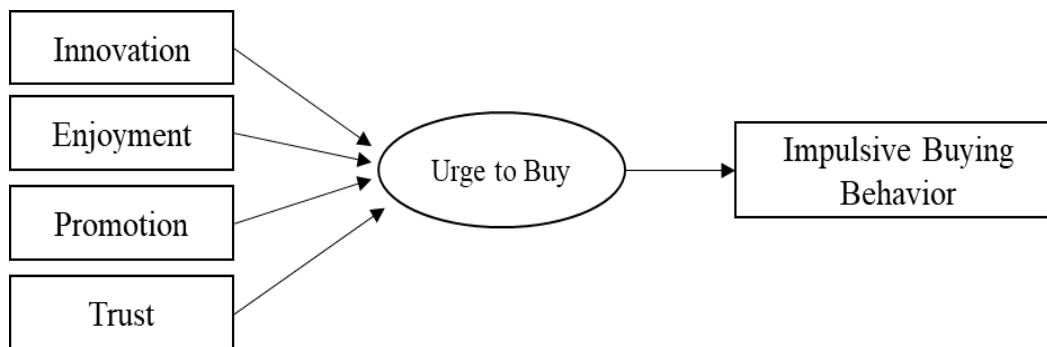
### ***Theoretical Framework***

The stimulus-organism-response (S-O-R) model, an empirical paradigm, describes how relationships among external stimuli, internal mental processes, and resulting responses affect customer behaviour (Widagdo and Roz, 2021). It provides a complete grasp of the factors that affect consumers' responses in certain circumstances. This model significantly influences the study "The Effect of Promotion and Innovation on Impulse Buying Behaviour: The Moderation Role Major Determinants for Consumer Goods (Smart Phone Accessories)." The S-O-R model can be used in the context of the study to examine how advertising campaigns and cutting-edge functions of smartphone accessories act as stimuli from the outside, which in turn influence consumers' internal mental processes (organism), which in turn affects consumers' impulse buying behaviour (response). According to the S-O-R Model, the stimuli from advertisements, innovation, and trust impact the organism's internal mechanisms, affecting how consumers react by engaging in impulsive purchasing. For instance, consumers are more inclined to make rash purchases and impulsive purchases if they see a special offer for a reduced smartphone accessory from a reputable brand. They are thrilled and driven to explore the novel capabilities. According to the S-O-R paradigm, customers' internal psychological processes serve as a conduit rather than a direct cause of the connection between stimuli and reactions.

The S-O-R model, in conclusion, offers a useful theoretical framework for research on the impact of marketing and innovation on impulsive purchasing behavior for smartphone attachments. Researchers can gain a thorough grasp of the fundamental principles at work by taking into account the external stimuli (promotion and innovation), their internal mental processes (perceptions and attitudes), and the following responses (impulse purchase behavior) (Hasim et al., 2018). Moderating factors can also detect the relationship's subtleties and boundary constraints. This S-O-R model application advances consumer behavior research in the setting of mobile phone accessories and reinforces the theoretical foundations of the study.

In this study, innovation, promotion, trust, and enjoyment are the independent variables, while the urge to buy is the dependent variable. At the same time, the urge to buy is the independent variable for impulse buying behavior. Independent Variables (Innovation, Promotion, Trust, Enjoyment) -> Dependent Variable (Urge to Buy). Independent Variable (Urge to Buy) -> Dependent Variable (Impulse Buying Behaviour). The study explores how innovation, promotion, trust, and enjoyment influence the urge to buy. Additionally, it examines how the urge to buy, in turn, affects impulse buying behavior.

**Figure 1: Conceptual Framework**



## Methodology

This study on the influence of promotion, innovation, trust, and enjoyment on impulsive purchasing behavior in the setting of smartphone accessories is best conducted using the deductive research approach. This method enables the formation of theories, testing hypotheses, acquiring objective facts, generalizability, and effectiveness. Using a deductive research approach, this study can shed light on customer behavior and offer useful information to retailers and makers of smartphone accessories. This study uses quantitative research approaches to offer important insights into the effects of advertising, innovation, trust, and enjoyment on impulse buying behavior for smartphone accessories. As a result of the generalizability of findings to a larger population made possible by statistical analysis, researchers can now draw important conclusions and implications from the data they have gathered. In conclusion, the current study largely used quantitative research approaches to examine how marketing, innovation, trust, and enjoyment affect consumers' impulsive purchases of consumer goods (smartphone accessories). This method offers essential tools for measuring and analyzing the interactions between variables, enabling a thorough comprehension of the key factors influencing impulse buying behavior in this situation.

This study aims to determine how promotion, innovation, trust, and enjoyment affect the impulsive buying of consumer items, emphasizing smartphone accessories. A questionnaire survey is conducted among users of smartphone accessories to get the essential data. This section gives a general description of the data-gathering procedure, which mostly entails approaching respondents and making the survey available online. A thorough questionnaire is prepared to get accurate data from the chosen respondents through purposive sampling. The questionnaire has sections for demographic data, promotion, innovation, trust, enjoyment, and impulsive purchasing. Several items in each area measure the constructions of interest. The questionnaire's simple design guarantees a high response rate, making it simple to comprehend and complete. To quantify participant replies and facilitate statistical analysis, the survey contains Likert scale items (Mathur, 2019). An internet-based survey of 325 Islamabad customers using smartphone accessories was performed to get the data. An average sample size

of 325 people, a common practice in social science research, may provide results with a 5% margin of error and a 95% confidence interval, according to a study by Baker Qureshi et al. (2019). This sample size also allows for dropouts or partial replies, enhancing the validity and dependability of the study's findings. A sample size of 325 participants can be deemed suitable for the study, according to Husnain et al. (2019), which examined the effect of innovation and promotion on impulse purchases.

Using regression analysis, correlation analysis, and descriptive analysis, the gathered data for the study on "The Effect of Promotion, Innovation, Trust, and Enjoyment on Determinants of Impulsive Buying Behavior through the Mediating Role of Urge-to-Buy with the Lens of SOR Model" is studied. These analysis methods offer new perspectives on how the variables are connected and make it possible to comprehend the research aims all-encompassing. Researchers can successfully evaluate the acquired data by applying regression, correlation, and descriptive analyses. This allows them to identify the correlations between promotion, innovation, trust, enjoyment, and impulsive buying behavior in the context of smartphone accessories. These analytical tools will help to a full knowledge of the primary factors of impulsive purchase behavior and give useful insights for the research.

### Analysis

In the table below, the overall statistics of all the constructs are shown. Total number of respondents are 384. The value of mean, sum, and standard deviation are given as well.

**Table 1: Descriptive statistics of all the dependent and independent variables**

	Descriptive Statistics			
	N	Sum	Mean	Std. Deviation
Innovation Main	384	1229	3.20	.888
Enjoyment Main	384	1275	3.32	.846
Promotion Main	384	1272	3.31	.838
Trust Main	384	1338	3.48	.862
Impulse Buying Main	384	1204	3.14	.967
Urge to buy Main	384	1210	3.15	.937
Valid N (listwise)	384			

### Correlations

In the analysis of the correlation between the dependent and independent variables, correlation finds the strength and association between the variables, which is the need to address the hypothesis. For correlation analysis, combining the data against various constructs is important. Therefore, SPSS is used to analyze the correlation test.

**Table 2: Correlation between Innovation and Urge to Buy**

		Innovation Main	Urge to buy Main
Innovation Main	Pearson Correlation	1	.568**
	Sig. (1-tailed)		.000
	N	384	384
Urge to buy Main	Pearson Correlation	.568**	1
	Sig. (1-tailed)	.000	
	N	384	384

\*\* . Correlation is significant at the 0.01 level (1-tailed).

The table above shows the correlation between the innovation and urge to buy. The correlation value of both variables is 0.568, which is positive.

**Table 3: Correlation between Enjoyment and Urge to Buy**

		Urge to buy Main	Enjoyment Main
Urge to buy Main	Pearson Correlation	1	.577**
	Sig. (1-tailed)		.000
	N	384	384
Enjoyment Main	Pearson Correlation	.577**	1
	Sig. (1-tailed)	.000	
	N	384	384

\*\* . Correlation is significant at the 0.01 level (1-tailed).

The table above shows the correlation between enjoyment and the urge to buy. The correlation value is 0.577, which shows a positive correlation between both variables.

**Table 4: Correlation between Promotion and Urge to Buy**

		Urge to buy Main	Promotion Main
Urge to buy Main	Pearson Correlation	1	.451**
	Sig. (1-tailed)		.000
	N	384	384
Promotion Main	Pearson Correlation	.451**	1
	Sig. (1-tailed)	.000	
	N	384	384

\*\* . Correlation is significant at the 0.01 level (1-tailed).

The table above shows the correlation between the promotion and the urge to buy. The correlation value is 0.451, which shows a positive correlation between both variables.

**Table 5: Correlation between Trust and Urge to Buy**

		Urge to buy Main	Trust Main
Urge to buy Main	Pearson Correlation	1	.359**
	Sig. (1-tailed)		.000
	N	384	384
Trust Main	Pearson Correlation	.359**	1
	Sig. (1-tailed)	.000	
	N	384	384

\*\* . Correlation is significant at the 0.01 level (1-tailed).

The table above shows the correlation between trust and the urge to buy. The correlation value is 0.351, which shows a positive correlation between both variables.

**Table 6: Correlation between Urge to Buy and Impulsive Buying**

		Urge to buy Main	Impulse Buying Main
Urge to buy Main	Pearson Correlation	1	.795**
	Sig. (1-tailed)		.000
	N	384	384
Impulse Buying Main	Pearson Correlation	.795**	1
	Sig. (1-tailed)	.000	
	N	384	384

\*\* . Correlation is significant at the 0.01 level (1-tailed).

The table above shows the correlation between impulsive buying and the urge to buy. The correlation value is 0.795, which shows a positive correlation between both variables.



## Analysis

In this study, SPSS has been used to evaluate the direct effect of independent variables on the dependent variable along with the indirect effect of the mediator. However, before conducting the linear regression, it is important to measure the regression assumptions to check if the data is fit for analysis. Table 7 shows the results of all the hypotheses.

**Table 7: Model summary of the regression analysis**

Path Coef.		$\beta$ Value	P Value	Results
H1	I→UB	0.251	0.001	Accepted
H2	E→UB	0.391	0.000	Accepted
H3	P→UB	0.402	0.003	Accepted
H4	T→UB	0.306	0.000	Accepted
H5	IEPT→UB →WB	0.254	0.004	Accepted

In the table above, the results show that the significance level of the P value is less than 0.05. Hence, we say that there is a significant relationship between all the hypotheses and path coefficients.

## Findings and Discussion

This study's primary objectives are to investigate the impact of innovation, promotion, trust, and enjoyment on the urge to buy smartphones in Islamabad, Pakistan. Furthermore, the impact of the urge to buy on consumers' impulsive buying behavior is investigated. A survey questionnaire is designed to get responses from 384 customers. As the nature of the study is quantitative, the hypothesis is developed to further narrow the research questions. The SPSS software is used for data analysis using descriptive, correlation, regression analysis, and t-tests. The study's findings reveal that all the independent variables, such as promotion, trust, enjoyment, and innovation, are positively associated with the urge to buy smartphones. The correlation analysis supports these findings. Furthermore, the urge to buy is tested to check whether it is associated with the compulsive buying of the customers. The correlation analysis shows a positive bond between both variables. In support of this finding, t-test, and regression analysis also depict the association highlighted in the data analysis. Additionally, the descriptive analysis shows that I like to try new and innovative smartphone accessories; I am a person who is looking for more fun and enjoyment in shopping; in a phone store, it is always economical to buy smartphone accessories available at a discount, I believe seller's trustworthiness is highly important while buying smartphone accessories, Whenever I purchase smartphone accessories unplanned, I think of its pros and cons quickly and buy it, I experienced no strong urges to make unplanned purchases of smartphone accessories are the highly perceived statements among the respondents in each construct. The existing body of knowledge confirms and reports the study's findings.

As the study's findings show, an effective business model in the smartphone industry strongly promotes the adoption of product innovation while severely discouraging disruptive product innovation. However, a company's technological capabilities can bolster the positive relationship between novel business models and product innovations while weakening the effect of design efficiency on innovation adoption. New product development studies have centered on the environmental and cost effects of product development and the role of other stakeholders' interests. Research shows that a company can get a competitive advantage through product innovation because the reason for product innovation is to satisfy consumer demand. In this context, "product innovation" refers to any innovation implemented in a company's manufacturing and distribution of new or existing products (Karim et al., 2021).

Smartphone businesses employ promotional incentive data to promote promotional activities and present products, focusing on drawing attention to the attractiveness of a price discount. By manipulating customers'

price sensitivity, online stores increase customer participation and spending power. The promotion incentive is often stronger than daily purchase activities in the hunger marketing mode under the e-commerce platform to induce consumers to buy specific goods immediately, directly affecting the perceived trust, value, and purchase intention of price-sensitive consumers (Gunawan and Iskandar, 2020). Public participation and consumption enthusiasm can be fostered by providing promotional incentive information that allows consumers to perceive the temptation of the promotion to save money, the abundance of promotion commodity categories, quantities, and styles, and the interest in participating in rush buying activities in the broadcast room (Karim et al., 2021).

In the field of smartphones, trust is a key concept. It's a mental place where one has good hopes for other people's actions and motivations. Smartphones rely on consumers' trust as a foundational principle since it mitigates buyers' reluctance to purchase online and fosters brand advocacy (Rodrigues et al., 2021). If customers don't believe in a company, they won't feel confident purchasing. Live commerce is an interactive mode in real-time, giving customers a sense of subjectivity and closeness to the transaction. Consumers place more faith in a company when the information they receive is timely, relevant, and presented in various formats (Turkyilmaz et al., 2015). Furthermore, this hunger marketing technique satisfies consumers with perceived value. Customers' strong sense of social presence is used in the webcast environment to fulfill their need for comprehensive information and increase their trust in promotion links, facilitating their on-the-spot purchasing decisions (Parsad et al., 2019).

Consumers who view smartphone shopping as a source of pleasure are more likely to devote more time to the activity. Shop around until you discover something he or she likes. Higher levels of hedonic shopping are associated with a greater thirst for product knowledge (Parsad et al., 2019). This is because consumers who purchase for hedonistic reasons frequently engage in informational searches just because they like doing so. The longer a person spends shopping, the more likely they are to be exposed to shopping stimuli and come to sense an urgent need for particular things (Karim et al., 2021).

Shoppers with a chronic need to buy often give in to the different forms of sales persuasion they encounter, despite their best efforts to resist them. When someone is confronted with a certain brand, item, or product in a retail setting, they may experience an impulse to make a purchase. This means that the want or urge to buy comes before the actual consumption, hence it stands to reason that the two are positively associated (Parsad et al., 2019). An impulse to purchase occurs when a customer encounters a product while shopping and immediately feels compelled to make a purchase (Li et al., 2022). A person's propensity to make an impulsive buy increases in proportion to the intensity of his or her desire to shop (Turkyilmaz et al., 2015). Customers in stores are more likely to give in to impulsive buys because the item is so accessible. When presented with aesthetically pleasing products, consumers have the most trouble controlling their inclination to buy on impulse. The desire to buy has been shown to have a favorable effect on impulse buying in the past.

## Conclusions

The study's results indicate a positive correlation between the urge to buy smartphones and the independent variables such as promotion, trust, enjoyment, and innovation. The aforementioned results are supported by the correlation analysis. Moreover, the urge to buy is evaluated to determine its correlation with the customers' compulsive buying behavior. The results of the correlation analysis indicate a positive association between the two variables as highlighted by both t-test and regression analysis. Promotion in the smartphone is a form of marketing that uses time-sensitive incentives to encourage instantaneous purchases from consumers. Time constraints are a part of the decision-making environment that might influence how customers make choices. Smartphone innovation boosts a business's competitive edge by attracting new customers, and incentive design that takes into account consumers' preferences speeds up the creation of long-lasting goods. Positive emotional brand attachment has been shown to increase innovation, word-of-mouth intent, and product appraisal, whereas negative brand attachment can have the opposite effect. One of the most important aspects in consumer behaviour in buying smartphones is trust. Multiple social science fields investigate the topic of trust. As a result, there is no universally accepted definition of trust in the academic literature. The level of satisfaction customers experience can be influenced by situational elements, such as store ambiance, advertisements, and social pressure, which in turn can affect their impulse purchase behavior. Customers' propensity to make impulsive purchases has both

short- and long-term consequences that should not be disregarded. Customers who act hastily may feel regret or embarrassment about their choices shortly. A person's overall degree of satisfaction with the purchase decreases as a result of this post-purchase dissonance, which has detrimental emotional effects.

## Limitations and Recommendations

In this study, the survey questionnaire is a time-consuming research technique to collect data. It involves preparing a set of questions that are relevant to the research topic and then administering them to a sample of respondents. The responses are then analyzed to draw conclusions about the population being studied. In the limited-time research, it affects the quality of the research. As the survey is taken from the respondents who are smartphone users, it was difficult to hire people with basic understanding of the survey's subject matter. Therefore, we had to ensure that the survey questions were clear and concise, so that even those with limited knowledge could easily understand and respond to them. Additionally, we provided a brief explanation of the survey's purpose and importance to encourage participation from potential respondents. The cross-sectional research nature of the study is a limitation because it only provides a snapshot of the data at one point in time. It cannot establish causality or determine changes over time. However, it can still provide valuable insights into relationships between variables and serve as a basis for future longitudinal studies.

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## Monetary Policy, Cash Flow and Corporate Investment: Evidence from Pakistan

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### Abstract

*The current research aims to study the combined effect of micro-economic factor internal cash flow (CF) and macro-economic factor monetary policy on investment behavior of non-financial firms listed on Pakistan Stock Exchange over the period of 2010-2020. Dynamic panel model is used in the study for empirical testing of the hypotheses. One-step and two step system with Quintile regression GMM estimation techniques were applied for empirically testing of hypothesis. Data were collected from secondary sources through company's annual published and audited financial statements and from company's website of 265 non-financial firms Pakistan. The results identify cash flow has an inverse relationship with investment of firms in one step system GMM i.e. simple regression. However, cash flow tends to increase the level of investment in all other regression models. The contractionary monetary policy would likely to decrease the investment. Cash flow decreases the investment of firms in lower quintile of firms as compared to high quintiles. Monetary policy decrease the investment in lower quintiles but this relationship tends to be positive when firm move towards high quintiles of firm investment. The magnitude of cash flow and monetary policy varies in all quintiles of firm investment. Overall, the results are inconclusive across all the level. This study suggested that financial managers should manage internal cash flows to increase cash reserves in order to meet capital expenditures and project's needs of non-financial firms in Pakistan.*

**Key words:** Cash flow, monetary policy, corporate investment, dynamic panel model

### Introduction

The macro level policy is imperatively designed by the monetary policy through managing the currency circulation. It contributes to flourish the economic activity that helps the firms to boost their investments. The central bank implements the monetary policy arrangement in order to accomplish various economic objectives i.e., to control inflation and to stabilize economic growth. However, due to liquidity restrictions, rising global interest rates and inflationary expectations, interest rates are expected to increase. Monetary policies would greatly affect the corporate lending and corporate investment (Kashyap et al., 1993; Morck et al., 2013). The corporate investment sensitivity with a shift in monetary policy rests on the business financial dimensions and its reliance on internally generated funds. The narrow monetary policy has a bad effect on investment decisions but the money reserves can save the firm from external borrowing difficulties (Gertler & Gilchrist, 1994). The investments are

not backed by the external borrowings all the times because the investment deficiency might put the firm under bankruptcy. The fund provision to new and additional investment in a firm is made through various internal and external alternatives. The verdicts about making capital expenditures are not only decisions which generate earnings and profits but comprise all those choices which leads to lower costs, increase profits and savings (Jangili & Kumar, 2010).

Every business's economic and financial success directly and indirectly relies upon effective management of cash flows (Liman & Mohammed, 2018). To be just profitable for a firm is not enough to consider it as financially stable and successful. A firm performance depends upon its cash flows management evaluated by using various financial measures. Firms are able to fulfill the desires of business operating, financing and investing activities by holding enough cash funds. Likewise, a firm might lead to facing adverse consequences if it lacks suitable and effective funds management policies. That's why; it is the main responsibility of managers of every firm to effectively cope with cash flows in order to avail investment opportunities desired performance. The cash flows dictate the investment decision of firms (Atrill & McLaney, 2011; David et al., 2018).

The instable monetary policy transmission mechanism adversely affects the corporate financial structure and investment behavior. There are many prior researches done regarding the monetary policies like (Brandt & li 2003; Devereux & Schiantarelli, 1990; kadapakkam et al., 1998; Kaplan & Zingales, 1997). Specifically, the tightened monetary policy decrease investments and at this time cash flows plays a very important role for investment decisions. This study aims to identify the combined effect of cash flow and monetary policy on investment behavior of non-financial firms in Pakistan. This study contributes as follows in many key ways to established literature as limited studies are available in the context of developing country like Pakistan. Firstly, it provides the more understanding and new evidence about the macroscopic and microscopic determinants, such as monetary policies and internal cash flows and their relationship with corporate investment. Secondly, a dynamic panel model with one-step and two step system and Quintile regression GMM estimation techniques is used in the study for empirical testing of the hypotheses.

## Literature Review

### *Monetary Policy and Investment*

Monetary policy is a significant tool related to investment assessments of enterprises. (Awais, Kashif, & Raza, 2020; Yaqub, Awais, Aslam, Mohsin, & Rehman, 2022). The loose monetary policy eliminates financing problems of private sector by making loans more easily available to them (Jing et al., 2012). This entitles the firm to take the advantage of better and more investment opportunities in beneficial projects for the improvement in profits and performance. Young et al. (2017) find that in china due to contractionary monetary policy from 2003-2013 decreases the corporate investment. Zhang et al. (2020) explores U.S monetary policy and investment in R&D by Chinese companies from 2015 to 2018. This study shows that Chinese companies are having a significant positive influence on R&D expenditures from Federal Reservation. The monetary approach through utilizing the macroeconomic information inferred the interest rates which has identified the major private sector investments (Tobias & Chiluwe, 2012). This examination likewise denotes to enormous studies (Bernanke & Gertler, 1995; Kahn, 2010; Majumder, 2007; Mishkin, 2009). The tight monitory policy improves the firm's ability in availing the loans for investments. It only possible with proper monitoring the onwads debt policy in times of expansionary monetary policies (Xuan, 2012). In this way, they can be able to moderately respond the monetary policy shocks. Hence, monetary policy notably explains the firm's investment behavior (Liu et al., 2013).

The demand and supply sides of economic policy (monetary policy) studied by Zhang et al. (2012) has suggested MP causes a lot of variations in investment decisions. It also affects the firm ability to make investments in capital projects, shares and bonds of other firms. Moreover, they are of view, by adopting various credit sources, monetary policy affects corporate investment in companies with various level of financing limitations. Takashi and Toshikaka (2004) investigated effects of monetary policy by valuing firm investment functions; the paper discloses there is only one way that is interest rate channel through which that monetary policy worked. But due to the deficiency especially in bank balance sheet conditions, its effect through the credit sources is non-existent which strictly hindered investments by smaller equity issuing firms than by larger debt-issuing firms.

The increase of money supply economy and available internal cash flows boost the borrowing capacity of firm and investment activities (Linh et al., 2019). The monetary policy has a greater and sometimes lesser significance for investment decisions (Valentine & Anca, 2017). However, relative risk in all types of investments and quantitative loose monetary policy have led to increase in financial investments (Chengsi & Ning, 2020). The change in cost of capital is backed by interest rates which economically and statistically affects the investments (Benoit et al., 2002). The investment behavior of firm is deeply dependent on central bank's monetary policy and bank's loan policy (Chaiporn et al., 2017).

Ndikumana (2008) analyzed significant positive effects of the interest rate reduction on private investment in expansionary MP. However, ancillary impacts on the private investment become significant by promoting domestic investment. Change in the interest rates does affect the present value of expected cash flows and time value of investment decisions (Emmons & Schmid, 2004). They claimed that low interest rates would result in a high present value of investment cash flows, thereby encouraging investment. Otherwise, investment may be discouraged because while making investment decisions it lowers the capital's opportunity cost. In a nutshell, because interest rates can influence investment practices in both directions, the impact of monetary policy on capital investment appears to be ambiguous. A Chinese research conducted by Fu and Liu (2015) examined impact of monetary policy in perspective of money supply and credit channels concluded companies tend to adjust investment cash flows faster during the duration of tight monetary policy. Corporate investment, on the other hand, tends to adjust faster as the money supply and credit expand. Markedly, this trend becomes significant during period of tighter or contractionary monetary policy.

H1: Monetary policy is a significant factor of investments of firms.

### ***Cash Flows and Investment***

The investments embrace the capital expenditures which are backed by sufficient cash flows availability. The more cash flows availability heightens the firm's investment activities (Bates et al., 2009; Oler & Picconi, 2014). The firm's cash holding or cash flows pushes them to more investments (Dittmar et al., 2003; Hoberg et al., 2014; Huang et al. 2013; Opler et al., 1999). The high amount of cash balance causes an increase in capital expenditures (Harford, 1999; Harford et al., 2008; Ferreira & Vilela, 2004; Mikkelsen & Partch, 2003). Kim et al. (2011) conducted research by using panel data and examine that restaurant companies hold more cash for greater investment opportunities. It has been concluded large restaurant firms in USA possess less cash in hand because these firms hold more liquid assets, incur high capital expenditures and distribute more dividends. In this way, both preventive and transactional drives are very significant in determining reasons of holding cash level by firms.

Sher (2014) examined that cash and cash equivalents at non-financial corporations worldwide have increased over the past twenty years. The non-financial firms hold more cash at the expense of investment activities which hinders the change. It has been suggested that the large amount of cash reserves is associated with an increasing uncertainty of firms. The investment cash flow sensitivity is low in companies that has less financing restrictions (Johnson et al., 2018). This sensitivity in investment cash flows is negatively associated with large shareholders' cash flow rights (Wei & Zhang, 2008). The shareholders claim as cash dividends reduce the investments. However, the investment cash flow sensitivity is higher in cash constraint firms (Riaz et al., 2016). The sensitivity of investment due to cash flow variation is greater in financially restricted firms (Carpenter et al., 1994). The capital investments are susceptible to external cash flows in financially constraint firms. They prefer to save large portion of cash flow for making future investment (Almeida et al., 2004). Hyde (2007) also concluded the same results of significant effect of cash flows on shareholders' investment decisions. Cleary (2006) discovered that in firms with a strong financial position, investment decisions are more sensitive to cash flow.

The financially restricted firms rely on cash inflows (Fazzari et al., 1988). Hence, managers under information asymmetry prefers the internal financing for investments (Donaldson, 1961). The firm could reduce its financial difficulties by holding large amount of reserves in the form of cash flow in organization (Cantor, 1990). So that investment practices continue without any hurdle. Devereux and Schiantarelli (1992) while investigating the relationship between cash flows and investment decisions concluded the significant positive impact of cash flow upon investment activities by large-sized and newly established firm because small level firms face problems of



cash shortages. The cash flows help the firms to take more and better investment decisions (Joseph, 2002). The cash flow has a greater influence on investments made by highly leveraged firms than by low leveraged firms (Whited, 1980). Overall, cash flow put the firms towards more investments (Bond & Reenen, 2007; Cleary, 1999; Fazzari & Petersen, 1988; Fazzari, & Petersen, 1993; Hoshi et al., 1991; Hubbard & Whited, 1980; Junlu, Zeguang & Qunyong, 2009; Kaplan & Zingales, 1997; Mizen & Vermeulen, 2004; Sun & Nobuyoshi, 2009; Vermeulen, 2002).

H2: Cash flows significantly explain the firm's investments.

### ***Theoretical Framework***

Theoretically, it is explored that firm follows the hierarchical pattern of financing for their investment needs. They maintain the sufficient cash flows for their future needs. It does not occupy the cost of capital and investment can easily be met through cash flows maintained by the firm. So, pecking order theory supports the relationship between cash flows and investment of firms. Pecking order theory drives the asymmetric information and it causes higher return on risky investments (Myers & Majluf, 1984). Outside sources are accompanied with high rate of return and corporations often prefer the use of available cash flows for making investment decisions.

Moreover, the crowding out theory refers to a phenomenon in which increased government spending responds to a reduction in private sector investment. It is attributed to the rise in interest rates coupled with the development of the public sector. The belief that crowding out occurs and represents a major economic issue is crucial to 'free market' intellectuals. The unsustainable growth in the public sector would eventually lead to an inefficient use of resources. As far as effect of monetary policy was concerned to Friedman's (1978) principle of crowd-out principle, this hypothesis suggests that unstable and ambiguous macroscopic strategies such as rising inflation or rising interest rates may have negative effects on investment. The position of interest rates goes to the core of the transmission method between increased government spending and rising corporate sector investment.

Q theory is another theory for investment decisions which is presented by (Tobin, 1969). As per this theory, an increase in Q index greater than one, corporate investment would promote. In this case return on investment is greater than cost of purchasing assets for company. Furthermore, capital expenditures made by companies rejected when Q index value is below 1 based on the fact that cost of purchasing properties is more than anticipated gains from the project. Both aggregate demand and aggregate supply decides the investment. This approach states investor multiplier describes relation between a rise in investment and a rise in magnitude. In another sense, it means how quantity is influenced by an increase in investment. The investment acts as a fundamental component of cumulative demand. Investment increases quantity from the perspective of aggregate production, which raises the amounts of money, and encourages investment.

### **Methodology**

To examine the empirical combined impact of monetary policy and internal cash flows on corporate investment, a quantitative research design, deductive research approach with positivism research paradigm was used. The sample data was collected for the study population of 265 non-financial firms over the 10 years period i.e. 2010-2020. For data analysis, secondary data was collected from audited and published financial statements and company's websites of non-financial firms in Pakistan.

### ***Data Estimation Method***

This study followed the empirical hypothesis testing using the dynamic panel model. The purpose of adopting the dynamic panel model is to be observed that there is an endogeneity problem in empirical model as supported by (Bond & Meghir, 1994; Dickinson & Jia, 2007; Yang et al., 2017). In the econometric model, leverage is the endogenous variables that lead toward the omitted variable bias and estimation through OLS put the biased estimates. Moreover, the inclusion of accounting based variables in one model leads to potential endogeneity. One and two step system GMM panel estimation was used to mitigate the endogeneity problems, which leads to appropriate and less biased estimates (Amidu & Wolfe, 2013). Moreover, the results would be better in GMM despite of the arise of autocorrelation and heteroscedasticity problems (Baum et al., 2003). This technique often confirms the use of instrumental variables to correct endogeneity, which results in skewed and contradictory

performance. By following the Roodman (2009) the command xtabond2 is used for one step and two-step system GMM. Antoniou et al. (2006) mentioned it is a superior estimate. Generally, two systems GMM is more accurate than the one step.

**Econometric Model**

Most the firm specific investments are dependent upon monetary policy mechanism. Like higher interest rates in monetary policy adversely affects the investment decisions of firms. Moreover, cash flows determine the liquidity position of the firm and are very helpful for investment decisions. Firms can utilize the cash flows for their investment opportunities with low cost of capital. The sufficiently availability of cash flows is an integral part of financial health of a firm and they can easily meet their financial obligations. In this way, investment decisions can be easily undertaken. The study provides the important insights about the relationship between monetary policy, cash flows and investment decisions of listed non-financial firms in Pakistan. Cash flows are endogenously determined due to precautionary and transaction cost motives. Furthermore, monetary policy is also highly dependent upon other macro-economic factors that create the potential endogeneity. Therefore, to remove the potential endogeneity and simultaneity bias in the model, the study developed the dynamic panel model. The model elaborates how cash flows and monetary policy are related with investments of firms. The dynamic panel model for hypothesis testing was developed due to endogeneity and heteroscedasticity problems. Bond and Meghir (1994) has referred this model.

$$INVST_{it} = \beta_1 INVST_{it-1} + \beta_2 CF_{it} + \beta_3 MP_{it} + \beta_4 ROA_{it} + \beta_5 FS_{it} + \beta_6 LEV_{it} + \beta_7 Risk_{it} + \beta_8 MTB_{it} + \beta_9 T_{it} + \varepsilon_{it}$$

Where  $Invst_{it}$  is measured as net end of year fixed assets minus net value of fixed assets at the beginning of the year,  $CF_{it}$  is the cash flow calculated as earning after tax+ fixed assets depreciation+ corporate income tax – dividend payment,  $MP_{it}$  is the monetary policy calculated as the value of M2 supply money,  $ROA_{it}$  is the return on assets, calculated as net profit to total assets,  $Size_{it}$  is measured as natural logarithm of total assets,  $LEV_{it}$  is the leverage ratio, measured by total debt to total assets,  $Risk_{it}$  is the standard deviation of firms net income,  $MTB_{it}$  is market value to book value of equity ratio measured as market value to book value and  $T_{it}$  is the tangible assets, calculated as fixed assets to total assets.

**Table 3.1: Variables Measurement**

Variables	Proxies	Measurement	Evidences
<b>Dependent Variable</b> Corporate Investment	Corporate Investment rate	Net Fixed Assets at the end to Net Fixed Assets at the beginning	Duchin et al. (2010), Linh and Hong (2019), Azzoni et al. (2006), Ullah (2017), kaddapakam et al. (1998).
<b>Independent Variables</b> <ul style="list-style-type: none"> <li>Monetary Policy (MP)</li> <li>Cash Flow</li> </ul>	<ul style="list-style-type: none"> <li>The value of M2 supply money</li> <li>Earning after tax plus fixed assets depreciation plus corporate income tax minus dividend payment</li> </ul>	<ul style="list-style-type: none"> <li>Value of M2 supply money</li> <li>Earnings after-tax + Fixed Asset Dep + corporate income tax – Dividend Payment</li> </ul>	<ul style="list-style-type: none"> <li>Li and Liu (2017), Linh &amp; Hong (2019).</li> <li>Kadapakkam et al. (1998), Linh &amp; Hong (2019).</li> </ul>

Control Variables			
<ul style="list-style-type: none"> <li>• Leverage</li> </ul>	<ul style="list-style-type: none"> <li>• Debts ratio</li> </ul>	<ul style="list-style-type: none"> <li>• Total Debts/Total Assets</li> </ul>	<ul style="list-style-type: none"> <li>• Kaplan &amp; Zingles, (1997), Opler &amp; Titman, (1994), Aivazian et al. (2005) Saquido (2003), Rahman (2020).</li> <li>• Jangili &amp; Kumar (2010), Cheng, (2018); Linh &amp; Hong, (2019), Rahman (2020).</li> <li>• Yang et al. (2017), Rahman (2020).</li> <li>• Yang et al. (2017), Saquido, (2003), Linh &amp; Hong (2019),</li> <li>• Yang et al. (2017), Saquido (2003), Shah &amp; Hijazi (2004).</li> <li>• Chou, yang &amp; Lin, (2011). Habib, Hasan &amp; Sun, (2020).</li> </ul>
<ul style="list-style-type: none"> <li>• Size</li> </ul>	<ul style="list-style-type: none"> <li>• Natural Logarithm of firm size</li> </ul>	<ul style="list-style-type: none"> <li>• LN (TA)</li> </ul>	
<ul style="list-style-type: none"> <li>• Return on Assets (ROA)</li> <li>• MTB</li> </ul>	<ul style="list-style-type: none"> <li>• Net profit to total assets</li> <li>• Market value to book vale</li> </ul>	<ul style="list-style-type: none"> <li>• NP after-tax/Total Assets</li> <li>• Market value of equity/Book value of equity</li> </ul>	
<ul style="list-style-type: none"> <li>• Tangible Assets</li> </ul>	<ul style="list-style-type: none"> <li>• Gross fixed assets to total assets</li> </ul>	<ul style="list-style-type: none"> <li>• Gross Fixed Assets/Total Assets</li> </ul>	
<ul style="list-style-type: none"> <li>• Risk</li> </ul>	<ul style="list-style-type: none"> <li>• Standard Deviation of Net Income</li> </ul>	<ul style="list-style-type: none"> <li>• <math>\sqrt{\sum(NI_i - NI_{avg})^2/n-1}</math></li> </ul>	

## Results and Discussions

The study followed the scientific methods of estimation in empirical analysis. More specifically, the techniques used in the testing and construction of hypothesis. The mathematical tools are aligned together with theory have addressed the methodological problems in the explanation and justification of induction. Hence, the empirical analysis likes descriptive statistics, correlation analysis and Generalized Methods of Moments (GMM) are presented in a rational manner.

### Descriptive Statistics and correlation analysis

Descriptive statistics indicate the distribution of data and numeric information of all variables used in this study. Table 4.1 given below presents the descriptive statistics while table 4.2 represent the correlation analysis among the variables. The average value of corporate investment of non-financial firms in Pakistan is 0.284 while its dispersion measured by standard deviation is 0.085. The mean value of cash flows and monetary policy are 0.050 and 0.093 respectively, while they deviate from their mean value by 0.239 and 0.021 respectively. All the variables in the study are only partially correlated with each other and are not highly correlated with each other; there is no multicollinearity problem in the model. It shows the rough picture and it is premature to draw the conclusion based on correlation analysis.

**Table 4.1:** Descriptive Statistics

Variables	Mean	Std. Dev.	P25	P50	P75	Skewness	Kurtosis
INV	0.284	0.085	0.250	0.307	0.336	-1.178	4.827
F	0.050	0.239	-0.021	0.029	0.107	23.754	939.442
MP	0.093	0.021	0.067	0.098	0.113	-0.101	1.470
ROA	0.060	0.126	0	0.039	0.120	0.669	6.812
SIZE	7.898	1.243	6.893	7.881	8.932	-0.112	2.451
LEV	0.455	0.160	0.319	0.476	0.581	-0.248	2.068
RISK	0.348	0.305	0.062	0.256	0.584	0.603	2.039
MTB	2.356	2.106	0.909	1.513	3.112	1.481	4.457
TANG	0.481	0.142	0.361	0.451	0.592	0.498	2.181

**Note:** The descriptive statistics table represent the mean, standard deviation, percentile 25, percentile 50, percentile 75, skewness and kurtosis of variables firm size, investment, risk, return on assets (ROA), cash flows (CF), monetary policy (MP), leverage, tangible assets, and market to book ratio (MTB).

**Table 4.2:** Correlation Analysis

Variables	INV	CF	MP	ROA	SIZE	LEV	RISK	MTB	TANG
INV	1.000								
CF	0.0025	1.000							
MP	0.0011	-0.0148	1.000						
ROA	-0.0014	-0.0189	-0.0030	1.000					
SIZE	-0.0316	-0.0199	-0.0170	-0.1171	1.000				
LEV	-0.0611	0.0009	0.0043	-0.0961	0.0838	1.000			
RISK	-0.0627	-0.0021	-0.0055	0.0346	-0.0196	0.1036	1.000		
MTB	0.0310	0.0233	0.0154	0.0009	0.0300	0.0452	0.0326	1.000	
TANG	-0.0048	-0.0603	0.0215	0.0402	-0.1083	-0.0609	0.0417	-0.0936	1.000

**Note:** This table shows the correlation / direction between the variables of study. The correlation is among the variables leverage, risk, investment, market to book ratio (MTB), cash flows (CF), firm size, monetary policy (MP), return on assets (ROA), and tangible assets.

### *Cash Flow and Investment*

This section shows the relationship between independent variable cash flows and dependent variable corporate investment of non-financial sector in Pakistan. Table 4.3 represents the results in connection to the cash flow and investment behavior of firms. The lagged dependent variable is significant and it is the confirmation of dynamic panel model, proving the strong justification for GMM technique. This shows that firm investment is based on last year's investment. With respect to one-step system GMM, the coefficient of cash flow without control variables shows a significant negative relationship with corporate investment consistent with the findings of (Bates et al., 2009; Hoberg et al., 2014; Oler & Picconi, 2014; Sher, 2014; Wei & Zhang, 2008). The coefficient of cash flows is significant and positive in both one-step (with control variables) and two step GMM (With and without control variables) consistent with the findings of (Almeida et al., 2004; Harford, 1999; Harford et al., 2008; Hoshi et al., 1991; Huang et al., 2013; Joseph, 2002; Mikkelsen & Partch, 2003; Kim et al., 2011;). The huge holding of cash flow enlarges the cash reserves which helps the future managerial investment decisions. Moreover, financially constraint firms depend more on internal cash flows in order to fulfill their capital investment needs in the period of financial distress. In addition to it, by supporting the pecking order theory, managers prefer internal funds more as compare to external funds due to asymmetry information in the capital market. They also claimed that the corporate investment is very sensitive towards cash flow, and this effect is found stronger in highly leveraged firms with more debt capital. It is concluded that cash flows has a significant positive relationship with investment decisions of firms in Pakistan. Firms maintaining the higher level of cash flows prefer to go for more investment by utilizing available resources for investments which is supported by pecking order theory. Contrarily, firms with better cash flows can easily meet their financial obligations and prefers the debt financing to support the investments. This particular is in support of trade off theory.

**Table 4.3:** Estimation results between Cash Flow and Investment

Investment is dependent variable in all the columns				
Variables	One-Step GMM		Two-Step GMM	
Perf <sub>(t-1)</sub>	-0.8745*** (0.1711)	-0.4827** (0.2313)	-0.8437*** (0.1163)	-0.0981** (0.0475)
CF	-0.7192*** (0.2592)	0.9911*** (0.0376)	0.6082** (0.2806)	0.4277*** (0.1263)
ROA		-0.0411 (0.0517)		-0.0605*** (0.0245)
SIZE		0.0061** (0.0032)		0.0000 (0.0019)
LEV		0.0689 (0.0485)		-0.0149 (0.0147)
RISK		-0.0540** (0.0271)		-0.0253* (0.0136)
MTB		0.0026** (0.0013)		0.0004 (0.0012)
TANG		-0.0160 (0.0214)		-0.0146 (0.0178)
AR (1)	0.028	0.000	0.004	0.000
AR (2)	0.209	0.258	0.605	0.407
Sargan	0.461	0.562	-	-
Hansen	-	-	0.841	0.739
Instruments	41	101	52	166
No. of Groups	265	265	265	265

**Note:** One step and two step system GMM results in dynamic panel model are reported in above table. The significance of AR (1) while insignificance of AR (2) and Sargen/Hansen test proves that model is correctly specified and is not over identified, hence no specification issues.

### **Monetary Policy and Investment**

This section shows the relationship between independent variable monetary policy and dependent variable corporate investment of non-financial sector in Pakistan. One step and two step system GMM panel estimators are applied for empirical testing. Table 4.4 represents the results in connection to the monetary policy and investment behavior of firms. The lagged dependent variable is a noteworthy feature of dynamic panel model and its significance confirms the dynamic panel model and is a strong justification for GMM technique. This shows that firm investment is based on last year's investment. With respect to one-step system two-step system GMM, overall the coefficient of monetary policy with and without control variables shows a significant and negative relationship with corporate investment decisions of firms in Pakistan which results are in accordance with the study of (Lenoco, 2016; Masuda, 2015; Sagi et al., 2020; Young et al., 2017). They argued that contractionary monetary policy is greater for small size firms due to significant rise in the liquidity constraint, resultantly reduction in corporate investment. Controlling inflation with contractionary monetary policy comes at a high cost in terms of reduced investment and, as a result, slower economic growth. This situation put the firms under pressure towards more investments. Moreover, as investments are backed by financing decisions and higher interest rates due to contractionary monetary policy would results in lower level of investments. On the contrary to these results, some researchers are in support of significant and positive impact of monetary policy on the corporate investment (Alawneh et al., 2015; Benoit et al., 2002; Chengsi & Ning, 2020; Jing et al., 2012; Jing et al., 2018; Linh et al., 2019; Li & Liu 2017; Morck et al., 2013; Tobias & Chiluwe, 2012; Zhang et al., 2019). They are of the view that an increase in the expansionary monetary policy leads to an increase in the level investment of non-financial firms in Pakistan because when money supply increases then interest rates fall which ultimately boost the domestic investment. Moreover, low interest rates would make the present value of investment cash flows to rise, thus encouraging investment activities.

**Table 4.4:** Estimation results between Monetary Policy and Investment

Investment is dependent variables in all the columns				
Variables	One-Step GMM		Two-Step GMM	
Perf <sub>(t-1)</sub>	0.1201** (0.0599)	-0.4604*** (0.1274)	-0.2309** (0.1038)	0.0336*** (0.0136)
MP	-0.4515*** (0.1884)	-0.1746** (0.0822)	0.6497*** (0.1674)	-0.5094*** (0.0860)
ROA		-0.0556** (0.0280)		0.0996*** (0.0363)
SIZE		-0.0023 (0.0034)		-0.0021 (0.0019)
LEV		-0.0107 (0.0392)		0.0299 (0.0241)
RISK		-0.0513*** (0.0214)		-0.0451*** (0.0162)
MTB		0.0019 (0.0021)		0.0028*** (0.0009)
TANG		-0.0603** (0.0318)		0.0270* (0.0148)
AR (1)	0.000	0.000	0.003	0.000
AR (2)	0.451	0.185	0.160	0.716
Sargan	0.754	0.897	-	-
Hansen	-	-	0.677	0.548
Instruments	84	166	66	134
No. of Groups	265	265	265	265

Note: One step and two step system GMM results in dynamic panel model are reported in above table. The significance of AR (1) while insignificance of AR (2) and Sargen/Hansen test proves that model is correctly specified and is not over identified, hence no specification issues.

**Quintile Regression**

This section shows the quintile regression results to identify the relationship between cash flow (CF) and monetary policy (MP) with the corporate investment decisions of the non-financial firms in Pakistan. Low quintiles identify the firms with lower investment while high quintiles identify the firms with higher level of investment. Table 4.5 represents the results in connection to the relationship in those low and high quintiles. The results identify that both CF and MP have a significant negative relationship in lower quintile of firm investment than in upper quintiles, consistent with the findings of (Bates et al., 2009; Dittmar et al., 2003; Hoberg et al., 2014; Lenoco, 2016; Masuda, 2015; Oler & Picconi, 2014; Sagi et al., 2020; Sher, 2014; Young et al., 2017). They claim that the investment cash flow sensitivity is inversely associated with the cash flow rights of the largest shareholders. Both CF and MP have a significant and positive relationship in medium and upper quintiles of firm investment support the findings of (Cantor, 1990; Devereux & Schiantarelli, 1992; Ferreira & Vilela, 2004; Harford et al., 2008; Huang et al., 2013; Johnson et al., 2018). The high cash reserves are the results of huge holdings of cash flows that put the managers in a position to more future investment decisions. However, the magnitude of relationship varies with respect to quintiles. Both cash flows and monetary policy have lower explanatory power in describing the investment of firms in low quintiles than in upper quintiles.

**Table 4.5: Quintile Regression Results**

Variables	Investment is the dependent variable in all the columns				
	1	2	3	4	5
Constant	0.2378*** (0.0217)	0.2749*** (0.0826)	0.3002*** (0.0578)	0.3150*** (0.0396)	0.3441*** (0.0506)
CF	-0.0706*** (0.0262)	0.1234** (0.0291)	0.1692*** (0.0291)	-0.2551*** (0.1026)	0.3730*** (0.0822)
MP	-0.1052*** (0.0373)	0.1972*** (0.0829)	0.2749*** (0.0512)	0.3892*** (0.1408)	0.4110*** (0.1521)
Controls	No	No	No	No	No

Note: this table shows the quintile regression of the model in 5 quintiles of cash flow and monetary policy. Column 2 to 6 shows the low quintile to high quintile of both cash flows (CF) and monetary policy (MP). Figures in parentheses shows the standard errors, '\*\*\*' and '\*\*' show the significance level at 1% and 5% respectively.

## Conclusion

The study aims to examine the role and effect of macroeconomic factor like monetary policy and micro economic factor cash flow on investment decisions of non-financial firms in Pakistan over the period of 2010-2020. The secondary data is collected from annual published financial reports of commercial banks. The dynamic panel model was developed due to endogeneity issues. One-step and two step system GMM panel estimators along with Quintile regression were applied for empirically testing of hypothesis and to control the potential endogeneity. The study concluded that both cash flow and monetary policy are significant factors that influence the level of corporate investment. The results identify cash flow has an inverse relationship with investment of firms in one step system GMM i.e. simple regression. However, cash flow tends to increase the level of investment in all other regression models. The study determined expansionary monetary policy causes increase in investment practices by firms. However, this is not always the case when monetary policy is ideal, because as inflation rises, so does the real value of the currency. The contractionary monetary policy would likely to decrease the investment. Moreover, Cash flow decreases the investment of firms in lower quintile of firms as compared to high quintiles. Monetary policy decrease the investment in lower quintiles but this relationship tends to be positive when firm move towards high quintiles of firm investment. However, the magnitude of relationship varies with respect to quintiles. Cash flow and monetary policy have lower effect in describing investment of firms in low quintiles than in upper quintiles of investment. Overall, the results are inconclusive across all the level. This study suggested that financial managers should manage internal cash flows to increase cash reserves in order to meet capital expenditures and project's needs of non-financial firms in Pakistan. Furthermore, in view of current results, political establishments should obligate themselves to maintain political stability and undertake better economic policies to eliminate insecurity in Pakistan. It was suggested that in the future, more researches could be initiated by increasing sample size for longer time period; by including different industries in financial and non-financial sector for better comparison between them and various other factors like sale growth, dividend payout ratio etc. would also affect the investment decision at firm level. Nonetheless, it can also be extended to include small and medium enterprises of Pakistan into sample.

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# Corporate Governance and Financial Sector Performance with Moderating Role of Corporate Social Responsibility: Empirical Evidence from Pakistan

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## Abstract

*Due to its viability in financial sector, corporate governance has become an integral component in various business organizational activities. This study examines relationship between corporate governance and banking sector performance by using the corporate social responsibility as a moderating factor for a sample of 14 listed banks over a period of 2012 – 2023. On the basis of performance, these banks are selected from Pakistan Stock Exchange. For empirical purposes, since Hausman test remained significant hence fixed effects method is utilized to estimate objectives of the study. The results reveal that in the presence of corporate social responsibility, the corporate governance has significant effect on banking sector performance. It is also evident that corporate social responsibility itself has positive and significant effect on banking sector performance.*

**Keywords:** Corporate Social Responsibility, Corporate Governance, Firm Performance.

**JEL Classification:** M14, L21

## Introduction

Globally, it has been considered that various financial sectors performance depends upon corporate governance. In general, corporate governance deals with the structure and procedures of different organization and generally, it controls firm's framework, board structure and develop relationship between investors and partners. In other words, corporate governance is associated with cost of exchange due to which firm's performance increases and the development of corporate social responsibility is essential for effectiveness of corporate governance in various organizations, which may improve multi-sectoral organizations around the world. In this regard, organizations are formulating various policies regarding corporate social responsibility and their effectiveness for their betterment in developed and developing countries.

The financial performance of a firm is a numerical measure, showing how well it is utilizing available assets to make its profit. A review of literature uncovers that the financial performance has been fundamentally estimated utilizing three approaches: market, accounting, and survey measurements (Masadeh et al., 2015). In this regard, the primary approach reflects the level of fulfillment of the investors, whereas the second focus the internal effectiveness of the firm while the performance of the last measurement approach gives an emotional estimation of firm's financial performance. The first approach is the very important to the shareholder because it is mainly linked to how we wealthier the shareholder at the end of a period to calculate that what he/she stands at the beginning. The shareholder's financial well-being can be determined by using various ratios which are derived from financial statements, mainly from the balance sheet and income statement, or by using stock market data (Berger & Patti, 2006).

Monetary performance is used to assess an organization's general financial position over a given period of time and can be used in a similar manner to break down of comparative companies in the same industry or to view cumulative market segments or businesses (Capon, Farley & Hoenig, 1990). Corporate performance is examined in monetary terms. Firm performance was found in terms of asset returns and return assets. In order to assess the efficiency of the company, some financial ratios were used, of which return on assets (ROA) is one of them (Khrawish, 2011). ROE implies how much profit an investor has earned from a balance of contributions. Return on equity (ROE) is meant for that what shareholders examined in venture capital. In any case, ROE can make up for many potential problems. If financial experts are not careful, it may shift ideas from the business foundation and incitement issues. The organization can turn to financial procedures to maintain good ROA for a long period of time and to take up the crisis in performance in business details. ROA indicates the ratio of wages to total assets (Khrawish, 2011). It examines the limits of a company's organization to generate a salary by leveraging the accessible associated assets. For effective management of any firm we have to measure the performance which is very critical (Demirbag, Tatoglu, Tekinus, & Zaim, 2006). The improvement in the process without measuring the outcomes are very difficult and impossible. Hence, which organizational resources impact the business performance leads to improve the organizational performance (Gadenne & Sharma, 2002).

Kanwal et al. (2013) examine that the CSR practices are used to find out the relationship between firm's performance and stakeholders through in process of investment in various corporations. In their analysis, it is evident that the stock ownership and managerial behavior are essentially important to increase firm's valuation over a period of time.

In the global scenario, the CSR has been considered for many corporations because every stakeholder is interest to know everything about the business in a true and fair manner in the presence of suitable corporate governance structure (Singh, 2014). In order to increase performance of firms over a period of time, many firms have utilized various aspects of CSR and corporate governance for their corporate philanthropy, business ethics, and corporate accountability.

### ***Research gap and Problem Statement***

It is evident that firm's performance augment over a period of time in the presence of corporate governance and corporate social responsibilities (Tsoutsoura, 2004). Corporate social responsibility starts when businesses exist. From there existence, as a responsible member of the society the firm behave ethically and perform its social duties in a good way. The companies which are socially responsible have a comprehensive set of programs and policies relating to companies responsibility towards the society which they incorporate in decision-making processes and business operations. Continuous improvements in this area is another EU's decision to announce mandatory corporate social responsibility for large organizations in 2014, and further strengthen the organization's participation in socially sound activities. The corporate social responsibility can increase the goodwill of the business. Holme and Watts (2007) describes that corporate social responsibility is considered as long term promise to act as economic development and to improve the living standards of the societies. The corporate social responsibility is about understanding and organizing the connection between trading operations and the financial system, situation and communities within which it is operated.

In fact, Pakistan is seen as a country with negligible corporate social responsibility practices. Similarly, investor enthusiasm for social and natural issues is evolving, and when they recognize the importance of corporate social responsibility, this will have a greater impact on their risk choices. This is also true for Pakistani investors, as more customers currently require social and ecological thinking in risk choices. (Awais, Saboor, Khan, & Mohd Thas Thaker, 2022; Awais, Ullah, Sulehri, Thas Thaker, & Mohsin, 2022). The literature is evident that the concept of corporate social responsibility related to the micro foundation has gained the persistent attention of researchers and practitioners during the last decade (Rupp & Mallory, 2015). Corporate social responsibility is an important aspect and unfortunately in Pakistan Government has no concrete plan to set and fix social responsibilities on corporate sectors. Government must provide ease of doing business and earns money at the same time it sets some responsibilities on corporate like health and safety, environment, cleanliness drives,

apprenticeship and internship program, etc. This important aspect is identified and cascaded as a moderator between corporate governance and firm performance.

### ***Objective of Study***

The main objective of this study is to analyze the relationship between corporate governance and firm performance with the moderating effect of corporate social responsibility in financial sector of Pakistan. In this study, the novelty claimed to construct a new study taking the corporate social responsibility as a moderating factor between corporate governance and firm performance. Since that in literature, it is evident that corporate social responsibility being a moderator factor positively and significantly moderates between firm corporate governance and firm performance. The study is organized as follows: after introduction in section I, the section II describes the relevant review of literature. Methodology and data description is discussed in section III. Results are discussed in section IV. Final section concludes the study with relevant policy recommendations.

### **Literature Review**

It is evident that corporate social responsibility is essential for improvement of firm performance over a period of time. Islam et al. (2012) conduct a study of the Bank of Bangladesh's corporate social responsibility firm performance linkages and found that banks that emphasize corporate social responsibility practices have more on returns on asset than those that did not focus on this training. Iqbal et al. (2012) examine the relationship between corporate social responsibility, firm performance, quotation and financial leverage. Overall, results conclude that corporate social responsibility did not have any impact on firm performance. It can be clearly seen from the results that corporate social responsibility has a negative impact on the available quote estimates, but had no significant relationship with the company behavior. Gupta and Sharma (2014) examine the impact of corporate governance variables on Indian and Korean companies regarding firm performance and conclude that corporate governance has limited impact on the organization's quoting costs and firm performance. Danoshana and Ravivathani (2014) investigate the impact of corporate governance on the performance of 25 record financial institutions in Sri Lanka. Return on equity and return on assets has been used to examine subject matter. The analysis reveals that the corporate governance variables has significant impact on business performance, and the size of the board of directors and the size of the audit committee have a positive impact on business performance. In addition, meeting reproduction is inversely related to business performance. Kiran et al. (2015) examine the firm performance and the impact of corporate social responsibility of 10 oil and gas organizations recorded during the 2006-13 period on the Karachi Stock Exchange and reveals that a positive link between corporate social responsibility and net income and net total income; a negative link between corporate social responsibility and absolute assets and a negligible link between the productivity of the organization. Afsheen (2015) examines the impact of corporate social responsibility on company performance through employee performance impact and expanded consumer loyalty. The study was quantitative in nature and find out a positive impact of corporate social responsibility on firm performance. Ahmed and Hamdan (2015) examine the impact of corporate governance quality on the company's performance on the Bahrain Stock Exchange. Past evidences reveal and found that corporate governance practices are effective in improving the company's firm performance. Furthermore, that performance measures such as return on assets and return on equity are significantly related to Bahrain's corporate governance. More importantly, earnings per share performance indicators did not show any significant impact on corporate governance. Overall, findings show that the corporate governance has a positive impact on the performance of the entire Bahrain Stock Exchange. Johl et al. (2015) examine the role of corporate governance and analyzed the impact of board characteristics and its impact on firm performance for 700 financial companies during 2009 and results reveal that there is no relationship between the independence of the board of directors and the company's performance. The statistical capacity of the size of the board of directors and board of directors had a great relationship with the company's performance. In order to conduct relationship of corporate governance and firm's performance. Javaid et al. (2016) examine the impact of on corporate financial performance between the US and Pakistan by using various factors such as board ownership, effectiveness, size and structure, independence, CEO duality, and board education and experience, while the company's firm performance was measured by return on

assets and return on equity. A sample of 100 companies from the Karachi Stock Exchange of Pakistan and the New York Stock Exchange of the United States had been investigated to examine the firm performance of its similar companies in corporate governance from January 1, 2010, to December 31, 2015. They conduct their analysis by collecting data through online questionnaires in Pakistan and the United States. The internal and external performance of the two companies estimates external performance by using return on assets (ROA) and return on equity (ROE) as internal performance and concludes that two countries follow the corporate governance (CG) rules. In Pakistan, there are some conflicts between the SECP-drawn CG code and the officially set strategy that it effectively draws, as most home-owned businesses were in the process, although strict CG codes were being pursued in the United States. There is positive correlation between, board education, experience and board ownership, survivability and company performance and also CEO duality, but negatively correlated board size. Yilmaz and Buyuklu (2016) investigate the relationship between corporate governance and the firm performance in Turkey. The association between ownership structure, board structure and financial results has been found and conclude that the corporate governance, board size, proportion of independent board members, foreign investors, the impact of the company's leverage index. Return on assets is used for companies listed on the BIS 100 stock exchange in Turkey. The shares of independent members of the board and leverage have a negative impact, while foreign ownership has a positive impact on the company's financial performance.

## Methodology and Data Description

The previous literatures reveal that relationship between corporate governance and firm performance can be examined through panel data analysis. Since panel data gives more consistent results than time series and cross sectional data and more number of observations. So depending upon relationship between dependent and independent variable for various cross sectional units “*i*” and time period “*t*”, equation (1) can be written as:

$$ROA_{it} = \beta_0 + \beta_1 ED_{it} + \beta_2 TS_{it} + \beta_3 MNG_{it} + \beta_4 CSR_{it} + \mu_{it} \quad (1)$$

In the above equation, ROA shows return on asset, ED shows proportion of executive board, TS shows proportion of top twenty stakeholders, MNG shows proportion of managerial ownership, CSR stands for corporate social responsibility and  $\mu$  indicates error term. Further, effectiveness of regressors on regressand can be examined by respective estimated parameters.

Besides, return on asset, past evidence reveals that performance also depends upon return on equity (ROE) for financial sector performance. Therefore, another equation can be written as:

$$ROE_{it} = \beta_0 + \beta_1 ED_{it} + \beta_2 TS_{it} + \beta_3 MNG_{it} + \beta_4 CSR_{it} + \mu_{it} \quad (2)$$

In this study, panel data analysis technique is utilized. During panel data analysis, we use fixed effects method and random effects method. Both these methods are distinguished by using Hausman test. During analysis, if Hausman statistic is statistically significant, we use fixed effects method otherwise random effects method.

## Data Description

On the basis of performance, a sample of 14 listed banks from Pakistan Stock Exchange has been selected to examine the objectives of study over a period of 2012 – 2023. The use of variables is as follows:

## Variable Description

As is evident that the corporate governance is treated as an independent variable, which consists of further three factors and firm performance is taken as dependent variable consisting the two factors. Nishanthini and Nimalathan (2014) state that profitability is the major measure of the overall success of enterprise. Similarly, Achim (2010) suggests that profitability will provide more exact view of the firm's performance. It is the major measure of the overall success of enterprise. Therefore, for measuring performance, returns on asset and returns on equity have been utilized as dependent variable.

## Dependent Variables

### Return on Asset (ROA)

It is the indicator of firm’s profitability relative to firm’s total assets. It provides with framework to manage the efficiency by utilizing the minimum assets to generate maximum output and making use of scarce firm’s resources into maximum productive and profitable endings. It can be calculated mathematically by division of company’s earnings in a period of year by its amount of total assets at that time. ROA is measured in various studies, such as (Prado et al., 2008):

$$\text{Return on Assets} = \text{Net Income} / \text{Total Asset}$$

### Return on Equity (ROE)

Return on Equity is the net income amount yields as equity to shareholders in percentage of his/her investment in a particular firm. It can be measured through company’s amount of profitability to amount of investment made by a particular shareholder. It measures the company’s gain or loss among the entire shareholder’s according to their share percentage. ROE can be estimated as follows, which already is measured by (Prado et al., 2008):

$$\text{Return on Equity} = \text{Net Income} / \text{Shareholder’s Equity}$$

## Independent Variables

**Proportion of Executive Directors:** It represents the number of executive directors or board size in the firms.

**Proportion of Top Twenty Stakeholders:** It represents the total share or amount to invest by top twenty stakeholders in the firms.

**Proportion of Managerial Ownership:** It represents the total share or amount invests by top managerial ownership in the firm.

**Corporate Social Responsibilities:** It is measured in various studies namely (Nieto et al., 2012; Reverte, 2009, 2011) and here we will use donations as a proxy for CSR.

## Results and Discussion

In this study, we want to empirically examine the effectiveness of various factors of corporate governance on performance of financial sector, being measured in terms of returns of asset and returns on equity with and without mediating role of corporate social responsibility. Table 1 shows empirical result regarding relationship between return on asset and various factors of corporate governance. Analysis shows that value of Hausman statistic is statistically significant, therefore, we will use fixed effects method.

**Table 1: ROA and Corporate Governance**

Dependent Variable: ROA		
Variable	With Moderator	Without Moderator
Constant	-4.71 (-20.40)**	- 3.12 (13.01)**
ED	- 0.51 (-0.63)	- 0.05 (- 0.32)
TS	0.24 (1.42)	0.14 (1.98)**
MNG	0.32 (2.14)**	0.09 (2.54)**
CSR	0.04 (2.04)**	--
	R Square: 0.82	R Square: 0.83
	F-Statistic: 14.36 (0.00)	F-Statistic: 14.27 (0.00)
	Hausman Stat: 8.12 (0.00)	Hausman Stat: 9.10 (0.00)

\*\* Show 5 per cent level of significance.

The result shows that under this scenario, except for executive board, all other factors are positively affecting return on asset. Further, also evident that effect of managerial ownership and corporate social responsibility



remain statistically significant at 5 per cent level of significance. On the other hand, without moderator, result reveals that only stakeholders and managerial ownership are positively and significantly affecting the return on asset over a given period of time. It concludes that effectiveness of corporate governance on return on asset remain statistically significant at conventional standard in the presence of corporate social responsibility for selected firms over a given period of time. It also reveals that over a period of time, corporate social responsibility is positively affecting the return on asset for selected financial firms. To some extent, similar findings have also been concluded by Javaid et. al. (2016) and Iqbal et. al. (2012).

**Table 2: ROE and Corporate Governance**

<b>Dependent Variable: ROE</b>		
<b>Variable</b>	<b>With Moderator</b>	<b>Without Moderator</b>
<b>Constant</b>	0.24 (9.50)**	0.25 (11.45)**
<b>ED</b>	- 0.16 (- 1.30)	- 0.08 (- 1.23)
<b>TS</b>	0.001 (0.13)	0.21 (1.02)
<b>MNG</b>	0.16 (4.20)**	0.14 (2.09)**
<b>CSR</b>	0.015 (2.84)**	--
	R Square: 0.93	R Square: 0.85
	F-Statistic: 45.34 (0.00)	F-Statistic: 21.97 (0.00)
	Hausman Stat: 9.15 (0.00)	Hausman Stat: 10.90 (0.00)
** Show 5 per cent level of significance.		

In this situation, analysis reveals that Hausman statistic is statistically significant therefore, fixed effect method will be appropriate in order to find out relationship between return on equity and corporate governance. Table 2 shows empirical relationship between return on equity and various factors of corporate governance. The result reveals that with and without moderator, managerial leadership has positively and significantly affecting the return on equity over a given period of time for selected sample of firms. Whereas other factors such as directors and stakeholders are not significantly affecting the return on equity. Similar outcome has also been found regarding the effectiveness of directors and stakeholders on return on asset by Kiran et. al. (2015) and Iqbal et. al. (2012). It concludes that in the presence of moderator, managerial ownership is significantly affecting both return on asset and return on equity for selected financial sector over a given period of time. But without moderator, it is evident that stakeholders and managerial ownership both are significantly affecting the return on asset. Contrary to this, it is evident that return on equity is significantly affected by managerial ownership in the absence of moderator. It also concludes that corporate social responsibility has positive and significant effect on return on equity.

### Conclusion and Recommendations

Corporate governance deals with the structure and procedures of different organization and generally, it controls firm’s framework, board structure and develop relationship between investors and partners. In other words, corporate governance deals with cost of exchange due to which firm’s performance increases. The endogenous relationship between corporate governance and firm performance reveal that both are positively related with each other. In general, development of corporate social responsibility is essential for effectiveness of corporate governance in various organizations. It is also believed that people's enthusiasm for corporate social responsibility is particularly developed in multi-sectoral organizations around the world, which target their different business standards and benchmarks, regulatory frameworks and partners' interest in corporate social responsibility. The study empirically examines the effectiveness of corporate governance on financial sector performance both in the presence and absence of corporate social responsibility. In this regard, 14 banks from Pakistan Stock Exchange have been selected on the basis of their returns on assets and equities over a period of 2012 – 2023. In this

analysis, various factors of corporate governance such as, executive directors, stakeholders and managerial ownership have been utilized to examine their effectiveness on performance indicators, namely return on asset and return on equity.

The results show that on the whole, corporate social responsibility and corporate governance positively are significantly affecting the firm's performance. Moreover, effectiveness of corporate social responsibility also remains positive and significant on firm's performance over a period of time. It is also evident that role of managerial decision is quite important in business decisions. Besides, it is also evident that effectiveness of leadership and various stakeholders does not remain meaningful for the effectiveness of corporate governance on the selected firm's performance. The analysis reveals that focus of policies must be to improve firm's performance by utilizing appropriate factors of corporate governance, which must be based on nature and functions of selected sector under analysis. Since this analysis shows to measure the effectiveness of the firm the corporate social responsibility remains an effective part. Therefore, it is recommending that corporate governance on firm's performance, corporate social responsibility must be included as a key component of financial sector while formulating appropriate policies.

### Limitation and Future Recommendations

This study is utilizing panel data methodology and controlling both effects of individual and temporal homogeneity over a period of time. However, it suffers from a limitation which may be addressed in future research by taking any other proxy of CSR to examine firm's performance. Moreover, some other control variables may be added like R&D to examine same relationship, as this variable is using in many developed countries to estimate the performance related objectives of firms by taking different sample size.

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## Does Technostress cause Procrastination – The Dark Side of Technology

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### **Abstract**

*The use of Technology at the work place aims to make the organizational processes efficient. However, the study focuses on the dark side of technology i.e. Technostress in employees which is an emergent phenomenon with increased focus on use of technology in the Post COVID-19 time. This study focuses on the behavioral side of the employees that emerges due to Technostress. This causal study quantifies the impact of Technology Related Stress i.e. Technostress on employees making a delay in work i.e. Procrastination. For the present study, based on convenience and snowball sampling, the data was collected from 390 employees who have day-to-day interaction with Information Communication Technology ICT. These employees were from the Telecommunication Industry and Software Houses. Following the research work of Nimrod (2018), Technostress has been operationalized having five dimension namely - Overload, Invasion, Complexity, Privacy and Inclusion while Procrastination was measured using Metin, Taris, and Peeters (2015). The results reflect a significant positive association of Overload, Invasion, Complexity and Privacy with procrastination while Inclusion was found to be statistically insignificant. Hence, the shady side of technology persists and the organizations need to ensure that technology adoption does not stress its employees to an extent that they start stalling work. For this, it is proposed that Technostress management trainings be organized to ensure the employees are well equipped to address the challenges proposed by Technostress at the work place.*

**Keywords:** Technostress, Procrastination

### **Introduction**

The impact of the technology use in the workplace has been profound and continues to evolve rapidly but has created disturbances- physical and psychological, leading to stressful circumstances. Technological resources, despite its many benefits, introduced a phenomenon known as "Technostress" in organizational employees. Technostress refers to the negative psychological and emotional impact experienced by individuals due to their interactions with technology. Pansini et al. (2023) provide an inclusive review on Technostress. Technostress, as conceptualized by Brod (1984), was initially described as "a contemporary disturbance resulting from an inability to effectively manage new computer technologies."

Recent learning characterizes Technostress as a composite phenomenon involving Technostress creators, referred to as techno-stressors, as well as psychological strain, such as feelings of frustration, and workplace outcomes, including diminished work performance (Califf & Brooks, 2020). Individuals can encounter Technostress at any stage of their adoption and utilization of information and communication technology (ICT), and it may manifest in diverse forms (Salo et al., 2019; Tams et al., 2018).

The rapid incorporation of technology in the workplace has introduced the phenomenon of "Technostress," characterized by negative psychological and emotional impacts resulting from technology use. This stress can lead to decreased job satisfaction, reduced productivity, and increased burnout. Despite extensive research on Technostress, there is limited understanding of its relationship with procrastination in organizational settings. This study aims to investigate how Technostress contributes to procrastination among employees, affecting their performance and workplace behavior. Understanding this relationship can help organizations implement effective interventions to mitigate Technostress and improve employee productivity.

Numerous investigations have revealed that Technostress can result in adverse outcomes across behavioral, psychological, work-related, and health domains. Specifically, Technostress has been linked to diminished job satisfaction and organizational commitment among individuals (Ragu-Nathan et al., 2008). In terms of behavioral consequences, it has been observed to hinder individuals' productivity in the workplace (Tarafdar et al., 2007).

The COVID-19 pandemic heightened Technostress among medical staff and students, resulting in increased stress, burnout, and strain, with varying effects on their health (Kasemy et al., 2022). Furthermore, the implementation of sales technology contributing to Technostress has been found to decrease job satisfaction and increase role stress, although job commitment can serve as a mitigating factor (Pullins et al., 2020).

This research aims to address the research gap by examining the impact of Technostress on procrastination. In the age of this digital evolution, the phenomenon of Organizational Technostress has emerged as a critical area of concern. This stress, arising from the intricate relationship between employees and technology in the workplace, has been associated with a spectrum of negative outcomes, notably manifesting in the form of Negative Workplace Behaviors.

This research has the objective to study the relationship between Technostress and procrastination in the organizational context. Awareness of the relationship between Technostress, procrastination, and Conservation of Resources theory can help individuals recognize and manage these issues. Employers can provide resources such as time management training, technology breaks, and stress management programs to mitigate Technostress and combat procrastination.

## Literature Review

The proposed model in this study draws upon the Conservation of Resources (COR) theory as elucidated by Hobfoll (1989) and Hobfoll et al. (2018). This hypothesis posits that stressors and susceptibility to stressors deplete and diminish the assets and energy reservoirs of employees that they endeavor to accumulate and conserve. According to COR theory, resources encompass various objects, personal attributes, conditions, or energies valued by individuals. The theory suggests that employees actively acquire, maintain, and safeguard these resources to effectively address the demands and challenges inherent in their roles. Conversely, stress is posited to deplete these resources, thereby influencing individuals' overall work attitudes, behaviors, and psychological well-being.

Furthermore, COR theory asserts that the threat of resource loss can be alleviated through resource acquisition. It posits that individuals typically operate under the risk of depleting physical, mental, and emotional resources, leading them to manage their existing resources to prevent further depletion in the event of loss. COR emphasizes that the impact of resource loss outweighs that of resource gain. Consequently, when employees encounter resource depletion due to demanding job conditions, they may exhibit reduced motivation to respond effectively, focusing instead on conserving their current assets.

The core tenet of COR theory centers on the accumulation and preservation of resources. Individuals actively strive to gather and protect valuable physical, mental, financial, and social resources. Stress ensues when these vital resources are threatened or actually lost. Conversely, access to additional resources can mitigate the risk of resource depletion caused by stress.

Technostress, originally conceptualized by Brod (1984), represents a contemporary adaptation challenge stemming from individuals' struggles to effectively manage new computer technologies. As defined by Rosen and Weil (1997), it encompasses any adverse impact on attitudes, thoughts, behaviors, or psychological well-being directly or indirectly attributed to technology.

Technostress encompasses the stress experienced when individuals struggle to keep up with the constantly evolving information and communication technologies (ICTs) and the changing cognitive and social demands associated with their use (Tarafdar, Tu, Ragu-Nathan, & Ragu-Nathan, 2007).

There have been several ways in which technology has contributed to Technostress including: Firstly -Information Overload: Arnold, Goldschmitt, and Rigotti (2023) provide a comprehensive review with regards to information overload. With the constant influx of emails, notifications, and data, employees can become overwhelmed by the

sheer volume of information they need to process. This can lead to feelings of stress, anxiety, and a sense of being constantly "plugged in" or "on call." Secondly - 24/7 Connectivity: Sharma and Gupta (2023) investigate the role of Technostress and the access to computer 24/7 Technology resulting in blurred boundaries between work and personal life. Employees may feel the pressure to be constantly available and responsive, even outside of regular working hours. This can lead to burnout, as individuals struggle to disconnect and find a healthy work-life balance. Thirdly, increased Expectations and Pressure: Siddiqui, Arif, and Hinduja (2023) discuss Technostress as a catalyst to leave the teaching profession in Pakistan during COVID-19 pandemic. Technology has enabled faster communication and instant access to information. As a result, expectations for quick responses and high productivity have risen. Employees may feel pressured to always be available and accomplish tasks at a rapid pace, leading to increased stress levels. Fourth, digital Distractions: Liu (2022) discuss reading in the age of digital distraction. The prevalence of smartphones, social media, and other digital distractions can hinder productivity and concentration. Employees may find themselves constantly checking their devices, leading to reduced focus, decreased efficiency, and heightened stress levels.

Technological Challenges and Skill Gaps: Reddy, Chaudhary and Hussein (2023) provide a digital literacy model to narrow the digital literacy skills gap. Rapid technological advancements can create stress for employees who struggle to keep up with the pace of change. Learning new software, adapting to new systems, and mastering complex technologies can be demanding and cause anxiety, especially for those who feel inadequate or fear becoming obsolete.

Pang and Ruan (2023) discuss information and communication overload influence on technology users' social network exhaustion, privacy invasion and discontinuance intention with a cognition-affect-conation approach. As technology becomes more integrated into work processes, employees may worry about data breaches, cyber-attacks, and the potential invasion of their privacy. These concerns can add to stress levels, particularly for employees handling sensitive information.

Siddiqui, Arif, and Hinduja (2023) discuss the fear of technology in employees that may become overly reliant on technology and fear the consequences of system failures, crashes, or technical glitches. The fear of losing important data, missing deadlines, or disrupting work processes can contribute to increased stress and anxiety.

Techno-stressors, also known as "techno-stress creators" (Califf & Brooks, 2020; Li & Wang, 2021; Tarafdar et al., 2007), encompass ICT-related stimuli, incidents, or demands according to Ayyagari et al. (2011) and Califf and Brooks (2017). These stressors are identified by researchers such as Califf and Brooks (2020), Tarafdar et al. (2007), and Wang and Yao (2021) and vary depending on individuals' professions, occupational roles, and specific technology usage characteristics. For instance, Ragu-Nathan et al. (2008) identified techno-overload, techno-complexity, techno-invasion, techno-insecurity, and techno-uncertainty as stressors prevalent among white-collar workers integrating ICTs into their work processes. Hwang and Cha (2018) reported that security-related professionals commonly experience techno-overload, techno-complexity, techno-uncertainty, role conflict, and role ambiguity as stressors. Ayyagari et al. (2011) identified techno-stressors including work-home conflict, privacy invasion, work overload, role ambiguity, and job insecurity among business ICT users. Lei and Ngai (2014) noted that irrespective of professional backgrounds, techno-stressors such as conflict between work and home, invasion of privacy, and role ambiguity are prevalent.

Procrastination in the workplace refers to the deliberate postponement of planned work-related tasks while engaging in non-work activities, without detriment to business, employee, workplace, or client, as defined by Metin, Taris, and Peeters (2016). Procrastination has been extensively studied in academic settings (van Eerde, 2016), yet its prevalence in the workplace is increasingly recognized (Klingsieck, 2013). Personality traits such as high neuroticism and low conscientiousness (Steel, 2007), along with situational factors such as limited task significance, restricted autonomy, and feedback (Lonergan & Maher, 2000), influence procrastination behaviors. Metin et al. (2018), Nguyen et al. (2013), and Wan, Downey, and Stough (2014) have linked procrastination to heightened levels of stress, fatigue, reduced work engagement, and performance decline. This behavior is associated with negative workplace outcomes such as lower pay, diminished performance, and shorter job tenure.

While procrastination research has predominantly focused on academic contexts, recent attention highlights its relevance in workplace settings (Klingsieck, 2013; van Eerde, 2016). Factors influencing procrastination include both individual traits and situational conditions, underscoring its impact on workplace dynamics and outcomes.

Based upon the literature of Technostress and procrastination, the study has the following hypotheses:

Hypothesis 1: Technostress will have a positive relationship with procrastination, such that higher levels of Technostress will be associated with increased tendencies to procrastinate.

Hypothesis 1a: Techno Overload has a significant impact on procrastination at work.

Hypothesis 1b: Techno Invasion has a significant impact on procrastination at work.

Hypothesis 1c: Techno Complexity has a significant impact on procrastination at work.

Hypothesis 1d: Techno Privacy has a significant impact on procrastination at work.

Hypothesis 1e: Techno Inclusion has a significant impact on procrastination at work.

The literature on Technostress depicts that it is an adverse psychological impact arising from the use of technology (Tarafdar et al., 2007). Past studies recognizing the growing relevance of technology in workplaces, Technostress characterized by the negative psychological impact of technology use, is positively linked to procrastination among employees. Specifically, the adverse effects of Technostress on individuals' well-being, role stress, and productivity (Tarafdar et al., 2007) may contribute to procrastination tendencies, manifesting as delays in task initiation and completion (Lim, 2002; Suh & Lee, 2017). This hypothesis suggests that the challenges associated with technology use in the workplace may exacerbate procrastination behaviors among employees. The Conservation of Resources (COR) Theory provides a valuable lens for understanding the proposed relationship between Technostress and procrastination. According to COR Theory, stress occurs when there is a perceived threat of resource loss, actual resource loss, or a lack of resource gain after investing effort.

In the context of Technostress and procrastination, Technostress represents a potential threat to individuals' psychological resources, stemming from the challenges associated with technology use. As individuals grapple with the negative psychological impacts of Technostress, they may experience a depletion of psychological resources, contributing to heightened stress.

## **Methodology**

The population of the study are the Employees of the telecommunication and software houses. These individuals are holding jobs and having day-to-day interaction with Information Communication Technology (ICT). The population caters employees connected with use of technology on regular day-to-day basis. These include the employees in software houses and similar technology based organizations. The technology industry is dynamic and subject to rapid changes. The dynamism of the technological advancements make these employees subject to more Technostress. The study intends to understand how the "employee" who is subjected to Technostress, how this Technostress impacts his procrastination.

Non-probability sampling methods, namely convenience sampling and snowball sampling, were strategically chosen based on their suitability for participant selection in the research study. Convenience sampling involves selecting participants based on their accessibility and willingness to participate, while snowball sampling relies on existing participants to refer or recruit additional participants.

A sample size of 390 was used for the study. However 215 responses were found acceptable. Technostress as measured by Nimrod (2018) has been taken into the study. Nimrod (2018) identified 5 main dimensions of Technostress: Overload (3 items), Invasion (2 items), Complexity (3 items), Privacy (3 items) and Inclusion (3 items). These have been measured on a 5-point scale. The dependent variable of the study is Procrastination measured by Metin, Taris, and Peeters (2016) scale. They measured Procrastination on a 12 item, 7-point scale. The instrument has some demographics added which were used for analysis in STATA.

## **Analysis & Interpretation**

The analysis section covers for descriptive data analysis, correlational analysis and the regression results.



The following table reflects the descriptive statistics.

**Table 1 Descriptive Statistics**

	<i>Overload</i>	<i>Invasion</i>	<i>Complexity</i>	<i>Privacy</i>	<i>Inclusion</i>	<i>Procrastination</i>
Mean	4.2917	3.9654	4.1125	4.5210	4.2708	5.9091
Standard Error	0.1049	0.1291	0.1198	0.1407	0.1064	0.1310
Median	4.3333	4.0000	4.3333	4.1667	4.3333	6.2083
Mode	4.3333	4.0000	4.6667	4.3333	4.6667	6.4167
Standard Deviation	0.4194	0.5163	0.4792	0.5626	0.4255	0.5241
Sample Variance	0.1759	0.2666	0.2296	0.3166	0.1810	0.2747
Kurtosis	0.6327	-1.1651	-0.2607	-0.1718	-0.0689	-1.2698
Skewness	-0.6525	0.3774	-1.0386	-0.0692	-0.9214	-0.6166
Minimum	2.0000	3.5000	3.3333	3.0000	3.3333	4.9167
Maximum	5.0000	5.0000	4.6667	5.0000	4.6667	6.4167
Count	215.0000	215.0000	215.0000	215.0000	215.0000	215.0000

The dataset provides descriptive statistics for six key variables: Overload, Invasion, Complexity, Privacy, Inclusion, and Procrastination. The analysis of these variables offers insights into central tendencies, variability, and distributional characteristics.

The mean values for the variables indicate that respondents generally reported moderate to high levels of perceived Overload (4.29), Complexity (4.11), Privacy concerns (4.52), and Inclusion (4.27). Procrastination had the highest mean score at 5.91, suggesting a notable prevalence of this behavior among respondents. The median values closely align with the means, reinforcing the central tendency findings. The standard deviation and sample variance provide insights into the dispersion of the data. Privacy (0.56) and Invasion (0.52) had the highest standard deviations, indicating greater variability in responses. Overload and Inclusion exhibited lower standard deviations (0.42 and 0.43, respectively), suggesting more consistency in these perceptions. Procrastination, despite its high mean, had a moderate standard deviation (0.52), reflecting a wide range of responses.

Skewness and kurtosis values offer additional insights into the data distribution. Most variables exhibited slight negative skewness, indicating a longer left tail and a concentration of higher scores. Notably, Complexity (-1.04) and Inclusion (-0.92) had more pronounced negative skewness, suggesting a greater frequency of higher values. Kurtosis values were close to zero for most variables, indicating distributions that are relatively normal in terms of peakedness. However, Invasion (-1.17) and Procrastination (-1.27) had negative kurtosis values, suggesting flatter distributions with lighter tails. The range of scores, as indicated by minimum and maximum values, highlights the extent of variability in responses. Procrastination scores ranged from 4.92 to 6.42, indicating substantial variation. Overload and Privacy scores ranged from 2.00 to 5.00, suggesting a wider perception spectrum among respondents.

This analysis provides a foundational understanding of respondents' perceptions and behaviors related to the six examined constructs, forming a basis for further inferential statistical analysis to explore underlying relationships and causations.

**Table 2 Correlation Analysis**

	<i>Overload</i>	<i>Invasion</i>	<i>Complexity</i>	<i>Privacy</i>	<i>Inclusion</i>	<i>Procrastination</i>
Overload	1.0000					
Invasion	0.4468*	1.0000				
Complexity	0.3501*	0.0636	1.0000			
Privacy	0.0451	0.3024*	0.6010*	1.0000		
Inclusion	0.1816	0.2919	0.2997*	0.1054	1.0000	
Procrastination	0.2144*	0.2255*	0.1776*	0.1267*	0.4047*	1.0000

\* Significant at  $p < 0.05$

The correlation analysis reveals that Procrastination has several significant relationships with other variables. Specifically, Procrastination is positively correlated with Overload (0.2144\*), Invasion (0.2255\*), Complexity (0.1776\*), Privacy (0.1267\*), and Inclusion (0.4047\*), with all correlations being significant at  $p < 0.05$ . Among these, Inclusion shows the strongest correlation with Procrastination, suggesting that as feelings of inclusion increase, so does the tendency to procrastinate. Although the correlations with Overload, Invasion, Complexity, and Privacy are weaker, they still indicate that higher levels of these variables are associated with increased Procrastination. These findings suggest that multiple factors contribute to procrastination behaviors, with inclusion playing a particularly notable role.

Table 3 regression analysis examines the influence of the dimensions of Technostress—Overload, Invasion, Complexity, Privacy, and Inclusion—on Procrastination.

Table 3 Regression Estimates

R Square	0.2055		
Adjusted R Square	0.1750		
Significance F	0.0051		
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>
Intercept	4.9180	3.0196	1.6287
Overload	0.2325	0.0932	2.4960
Invasion	0.0720	0.0165	4.3504
Complexity	0.4143	0.1827	2.2677
Privacy	0.1805	0.0500	3.6113
Inclusion	0.3717	0.4112	0.9039

The model accounts for 20.55% of the variance in Procrastination ( $R^2 = 0.2055$ ), with an adjusted  $R^2$  of 0.1750, indicating moderate explanatory power. The overall model is statistically significant (Significance F = 0.0051). The results reveal that Overload ( $\beta = 0.2325$ ,  $p < 0.05$ ), Invasion ( $\beta = 0.0720$ ,  $p < 0.05$ ), Complexity ( $\beta = 0.4143$ ,  $p < 0.05$ ), and Privacy ( $\beta = 0.1805$ ,  $p < 0.05$ ) are significant predictors of Procrastination. Among these, Invasion shows the strongest effect, suggesting that as feelings of being invaded by technology increase, so does the tendency to procrastinate. Additionally, higher levels of Overload, Complexity, and Privacy concerns related to Technostress are associated with increased Procrastination. Conversely, Inclusion ( $\beta = 0.3717$ ) is not a significant predictor ( $p > 0.05$ ), indicating that feelings of inclusion in the technological environment do not significantly impact Procrastination. These findings highlight the multifaceted nature of Technostress and its significant role in influencing procrastinative behaviors. Addressing Technostress comprehensively, by mitigating its various dimensions, is crucial in reducing Procrastination among individuals.

### **Conclusion & Recommendations**

The present study investigates the impact of various dimensions of Technostress—namely Overload, Invasion, Complexity, Privacy, and Inclusion—on Procrastination. The regression analysis reveals that Technostress significantly contributes to Procrastination, explaining 20.55% of its variance. Specifically, Overload, Invasion, Complexity, and Privacy concerns emerge as significant predictors of Procrastination. Among these, Invasion demonstrates the strongest influence, indicating that increased feelings of technological invasion are strongly associated with higher levels of procrastinative behavior. Conversely, Inclusion does not significantly impact Procrastination, suggesting that the sense of being included within the technological environment does not play a major role in procrastination tendencies. These findings underscore the complex and multifaceted nature of Technostress and its substantial role in fostering procrastinative behaviors.

Based on the findings of this study, several recommendations can be made to mitigate the effects of Technostress on Procrastination such that organizations should implement strategies to manage and limit the technological demands placed on individuals. Policies should be established to protect personal boundaries and minimize the invasive aspects of technology. Clear guidelines regarding after-hours communication and personal data privacy

can help reduce feelings of invasion. Simplifying technological tools and processes can alleviate the complexity-related stress. Providing user-friendly interfaces, comprehensive training, and ongoing support can help individuals navigate complex technologies more effectively. Although Inclusion was not found to significantly impact Procrastination, fostering an inclusive technological environment is still valuable. Encouraging collaboration, providing support networks, and ensuring equitable access to technology can contribute to a more positive overall experience.

The analysis highlights several policy implications for organizations aiming to reduce procrastination among employees by addressing various dimensions of Technostress. Firstly, implementing workload management strategies, such as clear task prioritization and time management training, can help employees manage their tasks more efficiently, addressing the issue of overload. Establishing boundaries for technology use is also crucial; creating policies that limit after-hours work-related communications and ensure employees have the opportunity to disconnect from technology can mitigate feelings of invasion. Furthermore, investing in user-friendly technology and comprehensive training programs can simplify technological interfaces, enhancing employees' comfort and competence with technological tools.

Strengthening data privacy and security measures is another important step. Implementing robust privacy policies and ensuring transparent communication about data handling practices can alleviate employees' privacy concerns. Moreover, it is essential to monitor and adjust inclusion initiatives to ensure they foster engagement without inadvertently increasing procrastination. Finally, developing holistic Technostress reduction programs that integrate the above strategies in a coordinated manner will ensure a comprehensive approach to managing Technostress. By addressing these significant predictors of procrastination, organizations can create a healthier work environment that minimizes Technostress and its adverse effects, ultimately enhancing employee productivity and satisfaction.

Future research should explore additional factors that may influence the relationship between Technostress and Procrastination, such as individual coping mechanisms, organizational culture, and the role of specific technologies. Longitudinal studies could also provide deeper insights into the long-term effects of Technostress on procrastinative behaviors.

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# Does Institutional Quality and Managerial Ability Drive the Association between ESG and Firm Performance: Evidence from Emerging Asian Markets

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## Abstract

*This study aims to explore the role of managerial ability (MA) and institutional quality (IQ) in enhancing the positive impact of Environmental, Social, and Governance (ESG) policies on financial performance (FP). Against the backdrop of global climate change, socio-economic advancements, and evolving corporate governance standards, organizations face increasing pressure to adopt ESG practices. However, the implementation of ESG policies often entails substantial costs. By investigating the joint influence of MA and IQ, this research seeks to identify supplementary factors that can amplify the beneficial effects of ESG initiatives on FP. The study is quantitative exploratory and uses panel data of 750 publicly listed companies covering period from 2010 to 2020. Data has been acquired from the reputed data provider like Thomson Reuters and OLS regression has been used for panel data analysis. Two measures of financial performance, the Tobin's Q and Return of Assets (ROA) have been used as proxies of financial performance. The study reaffirms the positive impact of Environmental, Social, and Governance (ESG) factors on the financial performance of firms. Each pillar of ESG – environmental, social, and governance – is positively correlated with financial performance. Additionally, managerial ability and institutional quality act as supplementary variables, moderating the relationship between ESG and firms' financial performance. Notably, both proxies of financial performance, Tobin's Q and Return on Assets (ROA), yield nearly identical results in terms of their relationships with ESG and the moderating effects of managerial ability and institutional quality. Data of only 750 firms used for the analysis. Latest data was not available, therefore, data from 2010 to 2020 was used in the study. The study underscores the potential for inducing Environmental, Social, and Governance (ESG) practices in emerging economies through a combination of managerial ability and institutional pressures. It emphasizes the role of policymakers in addressing inefficiencies, corrupt practices, and policy inconsistencies that impede the governance index and hinder the ease of doing business. At the organizational level, policymakers should prioritize appointing managers with higher managerial ability to responsible positions. For managers, understanding the long-term benefits associated with ESG practices is crucial, despite potential short-term challenges. While previous research often focused on specific countries, regions, or industries, this study stands out by examining the relationship between ESG and FP across multiple emerging economies and industries, offering more generalizable findings. Building upon Stakeholders' Theory, the study extends Upper Echelon Theory and Institutional Theory to incorporate the roles of managerial ability and institutional quality in shaping this relationship."*

**Keywords** – Environmental, Social, Governance, , ESG, Institutional Quality, Managerial Ability, Financial Performance.

## Introduction

The combination of environmental dangers, ineffective governance, and a lack of awareness within society has resulted in catastrophic consequences for the populace, causing significant harm to ordinary citizens. Recently,

the United Nations Organization outlined a set of 17 sustainable development goals (UNO, 2023). As per UN guidance, every member state is required to integrate these SDGs across all sectors of society within its borders by the year 2030. In the corporate world, businesses, as prominent entities, cannot ignore their responsibilities within their respective countries (Rosati et al., 2023). Consequently, they are actively working to meet public needs and address demands for social welfare (Galeazzo, Miandar, & Carraro, 2023). To stay in line with societal expectations and ethical standards, forward-thinking organizations must adopt environmental, social, and governance (ESG) practices (Irfan, Bhatti, & Ozturk, 2021). This broader set of responsibilities is encompassed within the concept of ESG, which is integrated into the larger framework of sustainability (Dalal & Thaker, 2019). Companies are now assessed not only on their profitability but also on their efforts toward environmental preservation, community development, and improved corporate governance (Chen, Song & Gao, 2023). Additionally, besides the benefits to reputation, the focus on ESG by firms in Emerging Markets of Asia seems to be motivated by expected enhancements in financial performance (FP), facilitating business growth and entry into new markets.

Previous research predominantly supports the positive impact of firms adopting ESG practices and highlights the likelihood of improved FP resulting from increased ESG engagement (Chen et al., 2023). Additionally, it has been noted that ESG strategies are linked to managers' inherent ability and past experience termed as Managerial ability (MA) to formulate and implement strategies, decisions, and future plans (Chatjuthamard, Jiraporn, Tong & Singh, 2016; Yuan, Tian, Lu, & Yu, 2017). Hermalin and Weisbach (2017) suggest that key stakeholders such as financiers, financial analysts, and customers continuously evaluate the Managerial ability of top management by observing their approach, intentions, competence, and personalities, which ultimately influence their interests. In addition to Managerial ability, another significant factor influencing the adoption of ESG practices is the institutional quality (IQ) of a country. IQ encompasses various factors that facilitate the exercise of authority within a nation, including political stability (Glaeser et al., 2004), the legal environment (La Porta et al., 2006), and regulatory quality (Djankov et al., 2002). IQ creates a supportive environment for business activities and moderates the potential impact of ESG on FP (Pinheiro, Santos, Cherobim & Segatto, 2023). A higher IQ assures investors, customers, and other stakeholders that they are protected by the law in their endeavors, and their rights and investments in human and physical capital are secure (Yuan et al., 2017).

This study suggests that in environments with higher institutional quality (IQ), organizations with stronger managerial ability (MA) can improve their financial performance (FP) by adopting ESG practices. The conceptualization of the relationships among IQ, MA, ESG, and firms' FP is rooted in the rationale proposed by the upper echelon theory (Hambrick & Mason, 1984) and institutional theory (Scott, 1987). According to these theories, organizational leaders with better MA, operating within a context of higher institutional quality, are more inclined to prioritize the interests of stakeholders. Existing literature indicates that IQ tends to be more stable and robust in developed markets, whereas in emerging economies, it is lower and subject to fluctuations. (Bibi, Butt, & Awais, 2024; Nasir, Awais, & Syed, 2017). This discrepancy is largely attributed to factors such as higher levels of corruption, inconsistent policies, weak governance, limited regulatory oversight, and lower adherence to the rule of law (Abaidoo & Agyapong, 2021).

Firms characterized by higher institutional quality and stronger managerial ability are inclined to support ESG initiatives, leading to improved FP (DasGupta, 2022). To explore the combined effects of institutional quality (IQ) and managerial ability (MA) on FP through ESG practices, a moderated moderation (double moderation) methodology has been employed. Therefore, further research is needed to understand the interplay between MA at the firm level and IQ at the country level and their role in shaping the relationship between ESG and FP (McWilliams & Siegel, 2001). For academia, this research has great significance in view of its methodology which is dual moderation (moderated moderation) method in understanding the ESG and FP relationship. This new methodology gives a new framework to researchers, who can check this by using other ESG related variables. These variables can also be tested for other regions / sectors in order to achieve generalizable findings. This study marks the first of its kind effort which examine the moderating effect of managerial ability reinforced by institutional quality on the relationship between ESG and FP.

## Literature Review and Hypotheses Development

## Theoretical Review

The three explanatory variables ESG, MA and IQ explained in this paper are based on Stakeholders, Upper echelon and Institutional theories respectively. The stakeholder perspective underpins the relationship between ESG and FP organizations. Tantalo and Priem (2016) argue that different stakeholders, such as investors, creditors, employees, customers, and regulators, view ESG as potential drivers of value creation. Managing key business and stakeholder relationships is critical to FP development. According to Harman et al. (2010). By engaging in social and environmental leadership and following good leadership practices, companies can delight their stakeholders and thus improve FP (Aboud & Diab, 2018). Upper Echelon theory provides a framework for understanding how the characteristics of top managers affect firm performance. The theory suggests that top managers' unique characteristics, world economic history, and financial values influence their choices and organizational outcomes. Therefore, senior managers' private views can influence their decision-making and subsequent performance outcomes. Research by Reinmoeller (2004) and Hambrick (2007) highlighted the impact of managerial behavior on the decision-making process. ESG (environmental, social, governance) measures represent strategic choices and therefore influence management. Most ESG practices reflect broader direction from senior management, and senior management behaviors are more likely to influence ESG measures. According to DiMaggio and Powell (1983), the Institutional theory posits that organizations adopt business practices to bolster their legitimacy. This theory aims to clarify the reasons behind nations' dedication to sustainable institutional frameworks and the various shapes these frameworks assume. Institutional theory, as outlined by DiMaggio and Powell (1983), places significant emphasis on how organizations establish and sustain legitimacy by embracing widely accepted structures and practices, termed as isomorphism. Although institutions are typically more robust in developed nations, they often lag behind in emerging economies.

### *ESG and Financial Performance of Firms*

Extant literature indicates that firms following ESG protocols and actively pursuing ESG implementation may or may not muster higher FP (Lee & Suh, 2022). Friede et al. (2015) analyzed almost 2000 studies and found a positive link between ESG – FP relationship in most of the cases. Aboud & Diab (2018) emphasized that due to pressure from stakeholders on firms to disclose their ESG activities, a positive link was discovered between ESG and FP. At the same time, it is argued that ESG investment reduces the opportunities to exploit resources to maximize profit as it involves higher costs, thereby increasing the conflict of interest among stakeholders (Barnett, 2007), which triggers competitive disadvantages and eventually diminishes firms' FP (Ahmad et al., 2021). In the case of developed markets, the studies mostly found a strong correlation between ESG and firms' FP, while in the case of emerging economies, mixed results were obtained (Bahadori, Kaymak, & Seraj, 2021). Covering emerging economies, Shakil et al. (2019) revealed the positive impact of ESG on firms FP, while Atan et al. (2018) found insignificant effects. Park's (2017) survey of 175 emerging Korean firms between 2010 and 2012 shows that ESG has a positive effect on long-term firm performance and provides direct and indirect value to firms through positive reputational feedback. In an emerging market like Malaysia, creating value by integrating ESG into a firm's long-term strategy with the right vision will attract the best talent, acquire authentic customers through an effective management structure, and increase shareholder value. In Taiwan, Wu et al. (2014) found that high CSR disclosure is associated with lower capital costs as a result of financial institutions recognizing firms' efforts to improve sustainability. Buallay (2019) examines firms in developing and emerging markets and finds mixed results on the impact of ESG on performance. Environmental disclosure has a positive effect on performance, while a negative relationship was found between corporate social responsibility disclosure and performance. Park's (2017) survey of 175 emerging Korean firms between 2010 and 2012 shows that ESG has a positive effect on long-term firm performance and provides direct and indirect value to firms through positive reputational feedback. In an emerging market like Malaysia, creating value by integrating ESG into a firm's long-term strategy with the right vision will attract the best talent, acquire authentic customers through an effective management structure, and increase shareholder value. In Taiwan, Wu et al. (2014) found that high CSR disclosure is associated with lower capital costs as a result of financial institutions recognizing firms' efforts to improve sustainability. Conversely, Jo et al. (2015) found that ESG costs adversely affect a firm's FP. In a highly competitive market, disclosure of ESG information will facilitate a firm's trust and ability to generate better performance compared to its competitors and motivate firms to actively engage in higher ESG activities to meet

market expectations (Li et al., 2018). Besides a few negative and inconclusive results, most of the studies found a positive and significant relationship between ESG and firms' FP. Hence, the paper hypothesize:

**Hypothesis-1:** *There is a positive relationship between ESG performance and Firms' FP in Asian Emerging Markets.*

### **ESG and firm FP: The Moderating role of Managerial Ability (MA)**

The lack of consensus on the ESG-FP relationship seems due to theoretical and empirical limitations, among which is the lack of consideration of other variables at the firm and country level (McWilliams & Siegel, 2001). In this context, the MA at the firm level is an important variable that can further explain the ESG-FP relationship. It is expected that managers having better MA manage firm's resources more efficiently, that minimize costs and maximize benefits from ESG related projects for better financial gains. This indicates that higher MA acts as a guarantor of the benefits of ESG in firms (Gong, Yan, & Ho, 2020). However, managers having low MA might show lesser enthusiasm for ESG projects as they focus on short-term investments, avoiding risky and uncertain projects that generate career concerns for them (Lee, Wang, Chiu, & Tien, 2018). Whereas in case of managers with higher MA, they may undertake ESG actions to garner the support and satisfaction of various stakeholders that will benefit their organizations. ESG has become an important aspect of business, attracting global attention from CEOs (Fabrizi et al., 2014). CEOs recognize that neglecting to invest in ESG efforts can lead to negative publicity and public relations. Additionally, consumers have expressed interest in limiting the products and services offered by companies that do not prioritize ESG consideration. Daradkeh et al. (2022) suggested that higher MA focus on activities that require continuing commitments that are beneficial to a broader spectrum of investors. García-Sánchez and Martínez-Ferrero (2019) argued that the ablest CEOs allocate the available resources to ESG more efficiently and enhance firm value. On the contrary, excessive ESG activities may cause firms to experience losses, if they are not purely profitability-oriented. Consequently, a negative association between ESG and firms' FP might be observed in this case. ESG can be used by managers as a tool to further their interests, which could negate the interests of shareholders. The strength of the corporate governance mechanisms in place would serve to prevent or promote the achievement of individualistic interests of managers in the use of CSR decisions. This therefore shows that the financial result (profitability) of ESG activities and related disclosures can be affected by the nature and effectiveness of the governance mechanisms applied by top management that exist in the organization. Building upon the upper echelon theory, Chatjuthamard et al. (2016) and Yuan et al. (2017) linked MA with their ESG performance and suggested a positive outcome. Hence, based on these considerations, the following hypothesis is formed:

**Hypothesis-2:** *The Managerial ability moderates the relationship between ESG and Firms' FP in Asian Emerging Markets.*

### **ESG and Firm FP: Moderating role of Institutional Quality (IQ)**

In line with previous studies, a positive link between ESG and FP enables us to extend the argument further to include IQ as a country-level moderating variable in the said relationship. IQ is defined as a set of factors that collectively form rules and constraints to be adhered to by a country at the macro level, it shapes the economic behavior and contribute towards economic development (Ortas et al., 2015). Since ESG still relies on the voluntary initiatives of the reporting entity, in the absence of any mandatory requirement, with a weak institution and a lack of laws, companies operating in this kind of environment are likely to benefit from a poor governance system. by not emphasizing disclosure. It is against this background that we consider it necessary to examine the financial performance implications of firms that choose to look beyond the system's weaknesses and do what is right. Extent literature while analyzing the impact of IQ on a firm's financial performance shows significant and positive results. Nations with weak rule of law and governance structures may exhibit less competitive and weaker firms (Klomp & De Haan, 2015). Various institutional factors, alongside organizational considerations, motivate management to integrate strategies that cater to both stakeholders and shareholders (El Ghouli et al., 2017). Past literature reviews underscore differences in institutional contexts between advanced and emerging economies, particularly regarding attributes such as government stability, effectiveness, accountability, control over corruption (Cheng et al., 2014), and regulatory frameworks (Ioannou and Serafeim, 2014). These disparities in academic research across countries, as noted by Jamali and Karam (2016), are inherently contextual and



influenced by multifaceted factors and actors within broader formal and informal governance systems. The institutional context can significantly influence the determination of suitable ESG priorities and initiatives (Hamann, 2006; Visser, 2005), which consequently have varying impacts on financial performance. The theoretical rationale behind these varying effects may lie in the governance pillar, which appears highly influenced by the overall governance environment of the country. Phan et al. (2021) found in their research that ESG performance and oil price uncertainty are negatively related, while country-level institutional quality moderates and further strengthens the negative relationship between ESG and oil price uncertainty. Hunjra et al. (2020) when investigating the moderating role of institutional quality (measured only by the corruption factor) on the link between the environmental component of ESG and financial development, found positive and significant results. Karmani and Boussaada (2021) found that the effect of ESG in the presence of better institutional quality significantly enhance firms' FP. Likewise, in case of emerging economies, Alam and Yazdifar (2019) explored that the IQ of a country was positively related to the FP of firms. Despite few insignificant results, generally the outcome remains significant. Liu et al. (2022) also examined the moderating role of IQ on ESG and firm's FP and found a positive outcome. Hence, based on these research findings, the following hypothesis was formed:

**Hypothesis-3:** *The IQ moderates the relationship between ESG and Firms' FP in Asian Emerging Markets.*

### **ESG and firm FP: Double Moderation by MA and IQ**

After having established the possibility a moderating role of managerial ability on the relationship between ESG and firms' FP, it is likely that this relationship is influenced by the country's institutional quality state. Very little literature is found in this context, while some is found in bits and pieces. In consonance with the Stakeholders Theory and Upper Echelon Theory, MA moderates the ESG-FP relationship. The ESG-FP relationship is further influenced by macro level variables such as IQ, that considerably affects MA and top management's decision-making process (Krasniqi & Mustafa, 2016). Among the many factors considered to influence firm productivity in emerging markets, institutional quality is a determinant of firm performance (Dollar, Hallward-Driemier, & Mengistae, 2005; Lu, Png, & Tao, 2013). Institutional failure can lead to ecosystem degradation. Well-functioning quality institutions improve the environment even if the country has a low level of income. With higher IQ elements, the firms find conducive environments to undertake ESG initiatives. In case of a low IQ index, the MA of firms will be affected that restrict management from undertaking long-term ESG projects. Ortas et al. (2015) argued that ESG performance is affected due to divergent behaviors of managers under similar institutional backgrounds. Whereas, able managers are expected to evaluate the prevailing ESG protocols better and manifested consistency under varied IQ environments (Inam et al., 2021). Under weak IQ level, firms' management is poised to invest in projects that are risky but could improve managerial power or prestige, as against those that increase payouts to shareholders and improve firm value (Fahlenbrach, 2009). A better MA entails that the able managers used their specific knowledge and experience for better evaluations of ESG activities even in unfavorable institutional environments. Therefore, it is expected that in varying IQ environments, good MA might promote more ESG application than low MA. According to Zhao et al. (2018) investors consider ESG activities along with institutional quality when analyzing emerging markets in order to better understand the external governance environment prevailing within (Aboud & Diab, 2019). Based on these considerations, the following hypothesis is framed:

**Hypothesis-4:** *The relationship between ESG and Firms FP moderated by MA is reinforced by IQ in Asian Emerging Markets.*

## **Methodology**

### **Sample and Data Description**

The sample comprising 750 Publicly Listed Companies from 13 Emerging Asian Economies i.e., China, Russia, India, Indonesia, South Korea, Malaysia, Philippines, Taiwan, Thailand, Singapore, Hong Kong, Turkey, and Pakistan. These countries were considered emerging economies by renowned organizations like the IMF (IMF, 2021), World Bank (WB, 2021), and Michigan Studies University (MSU-CIBER, 2020). These markets are also considered because of their membership in various emerging economic blocks like EAGLE, N-11, and BRICS (Sultanuzzaman et al., 2019). Within each country, only those firms were selected which were listed in the

respective stock exchanges and regularly reported ESG data for the last eleven years (2010-2020). The data for this study were obtained from Thomson Reuters Eikon for ESG, FP, MA, and control variables whereas for IQ the data is extracted from WGI (Worldwide Governance Index by World Bank) covering a period of analysis from 2010 to 2020. After excluding observations without financial data, MA, and ESG data, a final unbalanced sample of 8400 firm-year observations spanning 11 years was available to test the hypotheses. The selected 750 firms were engaged in businesses in different sectors like manufacturing, financial services, and utilities. Details of firms is as under:

**Sector-Wise Distribution of Firms**

Manufacturing	Services	Total
348	402	750

### *Variables of the Study and their Measurement*

**ESG performance.** For this study, ESG scores data of 13 Asian Emerging economies were extracted from Thomson Reuters Refinitiv Eikon DataStream formerly known as Asset 4. This DataStream is a reliable and well-known database for providing comprehensive ESG and financial information. It releases the ESG rating scores and other relevant data yearly. The sample is chosen based on the availability of firms' ESG score which ranges from 0-100. The ESG index comprising three pillars i.e., Environment, Social, and Governance. The pillars are further divided into ten categories. Environmental pillar has three categories i.e., resource use, emissions, and innovations. Social pillar had four categories i.e., workforce, human rights, community, and product responsibility. There were three categories of the governance pillar which included management, shareholders, and CSR strategies. The categories were measured through 70 indicators/key performance indicators (KPIs).

**Managerial Ability.** Managerial ability (MA) is measured by using the residual-based model proposed by Demerjian et al. (2012) to assess management proficiency. He used two-step approach to quantify MA by using the data envelopment analysis (DEA) method. Firstly, the firms' efficiency was estimated by examining the allocation of corporate resources versus net sales or revenue. Secondly, using a Tobit regression, the predicted efficiency scores were correlated with firm attributes. The remaining unexplained variables were indicative of management skill after controlling for firm factors and efficiency (Demerjian et al. 2012). In this study, main indicators were allocated resources of the firm (cost of doing business) and the revenue generated from these resources (revenue earned). The efficiency ratio (ratio between the utilized resources of the firm and the revenue earned) indicated the MA.

**Institutional Quality (IQ).** This study used IQ data as formulated and compiled by the World Bank (Worldwide Governance Index). This database provided comprehensive, updated, and wide coverage data in terms of timeframe and incorporated a larger number of countries than other governance indexes (Sharma & Paramati, 2021). The indicators used for measurement of IQ by the world bank included control of corruption, government effectiveness, political stability and absence of violence, voice and accountability, regulatory quality and rule of law.

**Firm's Financial Performance.** To measure the FP of firms, two proxies were used to measure firms' FP i.e., ROA and Tobin's Q. ROA showed the efficiency of use of the firm's assets, it is the accounting measure reflecting its operational performance and is widely used in past studies in the context of the ESG-FP relationship (Khouri et al., 2021). "Tobin's Q" was calculated by the sum of the market value of equity plus short-term debt plus long-term debt divided by total assets (Chung & Pruitt, 1994). The calculated ratio was an indicator of the perception about the company by people in the market place and stock exchange.

**Control variables.** In addition, to avoid biased results in our proposed models, we included several control variables (firm, and country-level aspects) as used in previous studies on ESG and firm FP relationship. The firm-level control variables included "Size" as the natural logarithm of total assets, "Leverage" as the ratio of total debt to total assets, "Age" as the number of years passed starting from its origin till 2020, "Sales" as the ratio of sales to total assets and "Cash" as the ratio of cash holdings to total assets. The country-level control variable included "GDP Growth" that is the change in the GDP from consecutive years and based on market prices at local currency.

Finally, to control for variation across time, country, and industry; the dummies for year, country, and industry were included.

## Model and Analysis Technique

The econometric models were created by the authors of this study based on review of the literature to analyze panel data using regressions with the Ordinary Least Square (OLS) estimation technique. OLS was used for this study because the aim was to investigate the relationship between ESG and financial performance of firms. For focusing on the said relation, it was assumed that the individual differences of firms were uniform. There was no intention of exploring the individual differences of the firms, countries, or business sectors which would be attempted in future studies by authors using fixed and/or random effects models. For H-1 the “ROA” and “Tobin Q” were regressed on ESG along with the control variables. To support Hypotheses 1 (H1), we expected a positive and significant coefficient for the ESG in line with the following equations:

$$ROA_{i,t} = \alpha_i + \beta_1 ESG_{i,t} + \beta_2 Size_{i,t} + \beta_3 Age_{i,t} + \beta_4 leverage_{i,t} + \beta_5 GDPgrowth_{i,t} + \beta_6 Sales_{i,t} + \beta_7 Cash_{i,t} + \beta_8 Year_{i,t} + \beta_9 Industry_{i,t} + \beta_{10} Country_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$Tobin's\ q_{i,t} = \alpha_i + \beta_1 ESG_{i,t} + \beta_2 Size_{i,t} + \beta_3 Age_{i,t} + \beta_4 leverage_{i,t} + \beta_5 GDPgrowth_{i,t} + \beta_6 Sales_{i,t} + \beta_7 Cash_{i,t} + \beta_8 Year_{i,t} + \beta_9 Industry_{i,t} + \beta_{10} Country_{i,t} + \varepsilon_{i,t} \quad (2)$$

Where  $i$  = indicates a specific firm;  $t$  = indicates a specific fiscal year and  $\varepsilon$  = random disturbance term.

To test Hypothesis 2 (H2), MA and its interaction term with ESG were added along with the control variable:

$$ROA_{i,t} = \alpha_i + \beta_1 ESG_{i,t} + \beta_2 (ESG * MA)_{i,t} + \beta_3 MA_{i,t} + \beta_4 Size_{i,t} + \beta_5 Age_{i,t} + \beta_6 leverage_{i,t} + \beta_7 GDPgrowth_{i,t} + \beta_8 Sales_{i,t} + \beta_9 Cash_{i,t} + \beta_{10} Year_{i,t} + \beta_{11} Industry_{i,t} + \beta_{12} Country_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$Tobin\ q_{i,t} = \alpha_i + \beta_1 ESG_{i,t} + \beta_2 (ESG * MA)_{i,t} + \beta_3 MA_{i,t} + \beta_4 Size_{i,t} + \beta_5 Age_{i,t} + \beta_6 leverage_{i,t} + \beta_7 GDPgrowth_{i,t} + \beta_8 Sales_{i,t} + \beta_9 Cash_{i,t} + \beta_{10} Year_{i,t} + \beta_{11} Industry_{i,t} + \beta_{12} Country_{i,t} + \varepsilon_{i,t} \quad (4)$$

For testing Hypothesis 3 (H3), IQ and its interaction term with ESG were added along with control variables:

$$ROA_{i,t} = \alpha_i + \beta_1 ESG_{i,t} + \beta_2 (ESG * IQ)_{i,t} + \beta_3 IQ_{i,t} + \beta_4 Size_{i,t} + \beta_5 Age_{i,t} + \beta_6 leverage_{i,t} + \beta_7 GDPgrowth_{i,t} + \beta_8 Sales_{i,t} + \beta_9 Cash_{i,t} + \beta_{10} Year_{i,t} + \beta_{11} Industry_{i,t} + \beta_{12} Country_{i,t} + \varepsilon_{i,t} \quad (5)$$

$$Tobin\ q_{i,t} = \alpha_i + \beta_1 ESG_{i,t} + \beta_2 (ESG * IQ)_{i,t} + \beta_3 IQ_{i,t} + \beta_4 Size_{i,t} + \beta_5 Age_{i,t} + \beta_6 leverage_{i,t} + \beta_7 GDPgrowth_{i,t} + \beta_8 Sales_{i,t} + \beta_9 Cash_{i,t} + \beta_{10} Year_{i,t} + \beta_{11} Industry_{i,t} + \beta_{12} Country_{i,t} + \varepsilon_{i,t} \quad (6)$$

To test Hypothesis 4 (H4), MA and IQ and their interaction terms with ESG were added along with control variables. This hypothesis combines firm specific variable (MA) and the country specific variable (IQ) because of the anticipation of hierarchal moderation effect of IQ on MA and then on the relationship between ESG and financial performance of firms (ROA and Tobin’s Q). The hierarchal moderation by combining different levels of moderating variables is in line with studies by Gajenderan, Nawaz, Rangarajan, and Parayitam (2023); Anurag, Patel, and Parayitam (2023); and Wills et al. (2013). The resultant model is depicted by following equation:

$$ROA_{i,t} = \alpha_i + \beta_1 ESG_{i,t} + \beta_2 (ESG * MA * IQ)_{i,t} + \beta_3 IQ_{i,t} + \beta_4 Size_{i,t} + \beta_5 Age_{i,t} + \beta_6 leverage_{i,t} + \beta_7 GDPgrowth_{i,t} + \beta_8 Sales_{i,t} + \beta_9 Cash_{i,t} + \beta_{10} Year_{i,t} + \beta_{11} Industry_{i,t} + \beta_{12} Country_{i,t} + \varepsilon_{i,t} \quad (7)$$

$$Tobin\ q_{i,t} = \alpha_i + \beta_1 ESG_{i,t} + \beta_2 (ESG * MA * IQ)_{i,t} + \beta_3 IQ_{i,t} + \beta_4 Size_{i,t} + \beta_5 Age_{i,t} + \beta_6 leverage_{i,t} + \beta_7 GDPgrowth_{i,t} + \beta_8 Sales_{i,t} + \beta_9 Cash_{i,t} + \beta_{10} Year_{i,t} + \beta_{11} Industry_{i,t} + \beta_{12} Country_{i,t} + \varepsilon_{i,t} \quad (8)$$

## Findings of the Study

### Descriptive Results

Table 1 presents the descriptive statistics for the independent variable ESG along with its three pillars; ENV (environmental), SOC (social), and GOV (governance); two moderating variables, MA and IQ, the dependent variable FP (measured by ROA and Tobin’s Q) and six control variables. The value for ESG, which is score from 1 to 100, minimum value was 1.19, representing those firms that were weak in their ESG performance and maximum score was 92.51 showing firms with exceptional ESG-related practices. The mean score for ESG was 41.80, indicating that on average, the sample firms were considerably good in ESG. Similarly, the pillars of ESG

were also scores ranging from 1 to 100. MA was the ratio between allocated resources of the firm and revenue generated from it ranging from 0 to 1. IQ was a score ranging from 1 to 100 whereas the FP, in both cases (ROA and Tobin’s Q) was a ratio. With regard to control variables, firm “Size” was the natural logarithm of total assets, “Leverage” the ratio of total debt to total assets, “Age” as the number of years passed starting from its origin till 2020, “Sales” as the ratio of sales to total assets and “Cash” as the ratio of cash holdings to total assets. GDP was GDP growth calculated as difference between current year with previous year GDP.

**Table 1**

*Descriptive Statistics*

Variable	Observations	Mean	Std. Dev.	Min	Max
ROA	8398	.054	.069	-.353	.435
Tobin’s Q	8272	1.182	1.541	.029	26.302
ESG	8448	41.803	20.67	1.19	92.51
ENV	8448	37.525	25.619	.09	98.39
SOC	8448	40.112	25.098	.05	97.25
GOV	8437	50.111	22.302	.6	97.69
MA	8448	.547	.356	.001	.988
IQ	8448	.377	.796	-1.184	1.636
SIZE	8398	18.936	2.656	12.108	27.893
SALES	8398	.656	.577	.015	8.462
CASH	8398	.172	.142	.003	.75
AGE	8448	26.297	16.733	24	73
GDP	8448	2.222	3.405	-14.4	13.395

*Correlation Analysis*

Correlation analysis revealed that without inclusion of interaction variables (created for checking moderation effects), ESG was found to correlate significantly with financial performance (both ROA and Tobin’s Q). The pillars of ESG were also significantly correlated with ROA and Tobin’s Q. After addition of interaction term (ESG\*MA\*IQ), the correlation of ESG and its pillars was still significant with ROA and Tobin’s Q while the interaction variable was also significantly correlated with both measures of financial performance. Similarly, the interaction variables of individual pillars of ESG (ENV\*IQ\*MA, SOC\*IQ\*MA, and GOV\*IQ\*MA) were also found significantly correlated with ROA and Tobin’s Q. It was worth noting that the correlation of ESG and its pillars did not change much with addition of the interaction variables. To avoid duplication of similar data without much insight, Table-2 presents only the correlations between variables of model-1 and 2 (without moderation) and model-7 and 8 (with dual moderation).

**Table 2**  
**Correlation Table**

Variables	(1) ROA	(2) Tobin's Q	(3) ESG	(4) ENV	(5) SOC	(6) GOV	(7) LVG	(8) SIZE	(9) SALES	(10) CASH	(11) Age	(12) GDP
(1) ROA	1.00 (0.000)											
(2) Tobin's Q	0.577* (0.000)	1.000										
(3) ESG	0.043* (0.000)	0.059* (0.000)	1.000									
(4) ENV	0.076* (0.000)	0.119* (0.000)	0.780* (0.000)	1.000								
(5) SOC	0.018 (0.091)	0.038* (0.001)	0.908* (0.000)	0.688* (0.000)	1.000							
(6) GOV	0.023* (0.034)	0.008 (0.487)	0.527* (0.000)	0.270* (0.000)	0.315* (0.000)	1.000						
(7) LVG	- 0.179* (0.000)	-0.145* (0.000)	0.209* (0.000)	0.193* (0.000)	0.202* (0.000)	0.077* (0.000)	1.000					
(8) SIZE	- 0.170* (0.000)	-0.238* (0.000)	0.256* (0.000)	0.226* (0.000)	0.259* (0.000)	0.063* (0.000)	0.066* (0.000)	1.000				
(9) SALES	0.304* (0.000)	0.335* (0.000)	-0.005 (0.621)	-0.007 (0.526)	-0.006 (0.571)	0.005 (0.618)	- 0.083* (0.000)	-0.159* (0.000)	1.000			
(10) CASH	0.268* (0.000)	0.221* (0.000)	- 0.093* (0.000)	- 0.098* (0.000)	- 0.104* (0.000)	-0.011 (0.310)	- 0.102* (0.000)	-0.304* (0.000)	0.082* (0.000)	1.000		
(11) AGE	- 0.023* (0.036)	-0.043* (0.000)	0.150* (0.000)	0.156* (0.000)	0.195* (0.000)	- 0.066* (0.000)	- 0.086* (0.000)	0.267* (0.000)	-0.018 (0.098)	- 0.139* (0.000)	1.000	
(12) GDP	0.097* (0.000)	0.140* (0.000)	- 0.070* (0.000)	- 0.098* (0.000)	- 0.035* (0.001)	- 0.036* (0.001)	- 0.412* (0.000)	-0.038* (0.001)	0.027* (0.013)	- 0.036* (0.001)	- 0.042* (0.000)	1.000

**Multivariate Results**

The results of the multivariate analysis are explained in the ensuing paragraphs.

**Impact of ESG on FP**

Two separate regressions were run, firstly the regression of ESG on ROA and Tobin's Q, and secondly the regression of each pillar of ESG (ENV, SOC, and GOV) on ROA and Tobin's Q. The first regression was to verify the positive impact of ESG on financial performance of firms. The purpose of second regression was to determine which of the pillars had the strongest relation with ROA and Tobin's Q. Table 3 presents the results of the multivariate analysis examination of the impact of ESG and its three pillars (ENV, SOC, and GOV) on FP (measured by ROA and Tobin's Q). The effect of ESG on ROA was found positive ( $\beta_1 = 0.018$ ) and significant ( $t = 5.238$ ) at  $p < 0.01$  implying that ESG significantly contributes to ROA (firm accounting performance). Individually, the effect of ENV on ROA was positive ( $\beta_2 = 0.010$ ) and significant ( $t = 3.721$ ) at  $p < 0.01$  and SOC was also positive ( $\beta_3 = 0.018$ ) and significant ( $t = 6.054$ ) at  $p < 0.01$ . However, the effect of GOV on ROA was positive ( $\beta_4 = 0.005$ ) but insignificant, which implied that the Governance dimension of ESG was less likely to enhance FP. The result indicated that environmental and social aspects of ESG are being given more attention as compared to governance by the firms in the sampled countries. Likewise, the effect of ESG on Tobin's Q was positive ( $\beta_1 = 0.607$ ) and significant ( $t = 8.53$ ) at  $p < 0.01$ . Similarly, each pillar of ESG positively contributed to Tobin's Q. The effect of ENV on Tobin's Q was ( $\beta_2 = 0.346$ ) and significant ( $t = 6.082$ ) at  $p < 0.01$ , SOC on Tobin's Q positive ( $\beta_3 = 0.545$ ), and GOV on Tobin's Q also positive ( $\beta_3 = 0.229$ ) and significant ( $t = 3.720$ ) at  $p < 0.01$ .

The regression coefficients of the control variables were mostly in consonance with previous studies. The regression coefficients displaying the impact of "Leverage", "Age", "Cash", and "Sales" were positive and significant with ESG. The "Size" had a negative but significant association with ESG which is not consistent with

previous literature. Probably bigger firms do not consider spending more on ESG activities as they have other means to influence the ISOs and other agencies. “GDP” Growth showed a negative and insignificant result, depicting that macroeconomic indicator GDP growth does not affect the ESG activities of firms. This study has found that ESG impacted significantly the firm’s financial performance as determined through both proxies i.e., ROA and Tobin’s Q in Asian emerging economies. The sensitivity of firms towards ESG has been found by other studies to vary considerably from firm to firm and the tendency of disclosure of ESG engagements and outcomes was also found comparatively less prevalent in Asian emerging economies. However, the data analysis in this study explained that the firms that had the inclination to adopt ESG had better financial performance. This evidence was in line with the Stakeholders’ Theory (Freeman, 1984) which declared that trustworthy and strong relationships with stakeholders could be built by firms through ESG-supportive initiatives.

**Table 3****Results of Regression Analysis (regression coefficients, significance, and ‘t’ values)**

Variable	ROA	Tobin’s Q
ESG	0.018*** (5.238)	0.607*** (8.533)
ENV	0.010*** (3.721)	0.346*** (6.082)
SOC	0.018*** (6.054)	0.545*** (9.109)
GOV	0.005 (1.581)	0.229*** (3.720)
Lev	0.055*** (8.845)	2.369*** (18.536)
Size	-0.004*** (6.109)	-0.313*** (25.752)
Sales	0.030*** (20.734)	0.667*** (22.454)
Cash	0.112*** (19.709)	1.605*** (13.669)
Age	0.007 (0.666)	0.003*** (2.731)
GDP	-0.001 (-2.013)	-0.007 (-1.219)
Industry Dummy	Yes	Yes
Year Dummy	Yes	Yes
Country Dummy	Yes	Yes
Constant	0.067*** (3.250)	6.027*** (14.096)
Observations	8,272	8,272
R-squared	0.359	0.456
Adjusted R2	0.350	0.448

Note: \*\*\*Significance at  $p < 0.01$

### **Impact of ESG on FP through the Moderating Role of MA**

Testing of the second hypothesis involved the introduction of an interaction term of ESG\*MA. Two regressions were run separately, one involving only the ESG (ESG\*MA) whereas the other entailed three pillars of ESG (combined with MA) predicting the financial performance of firms. With the inclusion of the interaction term (ESG\*MA), the stand-alone effect of the ESG on ROA remained positive ( $\beta_1=0.008$ ) and significant (t-stat= 1.261) at  $p < 0.05$ . The combined effects of ESG and MA on ROA was also positive ( $\beta_2= 0.028$ ) and significant (t-stat= 2.964) at  $p < 0.01$ , and enhanced beta value (from 0.008 to 0.028) portraying that the MA positively moderated the association between ESG and firm FP. For testing the effects of each pillar of ESG, the combined effects of ENV\*MA and SOC\*MA were positive and significant while GOV\*MA was positive but insignificant, suggesting that GOV may not be a significant moderator to affect the relationship between ESG and FP. In case of Tobin’s Q, again two separate regressions were run as for ROA. It was found that standalone effect of ESG on Tobin’s Q remained positive and significant ( $\beta_2= 0.258$  and  $t = 1.845$  at  $p < 0.1$ ). Introducing the interaction of MA

with ESG yielded a positive and significant coefficient ( $\beta_2 = 0.659$  and  $t = 3.195$  at  $p < 0.01$ ), portraying that the MA positively moderated the association between ESG and firm FP and enhanced beta value (from 0.258 to 0.659). Similarly, for examining the effects of the three pillars of ESG when combined with MA, the combined effect of ENV\*MA and SOC\*MA on Tobin's Q were positive and significant, however in case of GOV\*MA it was positive but insignificant (Table 4).

For control variables, it was found that firm size and GDP were negatively related to ROA, whereas age, cash, sales, and leverage were positively related. In the case of Tobin's Q, again firm size and GDP was negatively related, whereas leverage, age, cash and sales were positively related. The effects of control variables did not change enormously. Supporting literature for this finding indicated that managerial ability impacted all aspects of ESG implementation and its financial outcomes for the firms (Andreou et al., 2017; Berk & Rauch, 2016; Lins et al., 2016). A likely cause for the positive impact of superior managers on the financial performance of firms could be that investors perceived that firms with capable managers are more resilient and reliable in handling business challenges. The inference in reverse order can be that the firms with better financial performance are likely to have more capable managers (Cui, Jo, & Na, 2018; Lee et al., 2018).

**Table 4**  
**Results of Regression Analysis – Moderation by MA on ESG-FP Relation**

	ROA	Tobin Q
ESG	0.008* (1.261)	0.258* (1.845)
ESG*MA	0.028*** (2.964)	0.659*** (3.195)
ENV	0.017*** (3.426)	0.526*** (4.732)
ENV*MA	0.023*** (2.973)	0.418** (2.508)
SOC	0.003 (0.641)	0.075 (0.661)
SOC*MA	0.019** (2.445)	0.528*** (3.124)
GOV	-0.007 (-1.242)	-0.059 (-0.469)
GOV*MA	0.012 (1.435)	0.246 (1.293)
Lev	0.051*** (6.722)	2.169*** (18.621)
Size	-0.005*** (6.203)	-0.338*** (22.731)
Sales	0.039*** (17.331)	0.642*** (21.541)
Cash	0.189*** (14.072)	1.615*** (14.047)
Age	0.004 (0.266)	0.005*** (2.839)
GDP	-0.013** (-2.235)	-0.009 (-1.312)
Industry Dummy	Yes	Yes
Year Dummy	Yes	Yes
Country Dummy	Yes	Yes
Constant	0.059*** (3.701)	6.055*** (12.044)
Observations	8,272	8,251
R-squared	0.361	0.387
Adjusted R2	0.348	0.498

\*\*\*Significance at 0.01, \*\*Significance at 0.05 levels, \*Significance at 0.10.

**Impact of ESG on FP through Moderating Role of Institutional Quality (IQ)**

Test of hypothesis 3, entailed introduction of interaction terms of ESG\*IQ and carrying out two sets of regressions one regression for only ESG and the other regression for the three pillars of ESG predicting firms’ financial performance. The analysis revealed that the effects of ESG on ROA continued to be positive ( $\beta_1 = 0.015$ ) and significant ( $t = 3.642$ ) at  $p < .01$ . For each pillar of ESG, the combined effects of ENV\*IQ on ROA were positive ( $\beta_2 = 0.010$ ) and significant ( $t = 2.415$ ) at  $p < .05$ , SOC\*IQ on ROA positive ( $\beta_2 = 0.014$ ) and significant ( $t = 4.121$ ) at  $p < .05$ , and GOV\*IQ on ROA positive ( $\beta_2 = 0.003$ ) but insignificant. The results indicated that the IQ did not moderate the association between GOV and firm FP. In case of Tobin’s Q, the interaction of IQ with ESG yielded a positive and significant coefficient ( $\beta_2 = 0.195$  and  $t = 2.259$ ) at  $p < .05$ , portraying that IQ positively moderated the association between ESG and firm FP. In case of independent pillars of ESG, the effects of ENV\*IQ and SOC\*IQ was positive and significant, whereas GOV\*IQ on Tobin’s Q is negative and insignificant. The results supported sub-hypothesis but did not support for GOV when combined with IQ. Regarding control variables, the firm size and GDP were negatively related to FP (both ROA and Tobin’s Q), however for age, cash, leverage, and sales, they were positively related as presented Table 5.

Prior research generally corroborated the findings of this study. The rationale for the effective moderation of institutional quality on the financial benefits generated by ESG appeared multifaceted. Literature indicated that coercive pressure stemming from a regulatory standpoint is a consequence of the legal framework within a country (Barakat et al., 2015; Crawford & Williams, 2010). In the context of emerging economies, it appears that the institutional quality environment significantly influences the relationship between ESG and financial performance. ESG practices are relatively less esteemed in emerging economies, particularly where there exists a high prevalence of corruption, weak law enforcement mechanisms, ineffective regulatory oversight, and notably, issues of political and economic instability.

**Table 5**  
**Results of Regression Analysis – Moderation by IQ on ESG-FP Relation**

Variable	ROA	Tobin Q
ESG	0.009* (1.917)	0.195** (2.259)
ESG_IQ	0.015*** (3.917)	0.502*** (6.367)
ENV	0.008** (2.018)	0.216*** (3.162)
ENV_IQ	0.010** (2.415)	0.242*** (3.863)
SOC	0.011*** (2.991)	0.122* (1.691)
SOC_IQ	0.014*** (4.121)	0.476*** (7.215)
GOV	0.014*** (4.121)	0.258*** (3.794)
GOV_IQ	0.003 (0.760)	-0.094 (-1.233)
Lev	0.034*** (8.648)	2.929*** (17.998)
Size	-0.003*** (6.127)	-0.322*** (25.256)
Sales	0.033*** (20.231)	0.653*** (22.458)
Cash	0.115*** (19.297)	1.605*** (13.926)
Age	0.006** (1.557)	0.005*** (2.183)
GDP	-0.002** (-2.113)	-0.006 (-1.208)
Industry Dummy	Yes	Yes
Year Dummy	Yes	Yes



Country Dummy	Yes	Yes
Constant	0.062*** (3.701)	6.012*** (14.096)
Observations	8,821	8,234
R-squared	0.342	0.464
Adjusted R2	0.353	0.451

Note: \*\*\*significance at  $p < 0.01$ , \*\*significance at  $p < 0.05$ , \*significance at  $p < 0.10$

**Impact of ESG on FP through Moderating Role of MA and IQ**

The testing of fourth hypothesis was the culmination of this study which showed dual moderation of IQ and MA on the relation of ESG with FP. For this purpose, the double interaction term ESG\*MA\*IQ was introduced in the model. Like the previous analysis, two sets of regressions were run one for only ESG predicting the FP of firms and the other involving the three pillars as predictors of FP. It was found that the dual moderation effects of MA and IQ on the ESG-FP (both for ROA and Tobin’s Q) were positive and significant. In case of each pillar of ESG with ROA, the dual moderation effects of ENV\*MA\*IQ, SOC\*MA\*IQ and GOV\*MA\*IQ were positive and significant. However, in case of Tobin’s Q, the dual moderation effects of ENV\*MA\*IQ and SOC\*MA\*IQ were positive and significant whereas in case of GOV\*MA\*IQ, the result was negative and insignificant (Table 6). Past research works mostly focused on the significance and vitality of institutional quality in the improvement of financial performance (Farooq et al. 2013; Law & Habibullah, 2006; Saha & Ben Ali, 2017). However, only scanty work exists that has examined the association between institutional quality as well as managerial ability on the financial performance of firms in emerging economies.

**Table 6**  
*Dual Moderation Effects by IQ and MA on the Relationship between ESG and FP*

	ROA	Tobin Q
ESG	0.008 (1.294)	0.250*** (3.114)
ESG_IQ	0.006 (0.671)	0.175* (1.738)
ESG_MA_IQ	0.016*** (2.825)	0.086*** (0.846)
ENV	0.001 (0.148)	0.099 (1.557)
ENV_IQ	0.005 (0.700)	0.337*** (3.951)
ENV_MA_IQ	0.008** (1.972)	0.139** (1.383)
SOC	0.014*** (2.725)	0.343*** (5.203)
SOC_IQ	0.002 (0.240)	0.040 (0.454)
SOC_MA_IQ	0.009** (2.134)	0.084** (0.826)
GOV	-0.001 (-0.195)	0.133* (1.882)
GOV_IQ	0.005 (0.626)	0.019 (0.201)
GOV_MA_IQ	0.010** (2.134)	-0.113 (-1.320)
Lev	0.046*** (-7.458)	2.369*** (19.132)
Size	-0.003***	-0.323***

	(5.112)	(24.954)
<b>Sales</b>	0.032***	0.598***
	(19.541)	(21.251)
<b>Cash</b>	0.124***	1.612***
	(20.311)	(14.112)
<b>Age</b>	0.000	0.002***
	(0.419)	(2.766)
<b>GDP</b>	-0.002**	-0.009
	(-2.113)	(-2.191)
<b>Industry Dummy</b>	Yes	Yes
<b>Year Dummy</b>	Yes	Yes
<b>Country Dummy</b>	Yes	Yes
<b>Constant</b>	0.109***	6.027***
	(3.143)	(13.198)
<b>Observations</b>	8,272	8,272
<b>R-squared</b>	0.391	0.461
<b>Adjusted R2</b>	0.342	0.398

*Note:* \*\*\*significance at  $p < 0.01$ , \*\*significance at  $p < 0.05$ , \*significance at  $p < 0.10$

## Discussion and Conclusions

This study, drawing from a dataset encompassing 750 international firms spanning the years 2010 to 2020, investigates the impact of ESG performance on firm financial performance (FP) within 13 Emerging Markets of Asia. The findings of this study reaffirm a positive and statistically significant relationship between ESG performance and firm FP, consistent with prior research findings (Chen, Song & Gao, 2023; Friede et al., 2015; Whelan et al., 2021). This underscores the notion that firms' FP tends to increase over time due to socially responsible investments in ESG practices and declines when engaging in irresponsible activities. Stakeholders such as investors, customers, employees, and regulatory bodies closely monitor the ESG behavior of organizations when making decisions. Firms demonstrating higher ESG performance tend to attract investors and customers, resulting in enhanced FP (Chen & Xie, 2022; El Khoury, Nasrallah & Alareeni, 2023). The individual components of ESG exhibited slightly varied strengths of relationships with financial performance (FP). Specifically, the environmental and social pillars of ESG demonstrated positive and significant associations with Return on Assets (ROA), while the governance pillar showed an insignificant (though positive) relationship. One plausible explanation for this divergence could be that firms in emerging economies might not fully adhere to governance protocols or provide comprehensive disclosures about governance practices (Chen & Xie, 2022). Firms with limited governance disclosure are observed to restrict their investment in ESG initiatives (Almeyda & Darmansya, 2019; Chen & Xie, 2022). However, all pillars showed positive and significant relationships with Tobin's Q, another measure of FP utilized in this study.

The positive impact of managerial ability (MA) on the relationship between ESG and financial performance (FP) has been consistently supported by various studies, indicating that ESG investments often stem from strategic decisions made by managers with higher MA, especially within contexts of managerial discretion (Gong, Yan, & Ho, 2020). These findings were robust, as the moderation by MA was significant for both measures of FP, namely Return on Assets (ROA) and Tobin's Q. The moderating role of MA on the relationship between ESG and FP was notably emphasized by Cho and Lee (2019), who argued that the influence of MA on ESG-FP relations is strengthened by managers with higher abilities, manifested through supportive ESG-related behaviors. The moderation effects of each pillar of ESG, as indicated by the coefficients of the interaction terms (MAENV, MASOC, and MA\*GOV), were positive and significant for the environmental, social, and governance pillars concerning FP measured by ROA, albeit with varying levels of significance. However, for Tobin's Q, the moderation effect was insignificant only for the governance pillar.

Similarly, institutional quality (IQ) also played a significant moderating role in the relationship between ESG and financial performance (FP), consistent with findings from prior research (Karmani & Boussaada, 2021). High-

quality institutions characterized by well-defined business rules, reduced corruption, and effective enforcement of consistent policies tend to support ESG initiatives (Vatn, 2020). Consequently, firms adopt ESG practices to gain a competitive edge without resorting to unhealthy competition, shortcuts, or exploiting loopholes created by corruption. Both measures of FP (ROA and Tobin's Q) exhibited significant moderation effects of IQ on their relationship with ESG, indicating the robustness of the findings. Regarding each pillar of ESG, the moderation effects of IQ were positive and significant for the relationship between the environmental and social pillars and FP (both for ROA and Tobin's Q), albeit with varying levels of significance. However, the moderation effects of IQ on the relationship between the governance pillar and FP (both for ROA and Tobin's Q) were both negative and insignificant, suggesting a minimal role of IQ in governance aspects of ESG.

The dual moderation effects by both managerial ability (MA) and institutional quality (IQ) were positive and significant on the relationship between ESG and financial performance (FP), measured by both Return on Assets (ROA) and Tobin's Q. This dual moderation mechanism contributed to the enhancement of ESG practices and subsequently improved FP. While studies specifically analyzing the dual moderation by MA and IQ on the relationship between ESG and FP were scarce, indications of such effects could be inferred from the existing literature, indirectly supporting the findings of this study.

The behavior of firms is heavily influenced by the institutional environment, as preferences, values, and actions at all levels are shaped by institutional quality (Husted & Sousa-Filho, 2017; Vatn, 2020). Previous research suggests that firms often exhibit high levels of sustainable performance to gain legitimacy when faced with institutional pressures (Bansal, 2003; Bansal and Clelland, 2004; Berrone et al., 2010; Hoffman, 2001). Pressure from regulatory institutions compels organizations to appoint managers with superior MA, capable of meeting both institutional and stakeholder requirements for sustainability and legitimacy. In contrast, weak institutions characterized by corrupt practices and inconsistent policies fail to exert the necessary pressure on firms to change and align their behaviors with sustainable practices (Tuczek et al., 2018).

High-quality institutions, along with organizational leadership possessing higher managerial ability (MA), ensure that firms embracing ESG can achieve greater financial performance (FP) and meet stakeholders' expectations (Lacznik & Murphy, 1991). The Upper Echelon Theory and Institutional Theory suggest that managerial abilities translate into ESG-supportive actions when a conducive environment is present. These theories imply that stakeholders' expectations serve as motivators, while the firm's pursuit of legitimacy acts as a facilitator, encouraging enhanced ESG engagement (Nazari et al., 2015). Managers with greater MA are instrumental in assessing the beneficial returns on ESG investments and demonstrate a higher tolerance for uncertainty, aligning their actions with long-term corporate objectives. In emerging economies, institutional quality delineates the parameters for planning and implementing ESG activities by managers. Within these parameters, managers with higher MA visualize, plan, and execute ESG practices to advance the organizations' FP goals and integrate ESG into long-term organizational strategies.

The governance pillar of ESG demonstrated a weak association with firms' financial performance (FP) in both measures, namely Return on Assets (ROA) and Tobin's Q. Interestingly, despite moderation by institutional quality (IQ) and managerial ability (MA), both individually and jointly in the ESG-FP relationship, the link between the governance pillar of ESG remained weak and insignificant. This finding aligns with other studies and suggests a pressing need for firms to enhance their governance structures and adopt corporate governance protocols (Zubeltzu-Jaka et al., 2018). Transitioning to improved governance structures is likely to address issues related to legitimacy and trust within organizations to a significant extent (Kostova & Zaheer, 1999). To enhance governance, organizations should focus on bolstering the independence of governing bodies, fostering democratic decision-making processes, promoting gender diversity, and ensuring the independence of audit functions from executives (Gallego-Alvarez & Pucheta-Martinez, 2019). Additionally, mandating the disclosure of ESG performance for organizations can enhance transparency and accountability, further contributing to improved governance practices.

### ***Practical and Theoretical Implications of the Study***

Based on our findings, several policy and practical implications emerge. First, higher institutional quality fosters a conducive environment for business activities that benefit all stakeholders and society at large. This study

suggests that ESG practices, often discretionary in Emerging Markets, can be encouraged through institutional pressures. Therefore, the level of investment in ESG can be assessed by proficient managers who can effectively weigh the investment against considerations such as legitimacy, reputation, and financial outcomes.

Policymakers in government institutions play a crucial role in identifying inefficiencies, corrupt practices, and policy inconsistencies that undermine institutional quality, rendering them ineffective and unfriendly to businesses. Efforts should be directed towards addressing these issues to improve the overall business environment. Additionally, it is imperative to ensure that managers do not over-invest in ESG-related projects, especially in organizations with weaker financial statuses. Managers need to recognize the long-term benefits associated with ESG practices and carefully evaluate their potential impact on financial performance. Furthermore, managers should consider the institutional quality context in which firms operate to assess the availability of resources that can be allocated to ESG activities. By doing so, they can effectively enhance firms' financial performance while contributing to broader societal and environmental goals.

This study reinforces the positive and significant impact of ESG on firms' financial performance (FP), particularly within the context of emerging markets. While past research on emerging economies often focused on the impact of ESG on FP within a single country, region, or specific industry, this study utilizes a multi-country and multi-industry sample, leading to more generalizable findings. Against the backdrop of the institutional environment in Asian Emerging Markets, the study extends Institutional Theory and Upper Echelon Theory to include the role of managerial ability (MA) and institutional quality (IQ) in the relationship between ESG and firms' FP. Although FP can be enhanced through ESG adoption, managers with short-term perspectives may exhibit less inclination towards ESG practices. This situation is particularly concerning in Asian Emerging Markets, which already face ecological challenges exacerbated by factors such as global warming, population growth, pollution, and resource depletion, alongside a growing awareness of the importance of respecting employee and customer rights (Duque-Grisales & Aguilera-Caracuel, 2019).

Given the weaknesses observed in the governance pillar of ESG in Asian Emerging Markets, it is recommended that organizations adopt methodologies followed by Advanced Markets while adhering to globally accepted good governance practices to foster trust among all stakeholders. Moreover, in Asian Emerging Markets where official monitoring and regulatory mechanisms may be weak, proactive firm-level environmental and social initiatives should be encouraged and rewarded by institutions, with public acknowledgment for adhering to best practices. This approach can incentivize firms to prioritize ESG practices and contribute positively to both their own performance and broader societal well-being.

### ***Limitations and Future Direction of Research***

Certainly, there are several avenues for future research to address the limitations and further enhance our understanding of the relationship between ESG practices and firm financial performance:

**Comparative Analysis:** Conducting a comparative analysis between emerging and advanced markets could provide insights into the differences in ESG practices and their impact on financial performance. This approach could help identify areas where organizations in emerging markets may need to focus to improve ESG performance and financial outcomes.

**Updated Data:** Future studies should aim to use the most recent and updated data available beyond the year 2020 to capture the evolving landscape of ESG practices and their effects on firm financial performance.

**Alternative Data Sources:** Researchers should explore alternative sources or methodologies to gather data in cases where direct access to organizational data is limited, ensuring a more comprehensive analysis.

**Double Moderation:** Further investigation into the double moderating role of managerial ability (MA) and institutional quality (IQ) could provide deeper insights into their combined influence on the relationship between ESG and firm financial performance.

**Multidimensional Approach:** Adopting a multidimensional approach to analyzing firm performance, considering both financial and non-financial outcomes of ESG initiatives, could provide a more holistic understanding of the broader impacts of ESG practices on organizational sustainability and stakeholder value creation.

Non-linear Models: Exploring non-linear models that incorporate ESG, firm financial performance, IQ, and MA could uncover nuanced relationships and interactions among these variables. Techniques such as structural equation modeling or machine learning algorithms may be employed to capture complex relationships and potential threshold effects.

Addressing these limitations in future research endeavors can contribute to advancing knowledge in the field of ESG and its implications for firm performance, particularly in the dynamic context of emerging markets.

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## Examining the Expense of Quality Assurance in Construction Endeavors

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### Abstract

*This research focuses on assessing the cost of quality in the construction industry of Pakistan, particularly during the design and construction phase of building projects. Through a quantitative approach, data was collected from 125 questionnaires, group discussions, and interviews. The study aims to analyze critical factors influencing quality using the Relative Importance Index (RII) and Mean Item Score (MIS) method, as well as to calculate the total Cost of Quality as a percentage. Findings indicate a significant lack of emphasis on quality management practices within construction organizations, with many failing to allocate budgets for quality assurance and control. Critical factors affecting the Cost of Quality include project complexity and size, efficiency of quality management systems, contractor classification, supervision team experience, and project location. Furthermore, the total cost of quality for construction projects was found to be 54.32%, with prevention costs accounting for 15.5% of the budget, appraisal costs constituting 12.3% of the budget, internal failure costs amounting to 13.9% of the budget, and external failure costs totaling 12.6% of the budget. Recommendations include the development of clear quality policies, prioritizing critical factors affecting quality, proper allocation of budget for quality control, and establishment of dedicated quality control management departments within organizations. This study contributes to understanding the importance of quality management in construction projects and highlights the need for proactive quality assurance and control mechanisms to enhance project outcomes and mitigate financial risks.*

**Keywords:** Cost of quality, construction industry, internal failure, external failure, quality control and quality assurance

### Introduction

The word quality has so many definitions that range from conventional ones to those who are more strategic. There remains no unanimous agreement regarding a singular definition of quality; interpretations vary across products and services, industries, and dimensional scopes (Wicks & Roethlein, 2009). Some advanced definitions of quality define that quality does not require a higher degree of excellence. Instead, it requires to be met over some standard that is already set for some specific sort of work. For a product/service to be of high quality, it does not focus on including every possible feature in the product/service, rather it must reliably perform as per its design criteria, and it must be maintainable. Some of the definitions related to quality are: Quality is predictable degree of uniformity and dependability, at low cost and suited to market. Quality means meeting customer's requirements, formal and informal, at lowest cost first time and every time" (Deming, 1982), quality is fitness for use (Juran & Gryna, 1993), quality is conformance to requirements (Crosby, 1989). Nevertheless, there is ongoing discussion within the construction industry regarding the challenge of defining quality for construction projects, attributed to the absence of standardization, variations in project scale, and the diverse stakeholders involved (Hoonakker et al., 2010). A study conducted by Loushine et al. (2006) reviewed literature on the definition of construction quality and yielded five distinct definitions: meeting customer expectations, minimizing rework or defects, fostering repeat business, adhering to ISO 9000 standards, and achieving timely and budget-conscious project completion. As per the findings of Awan and Sadiq (2015), the quality perception revolves around aligning with the project's scope, being viewed as an additional expense in construction endeavors. It emphasizes

minimizing rework through the fulfillment of essential quality assessments and reducing defects by adhering to the specifications of supplied materials.

In most construction projects, cost and time are considered as one-dimensional concept. Also, we can say that we can express time and cost by simple value that generates a mutual insight between participants of project. In contrast, quality has its own vast dimensions and each of the dimensions causes different perceptions among the presenters. For instance, Foster (2004) introduced 5 different views for quality as follows: Transcendent view: Quality can be supposed naturally but it can't be stated effortlessly. Product-based view: The features and traits of any product define its quality. User-based view: If the product satisfies user/customer's needs, then it will be considered as a quality. Manufacturing-based view: If the product coincides with the standard design specifications then we will consider it as a quality product. Value-based view: If something provides you a good value for its price then it will be considered as a quality product. Keeping in view, there should be an equal perception of all dimensions of quality between the project participants (Foster, 2004). According to Heravitorbati et al. (2011), quality in construction projects involves meeting the diverse needs and requirements of all parties involved and affected by the project outcomes. When each step of the work process adheres to established standards and specifications, it significantly enhances the probability of the final product meeting the required standards. Notably, the primary factor contributing to quality problems is the occurrence of errors by workers (Rejeki et al., 2020). This underscores the importance of diligent adherence to quality protocols throughout the production process to mitigate potential errors and ensure the desired outcomes are achieved. As quality management theory has progressed, there has been a transition in objectives from aiming for complete elimination of defects to emphasizing the implementation of error prevention measures. This shift underscores a proactive approach to quality management, prioritizing strategies to anticipate and mitigate errors before they occur (Love et al., 2011; Psarommatis et al., 2022).

The cost associated with the quality in construction projects encompasses expenses related to ensuring adherence to standards and minimizing errors. Accurate estimation of this cost is vital for project planning, directly influencing budgeting and project success. There are many factors that influence the cost of quality. Neglecting to consider these factors can lead to financial losses and delays resulted in inaccurate estimates (Tawfek et al., 2012). Hence, understanding and accounting for the cost of quality enables informed decision-making, optimizing resources and ensuring project success within constraints.

Quality concerns persist in construction projects, manifesting as a range of imperfections such as waterproof roofing leaks, wall deformations, cracks, insufficient flooring thickness, floor base irregularities leading to bulging and cracking, and coating detachment. These issues recur intermittently, indicating ongoing challenges in maintaining quality standards within the construction industry (Forcada et al., 2016), (Alen-castro et al., 2018). Therefore, the construction industry often receives criticism for its poor delivery of projects, especially when it comes to the quality of finished products and the effectiveness of design and construction processes used (Marasini & Quinnell, 2010). Furthermore, despite the advancements in technology, the use of advanced tools for quality management in construction remains uncommon (Luo et al., 2022). Inadequate quality assurance and control measures in construction projects often result in costs exceeding initial projections. This prevailing disregard for prioritizing quality across projects leads to inflated expenses and extensive rework during later project stages. Addressing this challenge requires a focused effort on prioritizing factors that influence project quality and conducting comprehensive assessments of quality costs to preempt cost overruns. Investing in quality assurance and control measures early in the project lifecycle can mitigate the risk of cost overruns and minimize the need for costly rectifications. However, smaller-scale construction firms often struggle with insufficient budget allocations for ensuring quality standards, exacerbating the issue. Consequently, quality considerations take a backseat in the planning and execution phases, further contributing to inflated costs and project inefficiencies. To combat this, there is an urgent need to bridge the gap in assessing the cost implications of compromised quality. Equally important is quantifying the Cost of Quality as a percentage, providing invaluable insights into mitigating cost overrun and enhancing project outcomes. Through this research endeavor, the aim is to address these pressing issues and foster a culture of quality across construction firms, ultimately improving project management practices and reducing cost overruns. Therefore, the two main objectives of this research are:

1. Analyzing critical factors affecting quality of building projects using Relative Importance Index (RII) and Mean Item Score (MIS) method.
2. Calculating the total Cost of Quality in the form of percentage.

The next sections of the paper include literature review, research methodology, results and discussions, and conclusions. Literature review discusses each aspect of quality by defining different types of costs and equations to calculate costs. Research methodology section elaborates the methodology starting from initial phase till the results, including thorough explanation of all steps involved during the research. Results and discussions include results of the survey-based research. This research is based on a questionnaire survey and interviews conducted with the concerned authorities. The final section presents the conclusion of whole research work, limitations of this work and future work recommendations for implementation of quality costing system to prioritize quality in construction industry.

## Literature Review

The productivity and overall performance of construction projects are significantly impacted by quality issues, often resulting in cost overruns, and missed deadlines (Alwi et al., 2002; Josephson et al., 2002). To address these challenges, many organizations have adopted Total Quality Management (TQM) strategies (Kanji & Wong, 1998). Therefore, calculating the cost of quality is crucial to mitigate factors leading to poor quality (Low & Yeo, 1998). This calculation helps in evaluating the effectiveness of a quality system within an organization (Love and Sohal, 2003), making it imperative for managers to prioritize this aspect (Schiffauerova & Thomson, 2006). Numerous researchers have contributed to understanding quality-related costs in the construction industry and have proposed various models for their calculation. For instance, Davis et al. (1989) developed a Quality Performance Tracking System (QPTS) to categorize and quantify different quality aspects in construction projects. Abdul-Rahman (1993) conducted a case study to analyze failure costs, while (Aoieong et al., 2002) introduced a simplified methodology for quality cost analysis. Similarly, Kazaz et al. (2005) examined construction quality costs in Turkey. Additionally, Barber et al. (2000) analyzed the cost of quality failure and developed a method to measure it. İren, Deniz, ad Bilgen (2014) introduced cost models for typical quality assurance methods in crowdsourcing. An approach is proposed for analyzing quality-related expenses through the utilization of a cost-of-quality framework. The study aimed to assess the financial implications of ensuring quality in crowdsourced projects, providing a systematic approach to evaluate and manage quality-related costs effectively. Furthermore, a study conducted by Kurdin, Magribi, and Dars Hats (2016) assessed the impact of enhancing the quality of national construction, a move often associated with heightened quality expenditures. To investigate this, researchers examined various factors influencing quality costs and employed multiple linear regression techniques for modeling. The findings indicated that specific components of the quality management system, namely appraisal cost and external failure cost, had the potential to lower overall quality expenses. Conversely, the study revealed that prevention cost and internal failure cost could potentially drive up quality costs according to the model's analysis. A detailed literature review has been carried out to study the cost of quality and discussed below.

### *Cost of Quality*

By keeping in view different views of quality and finding out that what it is that actually causes costs, there are several concepts related to quality costs defined by many authors and researchers. One researcher defines the concept of cost of quality as the sum of prevention cost. i.e., cost invested in the prevention of non-conformance to the requirements, appraisal cost. i.e., cost invested in appraising a product for conformance to the requirements and failure cost. i.e., cost spent in failing to meet the requirements. According to him, quality costs and thus all the costs that are relevant to the working with quality are known as quality costs (Campanella, 1990).

In another research quality was categorized into two categories out of which the first one is the type of cost needed in order to confirm that requirements of quality are maintained, and the next one is related to the costs that comes from aberrations from the requirements (Song & Lee, 1990). Philip Crosby's (an American quality consultant) approach commences with disbelieving the hypothesis that there is a connection amongst cost and quality. Crosby laid stress over the classification of price of conformance and non-conformance. According to him, cost of quality is the sum of Conformance costs and Non-conformance costs. Cost of conformance is the price paid for making

certain things done right at the start while the Non-conformance cost is the price wasted when the work fails to meet the customer's requirements (Schiffauerova & Thomson, 2006). Abdul-Rahman (1995) also studies about quality costs and according to him it is defined as cost involved in confirming the quality requirements and evaluation that quality requirements are being met. It also involves any other costs occurred due to failure of quality or wasted as a result of failed product.

### ***Cost of Quality Categories***

In the beginning of year 1960 Armand Feigenbaum classified quality costs in the following categories as prevention cost, appraisal cost, failure cost (including internal failure and external failure cost). Many other followers followed in his footsteps. As given below, Fig. 01 indicates categories of cost of quality given by (Feigenbaum, 1983)

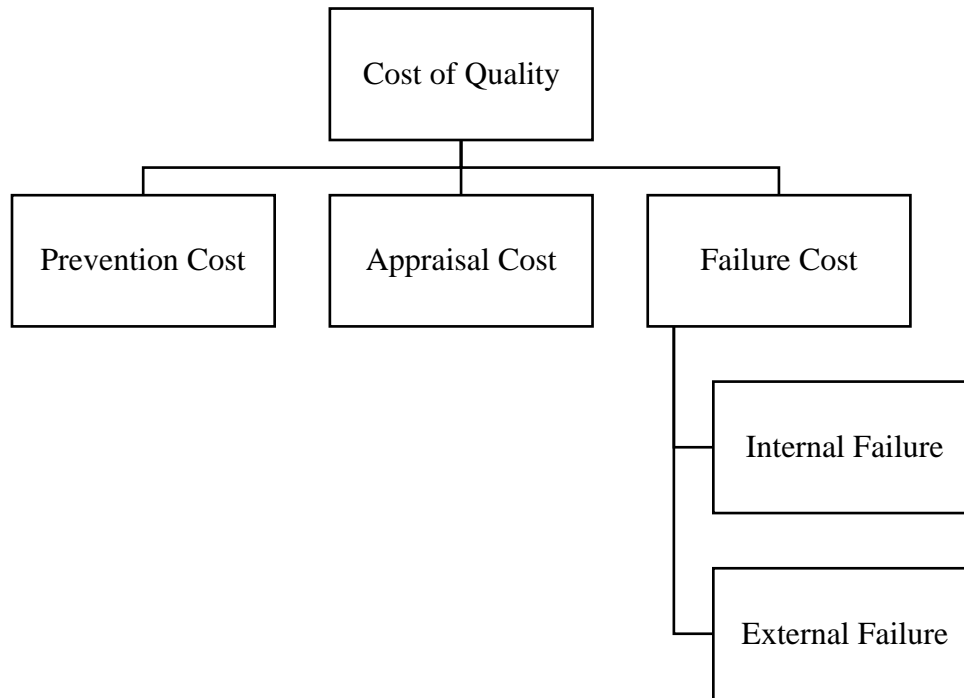


Figure 1 Categories of Cost of Quality

Prevention costs are basically those which are related to the prevention of defects from happening prior to implementation and keep the appraisal and failure costs at minimum level. Examples of such costs include: Review of new product, Planning quality, Supplier surveys, Reviews of processes, Teams for quality improvement, Education and training, etc. (Love & Irani, 2003). Appraisal costs, incurred during a project's operational phase, ensure adherence to quality standards. These include activities before, during, or after production, preventing the passage of faults and limiting the delivery of defective products to customers. While not eliminating errors, appraisal measures significantly reduce their occurrence. Examples encompass initial inspection, testing, process auditing, and supplier investigation (İren, Deniz, & Bilgen, 2014). Failure costs are defined as the costs occurred due to faulty products/services resulting in the loss of reputation of company. Failure occurs when the product/service is not as per customer's expectations. Failure costs are further divided as Internal and External failure costs. Internal failure costs are those caused as a result of defects found before delivering the products or services to the client which eventually result in client's dissatisfaction. Defects can occur because of faulty material, inefficiency of workers or due to inefficient process. These costs include: Rework cost, Cost occurred due to delays Redesigning cost, Shortage of material supply, Retesting due to failure, Equipment downtime, Lack of flexibility, Poor management control, Lack of skills. The external failure costs are the ones that arise after product/service delivery to the customer which causes a sense of dissatisfaction. External failure costs include: Cost for complaints, Repairing cost, Cost of recreating services, Warranty cost, Additional customer costs, Loss of sales, Cost of environmental degradation (Logothetis, 1992).

**Mathematical functions to calculate cost of quality**

Total amount of cost of quality (COQ) can be calculated by using the following equation (Mukhtar, 2010).

$$COQ_T = PC + AC + IFC + EFC \quad (1)$$

where,

COQ <sub>T</sub> :	Total Cost of Quality
PC:	Prevention Cost
AC:	Appraisal Cost
IFC:	Internal Failure Cost
EFC:	External Failure Cost

Most of the construction firms do not consider all the three categories of costs for calculating cost of quality. Instead, they just focus on the Failure costs. In general, field engineers examine the end product i.e., finished work, in order to measure the quantity of rework done or required on site. In construction industry, organizations spend most of their money on prevention and appraisal but the amount of these costs is quite lesser as compared to the total project's cost. It is broadly believed that if you spend more on prevention and appraisal costs i.e., conformance cost then you have to worry less about the failure/non-conformance cost. If conformance costs are manageable variables, then the non-conformance costs are resultant ones (İren, Deniz, & Bilgen, 2014; Mukhtar, 2010).

(The Cost of Quality - CQE Academy, n.d.) includes the Prevention and Appraisal costs of construction projects. Prevention and Appraisal costs in construction projects are often neglected which result in the failure costs. These costs play an important role in the success of construction projects, if taken notice of at the right time. These costs broadly include Planning quality, Surveys of suppliers, Process reviews, Training of team for quality management program, Testing during the execution, Timely maintenance of equipment, etc. Equation to find out the Cost of Good Quality can be written as:

$$COG_Q = PC + AC \quad (2)$$

where;

PC:	Prevention Cost
AC:	Appraisal Cost

Cost of Poor Quality (The Cost of Quality - CQE Academy, n.d.) includes Internal and External failure costs of construction projects. These costs result due to ignorance of Prevention and Appraisal costs. When there is ignorance of Prevention and Appraisal, Failure costs appear as a result of this ignorant behavior of the organization. These costs broadly include Reworking cost, Delay costs, Lack of knowledge, cost of complaints, Cost of repairing, etc. Equation to find out the Cost of Poor Quality can be written as:

$$COP_Q = IFC + EFC \quad (3)$$

where,

IFC:	Internal Failure Cost
EFC:	External Failure Cost

Most of the organizations consider quality improvement as finest way to improve the satisfaction level of customer, in order to reduce the manufacturing costs and to enhance productivity level. For quality improvement cost of quality must be reduced. Most critical activities in quality improvement program are monitoring and controlling the cost of quality (Boxer, 2004). In order to achieve a noteworthy impact on the total cost, the failure cost must be reduced and this could be done by spending more on prevention. Increment in prevention and appraisal costs will lead to a decrement in failure costs. Furthermore, spending more on prevention will reduce the appraisal cost. John R Parker presented 1:10:100 rule in order to reduce the cost of quality. According to his research, one dollar consumed over prevention will give you a benefit of \$10 on appraisal and of \$100 on failure costs. This rule will surely help to prioritize the cost spent over prevention, which will bring bigger profits at later stages.

According to Dale and Plunkett (1991) the percentage of quality cost consumed in appraisal and failure is 95%. Value spent on appraisal cost adds minor to the value of construction work. Appraisal cost just increases the construction cost. The cost that is avoidable is usually the failure cost. By reducing the causes of failure i.e., reducing the non-conformance cost can also help in reducing the appraisal costs at a substantial level. If any company/organization needs to cut off the defects and through this process reduction in cost of poor quality occurs. This will increase the cost of good quality which means higher funds needed in case of any kind of inspection, testing, monitoring and evaluation, training program for operators, etc. By keeping in view, the Six Sigma philosophy, preferring the quality and making things work right at initial stages, causing increment in cost of good quality, while rushing towards zero defect performance, can be smoothed if process becomes better.

## Research Methodology

This research is survey based and the main focus is on evaluating the recent situation of the construction industry of Pakistan regarding the implementation of quality standards and assessment of cost of quality in construction projects. Flowchart of the tasks accomplished to successfully meet the research objectives as illustrated by Fig. 02. Literature review includes research from different research papers relevant to the topic of research and extraction of relevant data. Research gap is identified from the literature study by analyzing that which part needs to be addressed. Group discussion and interviews include discussions from the staff of different companies running inside Pakistan and conducting interviews from several people working in the construction industry of Pakistan and later sorting out of relevant data from the discussions and interviews. The questionnaire was prepared based on literature review, group discussion, and interviews etc. Pilot study is a process that asks whether something is possible to be done or not. It involves studying the behavior of the research that should it be further proceeded or not. Pilot study has a particular design feature; this study is usually conducted on a minor scale rather than doing a larger scale research. In addition, this study is conducted in order to identify the safety of inventions, enhances the experience of the researchers with different methods of study and most importantly it is helpful in providing estimated for the calculation of sample size for the research in case of quantitative analysis (In J., 2017). Pilot study held in this research tells us that our data is useful and research should be proceeded further to get useful results. The response rate came out as a result of pilot study was 80%.

### Questionnaire Survey

After literature study, group discussion and interviews the questionnaire was finalized. Finalized questionnaire includes three major sections which are as follows:

1. Demographic section
2. Technical section
3. General section

The purpose of the demographic section is to collect Basic information of the respondent. This section is for collecting information about the Name of respondent, Size of organization the respondent is currently working in, Number of employees working in that organization, Annual turnover, Gender and Age of the respondent. The purpose of the technical section is to calculate the possible adverse impact of quality-related factors on total project cost. This section is useful in rating the factors that affect the cost of quality by ranking them as per the data collected from respondents. These factors can be helpful in identifying those critical factors that should be focused and should be eliminated in order to achieve high quality product/service. The purpose of the general section is to collect information about your knowledge related to quality and finding out the percentage of Conformance and Non-conformance costs incurred during Design & Construction phase. Apart from two main sections there are two sub sections as well: General Data and Project Specific Data. The sub-section of general data is related to the perception of the respondent related to the focus over providing quality products/services, the mindset of organization regarding quality that how do they perceive quality in their organization. On the other hand, the second sub section includes the percentage of total costs incurred during Design & Construction phase in the project. This is project specific data and relates to that specific project at which the respondent is currently working. This includes the types of costs: Prevention costs, Appraisal costs, Internal failure costs and External failure costs. These types collectively form the Cost of quality in the construction projects. This data will give us

the percentage amount of cost incurred on quality in each of the construction projects. This has to be filled by the staff working on the project.

**Data Collection**

Sample size relates to the number of people i.e., participants involved in the study. In most of the cases, this number is denoted by n. Sample size impacts two major statistical properties: 1) Accuracy of estimates 2) Influence of the research to extract conclusions.

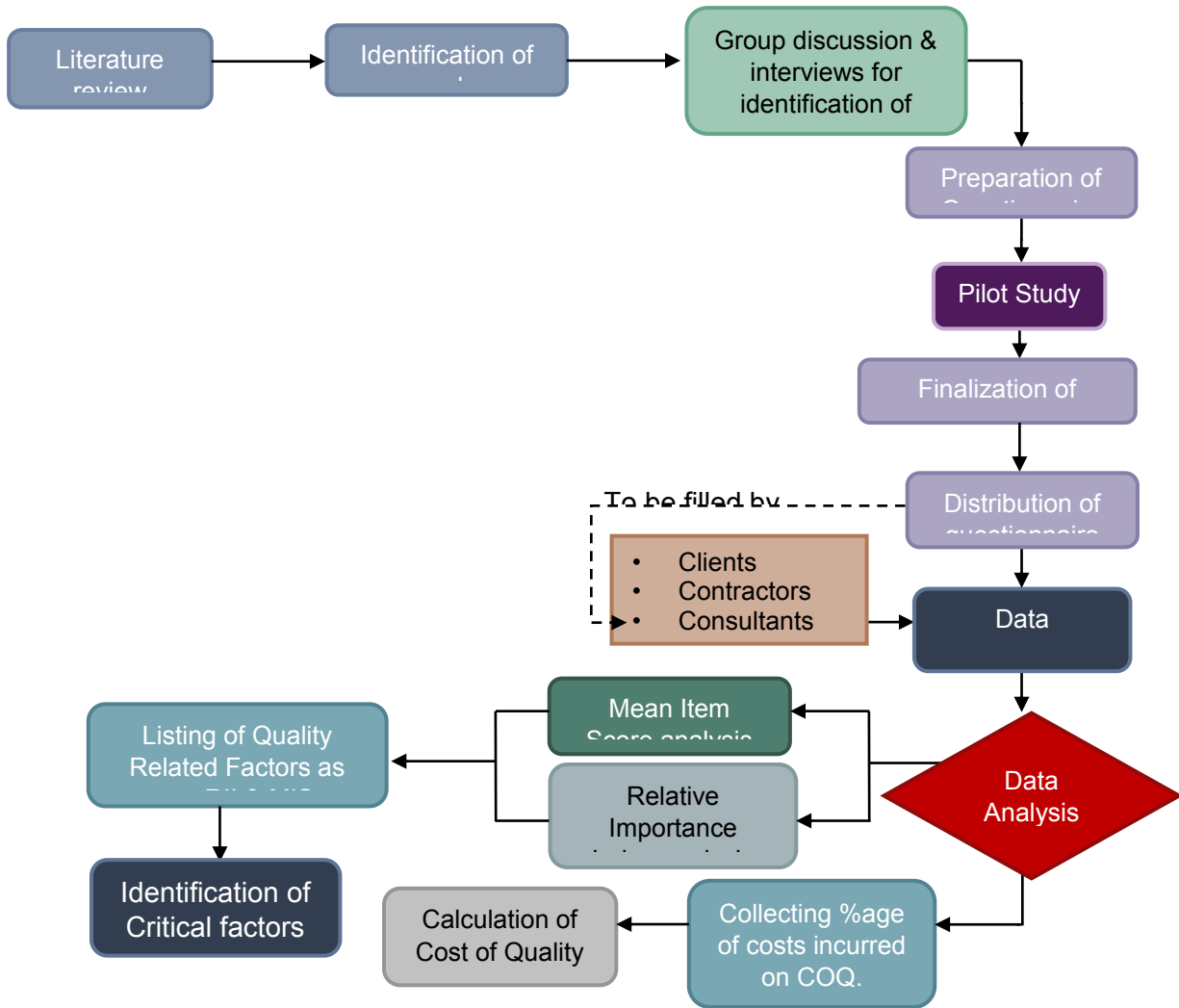


Figure 2 Methodology Flowchart

It is not a matter that how much we pay attention about choosing our population, there still exists a margin of error in the research study. This happens because we are unable to talk to each and everyone in the population of interest. This error is known as Sampling Error. Sampling error influences the precision of the data. This error is although unavoidable, can be improved by sample size. Larger the sample size, lesser will be the margin of error associated with the results. Yet, there is a point where increment in sample size no longer influences the results. This terminology is called as Law of diminishing returns.

Population size in our research is known. So, we can use Kothari’s formula given by Kothari (2004). This formula is useful when the population size is known. Kothari’s formula allows us to calculate sample size by keeping a precision level/margin of error of our own choice, population size of our own choice, and confidence level and response rate gathered using information from survey based on pilot study.

Mathematically, Kothari’s formula is written as:

$$n = \frac{\left( \frac{P[1-P]}{\frac{A^2}{Z^2} + \frac{P[1-P]}{N}} \right)}{R} \quad (4)$$

Where; n = Sample Size required, P = Estimated variance in population, as a decimal; 0.5 for 50-50, 0.3 for 70-30 and 0.2 for 80-20, A = Precision desired, expressed as a decimal; 0.03, 0.05 and 0.1 for 3%, 5% and 10% respectively, Z = Based on Confidence Level (CL); 1.6449 for 90% CL, 1.96 for 95% CL and 2.5758 for 99% CL and N = Number of people in population

Questionnaire was circulated and made to be filled by Clients, Contractors, Consultants and Staff members of different companies pertinent to the construction industry of Pakistan using online platform of Google forms. The aforementioned stakeholders of a typical construction project were the target population of this study and the participants were selected based on their involvement in construction projects and their roles within their respective organizations. The questionnaire was distributed among the population with 20-80 variability as 80% of the population with whom the questionnaire was shared is working in the construction industry and includes engineers.

In this research, following data was assumed:

N = 50,000, A = 5%

For Confidence level = 95%, Z = 1.96

P = 20-80%, R = 80%

So, sample size for the research came out to be 101.

Conventionally, a response rate of 20% is considered as a good response rate, while a 30% response rate is considered to be really good. In our research study, 155 questionnaires were distributed and the number of filled questionnaires collected at the end came out to be 125 which shows the response rate of the study to be 80% which is good enough to rely on. For that purpose Pie charts and bar charts were developed using Microsoft excel. These charts depict the amount of cost spent over quality in specific organizations and also shows the critical factors that affect quality either in positive or negative ways. Charts show the result of the research work obtained from online and in hand questionnaire surveys and interviews conducted at different construction firms.

### Data Analysis

Two different techniques were employed: Mean Item Score analysis and Relative Importance Index analysis. Mean Item Score analysis technique helps in giving a specific value to each factor/statement using summation method (J. Robert Warmbrod). Likert scale of 1 to 5 is used in this questionnaire, representing 1 – “Very Low”, 2 – “Low”, 3 – “Medium”, 4 – “High”, 5 – “Very High”. The Likert scale is most commonly used and reliable method in the field of research. In this research study, Likert scale is use because of the fact that it allows the respondents to prompt that how much they agree or disagree with the provided situations or statements.

Equation to find out Mean Item Score is as follows:

$$MIS = (1n_1 + 2n_2 + 3n_3 + 4n_4 + 5n_5) / \sum N \quad (5)$$

where;

n1 = Number of respondents responding with Very Low

n2 = Number of respondents responding with Low

n3 = Number of respondents responding with Medium

n4 = Number of respondents responding with High

n5 = Number of respondents responding with Very High

N = Total number of respondents

Relative Importance Index (RII) technique has been used in various studies to determine RII for various factors. The five-point scale ranges from 1 to 5 where; 1 indicates Very Low impact and 5 relates to Very High impact, respectively (Sambasivan and Soon, 2007).



Mathematical formula for finding out RII is as follows:

$$RII = \sum W / (A * N) \tag{6}$$

where,

W = Weight of each response given by the respondents. In our case, this data ranges from 1 to 5.

A = It is the highest weightage of scale, which is 5 in our case.

N = Total number of the respondents, 125 in our case.

QRFs were later to be categorized using a quantification method known as Relative Importance Index (RII).

### Results & Discussion

The results are based on the data collected from **125** filled questionnaires, group discussion and some of the company visits conducted to gather information about the assessment of cost of quality in Pakistan’s construction industry. It also narrates the understanding of the personnel working in field about the value of quality standards in their organization. The results obtained are elaborated in the form of charts below.

Following information was collected through questionnaire:

#### Position of respondent

Q: Mention the position of respondent in your company.

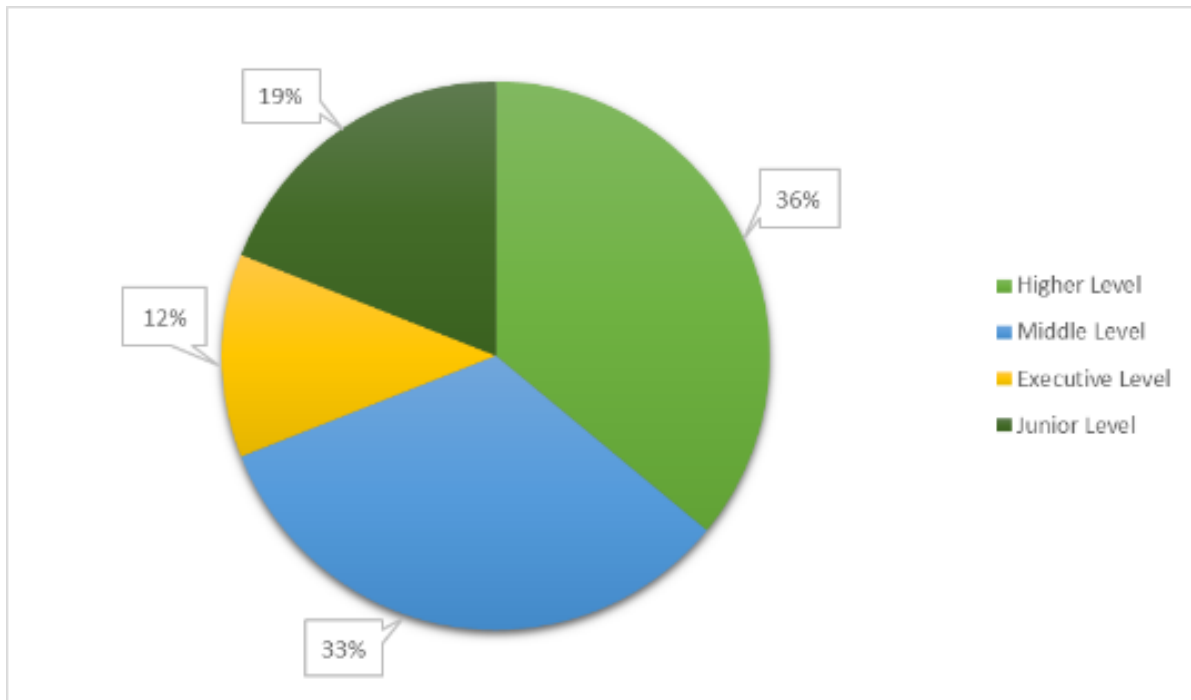


Figure 3: Showing the position and level of respondents in their respective firms who participated to our questionnaire.

This question is basically just to get the idea of respondent working in the construction industry. The position of the respondent tells us about the level of their experience in their organization. The higher the position, the more experienced the respondent will be.

#### Age of the respondents

Q: Age of the respondent filling out the questionnaire.

This question relates to the seniority of the respondent and it is directly related to the experience of that respondent

in the field of work. Most of the respondent lie under the range of 30-45% and that indicates that they have a high work experience and so it gives a better depiction of the construction industry of Pakistan.

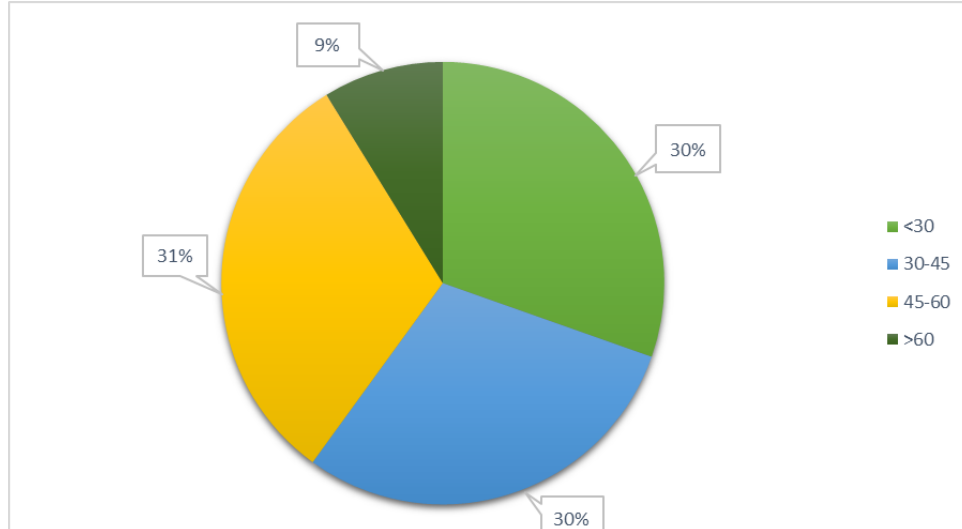


Figure 4: Ages of the respondents who participated in survey

### Gender of the Respondents

Q: Gender of the respondent filling out the questionnaire.

This data somehow shows the ratio of females working in our construction industry. As in the construction industry of Pakistan, mostly male workers prefer to work on construction sites. Trend of females working as a site engineer or on site is quite low in the construction industry of Pakistan

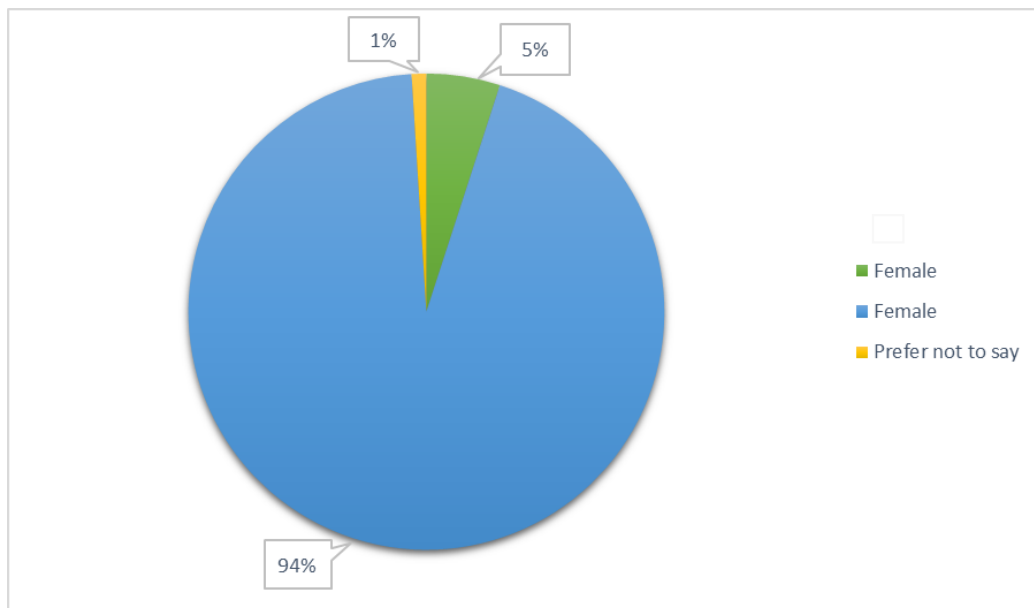


Figure 5: Shows the gender of the respondents

**Perception of Quality**

Q: What is your organization’s perception of quality?

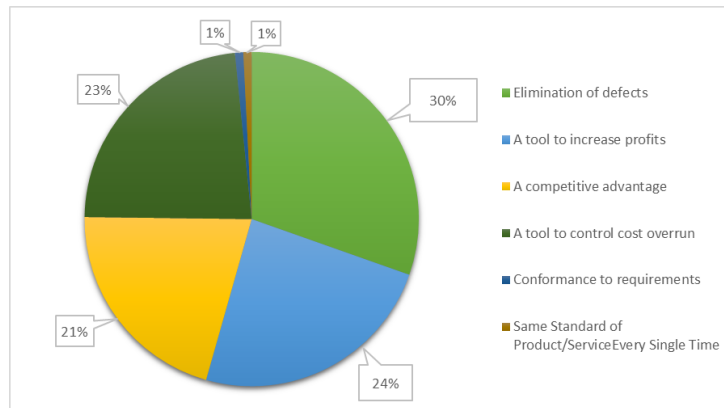


Figure 6: Shows the Perception of Quality

This data is about how different respondents perceive quality or what is the level of perception of quality in their organization. The results show that most of the people working in construction industry take quality as a tool for elimination of defects, then at the secondary position quality is considered as a tool to increase profits and the result obtained at third level is the consideration of quality as a competitive advantage as quality assurance and control helps the organization to maintain a good quality by increasing the profits and attracting the customers towards the organization following quality standards. At fourth position, it is considered that quality is a tool to control cost overrun and then at fifth rank as a tool for conformance to requirements, this shows that some organizations just follow quality in order to fulfill the customer’s requirements, not as a part of their organization’s policy. Least rating was given to the term that quality is followed to maintain same services every time.

**Importance of Quality**

Q: How would you rate importance of quality?

This question is about the importance of quality in the construction industry. The obtained data shows that 57% of the firms consider quality as a very important part of their organization and try to provide quality services, the rest of 27% consider quality as important but they do not consider it as a priority and 16% of the firms follow quality just as per the requirement of the customer, not as an essential part of their organization’s policy.

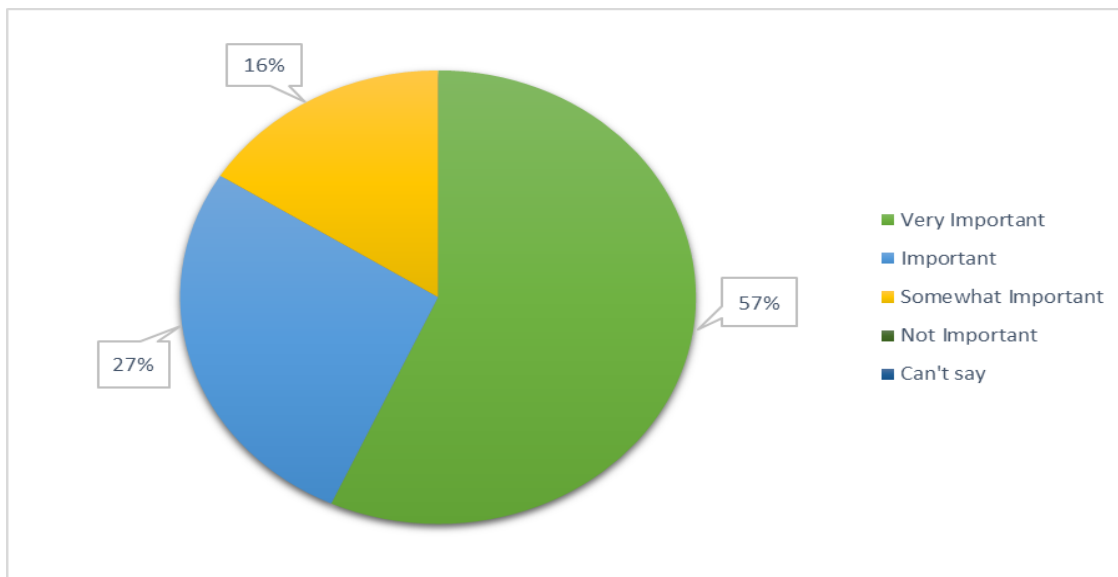


Figure 7: Importance of Quality

**Order of importance**

Q: Write down the order of importance of quality in your organization?

This question is about the order of importance of quality in the construction industry and is a sub-part of previous question asked by the respondents. This shows the ranking of factors that are part of the construction project and depicts the importance of quality in construction industry as per the point of view of respondents.

This data shows that first preference is scope in any construction project that project should be within the scope assigned to the project, at the second rank, comes the quality which is important in order to save the time and money in the construction projects, third important factor is the schedule as timeline of the project should be maintained, the fourth important factor came out to be the cost/budget of the project as it can be compromised due to reworks and operation and maintenance and unfortunately, the least important factor came out to be the safety in construction projects as it should be a priority but it is not considered as an important one in the construction industry of Pakistan as per the responses collected by the respondents working in the construction organizations.

In order of preference from 1 to 5, the results are:

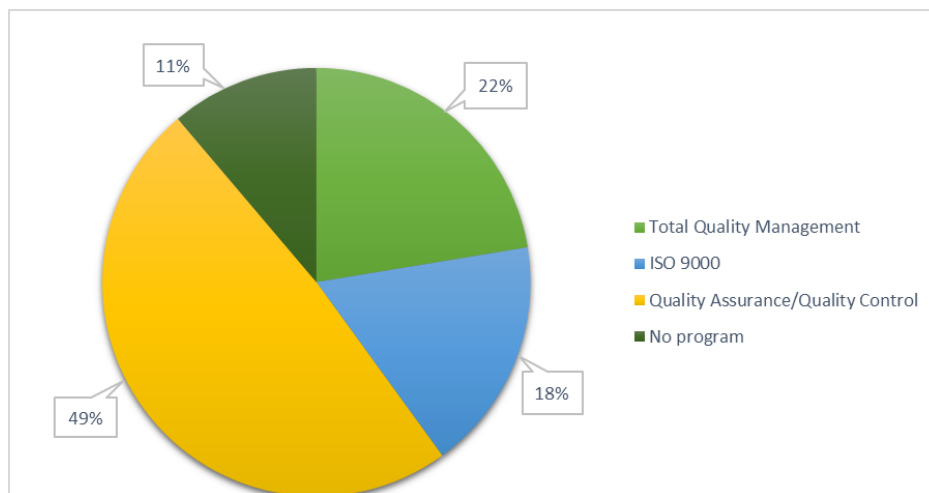
*Table 1: Order of the importance of quality*

Factors	Rating
Scope	1
Quality	2
Schedule	3
Cost	4
Safety	5

**Quality improvement program**

Q: What type of quality improvement program do you have?

This data shows that how many construction organizations have a quality improvement program and the results obtained show that major number of organizations i.e., 49% follow quality assurance and quality control system which go side by side along the project, then at the second position Total quality management (TQM) program is followed in the construction industry which involves long term success of project through customer satisfaction, the third factor is ISO 9000 that is followed by 18% of the organizations as it involves quality management and quality assurance in order to maintain efficient quality system and 11% of the organization do not follow any kind of quality control program in their organizations.



*Figure 8: Quality improvement program*

### Major objectives of program

Q: What are the major objectives of your quality improvement program are?

This question is related to the previous one and collects information about the objective of quality improvement program implemented in the organization. According to major number of respondents i.e., 27%, the purpose of quality management program is to increase the productivity in their firm/organization, 24% of the organizations follow quality management program for cost reduction as implementation of quality reduces the failure costs, rest of 24% of the respondents respond with the result that organizations do follow quality management program in order to comply with statutory authority i.e., to obey the law or to implement the quality policy as per standardization, other 23% of the organizations follow quality management program in order to involve their employees in quality building effort i.e., for the awareness of employees related to quality, less than 1% of the organizations follow quality program to reduce cost with maximum scope in least time.

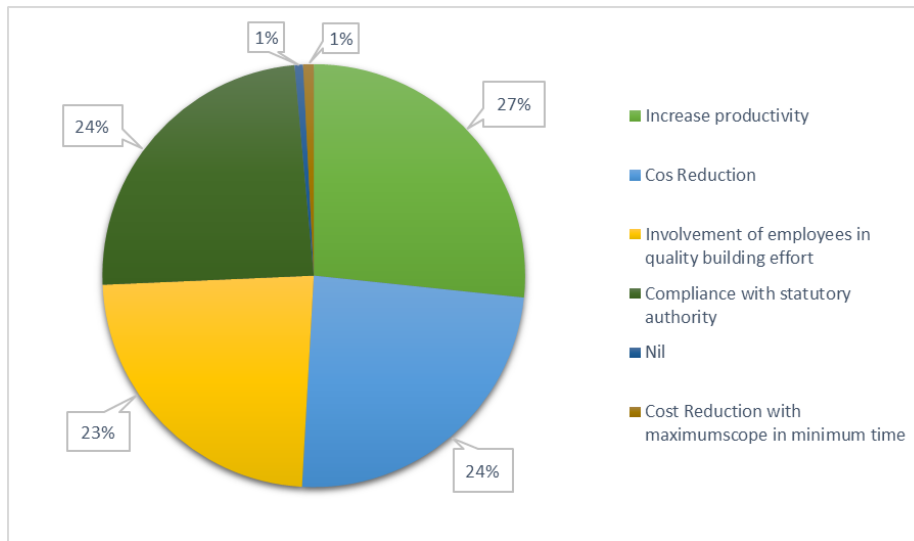


Figure 9: Objectives of Quality observed in different projects

### Quality policy

Q: Has your organization developed a clear quality policy?

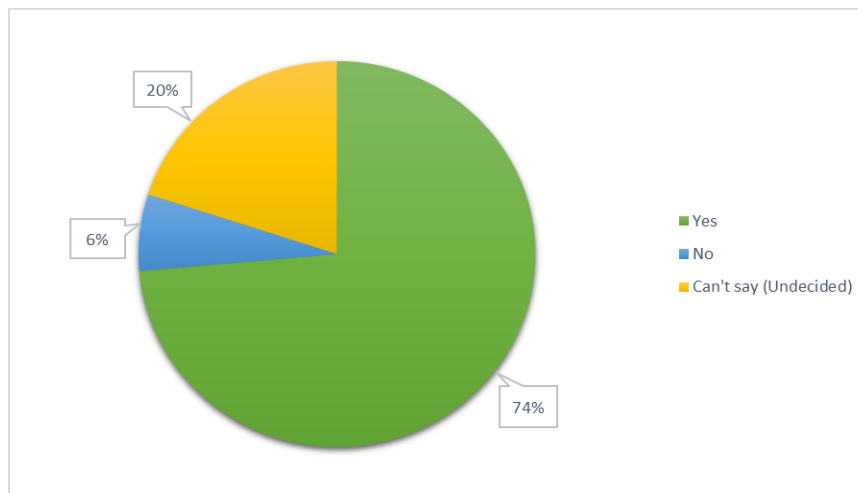


Figure 10: Response of different firms to the question on developing clear policy

This question relates to the fact that either your organization developed a clear quality policy or not. Results show

that 74% of the organization working for building construction have developed quality policy, 6% of the organizations have not developed any kind of quality policy in their organization and rest of the 20% organizations do not have yet a clear idea about the development of quality policy in their organizations.

**Quality definition**

In your opinion, which of these words best define quality?

This data defines quality as per the perception of respondents working in the construction industry of Pakistan. The data shows that the main purpose of following quality in their organization is to satisfy the external customer i.e., clients, in order to get a positive response from the external customer, at the second ranking comes the factor Value for money as by following the quality the customer can get the valuable services, the third preferred factor is the appearance which means that by following the quality appearance of the product/service gets much better and we can clearly predict good quality by the appearance of product/service. Fourth ranked factor is the increase in profits i.e., for the success of any firm/organization the important factors is customer’s satisfaction which usually results in profit enhancement. Teamwork is the fifth ranked factor which means that quality can be achieved by teamwork and proper communication, quality can also be considered to satisfy internal customer (within organization) and by survey this factor came out to be the seventh important one, the least factor that is considered by reading the word quality is the high cost because sometimes it is expensive to follow the quality or plan quality management in short term construction projects.

In order of preference from 1 to 7, the results are:

*Table 2: Responses of difference organizations on the question of what quality means to them*

<b>Factors</b>	<b>Rating</b>
Satisfying external customer (Outside organization)	1
Value for money	2
Appearance	3
Increased profit	4
Teamwork	5
Satisfying internal customer (Within organization)	6
High cost (Expensive)	7

**Factors affecting Project’s COQ**

This question relates to the Possible adverse impact of some factors on Projects’ cost of quality. Following are the results obtained from the Questionnaire survey about the factors that affect cost of quality of a construction project after calculating their Relative Importance Index and Mean Item Score method.

These factors are collected from the literature review, group discussion and interviews and are noticed as the ones that affect the projects’ cost of quality in a positive or negative way. Some factors may have a low impact on projects’ cost while others affect highly on projects’ cost of quality and result in the increment of the failure costs, if not properly mitigated at the initial stage.

**Ranked factors affecting COQ using RII & MIS**

Some of the factors were selected in order to find out their impact on the cost of quality of construction projects. The method used for the calculation of their criticality index is Relative importance index and Mean item scoring method. The results are displayed in tabular form in Table 3.

These factors are extracted from group discussions, literature study and interviews and later weighted as per the responses of the respondents from questionnaire survey. As per the response given by the respondents the factors are arranged as per their sequence in the questionnaire, providing them a weighted average named as Relative importance index. Relative importance index ranks the factors as per their relative importance by using a specific formula and putting down the values into the formula provided by the respondents.

Factors that affect the project’s cost of quality include the duration of the project, it’s location and size. Also, these factors include the experience of supervision team, wages of labors, skill level of labors, type of client and

class of contractor as these factors play important role for the successful completion of the project.

Factors like design errors. Condition of weather, accidents happening on site, equipment downtime, defect in materials and execution errors also play an important role in construction projects as minor defects in any of these factors can cause major effects on the total cost of the project and also can cause a delay in the timeline of the project which in the end results in the increment of the cost of the project and project goes over budgeted.

Also, some factors like plan of improvement of quality, advanced construction techniques and planned cost for the quality control system play significant role in construction and can cause a tremendous change in the cost of quality of a construction project.

All these factors play their own part in the cost of quality of a construction project and these should be focused during initiation of the project so that loss can be minimized at maximum rate and project can end with proposed budgeted rate and proposed timeline.

For ranking of the factors that affect the cost of quality of the project in construction industry, Relative importance index and Mean item score method is used, as these methods are effective for extraction of results from the questionnaire and are reliable to be used in the research work. Relative importance index is a weighted average method and Mean item score is a simple mean method which includes summation of the results and taking average of their sum.

Results are then ranked I the same order of the circulated questionnaire as per their Relative importance index (RII) and Mean item score (MIS) in tabular form as given in Table 3 and Table 4.

*Table 3: Factors affecting COQ with their RII (Unsorted)*

<b>Factors</b>	<b>RII</b>
Project Duration	55.84
Efficient quality management system	63.2
Supervision team experience	61.92
Project complexity & size	64
Project location	61.28
Awareness of quality for project team	60.32
Class of contractor	62.24
Prequalification of contractor	59.52
Client type	59.52
Labor skills	59.36
Percentage of Rejected Submittals	53.12
Prequalification of Suppliers	59.2
Type of contract	55.2
Wages of labor	56.32
Labor turnover	55.52
Design errors	60.96
Plan of improving quality	59.68
Accidents on site	54.56
Defected material	54.56

Equipment downtime	52.8
Execution errors	56
New construction techniques	58.4
Weather conditions	55.84
Procurement & Supply chain	59.36
Special construction engineering requirements	56

Table 4: Factors affecting COQ with their MIS (Unsorted)

Factors	MIS
Project Duration	2.792
Efficient quality management system	3.16
Supervision team experience	3.096
Project complexity & size	3.2
Project location	3.064
Awareness of quality for Project team	3.016
Class of contractor	3.112
Prequalification of contractor	2.976
Client type	2.976
Labor skills	2.968
Percentage of Rejected Submittals	2.656
Prequalification of Suppliers	2.96
Type of contract	2.76
Wages of labor	2.816
Labor turnover	2.776
Design errors	3.048
Plan of improving quality	2.984
Accidents on site	2.728
Defected material	2.728
Equipment downtime	2.64
Execution errors	2.8
New construction techniques	2.92
Weather conditions	2.792
Procurement & Supply chain	2.968
Special construction engineering requirements	2.8

**Categorization of Factors affecting COQ**

Factors affecting Cost of quality are above discussed using Relative importance index and Mean item scoring method and below is the categorization of these factors given in Table 5. Each project is unique in nature and carries its own properties and all these factors vary from project to project.

Factors are collected from literature study, group discussions and interviews and later categorized as per their nature. As it can be seen that the nature of the project involves the study of its size, geographical location, planned budget for controlling quality and the planned timeline of the specific project.

The next category is about contractual terms which includes procurement of either materials or machinery, supply chain management, prequalification of the suppliers and of contractors, contract type involved in the project and plan of quality improvement.

The next category defines factors related to the execution of the project and it involves errors in design stage, advanced construction techniques, errors during the execution phase, special engineering construction techniques



requirements, weathering conditions, accidents and hazards on site, delivery and identification of defected material on site, percentage of the rejected submittals and equipment downtime.

Last category involves workforce required for the construction project which involves following factors: experience of the team supervising the project, type of the contractor hired for the construction, project team’s awareness related to the quality, type of client involved, skill level of labor and their wages and rate of turnover of labors.

These categories are part of the projects’ cost of quality as the factors involved in these broad categories are effective on the construction and could be a reason of criticality of the construction project. These factors, if not properly mitigated, could result in horrible affects in the form of over budgeting and exceeding timeline.

Table 5: Categorization of factors affecting COQ

<b>Factors</b>
<b>Project Nature</b>
Project complexity & size
Project location
Efficient quality management system
Project Duration
<b>Contracts</b>
Procurement & Supply chain
Prequalification of Suppliers
Prequalification of contractor
Type of contract
Plan of improving quality
<b>Execution</b>
Design errors
New construction techniques
Execution errors
Special construction engineering requirements
Weather conditions
Accidents on site
Defected material
Percentage of Rejected Submittals
Equipment downtime
<b>Workforce</b>
Supervision team experience
Class of contractor
Awareness of quality for Project team
Client type
Labor skills
Wages of labor
Labor turnover

**Ranking of factors from Highest to Least RII value**

Factors that have an impact on cost of quality are important to be identified before time so that they can be rectified and cost of quality can be minimized too. Ranking of these factors as per their Relative importance index (RII) is provided in Table 6 and their Mean item score (MIS) is shown in Table 7. Both of these methods are effective to find out the importance index of any kind of factors and are reliable for the research purposes.

The factors are ranked as per their criticality as per the responses of the respondents collected from the questionnaire survey. The factors that are ranked as highly critical include Project complexity & size, Efficient

quality management system, class of contractor, supervision team experience, project location, design errors, awareness of quality for project team, plan of improving quality, prequalification of contractor and client type. These factors are marked as critical for the construction purpose as they effect the cost of quality at higher rates.

The factors having medium effect over the projects' cost of quality are ranked in the following sequence including labor skills, procurement & supply chain, prequalification of suppliers, new construction techniques, wages of labor, execution errors, special construction engineering requirements, project duration, weather conditions and labor turnover. These are the factors that should be focused after the most critical ones in any construction project.

The ones who have least impact on the projects' cost of quality include type of contract, accidents on site, defected material, percentage of rejected submittals and equipment downtime. These factors have not a high impact on projects' cost of quality but still they can play their role by increasing the budget or timeline so they should be carefully handled at the start of the project in order to minimize the losses ate the end.

Factors having ranking from 1 to 10 are termed as critical ones, numbering from 11 to 20 are the ones having medium impact and rest of the factors numbering from 21 to 25 are termed as the least critical ones for the projects in construction industry.

The factors that have highest impact on the projects' cost of quality are discussed in detail below:

Project complexity & size is the most critical factor having highest impact on projects' cost of quality as by increasing the size of the project chances of errors increase and quality should be of main focus in such cases as a minor mistake can result in a huge loss.

Proper budget comes at the second rank that should be allocated for quality controlling system before initiating the project so that if any error occurs in the project there won't be an over budgeting. A specific amount of budget as per the size of the project should be kept safe at side for quality control purposes.

Selection of the project is also an important factor and is rated as the third important factor that should be mainly focused before project commencement. As the relevant contractor can do the construction more efficiently, also he will be able to control the team in more productive way. In the contrast, if the contractor is not relevant to the work or not able to manage the team properly then major losses will occur which can be worse for the reputation of the organization.

The fourth important factor is the team built up for supervision, so this team should have maximum experience so that it would be easy for the team to manage the project efficiently. This will promote the teamwork in the organization and under the right supervision each team member will focus on his own work in a much better way which will result in the growth of the construction industry.

The fifth one is the project's location. Geographical location of the project is of great importance as when it comes to procurement then the remote sites have to face some difficulties in this process. So, location of the project should be identified and budget should be allocated as per the location factor including all the additional amounts that are going to be consumed during the travelling of the materials or machineries. Also, in some areas, there are no experienced worker available so proper training is also required in such cases which eats up much amount of the budgeted cost. Each and everything should be kept in notice in order to successfully complete the project.

Design errors come at the sixth preference but are as critical as the above factors are. Errors during the design phase should be mitigated as early as possible because if these errors continue into the execution phase of the project then it becomes more difficult to mitigate them and it demands more budget and additional time. There should be proper check of the errors in design phase so that each of the team member work properly and do not have to do additional work over dismantling and redesigning.

Another important factor, ranked as seventh one, is the awareness of project team regarding to quality. The team should be trained enough to pay focus on the quality of the project. Quality of the project should not be minimized in any case as it can be much more harmful as it seems in the start. Every team member should be well aware of the fact that quality is of great importance and it cannot be set aside.

The eight importantly ranked factor is the plan for improvement of quality. There should be a proper plan designed

for continuous improvement of quality by making amendments as the time passes by. Plans should not be static, rather they should be improved as per the advanced techniques.

Prequalification of contractor is the ninth ranked important factor to be focused on. Prequalification of contractor is an important process to be carried out for selecting the appropriate contractor for the execution of the construction project. Only a properly well trained and relevant to the project contractor can do his work efficiently and can hold the team in an efficient way through proper communication and guidance.

The factor that came up as the tenth critical one is client type. Client is an entity that provides funding for carrying out the construction either in a direct or an indirect way. Client can be a single person or group of persons taking part in the project’s funding. Client can be of a private sector project or a public sector project. In case of public sector projects, the budget is defined and project should have to be completed within the allocated budget and timeline and is more restrictive while in case of private projects, there can be a chance of additional payment over changing of the nature of work. So, as per the type of client, proper processes should be followed in order to minimize the failures and losses in the construction projects.

Table 6: Ranking of factors affecting COQ using RII (sorted)

Factors	RII	Rank
<b>High Effect</b>		
Project complexity & size	64	1
Efficient quality management system	63.2	2
Class of contractor	62.24	3
Supervision team experience	61.92	4
Project location	61.28	5
Design errors	60.96	6
Awareness of quality for Project team	60.32	7
Plan of improving quality	59.68	8
Prequalification of contractor	59.52	9
Client type	59.52	10
<b>Medium Effect</b>		
Labor skills	59.36	11
Procurement & Supply chain	59.36	12
Prequalification of Suppliers	59.2	13
New construction techniques	58.4	14
Wages of labor	56.32	15
Execution errors	56	16
Special construction engineering requirements	56	17
Project Duration	55.84	18
Weather conditions	55.84	19
Labor turnover	55.52	20
<b>Low Effect</b>		
Type of contract	55.2	21
Accidents on site	54.56	22
Defected material	54.56	23
Percentage of Rejected Submittals	53.12	24
Equipment downtime	52.8	25

Table 7: Ranking of factors affecting COQ using MIS (sorted)

Factors	MIS	Rank
<b>High Effect</b>		
Project complexity & size	3.2	1
Efficient quality management system	3.16	2
Class of contractor	3.112	3
Supervision team experience	3.096	4
Project location	3.064	5
Design errors	3.048	6
Awareness of quality for Project team	3.016	7
Plan of improving quality	2.984	8
Prequalification of contractor	2.976	9
Client type	2.976	10
<b>Medium Effect</b>		
Labor skills	2.968	11
Procurement & Supply chain	2.968	12
Prequalification of Suppliers	2.96	13
New construction techniques	2.92	14
Wages of labor	2.816	15
Execution errors	2.8	16
Special construction engineering requirements	2.8	17
Project Duration	2.792	18
Weather conditions	2.792	19
Labor turnover	2.776	20
<b>Low Effect</b>		
Type of contract	2.76	21
Accidents on site	2.728	22
Defected material	2.728	23
Percentage of Rejected Submittals	2.656	24
Equipment downtime	2.64	25

**Critical Factors effecting COQ**

Most crucial factors for a construction project that affect the cost of quality of a construction project in Pakistan are categorized using data collected from questionnaire surveys, group discussion and interviews in Table 8 also they are ranked as per their Relative Importance Index and Mean Item Score that is also presented in the same table.

The most critical factor in Pakistan’s Construction industry is the Project complexity & size as per the result of Questionnaire survey. As the construction industry of Pakistan is under development so our most of the focus should be on controlling the budget and timeline of the project as per the size of project. For large size projects, it becomes difficult to control the projects’ budget and timeline inside the limitations.

Project complexity & size should be at first priority, everything should be managed in accordance with the size of the projects. Budget for controlling quality should be allocated as per the size of the project because when the

larger sized project is constructed, the more it will become important to spend most of the budget or to allocate the budget for the prevention purposes.

Proper budget comes at the second rank that should be allocated for quality controlling system before initiating the project, selection of the project is also an important factor and is rated as the third important factor that should be mainly focused before project commencement, the fourth important factor is the team built up for supervision, so this team should have maximum experience so that it would be easy for the team to manage the project efficiently, the fifth one is the project’s location. Geographical location of the project is of great importance as when it comes to procurement then the remote sites have to face some difficulties in this process, design errors come at the sixth preference but are as critical as the above factors are because they also play an important role in over budgeting and exceeding timeline at later stages, another important factor ranked as seventh one, is the awareness of project team regarding to quality, the eight importantly ranked factor is the plan for improvement of quality. There should be a proper plan designed for continuous improvement of quality, prequalification of contractor is the ninth ranked important factor to be focused on. Prequalification of contractor is an important process to be carried out, the factor that came out as the tenth critical one is client type. Client is an entity that provides funding for carrying out the construction either in a direct or an indirect way.

*Table 8: Top Critical factors as per RII & MIS method*

<b>Factors</b>	<b>RII</b>	<b>MIS</b>	<b>Rank</b>
Project complexity & size	64	3.2	1
Efficient quality management system	63.2	3.16	2
Class of contractor	62.24	3.112	3
Supervision team experience	61.92	3.096	4
Project location	61.28	3.064	5
Design errors	60.96	3.048	6
Awareness of quality for Project team	60.32	3.016	7
Plan of improving quality	59.68	2.984	8
Prequalification of contractor	59.52	2.976	9
Client type	59.52	2.976	10

***Types of Costs with their Percentages***

Q: Select the specific range of percentage of total cost incurred during Design & Construction phase in your project in following categories.

This section is about the percentages of total budgeted costs incurred on conformance to quality i.e., prevention and appraisal costs and non-conformance to quality i.e., Internal failure and External failure costs.

***Overall Cost of Quality categories along their percentages***

Using data from questionnaires the following result has been concluded in the form of percentage of the total budget spent over Prevention, Appraisal, Internal failure and External failure costs. The data is collected out directly from the questionnaire without sorting out and is presented in Table 9.

Prevention costs come under the conformance costs and include those costs which are to be planned before the commencement of the construction project. These are the costs that should be planned at the start in order to minimize the losses.

Appraisal costs are the ones which move side by side along with execution process and are important to be planned as remodifying the errors as soon as the defect occurs can be much helpful then leaving the errors unmodified.

Internal failure costs are the ones that happen before handing over of project in the forms of reworks and repairing and maintenance either due to inefficient labor, defective materials or faulty machinery used during the construction of the project.

External failures are the ones that occur after handing over the project and these kind of errors result in the loss of profits by delivering the faulty products, loss of reputation and in the forms of repairs that come inside warranty timing.

Summation of all the percentages of all of these costs spent during the construction of building projects is calculated by simply adding up the responses and dividing them by the total number of responses. All the factors have their own percentages as per the perception of the respondents.

Table 9: COQ categories with their percentage

<b>Conformance Quality</b>	
<b>Prevention Costs</b>	<b>Percentage</b>
Filling out documents	17.104
Education/Training	21.368
Review of contract	18.312
Review of design	18.672
Prequalification of contractor	18.664
Quality team build-up	19.728
Supervision of Prevention	20.032
Technical support to suppliers	19.64
<b>Appraisal Costs</b>	<b>Percentage</b>
Cost of testing & inspection of materials	14.16
Cost of final product's testing & inspection	13.904
Quality Supervisor's cost	16.088
Equipment cost (used for quality testing)	15.784
Field testing	17.192
Test vehicles	15.504
<b>Non-Conformance Quality</b>	
<b>Internal Failure costs</b>	<b>Percentage</b>
Rework	15.728
Repair	14.984
Retesting	14.136
Disposal of defective product	15.984
Design Errors	20.48
Scope changes/Change orders	20.68
Poor Supervision	18.008
Material losses/Defective material	17.752
Material Overrun	17.496
Equipment downtime	17.848
Rework labor and Overhead cost	17.928
Delay in schedule	19.28
Over-budgeting	19.416
Fatalities	16.384
Retesting/Reinspection	16.616
Accidents on site	14.144
<b>External Failure costs</b>	<b>Percentage</b>
Repair after handing over	11.96

Cost of servicing & handling complaints	12.648
Warranty repairs	16.176
Replacement costs	19.456
Lost sales due to poor quality manufactured products	15.32
Returns and allowances	17.712

**Cost Categories with highest to least percentages**

Types of costs that have an impact on Project’s cost of quality were identified and organized in tabular form and their respective percentages were being collected using questionnaire survey and the data is sorted out from highest to least percentage as given in the Table 10.

The costs that are having highest percentages and come under the first ten include training or education of the employees, change orders or changes in scope, errors occurring during the design phase, supervision of the team for prevention, building up the team as per quality standards, provision of technical support to the suppliers, cost for replacement, over budgeting, schedule delaying and design review. These costs are the ones that eats up high percentages out of the budget assigned to the project.

Training/education takes 21.4% of the budgeted cost and thus ranked as the first one coming under prevention category, at the second rank comes the change order or changes in the defined scope which can cause you a cost of 20.7% that is very high and it is categorized as internal failure cost, then the third one is about the design errors and it takes 20.5% of the total budget and comes under internal failure costs occurring in the project, then at the fourth rank comes the supervision of prevention which relates to the prevention costs and costs 20% of the budgeted cost, at the fifth rank comes quality team build up process which take 19.7% of the total budget and includes making up a quality team for the successful completion of the project and is referred as prevention cost, provision of technical support to the suppliers have sixth highest percentage amount of 19.6% and is related to the prevention category; this cost includes educating the suppliers about the technical issues arising during their work, seventh important cost is the cost for replacement and causes 19.5% of the total budget; this cost includes replacement of any existing faulty product or removal of the low quality product by replacing it with a high quality one an comes under external failure costs, 19.4% of the total cost exceeds due to over budgeting and this comes under the costs that occur due to internal failures of the organization, at the ninth rank comes the schedule delay which is related to the internal failure cost and mostly happening in almost every construction project; this cost exceeds 19.3% of the total budget allocated for the construction project, the tenth critical cost came out as review of design and is located under the prevention category; the cost spent over this cost is 19.3% of the total budgeted cost; this cost is basically related to reviewing of the design proposed for the construction project as it should be an essential part of the project to review the errors beforehand so that they can be mitigated on time without delaying the schedule.

Rest of the costs include prequalification of contractor, review of contract, poor supervision, rework labor and overhead cost, equipment downtime, material losses/defective material, returns and allowances, material overrun, field testing, filling out documents, retesting/reinspection, fatalities, warranty repairs, quality supervisor’s cost, disposal of defective product, equipment cost (used for quality testing), rework, test vehicles, lost sales due to poor quality manufactured products, repair, cost of testing & inspection of materials, accidents on site, retesting, cost of final product’s testing & inspection, cost of servicing & handling complaints, repair after handing over.

All of these costs carry out some specific percentage as per the nature and the complexity of the project. This data shows that you have to spend more on prevention for saving a large amount of internal and external failures at later stages. Most of the companies ignore the prevention costs as they take a part of budget to be allocated specifically for the prevention purpose but these costs save the internal and external failure costs by saving the time spent in remodifying the errors and by saving much amount of the budget allocated to that specific project.

Table 10: Overall COQ from High to Low percentage

Cost of Quality (COQ)	Percentage
Education/Training	21.368
Scope changes/Change orders	20.68
Design Errors	20.48
Supervision of Prevention	20.032
Quality team build-up	19.728
Technical support to suppliers	19.64
Replacement costs	19.456
Over-budgeting	19.416
Delay in schedule	19.28
Review of design	18.672
Prequalification of contractor	18.664
Review of contract	18.312
Poor Supervision	18.008
Rework labor and Overhead cost	17.928
Equipment downtime	17.848
Material losses/Defective material	17.752
Returns and allowances	17.712
Material Overrun	17.496
Field testing	17.192
Filling out documents	17.104
Retesting/Reinspection	16.616
Fatalities	16.384
Warranty repairs	16.176
Quality Supervisor's cost	16.088
Disposal of defective product	15.984
Equipment cost (used for quality testing)	15.784
Rework	15.728
Test vehicles	15.504
Lost sales due to poor quality manufactured products	15.32
Repair	14.984
Cost of testing & inspection of materials	14.16
Accidents on site	14.144
Retesting	14.136
Cost of final product's testing & inspection	13.904
Cost of servicing & handling complaints	12.648
Repair after handing over	11.96

**Broad categorization of COQ categories**

Using results from the questionnaire survey and after the collection of the respective percentage of different types of costs consumed during the construction of a building project the following table is formed having collective percentages of various types of costs spent over quality during their construction.

This data shows that cumulative Prevention cost is higher than the Appraisal, Internal failure and External failure cost, which shows that if you spend over prevention which is before the initiation of the project you can save the amount to be spent later on the failures.

Most of the construction companies do not plan prevention before the initiation of the construction projects and eventually they have to face failure costs in an amount double to the prevention cost.



Prevention costs are higher in amount but they are refundable i.e., if you plan prevention on time you will save the failure cost eventually which usually comes out to be the double of prevention cost.

All the four broad types of costs are given in Table 11. This data includes prevention costs which carries 15.5% of the total budget to be specifically allocated for prevention purposes, then we have the appraisal costs which move along with the execution process and takes 12.3% of the total budgeted amount, internal failure costs are the ones that occur before handing over the project and takes 13.9% of the total budget and the category named as external failure costs that are related to the cost occurring after handing over the project to the client, these costs eat up to 12.6% of the total budgeted cost also causing many other disadvantages to the organization that are unhidden at the moment but appear as the time passes by i.e., loss of reputation.

Table 11: Broad categorization of COQ categories

Type of Costs	Percentages
Prevention Costs	15.52
Appraisal Costs	12.3
Internal Failure Costs	13.9
External Failure Costs	12.6

**Cost of Quality calculation**

Cost of quality spent over a building project can be find out in the form of controlling costs and controlling failure costs, using data from questionnaire surveys, can be calculated using various formulas as already elaborated.

**Total Cost of Quality (COQ<sub>T</sub>)**

Total cost of quality is the sum of all costs including all kind of Prevention costs, Appraisal costs, Internal failure costs and External failure costs. All of the types of costs spent over quality combine to make total cost of quality.

Total cost of quality can be found using *Equation 1*

$$COQ_T = \text{Prevention Cost} + \text{Appraisal Cost} + \text{Internal Failure Cost} + \text{External Failure Cost}$$

$$COQ_T = 15.52 + 12.3 + 13.9 + 12.6$$

$$COQ_T = 54.32\%$$

This calculation shows that half of the cost of construction of a building project is consumed by the quality. This shows the importance of quality and this clearly shows that quality should be of prime importance during the construction of any kind of project. Ignorance of quality can lead to disastrous effects including lost sales, poor repute and also can cause complete shutdown of the organization.

**Cost of Good Quality (COGQ)**

Cost of Good Quality includes only Prevention costs and Appraisal costs which means that this cost is related to the quality control before handing over the project. This cost basically involves the budget reserved for the omission of the failures and for rectification of the failures during the project completion process i.e., operational phase.

Cost of Good Quality can be found using *Equation 2*

$$COGQ = \text{Prevention Cost} + \text{Appraisal Cost}$$

$$COGQ = 15.52 + 12.3$$

$$COGQ = 27.82\%$$

This result shows that almost 28% of the cost of project is consumed in controlling the quality in construction project of Pakistan. Cost of Good Quality includes the prevention and appraisal costs which are an important part of the projects' budget. Specified budget should be allocated for the Cost of Good Quality which can be utilized during the project and if remain untouched then it can be considered as the increase in profit.

### **Cost of Poor Quality (COPQ)**

Cost of Poor Quality includes only Internal failure costs and External failure costs and these costs always result in the budget overrun of the construction project and should be minimized in order to avoid poor services and products.

Cost of Poor Quality can be found using *Equation 3*

$COPQ = \text{Internal Failure Cost} + \text{External Failure Cost}$

$COPQ = 13.9 + 12.6$

**$COPQ = 26.5\%$**

This data shows the cost spent over controlling the failure done by the organization either in the form of any kind of loss. This cost includes internal and external failure cost of a project. This shows that if you are not willing to spend on prevention then you will have to loss almost 27% of your total budget over controlling the failure.

### **Conclusion**

In conclusion, the research conducted offers critical insights into the state of quality management practices within Pakistan's construction industry, specifically focusing on the design and construction phases of building projects. Through a robust quantitative methodology involving data collection from 125 questionnaires, group discussions, and interviews, a pervasive lack of emphasis on quality management practices has been revealed, with numerous organizations failing to allocate adequate budgets for quality assurance and control. This dearth is compounded by the absence or ineffective enforcement of clear quality policies.

The identified critical factors affecting the Cost of Quality (COQ), notably project complexity and size, efficiency of quality management systems, contractor classification, supervision team experience, and project location, elucidate the multifaceted nature of quality challenges prevalent within the sector. Particularly pertinent is the recommendation to pay heightened attention to project size and complexity in Pakistan's context, given the exigency for heightened safety measures on-site.

This study significantly contributes to the existing body of knowledge by quantifying the total COQ and delineating its constituent elements: prevention costs, appraisal costs, internal failure costs, and external failure costs. These findings provide empirical evidence of the financial repercussions associated with overlooking quality management.

Practitioners within the construction industry are strongly encouraged to prioritize quality improvement initiatives by formulating clear quality policies, judiciously allocating resources, and establishing dedicated quality control management departments within their organizations. Such actions, underpinned by empirical insights, advocate for a transformative shift towards proactive quality management methodologies.

In summary, this research underscores the imperative of prioritizing quality assurance and control mechanisms within construction organizations to bolster project outcomes and mitigate financial risks. By addressing the identified deficiencies and implementing the recommended strategies, stakeholders can endeavor to elevate standards of quality in construction endeavors, thereby fostering sustainable development and ensuring the safety and satisfaction of all involved stakeholders.

### **Limitation of work and future work recommendations**

While this research provides valuable insights into the construction industry of Pakistan, it's important to acknowledge its limitations. The focus on structural design and construction phase, as well as exclusively on building projects, may limit the applicability of findings to broader contexts. However, the inclusion of both private and government construction companies in the questionnaire survey enriches the data diversity. Moreover, the comprehensive assessment of the cost of quality through multiple data collection methods demonstrates the thoroughness of the research. These limitations present opportunities for future studies to expand the scope and enhance the depth of understanding within the field.

Research efforts should focus on assessing the long-term impact of quality management practices on project outcomes, conducting benchmarking studies to identify best practices, exploring the integration of emerging technologies in quality management, investigating cross-cultural perspectives on quality management, examining sustainability integration in quality management frameworks, and studying the human factors that influence the effectiveness of quality management initiatives.

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## Impact of Perceived Organizational Support on Employee Turnover Intention: The Mediating Role of Job Burnout

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### **Abstract**

*This study is an investigation into the association between employee turnover intention and perceived organizational support of employees as well as the mediating effect of job burnout. Job burnout has received exceptional attention in business research because it has several negative consequences on employee performance. Although employees from all fields of work get effected but burnout is a critical phenomenon for nursing community. Besides existence of plethora of research related to burnout, limited studies have discussed its role as a mediator between perceived organizational support and the turnover intentions. Current study conducted a cross-sectional analysis of the data to analyse the phenomenon quantitatively. Sample of study contains 212 nurses employed at private hospitals of Pakistan. A questionnaire given out by the researcher was used to gather data in a formal setting. The regression analysis was performed to analyze a linear relationship between the variables of study. Preacher and Hayes technique was used to investigate the mediation effect between the variables (Hayes & Preacher, 2010). Results reported in the study, as supported by the theory, demonstrated that perceived organizational support has statistically significant negative relationship with turnover intention of employees (Galanis et al., 2024). Results also found that job burnout is negatively associated with perceived organizational support and employee turnover intention and mediates the relationship between perceived organizational support and turnover intention in employees.*

**Keywords:** Perceived Organizational Support (POS), Job burnout, Turnover Intention.

### **Introduction**

Job burnout has received exceptional attention in organizational behavior research because it has several negative consequences. It is a common phenomenon among nursing staff. Hospitals complex and stressful work environment has been considered the basic cause of high burnout ratio among nurses (Saifan et al., 2022). Several studies have focused on work environmental factors contributing in job burnout (Iftikhar Ali, 2022). Moreover, it is found that perceived organizational support may results in reduced burnout among the employees (Saifan et al., 2022). Earlier, it was argued that there is a significant negative correlation between perceived organizational support and job burnout (Akgunduz et al., 2023; Kao et al., 2022). Similarly, turnover intention is also a common phenomenon in workplace having several negative consequences especially in nursing staff. Also, there is a significant negative relation between perceived organisational support and turnover intention (Wu et al., 2023).

A recent study was conducted to investigate the relationship between perceived organisational support and employee turnover intention on employees, where it was found a negative relationship between perceived organisational support and employee turnover intention (Buriro et al., 2022). However, different researchers studied the relationship between perceived organisational support with job burnout and turnover intention

separately, but there is a lack of studies emphasizing on the mediating role of job burnout between perceived organisational support and employee turnover intention.

The effect of social support on job burnout and employee turnover intention was studied where it was concluded that social support is negatively associated with both job burnout and turnover intention (Wu et al., 2023; Yousaf et al., 2020). Moreover, the mediating effect of emotional exhaustion on employee turnover intention in nursing staff was researched, however, other dimensions of job burnout were ignored (Tang et al., 2023). Therefore, there is a need to understand the mediating role of the whole construct of job burnout between perceived organisational support and turnover intention. Furthermore, there is a lack of studies emphasizing the proposed model in nursing staff especially in Pakistan. Therefore, this study will examine the mediating role of job burnout between perceived organisational support and turnover intention.

### **Contextual Analysis**

Study explores the phenomenon of turnover intention as a harm to organization. Study attempts to build a relationship between organizational support and turnover intention. It is argued that if organization is supportive and values its employees they become more loyal and engaged resulting into a stronger bond between employees and the organization. Resultantly, there is a lower intention towards employee turnover. On the other hand, study argues that lower organizational support leads to job burnout and it results into intention to quit. Research question of the study is 2 fold, (1) *to analyze the impact of perceived organizational support on employee turnover intention* (2) *mediation effect of employee burnout between perceived organizational support and employee turnover intention.*

## **Literature Review**

### **Organizational Support**

Perceived organizational support is the extent to which staff members feel their company appreciates their contributions, is concerned for their welfare, and satisfies their socio-emotional needs (Yaghoubi et al., 2014). In workplace literature perceived organizational support has been widely studied with organizational, individual and job-related factors. Organizational behaviour researchers believed that POS is one of the major predictors of job outcomes. POS significantly contributes in psychological well-being of employees (Bravo-Yanez et al., 2016). When studied as a mediator between organizational justice and trust, POS is found to significantly mediate the relationship (Arif et al., 2020). However, psychological well-being is one of the major predictors of burnout among employees (Ilyas et al., 2023). Perceived organizational support has been studied with relation to different job outcomes such as job satisfaction, commitment and employee performance (Haq et al., 2023). POS is the most crucial factors in relation to job satisfaction (Duan et al., 2019). According to POS theory, it contributes in satisfaction of employees regarding their job by increasing their wellbeing (Godinic et al., 2019). However, it is argued that POS is negatively associated with job dissatisfaction and job burnout (Saadeh & Suifan, 2020). Lack of organizational support contributes to high employee dissatisfaction and burnout among the Korean nurses (Galanis et al., 2023).

Relationship between POS and job burnout was studied by taking the frontline hospital employees as unit of analysis (Hameed et al., 2022). It was found significant relationship between POS and all three aspect of burnout during job which include personal accomplishment, emotional exhaustion and depersonalization (Dubose, 2020). Moreover, the relationship between POS and employee turnover intention among child welfare employees was studied, and it was found out that POS is has significant indirect effect on turnover intention among employees (Siddiquei et al., 2022). Moreover, a study analyzed the effect of organizational perceived support made through the employee development training on employee turnover intention. The study found that POS in the form of employee development trainings negatively associated with employee turnover intention (Rawashdeh & Tamimi, 2020).

### **Job Burnout**

According to Terry (1997), "job depression a malaise of the spirit" is the definition of job burnout (Terry, 1997). Regardless of nature, burnout occurs at work and can lead to dissatisfaction, despair, emotional retreats, and health

issues. In workplace literature, there has been discussion of the relationship between job burnout and employee performance, satisfaction, and motivation. The most outstanding research on job burnout has been credited to Christina Maslach (Maslach et al., 2001). She described job burnout as a persistent response to interpersonal and emotional pressures at work (Maslach et al., 2001). Maslach (2001) identified three elements of job burnout: emotional weariness, depersonalization, and personal accomplishment. The primary condition of job burnout, which explains the stress component of job burnout, is emotional weariness, whereas depersonalization is crucially linked to job burnout.

From an organizational perspective, job burnout over time can impair an employee's motivation, productivity, and capacity for critical thinking. Maslach created the Maslach fatigue Inventory (MBI), a tool to measure employee job fatigue. The MBI consists of 22 items, nine of which are concerned with emotional exhaustion, five with depersonalization, while the remaining eight are only concerned with personal achievement. According to Brady et al. (2020), high EE, high DP, and low PA lead to a high level of occupational burnout (Brady et al., 2020).

### ***Job Burnout and Turnover Intention***

There are different outcomes of burnout such as individual health, job attitude, and turnover intentions (Lancaster, 2019). Burnout adversely affect the physical and mental health of a person (Towey-Swift et al., 2022). Many researchers have also identified the same phenomenon in a person suffering from burnout. Burnout has been linked to both turnover and the intention to leave the nursing workforce, according to research on the subject (Liu et al., 2018). The likelihood of nursing staff leaving has a two times stronger correlation with emotional weariness as a symptom of job burnout. Burnout results in high absenteeism and is linked with negative job attitude such as high turnover intentions, low job performance, and lower organisational commitment (Ilyas et al., 2023).

### ***Turnover Intention***

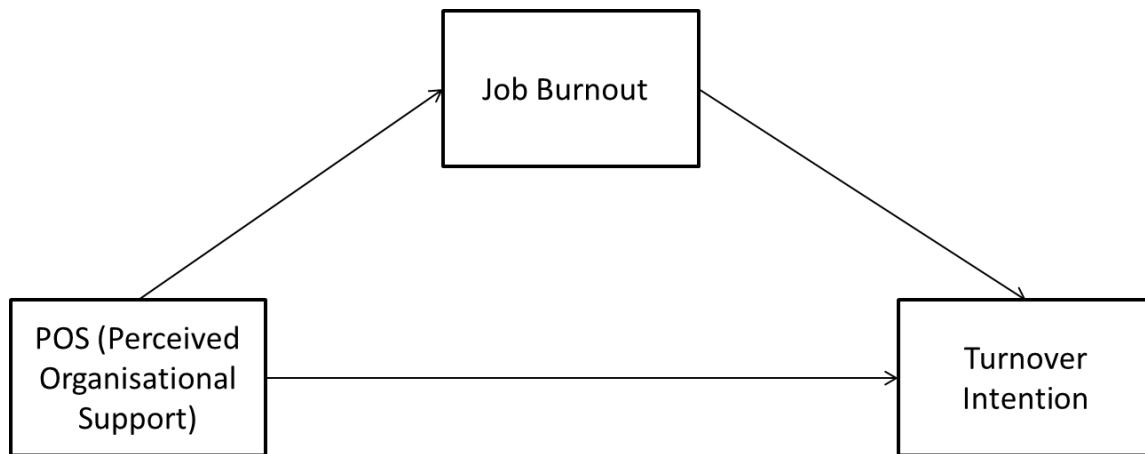
Employee turnover intention is the workplace issue which has to be managed for proper execution of organizational affairs because employees are the scare competitive assets of organisations (Dysvik et al., 2010). Researcher reported that turnover intention is negatively associated with organizational profit (Sija, 2021). Employee thinking about leaving the organisation gradually loses interest in job duties and ultimately his/her performance goes down which could lead to higher training cost or termination (Lin & Huang, 2020). On the other hand hiring a new employee is also an overhead cost for the organisation as well. There are several consequences of turnover including high replacement cost (Kang et al., 2018).

According to one analysis, the apparent or direct recruiting expenses are roughly equal to 21% of compensation, however the hidden costs of lost productivity are equal to 79% of income (Kang et al., 2018). These expenses cover missed productivity as well as the price of hiring and orientation.

According to Wen et al. (2020), employee turnover intention is significantly predicted by workplace stress. In addition to researching the direct effects on workers' intentions to leave, researchers have also looked into the mediating elements in this phenomenon. In workplace literature, intention is used as a stand-in for turnover, particularly about nurses. In one study, instructor communication and turnover intention were found to be significantly correlated in a sample of 231 newly licensed nurses (Chegini et al., 2019).

### ***Theoretical Framework***

The perceived organizational support idea was put forth by Eisenberger et al. in 1986. Employees usually believed, in accordance with the POS theory, that the company valued their contributions to organizational performance (Ali et al., 2022) and cared about their well-being to meet their socio-emotional needs. In organizational behaviour research, the researchers argued that perceived organizational support contributes to employee performance and also decreased negative job outcomes such as turnover intention. Therefore, this study proposes that decreased/less organisational support may lead towards decreased well-being and likely to contribute to burnout. And in case of high burnout employee intention to leave would be high; therefore job burnout mediates between POS and turnover intention.



**Variables:** **Dependent:** Turnover Intention (TI) **Independent:** Perceived Organisational Support (POS)  
**Mediating:** Job Burnout (JB)

## Research Methods

### Respondents and Sampling

Using a proportionate stratified sampling technique, a sample of 215 female registered nurses employed in private hospitals and clinics within the Faisalabad District was gathered. There are 18 private hospitals in Faisalabad and several private clinics exist; but in this study clinics having more than 6 nurses have been included. Total of 610 registered female nurses in total were included in the sampling frame. The type of organization was the basis for the development of two strata. i.e. Private Hospitals (n=167) and Private Clinics (n=48). Of 199 completed questionnaires (92%), 157 female nurses (78.9%) worked in private hospitals and 42 female nurses (21.1%) worked in private clinics.

A cross-sectional survey was used in this investigation. Data were gathered using questionnaires that were given out by researchers. The method was applied to help the responders understand the questions. The majority of respondents filled out the questionnaires that the researcher gave them in a classroom setting; very few respondents were contacted one-on-one to gather data. The high response rate was due to the adoption of researcher-administered questionnaire survey approach.

### Instrumentation

Validated scales were utilized to measure every construct in the investigation, guaranteeing the excellent reliability and validity of the questionnaire. Additionally, a four-step translation approach developed by the World Health Organization (2015) was used to translate the adopted scales into Urdu, allowing respondents to better comprehend the underlying meanings of each question and item.

Perceived organizational support among registered female nurses was measured through SPOS 8-items scale developed by Eisenberger (1997). The items were rated on 7-point Likert scale (0=Strongly Disagree to 6=Strongly Agree). In this study, the value of Cronbach's Alpha Coefficient for SPOS 8-item is 0.601. On the other hand, registered female nurses employed in teaching hospitals had their job burnout measured using the 22-item ( $\alpha=0.921$ ) Maslach Burnout Inventory (Maslach et al., 1986). A 7-point Likert scale (1 = Never to 7 = Always) was used to rate the responses. At last, Vigoda (2000) designed a 3-item ( $\alpha=0.949$ ) measure to ascertain the intention of employee turnover. A 5-point Likert scale was used to assess the replies (1 being strongly disagree and 5 being strongly agree).

### Ethical Considerations

Approval for data collection was acquired from relevant hospital and clinic authorities in accordance with research ethics. Additionally, prior to data collection, the respondent consent statement, the research purpose, and the estimated time to complete the questionnaire were communicated. Research participants received no incentives.



In addition, nurses were notified that their personal information would be kept private and their consent was obtained.

### Data Analysis

Following completion of the questionnaire survey delivered by the researcher, data were entered using data processing software (Microsoft Excel 2010) in a predetermined format. To undertake data analysis, professional Statistical software (SPSS Version 20) was employed. The study employed descriptive statistics to examine the demographic factors of participants, while inferential statistics was utilized to examine the correlation between the variables under investigation. Additionally, the study instrument's validity and reliability tests were carried out. Preacher and Hayes (2004) used a bootstrap technique to evaluate the mediation role of job fatigue between perceived organizational support and turnover intention. It is the most up-to-date and precise method for mediation analysis (Beatriz et al., 2020).

### Reliability and Validity

The relevant validated scales were used in this study to guarantee high standards of validity and reliability. Table 1 provides the Cronbach's Alpha Coefficient value for each scale. A high degree of internal consistency is indicated by values greater than 0.70 (Taber, 2018).

However, the Principle Component Analysis method was applied to guarantee the validity of the constructions. The numbers in Table 2, which demonstrate that the KMO values for each construct are over 0.60 at the significance level of  $p < 0.05$ , indicate that the instrument has good validity and that there is a substantial association between each construct's item.

**Table 1: KMO Measure of Sample Adequacy**

“Constructs”	“Number of Items”	“KMO Measure of Sample Adequacy”	“Barlett’s Test of Sphericity” Sig.
Perceived Organizational Support	08	0.853	0.000
Job Burnout	22	0.809	0.000
Employee Turnover Intention	03	0.776	0.000

Results of factor loadings of items of all constructs found greater than 5 (threshold) which authenticate the construct validity including discriminant and convergent validity.

### Results

#### Descriptive Statistics

Approximately 76% of the 199 registered female nurses who responded are under 30 years old, and 78.9% of them work in private institutions. About one-third of the participants acquired both a nursing diploma and a degree from graduation. Nonetheless, the majority of respondents 68.8% work as "Staff Nurses," followed by "Midwives" (14.1%) and "Head Nurses" (15.2%). While 17.6% of respondents have 10 to 20 years of experience, 60.8% of respondents said they have less than five years of work experience.

#### Correlation Matrix

Table 4 presents the correlation matrix of study variables . Perceived organizational support negatively associated with job burnout (-0.689) consistent with previous studies (Zeng et al., 2020). Perceived organizational support also negatively associated with turnover intention (-0.541) consistent with past studies (To & Yu, 2023); whereas job burnout and turnover intention are also positively correlated (0.734).

**Table 2: Correlation Matrix**

	Organizational Support	Job Burnout	Turnover Intention
Organizational Support	1		
Job Burnout	-.689**	1	
Turnover Intention	-.541**	.734**	1

\*P < 0.05; \*\*P < 0.01; \*\*\*P < 0.001

**Mediation Analysis**

In order to ascertain the mediation between the research variables, direct and indirect effects were examined. Five thousand bootstrap samples were taken in order to implement the Preacher and Hayes (2004) mediation technique. Moreover, calculations were made for the upper confidence limit (UCL) and lower confidence limit (LCL). The combined direct and indirect effects are displayed in Table 5.

**Table 3: Preacher and Hayes 2014) Mediation Results**

Perceived Organizational Support → Job Burnout → Turnover Intention	Effect	LCL	UCL	Significance
<b>Total Effect</b>	-0.7151	.6015	.8287	0.000
<b>Direct Effect</b>	-0.3841	.2525	.5158	0.000
<b>Indirect Effect</b>	-0.3309	.1963	.5105	

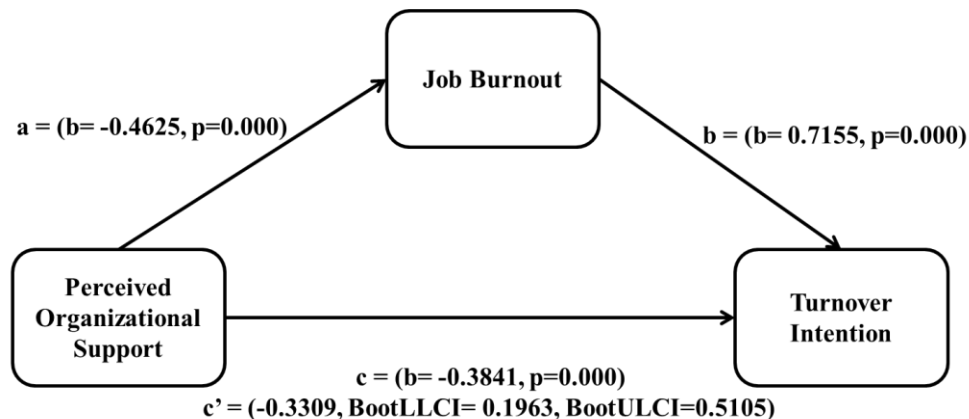
Note. N= 199. Bootstrap sample size 5,000. Unstandardized regression coefficients are reported. LCL = lower Confidence Limit UCL= upper Confidence limit .

**Independent Variable = Perceived Organizational Support**

**Dependent Variable = Turnover Intention**

**Mediating Variable = Job Burnout**

Table 5's findings demonstrate that turnover intention is predicted by perceived organizational support (POS) (b=-0.7151). Additionally, both path "a" and "b" are significant because job burnout and perceived organizational support strongly predict burnout (b= -0.4625, p=0.000) and turnover intention (b= 0.7155, p=0.000), respectively. Because the indirect effect's LCL (0.1963) and UCL (0.5105) values do not contain zero, indicating that the association between perceived organizational support (POS) and turnover intention is partially mediated by job fatigue. According to the Direct Effect's significant value (b=-0.3841), there is a partial mediation. Preacher and Kelley (2011)'s high value (K2 = 0.3032, BootLLCI = 0.18932, and BootULCI = 0.4462) ultimately validates the partial mediation and lends partial support to the proposed model.



## Discussion

Descriptive statistics were employed in this study to analyze respondent demographics in connection to study variables.

**Table 4: Demographics to POS , Turnover Intention and Job Burnout Ratio**

		POS	Job Burnout	Turnover Intention
		Mean	Mean	Mean
<b>Age</b>	<b>Less than 20 Y</b>	2.75	2.72	3.28
	<b>21 to 30 Y</b>	3.03	2.40	2.32
	<b>31 to 40 Y</b>	3.05	2.58	2.65
	<b>41 to Above</b>	2.83	2.87	3.07
<b>Qualification</b>	<b>Matriculation</b>	3.15	2.50	2.57
	<b>Intermediate</b>	2.75	2.62	2.83
	<b>Graduation</b>	3.00	2.47	2.50
<b>Organization</b>	<b>Private Hospitals</b>	2.93	2.54	2.66
<b>Type</b>	<b>Private Clinics</b>	3.03	2.55	2.58

Young nurses have been shown to express high levels of burnout and a relatively high intention to leave their jobs, based on the data presented in Table 6. However, the results show that nurses above the age 41 years also reported turnover intention and burnout. This might be the fact of age factor as mental ability has decreased in that particular age. Interestingly, burnout and turnover intention persists among nurses and there is no association with education. This indicates that their amount of education has no bearing on their capacity to manage stress and burnout at work. This implies that there is a need of proper training for the nurses to handle work stress and burnout. Nurses working in private hospitals report more turnover intention than private clinics. This may be the cause of the longer workdays, unstructured occupations, and additional duties in private hospitals. Additionally, analysis reveals that 37% of respondents had moderate to severe burnout. This suggests that about one-third of nurses experience burnout at work. This corroborates the comparable results of earlier research (Tang et al., 2023b).

Furthermore, the study's outcomes and conclusions demonstrate that POS has a strong correlation with both job burnout and intention to leave. High burnout nurses are more likely to want to quit. However, nurses experienced high POS reported less burnout and also have less turnover intention as compared to nurses reported decreased/less POS. Therefore, by controlling burnout the healthcare managers can minimize the turnover intention among nurses. Additionally, the study demonstrates a strong correlation between the intention to leave one's employment and job burnout. The greater job burnout score suggests that nurses are highly likely to quit. This supports the proposed theoretical framework. Significant results of total, direct and indirect effect indicates that job burnout partially mediates between POS and turnover intention. So, the significant results of mediation analysis also support the theoretical framework that job burnout mediates between POS and turnover intention. By improving the perception of organizational support, healthcare managers can reduce the intention of female nurses to leave, which in turn reduces the likelihood of burnout among nurses.

### Limitations

There are certain restrictions with this study. First of all, there are restrictions associated with the use of cross-sectional research design. By looking at the link between study variables over time, longitudinal research design allows for the inference of more contemporaneous and real outcomes. Additionally, the study only examines a limited sample of female nurses working in private clinics and hospitals. Therefore, it is advised that the proposed model be retested in subsequent research using a sizable sample size in various environments and circumstances.

This study looks at job burnout as a single construct to investigate the relationship between POS and turnover intention; nevertheless, it is recommended that future research look at the study variables dimension wise for a deeper analysis of the proposed model.

### Implications

In order to maintain organizational goals and objectives, job fatigue and turnover intention are significant workplace elements that must be addressed for optimal performance (Ali & Waqas, 2022). Research indicates that burnout negatively affects a number of job outcomes, including performance and job satisfaction. According to this study, one of the main factors influencing nurses' intentions to leave their jobs is their perception of organizational support. As a result, managers of healthcare facilities must make sure that this perception of support permeates their employees' intentions to leave. This study adds in existing literature that job burnout mediates between POS and turnover intention. Moreover, POS is negatively associated with job burnout; and job burnout is positively related with turnover intention. The study's empirical results indicate that healthcare managers can enhance nurses' perceptions of the organization's concern for their well-being by implementing POS initiatives. This could lead to a decrease in burnout and a decrease in nurses' desire to leave the profession.

### Conclusion

This study was among the first to examine the function of job burnout as a mediating factor in the relationship between employee turnover intention and perceived organizational support. The survey comes to the conclusion that burnout and staff turnover intention are the main workplace issues Pakistani hospitals are dealing with. Hospitals and clinics in the public and private sectors both experience this issue. It is also established that there is a favorable correlation between turnover intention and job fatigue and POS. Additionally, it acts as a partial mediator in the connection between POS and turnover intention.

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# Infrastructure Development (Physical), Economic Growth and Policy Choices: A Cross-Country Analysis

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## Abstract

*The following study inspects the influence of the physical infrastructure on economic growth of Asian countries. The countries in the studies are under-develop and have same geographical area. Countries from where data is selected for examination are Pakistan, China, India, Bangladesh, Iran and Sri Lanka. The data of last 50 years have been regressed from 1970 to 2019 of Pakistan, China, India, Bangladesh, Iran and Sri Lanka. The findings explain that there is substantial relationship between infrastructure development and economic growth; infrastructure reflects physical. Energy consumption (oil) other variables proved positively significant relationship with economic growth. Policy has been recommended for economic growth and approach to value the variables according to needs and financial constraints and then prioritize the sectors in which government should invest.*

**Keywords:** Economic growth, Infrastructure development, Physical infrastructure.

## Introduction

There is a heated debate regarding the relationship between the economic growth versus infrastructure development and its policy implications. Multipurpose studies regarding these issues were conducted since the late 90's. The role of infrastructure is very much important in economic growth over long run. There are two types of infrastructure defined by the researchers Physical Infrastructure. The studies on physical infrastructure relationship has been conducted by (Aschauer, 1989; Lau & Sin, 1997; Lynde & Richmond, 2019; McGuire, 1990; Ratner, 1983). They have attempted to capture the relationship between public infrastructure capitals and the total factor productivity of the US economy and established that there is a positive effect of public infrastructure capital growth on the economy of US and the effect was highly significant and positive. Likewise, numerous such studies have been conducted in China regarding this subject. China had executed very high infrastructure (physical) investment policy for economic growth (Démurger, 2001; Nannan & Jianing, 2012; Sahoo, 2010; Wang, 2002) their studies show the highly significant relationship transpires between infrastructure (physical) development and economic growth. The last two decades of the Pakistan economy has shown a little bit of boom. The last 5 years the economic policies were infrastructure intensive, due to that the GDP has raised (Batool, Awais, Rehman, Shafiq, & Dar, 2019; Ellahi, Awais, & Raza, 2018; Yaqub, Rehman, Awais, & Shafiq, 2018) and also a high raise in infrastructure development in the country with remittances boost in early 2000. The economy had seen investment in infrastructure development through connection of roads and mainly CPEC.

## Research Problem

Infrastructure investment in Pakistan is more focused towards physical infrastructure i.e. roads and highways and tangible infrastructure projects and is it as beneficial for the economic growth for the struggling country as it is portrayed. In the light of this the research problem of studies will look into the factors which are more inclined towards investment in physical infrastructure. So, this has been further operationalized into following research objectives.

### **Research Questions**

The previous studies demonstrated the a rather positive relation between the public investment in infrastructure and economic growth. In the light of this there are following research questions.

- Does physical- infrastructure play major part in the economic growth?
- Viability of infrastructure development in short run and long run?

### **Research Design**

Direction, technique and research design depends upon the types of inquiry in qualitative, quantitative and mix-method approach (Creswell, 2014). This research is directed towards quantitative methods to look at the elements of infrastructure development, economic growth and policy choices by analyzing the indicators in physical and non-physical infrastructure. Researcher has selected descriptive research design for this research because data required for this research is external, secondary taken from World Bank statistics. As this research is based on quantitative research methods with descriptive design; data has been produced and results have been described in tabular form. Data and result have been produced in order to meet the objective of research.

### **Research Strategy**

Creswell examined an inquiry into social and human issues demanding of testing and speculation or hypothesis made out of factors, estimated with numbers and broke down with measurable strategies. In the direction of this researcher used quantitative research strategy because it involves, he measures of tangible and countable features with the help of available statistical data.

### **Literature Review**

The observed research on effect and the role infrastructure plays in economic growth started after the foundational work by (Aschauer, 1989) where Aschauer reasoned that public spending is reasonably productive, and the decrease in the U.S productivity was in direct relevance to decline in the public infrastructure and has assessed the relation between the infrastructure stock and growth in USA that mainly comprises of physical infrastructure that include roads and highways, gas and electricity and mass transport systems that can be elaborated as fundamental infrastructure stock. (Fedderke et al., 2006) scrutinized the relationship of infrastructure investment by the government and output growth, by analyzing the data set of 88 countries the variable he opted was stock of infrastructure. The time series selected was from 1960 to 2000. PMG (pooled mean group) was employed for the estimation of the data and estimates are statistically significant and also stout to alternate infrastructure measures and dynamic specifications.

Straub and Terada-Hagiwara (2011) explained the overview of infrastructure development in context of developing Asian countries. This paper applies two discrete approaches that are growth regressions and accounting of growth to investigate the linkage between productivity of an economy and economic growth and infrastructure. Egert, Kozluk, and Sutherland (2009) found that infrastructure has enhanced the economic growth in OECD countries through economies of scale, network externalities and enhancement in market competition. They found a strong and positive impact of efficient investment in telecom and power sector in long run economic growth across the countries. Despite that the transportation sector effects are not included in these positive effects on economic growth.

The literature above gives a thorough image of studies that are conducted in different parts of the globe regarding infrastructure development and economic growth. From developed economies to the developing economies. The literature mainly comprises of Physical infrastructure development and its effect whether its long run or short run.

### **Research Gap**

The research gap that has identified is that there isn't enough research present that has shown that either infrastructure investment/development can be used as a tool to maintain or increase the rate of economic development and also which side of infrastructure either physical or nonphysical infrastructure should be used in a long run for better economic growth.



## Model, Data and Methodology

### *Theoretical Framework*

Infrastructure can be divided into two physical and non-physical; there are studies that show the effects and impacts of different variables from physical having significant effect on economic growth. Physical infrastructure has a significant role in economic growth as defined by (Button, 1998). Physical infrastructure can be further examined by different variables. (Economics, 2017; Pillai, 2008; Sahoo & Dash, 2012; Shoukat, 2017) these papers show the significance of physical infrastructure in economic growth in different economies including Pakistan's. Electricity production and consumption is a crucial part of an economy. Electricity consumption is regarded as key variable to see the effect of infrastructure development on economic growth; the electricity consumption has a significant impact both in short and long-run on economic growth (Abbas & Choudhury, 2013; Chaudhry & Safdar, 2012; Egert et al., 2009; Kusharjanto & Kim, 2011; Muhammad & Wasif, 2012; Shahbaz & Feridun, 2012; Ullah, 2013). Oil consumption is also used as a proxy of physical infrastructure; it has significant positive impact on the economic growth in Asian economies. Construction Industry has a big share in Asian economies, construction is highly significant impact on economic growth (Aqeel, 2001; B. Huang, Hwang, & Yang, 2007; Chaudhry & Safdar, 2012).

### Hypothesis

#### *Hypothesis 1*

$H^0$  = There is significant relationship between physical infrastructure and other variables defined in study.

$H^1$  = No significant relationship between physical infrastructure and other variables defined in study.

#### *Data and Data Sources*

The data will be used is panel data of last 50 years and 6 countries Pakistan, India, China, Bangladesh, Iran and Sri Lanka. The data source is World Bank.

#### *Econometric Model*

The model has used four variables because of their significance level based on their R Square values by using simple regression ARDL approach is used for forecasting and to disentangle long run relationship from short run dynamics. The researcher has used ARDL approach because of time series data also ARDL method is used for stationery and non-stationery data. The data has auto regressive nature and value of all variables is determined by its past values and some adjustment factors. ARDL is also used to find out the long-term relationship between variables i.e. between physical, nonphysical, and economic growth. In addition, it is statistically much more significant approach for the determination of co-integration relationship in small samples while allowing different optimal lag of variables.

The model for the estimation is ARDL Model. ARDL was used by (Y. Shin, M. Hashem, n.d.) (Richard J. Smith, n.d.) (Z. Khan, Rabbi, Ahmad, & Siqun, 2019).

$$\Delta Y_{GD(it)} = a_1 \mathbf{Electric}_{it} + a_2 \mathbf{Energy}_{it} + a_3 \mathbf{Industry}_{it} + \mu_{it} \quad (\text{Eq. 1})$$

It's a Log-Linear model as the values of GDP Per Capita changed to log values to change it to percentage values.

Electricity Consumption Kwh Per Capita as Electric, Energy Consumption (Oil Kgs) , Per Capita as Energy and Industry (construction) Value Added % GDP as Industry. Whereas ( $i$ ) is cross section and ( $t$ ) is time from 1970-2019.

$\lambda_1$ ,  $\lambda_2$ , and  $\lambda_3$  are coefficient and  $\mu_{it}$  is the error term.

$$\Delta Y_{GD(it)} = \lambda_1 \mathbf{Electric}_{it} + \lambda_2 \mathbf{Energy}_{it} + \lambda_3 \mathbf{Industry}_{it} + \mu_{it} \quad (\text{Eq. 2})$$

## Results and Interpretation

**Table 1.1: Unit Root Test**

Results of Panel Unit Root Tests		
	Levin-Lin-Chu (2002) (LLC)	
Variables	I(0)	I(1)
Electricity Consumption	-1.36109 (0.0867)	-0.10686 (0.000)
Energy Consumption (oil)	-0.39282 (0.3584)	-0.10686 (0.4574)
Industry (Construction)	0.93371 (0.8248)	-0.10686 (0.000)

The results of Table 1.0 illuminate that the variables are integrated at  $I(1)$ . The results support us to use ARDL Bound Test approach for cointegration.

**Table 1.2: Long Run Analysis:**

### Long Run Equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Electricity Consumption (kwh)	0.001454	0.000468	3.10485	0.0022
Energy Consumption (Oil Kg)	-0.00132	0.000549	-2.404559	0.0172
Industry(Construction)	0.087863	0.022017	3.990662	0.0001

Table 1.2 shows the results for the long run. The variables are significant, 1 % change in electricity consumption changes GDP by 0.0014 %, as the developing economies are mostly reliant on industrial and services sector for the growth these sectors highly dependent of electricity consumption the positive relation that means higher the consumption higher the GDP (Siddiqui, 2004). 1% increase in Energy Consumption (Oil) decreases GDP by 0.00132 % as oil is being imported for the domestic usage also for industrial usage that has impact on balance of payments that in broad terms effects the GDP inversely. Same results have been shown by (Khan et al., 2019; Chaudhry et al., 2012). 1% increase in Industry (construction) impacts the GDP 0.08%, construction industry is an integral part of economic growth and also it is related to other sectors of economy too as construction provide much employment and also it mobilize the private sector as well that also play important part in economic growth (Durdyev & Ismail, 2012; Farooqui, Ahmed, & Lodi, 2008).

**Table 1.3: Short Run Analysis**

### Short Run Equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
$\Lambda$	-0.097585	0.037756	-2.584657	0.0105
D(GDP(-1))	-0.044608	0.114935	-0.388116	0.6984
D(ELECTRIC(-1))	-0.004981	0.004832	-1.030835	0.304
D(ENERGYOIL(-1))	-0.002775	0.002965	-0.935938	0.3506
D(INDUSTRY(-1))	-0.06275	0.063979	-0.980789	0.328
C	0.321247	0.160305	2.003968	0.0466

Mean dependent var	0.111017	S.D. dependent var	1.064845
S.E. of regression	1.257494	Akaike info criterion	-1.431262
Sum squared resid	281.47	Schwarz criterion	0.074943
Log likelihood	336.6893	Hannan-Quinn criter.	-0.828477

Table 1.3 reports the short run findings, major portion of variables show insignificant relationship with the GDP, industry (construction), electricity consumption and energy consumption (oil).  $\lambda$  denotes the speed of adjustment towards the equilibrium or the convergence towards the long-run equilibrium, at every year 9.7% adjustment takes place. Most of the variables show the negative impact on economic growth, in long-run these variables showed the positive impact on the economic growth. That means sudden boom in the education, health and physical infrastructure don't show any positive impact on economic growth. But in long-term these investments bear the fruit of economic growth. That means government shouldn't stop investment in education, health, construction industry and energy infrastructure sector.

## Conclusion and Policy Recommendations

### Conclusion

Infrastructure development plays a crucial role in economic growth, whether its physical infrastructure or non-physical. The results show the significance of physical infrastructure. The physical variables have positive and significant effect on economic growth in long run except Energy Consumption (oil). Other variable does show the significance and the movement towards the long run equilibrium.

Electricity consumption has shown positive response towards the economic growth, as in previous years there was significant government spending in the electricity projects that shows the importance of energy sector spending in Pakistan. While Energy Consumption (oil) has negative impact on the economy as larger portion of the oil is imported from the international market and government buy it on deferred payments which leads to increase in foreign debts and the current account deficit. So rather than using imported oil we should move towards the local energy sources. In accordance to the study if we see the results, there are similarities and the results shows the significance of the selected variables on the economic growth. China is leading the way in world of production and capturing the international markets through the infrastructure investment in the developing countries. Results has also shown the significant investment in infrastructure in India. The investment in infrastructure and the education infrastructure has grown greatly. The estimations and results show the positive impact of infrastructure in the Indian economy ultimately leading to economic growth. As of Bangladesh, The study shows the positive impact of the variables on the economic growth but with higher investment in the long run.

### Policy Recommendations

Governments should invest in the sectors that are craving more funds like energy production and roads infrastructure. Physical infrastructure is regarded as a defining variable for economic growth, it's a necessity for domestic and commercial sector of the economy. Long term investment in electricity infrastructure and construction industry which will also benefit the economy. Lastly the unavailability of technological advancement to process the crude oil for future consumptions has negative effect on the economic growth which can be changed by technological advancements so that we can process the crude oil domestically. Collective Policy Recommendations for Developing Economies (India, Pakistan, China, Iran, Bangladesh, & Srilanka). Economy of developing economies (India, Pakistan, China, Iran, Bangladesh, & Srilanka) is heavily oil reliant with no real foreign exchange and not having the technological advancement to process the crude oil for future consumption purpose. and cause inflation in the country. The governments of above-mentioned developing economies need to make a concerted effort to diversify its energy reliance on solar, hydro, and clean coal.

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## Green Tourism and Revisit Intention: The Role of Place Attachment, Loyalty, and Sustainable Practices

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### Abstract

*The tourism industry is considered an imperative financial driver in a few nations. Therefore, travel industry specialists consider the elements that could give them a serious advantage, particularly in drawing in recurrent appearances to specific traveler objections. The tourist immersion in green environment has a positive impact on tourist revisit intention. Place attachment and place loyalty positively mediate the relationship between tourist immersion in green environment and visitor revisit intention. The moderator technological innovation and low carbon practices positively moderated the association of tourist immersion in green environment and tourist revisits intention. This study used a survey research design, with data collected from both international and local visitors. Data was collected using simple random sampling. The SmartPLS software was used to perform Confirmatory Factor Analysis (CFA) on the model's fit, convergent validity, and discriminant validity. This study contributed to the existing literature. It might further develop information regarding the comparability and contrasts in factors impacting return to expectations*

**Keywords:** Green Environment, Tourism, Revisit intention, Place attachment, Place loyalty, Technological innovation

### Introduction

The travel sector focuses on migrating to a new location with the intention of making money there, traveling from one location to another, spending time outside of one's former neighborhood, investing leisure time, and engaging in other activities. In the countries where tourism is the main industry, it plays a significant role in providing people with a living standard (Shin & Jeong, 2022). Travel industry advertisers face mounting pressure from limited budgets and escalating global competition, amplified by technological, market, and societal changes (Wei et al., 2022).

Our craving to encounter new societies, distant places, or adjoining displays has not reduced amid the lockdown. People look for associations with one another, different cultures, and nature. Turning toward virtual substance may be an impermanent break into a different universe, which feels off-kilter, energizing, and new, yet embracing online assets with webcams, cell phones, or stages transforms into the new typical (Li et al., 2022). The travel industry repeats the sensation of investigating the actual world in the virtual domain in the type of mental voyage. It could, in any case, be early days, yet we can perceive how innovation is beginning to take structure in the movement business (Wei et al., 2019).

Revisit intention (RI), a significant variable to quantify a vacationer's goal to return to or return to a location, isn't just a considerable part of traveler conduct but a fundamental mark of the practical improvement of the site. Understanding the determinants of sightseers' ability to return for legacy objections can give chiefs the

establishment for overseeing legacy objections. Studies have shown that the validity of the legacy of the travel industry is a fundamental component that impacts sightseers' RI (Yoon et al., 2021).

A few examinations have characterized a return to expectations regarding the travel industry's objections. It describes the return to expectations as the probability of guests returning to a vacation location later. Return to goals, and the singular's eagerness likewise connect as far as possible (Khan, Awais, Khan, & Khan, 2017; Ullah, Zeb, Shah, & Awais, 2020). It presents that a guest's readiness to return to a traveler objective in something like a year depicts their return to goals conduct. For instance, the expected result for a specialist co-op is to see a guest return soon after network creation through quality help. This situation makes a return to goal conduct (Yang & Zhang, 2022). A few markers are connected to return to expectations: consumer loyalty, client unwavering, administration quality, corporate picture, and close-to-home encounters. The creators further contended that help quality and profound encounters connect to consumer loyalty, impacting the corporate image and client dedication. In this manner, fulfillment affects the chance and assumptions for a guest's return to expectations (Lee et al., 2020). We expand the precursors of return to goals to put the connection in the conviction that a traveler's objective's social and co-native peculiarities are significant for a guest's return. The travel industry writing has long centered on unwinding factors that drive sightseers' meeting and returning to designs or keep them from returning to an objective. Tourist revisiting intentions can have various benefits in terms of environment, economy, and society.

Tourists who revisit a destination may be more likely to engage in sustainable tourism practices, such as reducing waste and supporting eco-friendly initiatives. Revisit intentions can also contribute to the preservation and conservation of natural resources and local ecosystems, as tourists may become more aware of the impact of their actions on the environment (Bhutto et al., 2021). Tourist revisits intentions can increase local businesses' revenue and create job opportunities for the local community. Repeat visitors may also be more likely to spend more money during their stay, contributing to the local economy. Tourist revisit intentions can help build a sense of community between visitors and locals, creating a positive and welcoming atmosphere (Seeler et al., 2021). Repeated visits can also lead to the development of long-term relationships and a deeper understanding of local culture and traditions.

The term "green environment" typically refers to an environment that is healthy, sustainable, and supports the well-being of humans and the natural world. It characterizes by a commitment to environmental sustainability, which involves reducing harmful impacts on the environment, conserving natural resources, and promoting eco-friendly practices (Bhutto et al., 2021). A green environment can achieve through various means, such as reducing carbon emissions and shifting towards renewable energy sources, promoting sustainable agriculture and land use practices, reducing waste and pollution, and increasing public awareness and engagement in environmental issues (Seeler et al., 2021). The concept of a green environment is often associated with achieving sustainable development, which seeks to balance economic growth with social and environmental well-being.

Regarding the previous and given the strategic hardships connected with estimating genuine (re)visitation, scientists have turned their advantage to past appearance, objective reliability, the expectation to return to an objective, and aim to suggest a goal, taking into account every one of these as its possible markers (Schioapu et al., 2022). However, an adequate number of studies have recently centered on this return to pointers, their interrelationships remain rather dubious, and the individual informative force of proposed models is very restricted. Considerably more, analysts have conceptualized these pointers as parts of travelers' general conduct expectations or objective steadfastness (Peng et al., 2023). The goal to return to and the expectation to prescribe an objective has all the earmarks of being the most widely recognized proportions of faithfulness toward an objective.

Ecotourism projects utilize sustainable energy from sun, wind, water, and biomass. Pay from ecotourism empowers them to use these assets, assisting with drawing in additional travelers and incrementing the wellspring of income. Neighborliness areas in ecotourism projects had additionally set up significant rules for running their tasks reasonably, incrementing their current circumstance kindness and incrementing the greatness and prevalence of their travel industry business (Wang et al., 2022). Hydroelectricity utilizes for lighting, warming the water, preparing food, cooling things, saving food, warming the space, and water flow in the home and other electrical

machines. Likewise, power is valuable for washing garments and dishes, utilizing dryers and air filters, getting ready toasts and food, watching TV, and utilizing cell phones and TVs. Utilization of these electrical things assists with saving energy and safeguarding the environment (Errichiello et al., 2019).

By the by, different analysts demand that goal to return to ought to reject from objective reliability estimation. That accurate loyalty can be best reflected either by the expectation to suggest an objective responsibility or by the aim to offer alone (Wang, 2022). The place is necessary to the travel industry. The feeling of spot additionally alluded to as place connection, topophilia, and local area opinion has gotten significant consideration in the travel industry studies since it both adds to and impacts the travel industry. Place connection has gotten a lot of concern, who conceptualized place connection and delineated its multi-disciplinary establishments. Much writing on place connection praises its estimations and legitimacy (Trunfio et al., 2022). Although specific sites and conditions have adverse consequences, these spots (like home, working environment, church, neighborhood, city, nation, and mainland) have solid, beneficial outcomes that are answerable for personality definition, significant residence, and esteem advancement. Most examinations on connection to put have zeroed in on the scope of the area. For instance, connections to houses and places seem as social conditions. Additionally, different examinations have zeroed in on the actual component of spot connection rather than its social attributes (Lee et al., 2020). They viewed connection to the neighborhood as the most fragile alongside house and city while laying out that social connection is more prominent than actual connection.

Place connection additionally connects to travelers' reliability in the travel industry encounters the board guidelines, local area investment and arranging, and occupant commitment. Usually, this examination centers on vacationer factors and has not underlined the extent of spot connection in foreseeing travelers' return to expectations. However, the meaning of the return to goals is significant in the vacationer's writing (Yoon et al., 2021).

This study is significant for traveler experts to recognize substantial variables during the travel industry areas and augmentations. The travel industry board must also know the main factors driving a return to goals while considering place connection. Significantly, this study means quite a bit to guests to ponder what physical and administration natural offices they anticipate from the travel industry objections given their psychological delegate conduct of spots (Wei et al., 2019). In any case, the utilization of position connection as a middle person in the relationship between climate and return to aim is deficient. Place connection as a middle person between past visits and return to expectation. Place connection utilizes as a determinant of goal return. Objective picture joins return to expectation with place connection as a go-between. In addition, past proof has examined the return to aim in food habitats; the celebration focuses and wearing objective with fewer observational examinations (Yang & Zhang, 2022). These investigations have similarly concentrated on climate and spot connection at the total level, accordingly expanding the conflicting discoveries on place connection writings. It got critical consideration in the travel industry studies since it both adds to and impact vacationer.

## Literature Review

### Cognitive Appraisal Theory

The Cognitive Appraisal Theory (CAT) explains how humans respond to external stimuli by judging their personal relevance, resulting to emotional responses. Emotions result from a person's cognitive interpretation of an input, impacting their behavior. According to CAT, a person's emotional response is determined by their mental appraisal of a stimuli, which then influences their behavior, including consumer behavior, as they act on their emotional evaluations (Choi & Choi, 2019). Feelings affect social responses and are a person's versatile significance examination or assessment of their inclinations. In this way, individuals will likewise answer the upgrade when a climate invigorates individuals. This individual assessment of the environment includes the both internal and outside assessments. Internal assessment is the inward perceptual assessment of characters, convictions, and objectives, or at least, the perceptual assessment of oneself. Conversely, outer assessment alludes to the outside perceptual assessment of item execution and criticism from others, or at least the perceptual assessment of the climate (Jiang, 2020).



## Impact of tourist revisits intention on tourist immersion in a green environment

In the connection between the travel industry, vivid discernment, and RI, the travel industry discernment might view as a natural boost, and RI might view as a human conduct reaction. The mental examination hypothesis of the feeling hypothesis makes sense in that conduct is shaped by the connection between people and the climate, which is significant for concentrating on customer conduct in the environment (Hofmann et al., 2020). Tourist revisit intention can positively impact tourist immersion in green environments. Repeat visitors are more likely to develop a sense of familiarity and attachment to a destination, leading to a deeper appreciation and engagement with the natural environment.

Tourist immersion in green environments often characterizes by a sense of connection and engagement with nature, as well as an understanding and appreciation of a destination's environmental and cultural context. Repeat visitors may be more likely to seek out and engage in eco-friendly activities, such as hiking, bird watching, or wildlife conservation efforts, which can enhance their natural environment experience (Thipsingh et al., 2022). Tourist revisit intention can also increase support for environmental conservation and sustainable tourism practices. Repeat visitors who have developed a sense of attachment to a destination may be more likely to advocate for preserving the natural environment and support local initiatives to promote environmental sustainability (Chen et al., 2023). It can create a more supportive and engaged community of tourists, locals, and businesses committed to protecting and preserving the natural environment. Overall, the impact of tourist revisits intention on tourist immersion in green environments can be positive, leading to a greater appreciation and engagement with nature and increased support for environmental conservation and sustainability (Charkhabi, 2019). Critical travel industry encounters, which are encounters that sightseers effectively recollect in the wake of visiting a vacationer location, are mental assessments of outer improvements (like the travel industry's realness). Applicable investigations have shown that the travel industry's genuineness relates to revisit intention.

*H1= tourist immersive perception positively impacts tourist revisits intention*

## Impact of tourist immersion in a green environment on Place attachment

As the spot is integral to numerous religions and their celebrations, research zeroing in on the mental components of the site can effectively make sense of various result factors inside a celebration setting, given its new use inside the overall travel industry writing (Mohamed et al., 2022). However, a customary conceptualization of put connection centers around the connection between people and the indigenous habitat, arising research has considered a social part of setting a connection

Tourist immersion in green environments finds to impact place attachment positively. Environmental quality, perceived restrictiveness, and recreational opportunities have also find to influence place attachment in green environments (Bhutto et al., 2021). Overall, immersion in natural settings can contribute to a deeper connection with a place, positively affecting sustainable tourism development and conservation efforts.

*H2= tourist immersion in green environment positively impacts place attachment*

## Tourist immersion in green environment impacts on place loyalty.'

Place loyalty alludes to a person's close-to-home association with a particular climate, the profound interest in a spot, or the level of assessment and recognizable proof with a specific environment. Place loyalty comprises spot reliance and spot character, which allude to a person's practical close-to-home connection to a spot separately. An individual or local area involves places as a medium to characterize oneself and feel a piece of the site sincerely. Currently, there is no agreement on the connection between place personality and spot reliance (Souza et al., 2020). A few investigations have proposed that the two are free, while different examinations have recommended that the two impact one another. As a mind-boggling feeling, Dad is a practical consequence of the human spot connection. In this way, place loyalty is imperative in objective administration (Charkhabi, 2019). Place loyalty mirrors the favorable condition of a person while moving toward a specific spot. As per the CAT hypothesis, people assess the importance and appropriateness of the climate to give individual significance and, in this way, create feelings. In the travel industry, vacationers might frame a connection to a location provided their fulfillment, explicit personal objectives, or representative significance (Trunfio et al., 2022).

Tourist immersion in green environments finds to impact place loyalty positively. The emotional connection that develops through immersion in a natural setting can lead to a stronger attachment to the place, translating into repeat visits and recommendations to others—factors such as perceived environmental quality and access to outdoor recreation opportunities in green environments (Thipsingh et al., 2022). Therefore, developing and promoting sustainable tourism practices in natural settings can contribute to increased place loyalty, which can have positive economic and environmental outcomes for the destination (Errichiello et al., 2019). Besides, sightseers can get a considerably more extravagant traveler experience through regular travel industry objects, which advance the personality of legacy destinations. Moreover, when vacationers partake in the travel industry exercises at legacy destinations to acquire EA, they become subject to the legacy site since they escape from their ongoing climate (Hofmann et al., 2020). Moreover, the honestly communicated self-state is helpful for travelers' drenching and self-acknowledgment, reinforcing vacationers' place personality. To be sure, studies have shown that legitimacy profoundly connects with place loyalty.

*H3= tourist immersion in green environment perception positively impacts place loyalty.'*

### **Impact of Place attachment on tourist revisits intention**

Place connection portrays the connection between an individual and a setting bounded by the physical and kinds of settings set up. The relationship between place character and goal return investigate, and place personality intervenes between past visits and expectations to return. Scientists found that location personality or profound connection moderately less contrasted with Place reliance with a return to aim (Atzeni et al., 2022). The creators contended that this might be because of contrasts in psychographic and demographical factors. For instance, vacationers with high set-up characters will generally be all the more earth touchy and could perfect their insight structures and touristic encounters (Wang et al., 2022).

Nonetheless, fulfillment level in past visits might assume an essential part of a future return to goals. The specialist found that sightseers' reliability to different objections or places of interest will be interceded by the pretended spot connection, individual contribution, and objective picture. Research additionally expressed that place personality finds to be all the more firmly intervening between the fulfillment and reliability of vacationers in Mauritius than place reliance, suggesting that travelers put a higher significance on profound connection than utilitarian connection (He et al., 2022). In another view, intervened place connection between nature-based sporting advantages and future visit goals. As per the creators, regular and social variables impact travelers' return to destinations. Besides, vacationers have a closer-to-home reaction to expected sporting advantages than to fake benefits, making the place's character a significant middle person in later visits and returning to goals (Jiang, 2020). Place personality likewise views as the main proportion of setting connection in producing to have urban areas and public parks. Subsequently, it is essential to lay out whether place personality influences the return to expectations of sightseers in Island sporting focuses.

*H4= Place attachment positive impact on tourist revisits intention*

### **Impact of place loyalty impact tourist revisit intention**

a vacationer's goal to return to a location, communicating a singular's inspiration to use assets for rehashing a movement to a similar place, doesn't agree with a genuine return; expectation shows inclination. However, it doesn't guarantee prompt activity. According to the inspiration hypothesis, people venture out to escape from their daily practice or look for new encounters. In this manner, neither the absence of expectation to return to an objective nor the absence of actual recurrent appearance can block the presence of objective reliability (Stylos & Bellou, 2019). Put in an unexpected way. Similarly, a return to aim doesn't relate to a genuine return to (the first is an indicator or a decent gauge of the last option). In this way, it isn't suitable to involve a return to goals as an intermediary for objective unwavering and the other way around. Indeed, this is likewise precisely upheld, who showed that in light of shifting degrees of objective faithfulness, sightseers might be sectioned into three gatherings, exhibiting various degrees of propensity to return to an objective (Choi & Choi, 2019). The current review takes on the attitudinal methodology of objective devotion that joins objective responsibility to suggest. Also, in the travel industry showcasing writing, objective faithfulness is conceptualized and displayed as a forerunner of goal return.

*H5= place loyalty positively impacts tourist revisit intention*

***The mediating role of place attachment, the place loyalty between tourist immersion in a green environment and tourist revisit intention***

Past investigations have discovered that the level of contribution and recurrence of interest in the travel industry exercises can utilize to anticipate the status of vacationers' connection to the objective. Inclusion has become a key component influencing the close-to-home association among travelers and the goal. A concentration on rail routes and the travel industry uncovers that the recurrence of the purpose of sporting space and the level of association impacts travelers' place connection (Souza et al., 2020). In a review of global sightseers in lodgings, the analyst found that vacationer inclusion influences the placement of the link, affecting traveler fulfillment and the eagerness to suggest and return. In such a manner, traveler contribution is essential for their satisfaction and aim to visit from here on out. In an investigation of celebration, the travel industry contrasted. Social researchers ceaselessly investigate the qualities that can impact traveler faithfulness, considering the practical ramifications of objective steadfastness. Traveler dependability studies can sum up inspiration factors, segment attributes, previous encounters, accurate picture, administration quality, saw quality, fulfillment, and oddity (Wang, 2022). The existing literature suggests that place attachment and loyalty can mediate the relationship between tourist immersion in green environments and tourist revisits intention. Tourist immersion in natural settings can develop emotional bonds and a sense of connection to the place, leading to increased place attachment (Seeler et al., 2021). This attachment, in turn, can influence tourists' loyalty to the site, leading to repeat visits and recommendations to others. Place attachment and place loyalty find to impact tourists' revisit intention in green environments positively. Therefore, developing sustainable tourism practices that enhance visitors' experiences and foster emotional connections to natural settings can lead to increased place attachment, place loyalty, and, ultimately, tourist revisit intention (Lee et al., 2020). The review structure is created by considering the apparent worth and experience as two factors that propel the internal state in objective value and connection, prompting real dedication in the ecotourism setting.

*H6= Place attachment plays a mediating role in the relationship between tourist immersive perception and tourist revisit intention*

*H7= Place loyalty plays a mediating role in the relationship between tourist immersion in green environment perception, and tourist revisit intention*

***The moderating role of technological innovation, low carbon practices between tourist immersion in a green environment and tourist revisit intention***

In light of the dramatic advancement of innovations, it is difficult to come by places where no innovation is accessible. As per the Seat Exploration Center, there has been a striking expansion in the quantity of Web and cell phone clients overall. While early innovation, considering the memorability of vacationer encounters at shrewd travel industry locations, this study inspects two possible outcomes: fulfillment and conduct (return to) expectation (Jiang, 2020). Fulfillment characterizes as a singular's upbeat assessment of an encounter. In the travel industry setting, satisfaction shows the vacationer's positive evaluation of their mental state coming about because of a moving experience. As per the balance hypothesis, people change their mentalities when they see logical inconsistency. People will generally keep up with their mentality as per their discernments (Souza et al., 2020).

The existing literature suggests that technological innovation and low-carbon practices can moderate the relationship between tourist immersion in green environments and tourist revisit intention. Tourists are increasingly interested in sustainable and eco-friendly practices, and the availability of low-carbon options can enhance their overall experience and satisfaction with the destination (Thipsingh et al., 2022). Additionally, integrating technology, such as digital apps, can enhance tourists' experiences in natural settings by providing information on environmental education or facilitating access to outdoor activities. The moderating role of these factors can increase the positive effects of tourist immersion in green environments on revisit intention. Therefore, developing and implementing technological innovations and low-carbon practices can enhance the overall tourist experience, contributing to increased revisit intention and positive economic and environmental outcomes for the destination (Atzeni et al., 2022).

Moreover, clients' previous experience seems to have severe areas of strength for a relationship with their fulfillment with the utilization of innovation and their conduct goals. The specialist contends that conduct expectations are the most effective way to foresee an individual's behavior and to mirror their eagerness to play out a way of behaving. In the investigation, people will generally participate in a specific form of acting when they have a positive expectation to play out the course of conducting (He et al., 2022). Hence, a tangible goal to play out a way of behaving is profoundly prescient of an execution of that specific way of behaving. As per the hypothesis of arranged conduct, social aims are a predecessor to actual conduct overall. Conduct expectation in this study alludes to sightseers' purpose or obligation to visit and suggests a central brilliant travel industry objective. Considerable experience has likewise been perceived as a driving variable for future navigation, showing that essential experience influences conduct expectation straightforwardly (Stylos & Bellou, 2019). Paramount experience shapes positive social expectations. The critical effect of significant experience on travelers' goals views as confidence. Besides, crucial involvement with a travel industry objective essentially affects informal.

Past examinations have found that fulfillment straightforwardly affects social goals. Sightseers will more often than not return to a travel industry objective or prescribe the aim of others when they are happy with the drive (Wei et al., 2019). Alternately, sightseers are less inclined to return to the purpose or spread positive informal exchange when disappointed with their movement experience. Fulfillment plays a middle person in the connection between knowledge and aims; adopters use the Web and innovative gadgets more, and others start to involve advances in their everyday and professional lives. Today, innovation is progressively becoming necessary instead of an auxiliary device, as shrewd innovations are predominant in all matters, from common frameworks to training administrations (Yang & Zhang, 2022). For example, the Web of Things and sensors give a lot of data and permit city authorities to follow primary occurrences and ongoing traffic and air contamination levels. The individual shrewd gadgets and applications assist citizens with straightforwardly speaking with public executives and taking care of issues (Stylos & Bellou, 2019). The travel industry's objections are not an exemption from brilliant innovation usage, as innovation has fundamentally impacted the travel industry in different ways. They are ever-improving a shining city, a spot where savvy innovations coordinate

*H8= technological innovation moderates the relationship between tourist immersion in a green environment and tourist revisit intention*

*H9= Low carbon Practice moderates the relationship between tourist immersion in a green environment and tourist revisit intention*

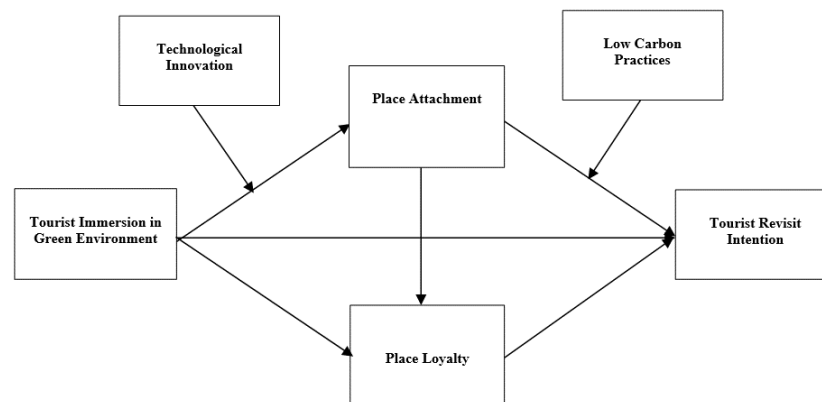


Figure 1: Research Framework

## Research Methodology

All the visitors were randomly approached, the objectives of the study were explained and their willingness to participate in the study was asked for. Later, the questionnaire was shared only with the respondents who consented to fill it out. A total of 291 respondents shared the information about the research variables, whereas, 130 of them were international visitors and 161 were local visitors. The study's target audience included all tourists aged 18 and up who had participated in green tourism efforts.

The sample size was selected using Cohen's (1988) formula, which takes into account the effect magnitude and required level of precision. We sought to detect a moderate effect size (0.5) with a precision of 0.05 and a 95% confidence level. Based on these factors, the sample size was predicted to be 350. To choose participants from the target population, we employed a random sampling approach. Visitors were approached and asked to participate in the survey. The survey received 291 responses, accounting for nearly 83% of the planned sample size of 350.

For data collection, we designed a survey questionnaire which consisted of six variables; 1 IV (Tourist immersion in green environment), 1 DV (tourist revisit intention), 2 Mediators (place attachment, place loyalty) and 2 moderators (technological innovation and low carbon practices). Notably, the instrument consisted of 29 items and all of these items were taken from the existing literature. Part of this, 5 items to measure Tourist immersion in green environment (Lunardo & Ponsignon, 2019), 4 items of place loyalty (Sánchez Cañizares et al., 2015), 4 items of place attachment (Vada et al., 2019), 4 items-scale of tourist revisit intention (Phillips et al., 2013), 4 items of low carbon practices (Berezan et al., 2013) and 8 items of technological innovation (Liñán & Chen, 2009) were adapted. Moreover, in order to get the more precise and objective response, we employed a 7-point Likert scale ranging from 1= Strongly Disagree to 7= Strongly Agree.

### Data Analysis

There were six factors in the research framework namely, tourist immersion in green environment, tourist revisit intention, place attachment, place loyalty, technological innovation, low carbon practices and 29 items in total. But prior to the examination of hypotheses, we carried out CFA for assessing the fit indices and quality of the model. It helped us evaluating the convergent validity and discriminant validity of the variable used in this research. For this purpose, we used SmartPLS (Barbeau et al., 2019), a well reputed software, renowned for handling the data more effectively (Barbeau et al., 2019) and is very useful in when it comes to the estimation of the measurement model and structural model.

### Model Fitness, Validity and Reliability

In order to meet the specific requirements of the software, it was essential to assign appropriate codes to each variable before proceeding with the analysis. Therefore, the full names of the variables were shortened and were replaced with the smaller codes i.e., TIGE, RIN, PAT, PAL, TIN, COP. Where, TIGE was used for “Tourist immersion in green environment”, RIN for “tourist revisit intention”, PAT was shorted for “place attachment”, PAL for “place loyalty” and TIN for “technological innovation” and LCAP represented “low carbon practices”.

Moving ahead, before testing the hypothesis, we assessed the measurement quality and model fitness of the research framework. As a part of that, to evaluate the internal consistency and validity of the manifest variables, we first calculated the convergent validity and discriminant validity of the measurement model (Thien, 2019). The results of the CFA were interpreted according to the criteria given by Hu and Bentler (1999). Furthermore, the decision about the model fitness was made on the basis of values of chi-square, SRMR, RMSEA, CIF and TLI (Muthén & Asparouhov, 2012). The following table 1 contains information about the fit indices of the model. As highlighted, all the model fit indices were greater than the maximum cutoff values and hence the model was deemed fit for testing the hypotheses (Hu & Bentler, 2009).

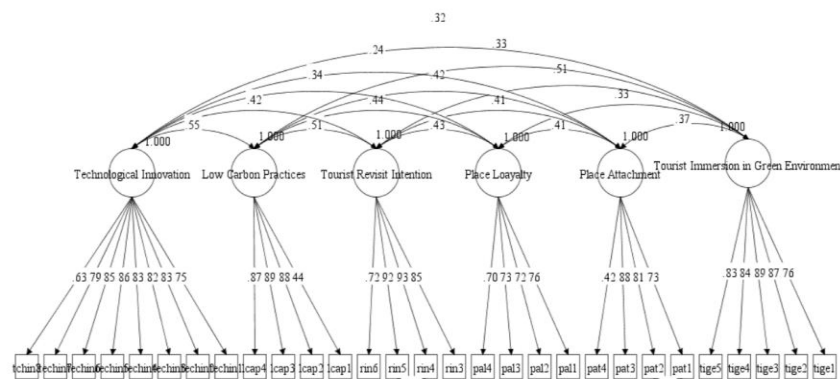


Figure 2: Measurement Model

**Table 1: Model Fitness**

Measurement Model	X <sup>2</sup>	DF	X <sup>2</sup> /DF	CFI	TLI	SRMR	RMSEA
1	656.362	360	1.832	0.948	0.941	0.049	0.053

Note: n=291, X<sup>2</sup>= Chi square value, DF =Degree of freedom

Since the research employed a survey questionnaire which was designed to collect data from the all the respondents at the same time, it was essential to ensure that the connection between the variables is not inflated (Podsakoff et al., 1990) and is not influenced by the respondents’ personal evaluations (Jahanger et al., 2022; Murshed et al., 2021; Pekovic & Vogt, 2021). To detect this, we applied Harman's single-factor method to find out whether link between variables was biased or not. The test of CMB revealed that the one factor explained 35.15% of the variance, as indicated below (Table 2), which is less than the maximum recommended value (50%). As advised, that if the results indicate that one factor accounts for less than half (50%) of the variance, the association between the variables should be considered real (Podsakoff et al., 2012; Saris & Gallhofer, 2014). Therefore, we were certain that that there was no issue of spurious correlation between the variables.

**Table 2: Common Method Bias**

Factor	Initial Eigen Values			Extraction Sums of Squared Loadings		
	Total	Variance	Cumulative	Total	Variance	Cumulative
1	10.194	35.151%	35.151%	10.194	35.151%	35.151%

**Validity, Reliability and Descriptive Statistics**

Moreover, it is believed that the measurement model banks upon the factor loadings for estimating reliability, convergent validity, and discriminant validity CR, and AVE (Ursachi et al., 2015). However, for establishing the discriminant validity, we used the criteria of Fornell and Larcker (1981), who recommended to compare the SQRT of AVE with the corresponding correlation values for that purpose. It was observed the values for the "squared root of AVE" were higher than their corresponding correlations, demonstrating that there is no risk of discriminant validity (Whittaker, 2011). Likewise, convergent validity was assessed using the standardized factor loadings, AVE, and item reliability (Farrell, 2010; Fornell & Larcker, 1981; Suárez-Albanchez et al., 2021). The research instrument, as depicted in Figure 2, contained 28 questions each with a standardized item loadings of greater than 0.6, values of AVE greater than 0.5 and values of CR remained greater than 0.7. This indicated that “scale's convergent validity” was not an issue at all (Hair, 2009; Memon & Rahman, 2014). In addition to this, the reliability of the scale was as also confirmed as the values of CR (composite reliability) of all the constructs were higher than 0.7, wherein, the maximum value of CR (0.934) was associated with TIN (technological innovation) and the minimum value of CR (0.811) represented PAT (place attachment). In addition to this, we also assessed the issue of multi collinearity, as the Table 3 also contains pertinent information about the strength of the relationships between variables. It was found out that strength of the correlation amongst the constructs was lesser than 0.90, whereas the values of correlations greater than 0.90 confirm the existence of the issue of multicollinearity (Midi et al., 2010).

**Table 3: Descriptive Statistics, Correlation and Discriminant Validity**

Construct	Mean	S. D	TIGE	PAT	PAL	RIN	TIN	LCAP
TIGE	4.954	1.036	<b>.839</b>					
PAT	4.964	.741	.366**	<b>.729</b>				
PAL	5.714	.741	.325**	.415**	<b>.728</b>			
RIN	5.273	1.206	.509**	.405**	.428**	<b>.858</b>		
TIN	6.405	.792	.319**	.244**	.345**	.423**	<b>.800</b>	
LCAP	5.877	.963	.334**	.424**	.439**	.512**	.550**	<b>.792</b>
CR			0.923	0.811	0.818	0.918	0.865	0.934
AVE			0.71	0.53	0.53	0.74	0.63	0.64

Note: n=291, S.D= Standard deviation, TIGE = Tourist immersion in green environment, PAT = Place attachment, PAL = Place loyalty, RIN = Tourist revisit intention, TIN = Technological innovation and LCAP = Low carbon practices, CR= Composite reliability, AVE= Average variance extracted.

As can be seen in Table 3, we computed mean values and standard deviation values of the of the variables, where the “TIN” scored the highest and its mean value was 6.405 whereas the TIGE scored the in terms of the mean and its value was 4.95. Additionally, the results demonstrated that the highest standard deviation (1.20) was linked to the dependent variable “RIN” and the lowest S.D (0.741) was computed for one of the mediating variable “PAL”. The data was ready for hypothesis testing because its normality was proved by the prior analysis.

**Hypothesis Testing**

As the research framework had multiple direct associations, therefore it was essential to first examine the significance of the paths. There were six hypotheses that were designed to assess these direct links. Table 4 specifically provides information about the direct associations. We assumed in the H1 that TIGE is expected to positively cause the dependent variable RIN. The results exposed that TIGE positively and significantly changed RIN  $\beta= 0.510$ ,  $SE= 0.042$ ,  $T\text{-value}=10.896$ ,  $P\text{-value}= 0.000$ . Therefore, our first proposition was supported. Hypotheses-2 mainly focused on the direct relationship of TIGE-PAT. The analysis revealed that TIGE positively predicted PAT  $\beta=0.350$ ,  $SE= 0.057$ ,  $T\text{-value}= 6.109$ ,  $P\text{-value}= 0.000$ . Therefore, H2 was also supported. We hypothesized in H3 that TIGE can be leveraged to significantly predict PAL. The results supported the assumptions that tourist immersion in green environment (TIGE) can lead to a feeling of place attachment i.e.,  $\beta=0.326$ ,  $SE= 0.061$ ,  $T\text{-value}= 5.328$ ,  $P\text{-value}= 0.000$ . Therefore, our assumptions about H3 were supported. Based upon Hypotheses-4, we examined the link between the two mediating variables PAT and PAL. The data analysis revealed that place attachment (PAT) can lead to the development of place loyalty (PAL). Thus, H4 was also supported. We further looked at the association between the mediating variables PAT, PAL and the dependent variable RIN. It was confirmed that both PAT and PAL lead to the development of revisit intention in the tourists,  $\beta=0.372$ ,  $SE= 0.057$ ,  $T\text{-value}= 6.469$ ,  $P\text{-value}= 0.000$  and  $\beta=0.430$ ,  $SE= 0.056$ ,  $T\text{-value}= 7.687$ ,  $P\text{-value}= 0.000$  respectively. It is evident that these relationships were positive and significant (see Table 4).

**Table 4: Hypothesis Testing for Direct Effects**

Hypotheses	B	SE	T-Value	P-Value	Outcomes
H1: TIGE--RIN	0.510	0.042	10.896	0.000	Supported
H2: TIGE--PAT	0.350	0.057	6.109	0.000	Supported
H3: TIGE--PAL	0.326	0.061	5.328	0.000	Supported
H4: PAT--PAL	0.395	0.069	5.715	0.000	Supported
H5: PAT--RIN	0.372	0.057	6.469	0.000	Supported
H6: PAL--RIN	0.430	0.056	7.687	0.000	Supported

Note: Note:  $\beta=$  STDYX,  $SE=$  Standard error TIGE = Tourist immersion in green environment, PAT = Place attachment, PAL = Place loyalty, RIN = Tourist revisit intention.

Besides the examination of these direct associations, we also investigated the paths involving mediators. For the assessment these mediate paths, we applied a bias-corrected bc-bootstrapping approach to generate bias-corrected 95% confidence intervals to look into the significance of specific indirect effects (SIE) of the mediator. However, to create precise and trustworthy confidence intervals, the significance should be tested with at least 1000-bootstrap replications (Cui et al., 2022). Moreover, for significant results, it is also advised that the ULCI and LLCI should not pass through zero (Shrout & Bolger, 2002). In the light of these recommendations, the results pertaining to the mediated paths are placed in the Table no. 5.

**Table 5: Hypothesis Testing for Indirect Effects**

Hypotheses	$\beta$ (SIE)	SE	T-Value	95% CI	P-Value	Outcomes
H7: TIGE-PAT-RIN	0.091	0.028	3.231	0.045—0.138	0.001	Supported
H8: TIGE-PAL-RIN	0.095	0.027	3.527	0.047—0.143	0.000	Supported
H9: TIGE-PAT-PAL	0.128	0.037	3.414	0.066—0.189	0.001	Supported

Note:  $\beta=$  STDYX, SIE= Specific indirect effect, SE= Standard error, CI= Confidence interval, TIGE = Tourist immersion in green environment, PAT = Place attachment, PAL = Place loyalty, RIN = Tourist revisit intention.

H7 predicted the significance of mediated effect of PAT between TIGE and RIN. The findings confirmed the mediating role of PAT as the SIE of the path was positive and significant with  $\beta=0.091$  (P-value: 0.001) and a 95% ULCI-LLCI were [0.045--0.138]. Therefore, H7 was supported as the path “TIGE-RIN” was mediated. Furthermore, the results of the analysis also confirmed the mediating role of the second mediator PAL between TIGE and RIN. As the findings indicated a significant mediating role of the PAL,  $\beta$  (SIE)= 0.095 (P-value: 0.000) and 95% ULCI-LLCI were [0.047--0.143]. These results supported our notion of the mediating role of PAL between TIGE and RIN in H8. Likewise, the final mediation path involved the examination of PAT between TIGE and PAL. The (SIE)  $\beta=0.144$ , (P-value: 0.000) and its 95% confidence intervals also depicted the significance of the mediation i.e., [0.090—0.199]. Therefore, as per our prediction, H9 was supported.

The model also had two moderating paths i) moderation of TIN on the TIGE-PAT relationship and ii) moderation of LCAP on the PAT-RIN relationship. For investigating the moderating role of “TIN” and “LCAP”, all the pertinent variables were standardized in SMART PLS (Brown et al., 2013; Van Der Linden et al., 2017) and afterwards the interaction term was generated to look into contextual role of the concerned variables (TIN, LCAP). H10 hypothesized that the link between TIGE and PAT is expected to be positively and significantly moderated by TIN. To our surprise, negating the theory and expectations, the findings confirmed that TIN negatively influenced the path of TIGE-PAT and was highly insignificant i.e.,  $\beta= -0.088$ , SE: 0.111, T-value: -0.797, P-value: 0.429. We further examined the moderating role of LCAP on the PAT-RIN path. The analysis proved that the moderation of LCAP was highly significant and positive as the interaction term (PAT\*LCAP) significantly influenced the PAT-RIN association,  $\beta=0.321$ , SE: 0.151, T-value =2.133, P-value: 0.000. This significant role of the moderating variable was also examined which also confirmed the 95% CI of the interaction term. The ULCI and LLCI of 95% CI did not include zero [0.073 --- 0.561]. Therefore, H11 was supported (see Table 6).

**Table 6: Moderation Analysis**

Hypotheses	B	SE	T-Value	P-Value	95% CI	Outcomes
H10: Moderating role of TIN between TIGE-PAT relationship	-0.088	0.111	-0.797	0.425	[-0.271---0.094]	Not Supported
H11: Moderating role of LCAP between PAT-RIN relationship	0.321	0.151	2.133	0.033	[0.073---0.561]	Supported

Note:  $\beta=$  STDYX, SE= Standard error, CI= Confidence interval TIGE = Tourist immersion in green environment, PAT = Place attachment, RIN = Tourist revisit intention, TIN = Technological innovation and LCAP = Low carbon practices

Finally, because the H11 was supported, we also conducted simp-slope analysis to examine the moderation effect at low, medium and high values of LCAP. It was confirmed that the moderation effect was stronger as the LCAP assumes higher values and weaker as the values of LCAP decrease (see Figure 3)

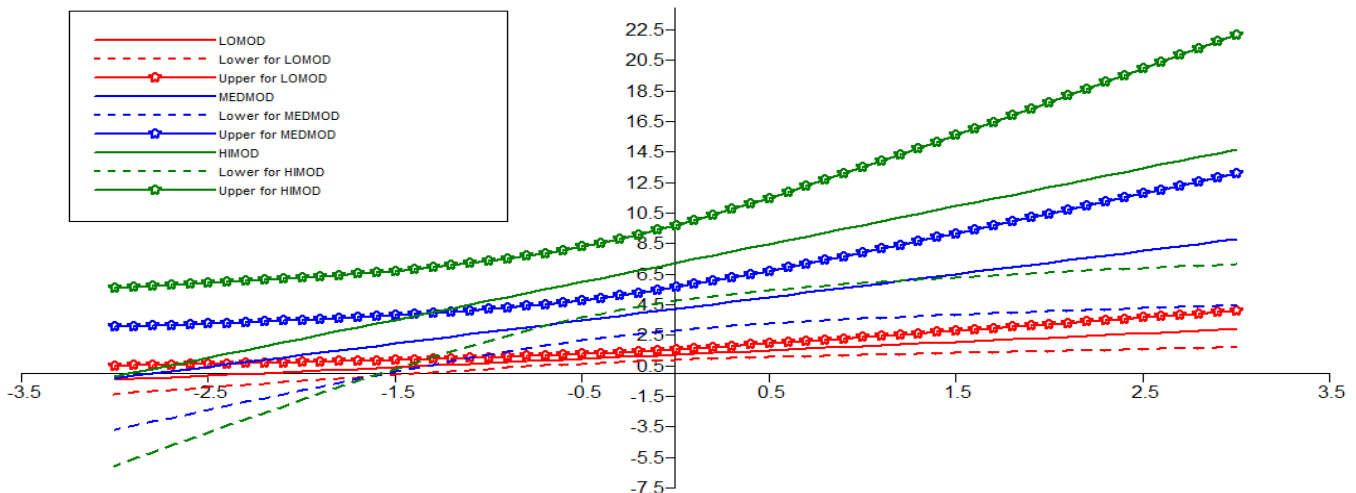


Figure 3: Interaction plot for moderation of LCAP between PAT-RIN



## Discussion

The study provides important insights into the links between visitor immersion in green areas, revisit intention, place attachment, place loyalty, technological innovation, and low-carbon activities. The measuring model showed good fit indices, convergent validity, and discriminant validity, implying that the constructs were well-defined and empirically validated. The structural model demonstrated that visitor immersion in green areas has a beneficial influence on revisit intention, location attachment, and loyalty. Furthermore, we discovered that place attachment and loyalty have a beneficial influence on revisit intention. These findings imply that providing immersive experiences in green surroundings might build a sense of attachment and loyalty among tourists, ultimately increasing the likelihood of returning to the place. Place attachment and place loyalty were also validated as mediating factors between visitor immersion in green environments and intention to revisit. This shows that visitor immersion has an indirect impact on revisit intention by promoting site attachment and loyalty. However, technological innovation did not have a significant moderating influence on the association between visitor immersion in green areas and place attachment. This defies our expectations, as we predicted that technological innovation would improve the link between visitor immersion and place attachments. However, low carbon practices had a significant and favorable moderating influence on the connection between place attachment and revisit intention. This shows that the association between place attachment and intention to return is reinforced when tourists believe their actions are helping to sustainable practices. The simp-slope analysis found that the moderation effect of low carbon practices is stronger at higher levels of LCAP, implying that the relationship between place attachment and revisit intention is more prominent when tourists are actively involved in sustainable behaviors. The study's findings are beneficial to tourism stakeholders and destination managers. Destinations can develop a sense of connection and loyalty among tourists by providing immersive experiences in green areas and promoting sustainable practices, resulting in higher revisit intention. The study emphasizes the role of technological innovation and low carbon practices in understanding the relationship between tourist behavior and destination loyalty. Tourist immersion in green environments positively impacts place attachment, place loyalty, and tourist revisit intention. The mediating effects of place attachment and place loyalty suggest that developing emotional connections and a sense of Place identity can lead to more positive attitudes towards the destination, increasing tourist revisit intention. The moderating effects of technological innovation and low-carbon practices also influence the relationship between tourist immersions in green environments and revisit intention. Tourists are increasingly interested in sustainable and eco-friendly practices, and the availability of low-carbon options can enhance their overall experience and satisfaction with the destination. The implications of these findings for sustainable tourism development are significant. The development and promotion of sustainable tourism practices and eco-friendly options can enhance the overall tourist experience and contribute to positive economic and environmental outcomes for the destination. The integration of technology can also help to improve the tourist experience in natural settings, providing information and facilitating access to outdoor activities. However, it is essential to note that the relationship between tourist immersion in green environments and revisit intention may not be linear, and other factors may influence the relationship between these variables. Additionally, the role of other moderating factors, such as cultural differences or individual preferences, should also be considered when exploring the impact of tourist immersion in green environments on revisit intention.

This study suggests the development and implementation of sustainable tourism practices, the promotion of eco-friendly options, and the integration of technology. It can enhance the positive effects of tourist immersion in green environments on place attachment, place loyalty, and tourist revisit intention, contributing to more sustainable tourism development and positive economic and environmental outcomes for the destination.

## Conclusion

The existing literature highlights the critical role of tourist immersion in green environments in shaping tourists' revisit intention through the mediating effects of place attachment and place loyalty. Immersion in natural settings can develop emotional bonds and a sense of connection to the place, which can ultimately contribute to increased place loyalty and revisit intention. However, the impact of tourist immersion in green environments on revisit intention can further enhance through the moderating effects of technological innovation and low-carbon practices. Technological innovation and low-carbon practices can provide tourists with more sustainable and eco-

friendly options, improving their overall experience and satisfaction with the destination. Integrating technology, such as digital apps and environmental education, can also help enhance tourists' experiences in natural settings. Therefore, developing and implementing technological innovations and low-carbon practices can contribute to increased revisit intention and positive economic and environmental outcomes for the destination. Overall, the results suggest that developing sustainable tourism practices and promoting eco-friendly options can enhance the positive effects of tourist immersion in green environments on place attachment, place loyalty, and, ultimately, tourist revisit intention. It has important implications for developing and managing sustainable tourism practices in natural settings.

The immediate impact of appearance recurrence on dependability and return to aim can practically be carried out through redid contact with past guests and by arranging great incentives for-cash travel bundles using designated email crusades individually. Offering heaps of administrations as bundles and, in any event, setting exceptional concurrences with carriers to offer different associations and ticket offers are rehearse that might expand the chance of returning to an objective. The Positive all-encompassing pictures impact their steadfastness and return to aim, targeting working on different parts of the traveler encounters chain, from the outbound excursion to the bring one back. Additionally, availability to Crete using additional continuous flights lasting through the year might increase reliance. It recommends that as individual's age, they get more engaged with the networks they have a place, and they will generally be more mindful of the meaning of their feeling of spot connection.

## Implications

### *Theoretical implications*

This study contributes widely to the writing on return to aims by distinguishing the significant ecological variables that trigger spot connection and return to expectations. The inventiveness of this study is the attention to various elements of spot connection. Past investigations have reported place personality and spot reliance. Ongoing examinations, in any case, have incorporated the social and full-feeling parts of spot connection. Significantly, we consider climate as an improvement to put connection as the living being to return to goals, which is the reaction. Foundation and climate view as the most significant for Place personality and spot emotional, reliable with the discoveries of while the environment thinks of as the most important for site reliance and area social holding. This outcome suggests that elements like an appealing framework and being effectively open impact a guest's cooperation with the climate and, subsequently, structure a spot marking that decides character and, eventually, recognizes emotions.

Concerning air climate as the primary variable for place reliance and social holding, it suggests that the help conveyance in the travel industry is a component of the assistance and actual ecological offices. Utilitarian and honest offices impact place reliance more than do conduct factors, and the ways of life of travelers or people shape the social holding among guests. Climate perceives the perplexing idea of individual frameworks through place reliance. Accordingly, entertainers in the travel industry should give expanded consideration to both foundation and air conditions. In growing vacationer places, conventional spot personality ought not to be the primary variable to consider; the spot full of feeling highlights of the such framework should be carried out and supported. Since there is expanded support in vacationer locations, our discoveries show that social holding is the primary variable for return to goals. Curiously, our findings show that high returns to destinations rely more upon the new factors of put full of feeling and social holding than on the variables of conventional spot character and spot reliance. In any case, we find that the social part of the climate is irrelevant to place connection. A few variables might uphold this accommodation; for instance, legacy culture in the travel industry is not necessarily place-bound in every case, and the mental portrayal of spots among guests renders legacy culture irrelevant to Place connection. Additionally, social climate may not impact place connection aside from the presentation of the directing job of spot fulfillment. Notwithstanding social environment being insignificant for place connection, the outcomes showed that place connection aspects are significant for return to expectations.

### *Practical implications*

This study has practical ramifications for professionals and travel industry executives. For experts, it gives essential data to the structure and foundation of the travel industry focuses. It demonstrates that social holding

and spot emotional are vital components for infrastructural climate and air climate separately in the augmentation of the travel industry objections to new urban communities and focuses. It helps the travel industry and the board to realize which variables to put significance on. Because of our discoveries, the degree of return to aims ought to be surveyed by first putting inclination on Place social holding, trailed by place character, place reliance, and in conclusion, a place full of feeling according to access to the travel industry assets.

### ***Limitations and future research***

This study restricts because it utilizes a field review, which doesn't consider exact command over unessential factors. The single examination strategy used in this exploration raises a few worries. For instance, the single exploration strategy can't give the advantages of the triangulation research technique. Likewise, this concentrate additionally experiences the utilization of the accommodation testing strategy, as the method is known to experience the ill effects of examining blunders. This way, the future examination could explore ecological impacts on place connection in a lab setting to give more command over the factors impacting this build. A controlled trial might share further knowledge about the particular natural elements that add to put connection. Each essential climate component could be tried and assessed regarding its commitment to put relationship. These outcomes would give a unique understanding of what people explicitly consider when structuring connections to virtual spaces.

Future exploration ought to zero in on various objective settings. It might further develop information regarding the comparability and contrasts in factors impacting return to expectations. The forthcoming investigation could likewise zero in on different directing factors. The directing job of spot fulfillment might affect the connection between social climate and spot connection.

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## Nexus among SDG 5 and sustainability performance

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### Abstract

*Incorporation of SDG 5 (Representation of women) on the board of directors is beneficial for corporation's long-term value creation and sustainable expansion. This study examines how the inclusion of SDG 5 on the board affects sustainability (financial, social, and environmental). This study tries to define SDG 5's role and its implications for sustainability performance. This study is based on three theories: the Triple Bottom Line, which says that businesses should prioritize profit, the planet, and people; the agency theory, which says that directors should align stakeholders' interests with sustainability practices; and the gender socialization theory, which supports a gender difference perspective. The research sample consists of 8 years data span from 87 Industrial firms with Pakistan Stock Exchange listings. The study used dynamic GMM analysis for estimations. The results demonstrate that the presence of more women on boards of directors improves the sustainability of the social and environmental spheres, whereas having more women on the board of directors makes the company's finances less sustainable. According to this study, SDG 5 should encourage diversity and inclusion on the board of manufacturing organizations. These companies should also focus on sustainable growth and merit-based board member hiring. Additionally, this research has positive implications for regulators and policymakers who support sustainable organizations.*

**Keywords:** SDG-5: Financial sustainability: social sustainability: environmental sustainability: manufacturing companies.

### Introduction

Sustainability means "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Jhunjunwala, 2023; Sakalasooriya, 2021). The 2030 Agenda for Sustainable Development was approved and ratified by each and every UN member state in 2015, with the goal of eradicating poverty, protecting the environment, and ensuring prosperity by 2030. (Tsalis, Terzaki, Koulouriotis, Tsagarakis, & Nikolaou, 2023). Its 17 Sustainable Development Goals (SDGs) are a comprehensive plan that balances economic, social, and environmental elements of sustainable development (Oliveira, 2024; Sekarlangit & Wardhani, 2021). The SDG encourages social inclusion, sustainable economic growth, decent workplaces, and gender parity. The Agenda 2030 for Sustainable Development emphasizes equity and inclusivity while promising to "transform our world" and "leave no one behind," ensuring that everyone, especially the most vulnerable, benefits from development (Schroeder et al., 2024).

Therefore, SDG 5 is closely and specifically related to this objective, i.e., gender equality or gender diversity. This goal aims to empower all females and to ensure the full participation of women in management, leadership, and decision-making (Beloskar, Haldar, & Gupta, 2024). The phrase "gender equality" describes the process of guaranteeing equal rights and liberties to all individuals, irrespective of gender, in all social contexts, like gender opportunities in businesses, the proportion of salary, abuses both physical and psychological, the right to vote and the right to get an education, economic participation, strategy development, and decision-making (Beloskar et al.,

2024; Khatri, 2023; Martínez-García & Ansón, 2021). A number of issues must be addressed in order to guarantee that men and women are treated equally and have equal opportunities in the workplace. These issues include organizational culture, career advancement, hiring practices, pay equity, and work-life balance (Baghdadi, Safiullah, & Heyden, 2023; Kunze & Scharfenkamp, 2022). The empowerment of women is a crucial first step toward guaranteeing gender equality. The idea of empowering women emphasizes how important it is for women to be able to make more independent decisions in their lives (Lisowska, 2021). Empowerment of women is defined as “a woman’s sense of self-worth, her decision-making power, her access to opportunities and resources, her power and control over her own life inside and outside the home, and her ability to effect change” (Slomka-Golebiowska, De Masi, & Paci, 2023). Four Aspects make up empowerment: status (do groups of men and women interact as equals or as superiors and subordinates), decision-making (do one or both groups make decisions), settlement of conflicts (do dispute resolution processes work, and can one group be forced to do something against its will), and resource distribution (do one or both groups control resources) (Dandona, 2015; Salazar & Moline, 2023). In terms of rights and opportunities, treatment and valuation, and empowerment (i.e., promoting women's agency and voice), gender parity is the focus of Sustainable Development Goal (SDG) 5 in the workplace (Mazumder, 2024).

As companies growing realize they need to balance their social and environmental obligations and their financial objectives, corporate governance has emerged as a key area of focus in the quest for sustainability (Awais, Zulfiqar, Saghir, Sohail, & Rana, 2022; Malik, Awais, Sulehri, Mohsin, & Ali, 2021; Saghir & Awais, 2024). The composition of corporate boards, which is central to this governance, is important in determining the strategic goals of companies. Lestari and Soewarno (2024) emphasized the value of diversity in boardrooms, especially the presence of female directors, as a way to improve business performance and decision-making. Women bring different perspectives, experiences, and values to the workplace, especially the boardroom, which can lead to more comprehensive discussions, increased innovation and creativity, improved financial and non-financial performance, better decision-making, employee satisfaction, and retention (Salazar & Moline, 2023; Zampone, Nicolò, Sannino, & De Iorio, 2024). It also enhances reputation and brand image, attracting top talent and customers. When it comes to corporate matters, women are a bit more careful and risk-averse, more confident, ethical, and concerned about their reputation (Dobija, Hryckiewicz, Zaman, & Puławska, 2021; Galletta, Mazzù, Naciti, & Vermiglio, 2022; Rixom, Jackson, & Rixom, 2023; Zampone et al., 2024). These attributes have the potential to enhance the efficacy of female directors in terms of overseeing and evaluating the financial, social, and environmental sustainability performance. Many factors are thought to contribute to gender inequality in boardrooms, such as work-life balance concerns, gender-based labor market segmentation, Stereotyping and prejudice against women, and the undervaluing of women's contributions (Baghdadi et al., 2023; Reddy & Jadhav, 2019).

Acknowledgment of women's presence around the world as a field of study is a reflection of growing academic interest in understanding the diverse and significant roles women play in different corporations and economies globally (Zampone et al., 2024). Therefore, it is crucial to understand female presence within the framework of a developing country such as Pakistan. In 1934, Lettie Pate Whitehead became the first female director of Coca-Cola, a large, renowned company (Wiley, Pavelka, & Stinnette, 2016). Regulators around the world took official action, though, since the trend did not significantly improve. Gender quotas are primarily intended to capitalize on the talents and skills of highly qualified women in order to maximize economic growth potential (Shaheen, 2022; Zampone et al., 2024). Another reason for the rise in the quantity of female board members is the Securities and Exchange Commission of Pakistan (SECP) guidelines, which mandate that the 2017 Code of Corporate Governance mandates that publicly listed companies have at least one female director on their boards. As a result, businesses have been able to adhere to the legal requirement for a female presence on the boards (Reddy & Jadhav, 2019; Wu, Richard, Triana, & Zhang, 2022). This initiative aims to promote more gender diversity, promote inclusive decision-making processes, and capitalize on the distinct viewpoints that women offer to corporate governance (Amin, Ur Rehman, Ali, & Ntim, 2022). These rules follow global developments, which show that more and more people are realizing the importance of having a diverse range of genders in boardrooms for more effective corporate governance and performance. Through the implementation of these regulations, Pakistan



wants to increase the number of women in senior roles in the business world, thereby supporting wider endeavors aimed at achieving workplace gender equality (Athar, Chughtai, & Rashid, 2023; Zeeshan et al., 2022).

Indeed, an explosive and growing field of research is the analysis of the implications of SDG 5, which attempts to empower all women on boards of directors and attain gender equality, as well as the effect that this has on the performance of financial, social, and environmental sustainability. A key component of accomplishing this goal is having more women on BODs. The different perspectives, creativity, innovation, and problem-solving skills of women improve market awareness, consumer satisfaction, and company strategy, and ultimately increase revenue and profitability (Nadeem, Gyapong, & Ahmed, 2020). Businesses with female board members are more inclined to adopt environmentally friendly practices, reduce emissions, and invest in green technologies and renewable energy sources (Bazel-Shoham, Lee, Munjal, & Shoham, 2023; Meinzen-Dick, Kovarik, & Quisumbing, 2014). Gender diversity in the boardroom welcomes individuals with different backgrounds, aptitudes, viewpoints, and specialties (Baselga-Pascual & Vähämaa, 2021). The BOD's understanding of the rights and interests of diverse stakeholder groups is thus enhanced by diversity (Zampone et al., 2024). Additionally, gender diversity helps provide better problem-solving approaches and new creative ideas (Bosone, Bogliardi, & Giudici, 2022). Support for community-beneficial and social welfare-improving initiatives is more common among female directors (Prabowo, Jamin, Saputro, Mufraini, & Agustia, 2017). Businesses with a higher proportion of female board members outperformed their peers in terms of CSR (CSR) (Awwad, Binsaddig, Kanan, & Al Shirawi, 2023; Boiral & Yuriev, 2024; Gurol & Lagasio, 2022).

In a nutshell, this study's primary objective is to comprehend how females behave towards sustainability plans when they are members of BOD. This study contributed to offering in-depth insights into the theoretical as well as the practical aspects of the literature on the manufacturing sector's performance in terms of sustainability in Pakistan. Thus, the following are significant contributions made by this study to the literature on sustainability: Firstly, this research adds to the knowledge of the theoretical and practical significance of SDG-5, i.e., female presence in the BOD. Lack of gender diversity led to those enterprises' poor financial and non-financial sustainable performance (Zioło, Szaruga, & Spoz, 2023). Secondly, this study expands our understanding of how to gauge sustainable development by evaluating its three key dimensions, i.e., financial, social, and environmental. Thirdly, this study uses an integrated approach based on the Triple Bottom Line, agency theory, and gender socialization theory to fill the gap in existing literature. Lastly, the research specifically focuses on the manufacturing sector of Pakistan because the manufacturing sector requires more practice of environmental practices due to its drainage and waste system, which damages the environment. Another reason is that Pakistan's main revenue source is the manufacturing sector; therefore, effective board members must be needed to focus on sustainability performance (Tanveer, Song, Faheem, Daud, & Naseer, 2021; Zampone et al., 2024).

The remaining components of this investigation are as follows: The theoretical backdrop, hypothesis development, and literature review form the basis of the following section. Methodology is a key component of the third section. This report then presents our findings from empirical research and a results discussion. The conclusions and implications form the base of the last section.

## Literature Review and Theoretical Background

The issue of female presence in BOD has received substantial academic attention, and studies have framed the issue using multiple theories. Among various theories, the most highlighted are the triple bottom theory, gender socialization theory, and agency theory (Assenga, Aly, & Hussainey, 2018; Gurol & Lagasio, 2022; Peng, Fu, & Zou, 2024; Wu, Furuoka, & Lau, 2022).

The "triple bottom line" theory is concerned with a company's sustainability (Mendes, Braga, Correia, & Silva, 2023; Zampone et al., 2024). This theory states that businesses should prioritize profit, the planet, and people. and promotes companies to balance their societal and environmental responsibilities with their profits (Munjal & Sharma, 2023). It pushes companies to pay attention to their effects on people and the environment as well as profit—the conventional bottom line. The goal of this strategy is to develop a more just and sustainable kind of capitalism. The People (Social) dimension takes into account how businesses operations affect all parties involved, such as suppliers, consumers, employees, and society as a whole. Planet (Environmental) Aspects track an organization's ecological footprint while emphasizing environmentally sound practices. Profit (Financial)

measures a company's financial performance, but it also takes into account how economic activity contributes to sustainability (Henry, Buyl, & Jansen, 2019).

Another theory relating to this study is agency theory, which states that a manager or director has an opportunistic mindset and may have goals different from those of stockholders (Hindasah & Harsono, 2021). The BOD acts as a representation and protects the corporate property's interests to prevent what is known as agency costs (Galletta et al., 2022). Considering this, numerous studies have addressed how having more female directors or management influences the company's strategic decisions, whether they are related to financial as well as non-financial (social and environmental) issues too (McElhaney & Mobasser, 2012; Mungai, Ndiritu, & Rajwani, 2020). The interests of shareholders are better protected when there are women on the BOD. This is because individuals with diverse backgrounds provide unique insights into the decision-making process (Furlotti, Mazza, Tibiletti, & Triani, 2019). According to Jolevska and Cvetkoska (2023), female presence improves. Increasing oversight will increase board effectiveness and independence of management's opportunistic conduct and minimize agency difficulties, resulting in improved corporate sustainability. A diversified board is more inclined to consider the viewpoints of many stakeholders when making decisions, better representing the needs and interests of the community, customers, and staff (Torres, 2024).

Gender socialization theory, which says that socialization encourages individualistic and competitive behavior in males over cooperative and altruistic behavior in women (Marchini, Tibiletti, Mazza, & Gabrielli, 2022; Peng et al., 2024), can be used to support a gender difference perspective. In light of these different social commitments and expectations, multiple professions and leadership ideologies have emerged based on the gender of the leaders. Females are more focused on stakeholder-commitment outcomes and strategies based on long-term goals. These outcomes and goals are necessary for successful social and environmental practices and performance (Eliwa, Aboud, & Saleh, 2023). In leadership positions, women are also actively involved and creating connections (Nguyen, Ntim, & Malagila, 2020; Prabowo et al., 2017).

## Hypothesis Development

### *SDG-5 in Board and financial Sustainability*

A company's ability to make revenue while reducing risks and making adjustments for changing market dynamics is referred to as financial sustainability (Wu, Gao, Luo, Xu, & Shi, 2024). SDG 5 addresses corporate governance and enhancing the financial sustainability of organizations by promoting gender equality and female empowerment (Echeverri-Pimienta, Valencia-Herrera, & Correa-Mejía, 2022). Recent decades have seen a notable rise in the conversation around female presence in the workforce within organizations. An in-depth study conducted by Campbell and Mínguez-Vera (2007), revealed that businesses with females in decision-making positions (board) generate higher profitability and earn higher market returns. A significant number of women at top echelon positions, such as board member, boost both The company's worth and financial performance (Bannò, Filippi, & Trento, 2023; Orozco Collazos & Botero, 2024). According to Bosone et al. (2022), Less than 10% of board positions are held by women in Pakistani manufacturing companies, a gender disparity that has serious consequences for sustainability and financial performance (Bazel-Shoham et al., 2023; Zampone et al., 2024).

Issa, Yousef, Bakry, Hanaysha, and Sahyouni (2021) revealed that Companies having diverse BOD were seen as being more in compliance with the requirements and were subject to fewer financial penalties. In fact, females bring various talents, capabilities, and skills to BOD, including a propensity to be less risk-taking than men (Torres, 2024). Brahmhatt, Patel, and Patel (2012) found female board members frequently emphasize financial sustainability and long-term strategic planning by improving firm's return. Study of Buallay, Hamdan, Barone, and Hamdan (2022) have indicated that businesses with gender-diverse boards frequently see increases in profitability and return on investment (ROI) that result in enhancing financial sustainability. Dang, Ho, and Nguyen (2023) found that businesses with a minimum of one female board member experienced better average growth, lower leverage, and higher average returns on equity.

Gulamhussen and Santa (2015) observed a connection between the number of female members of the board and sustainability, asserting that the moderating influence of masculinity on a national level harms board diversity and affects females' behavior toward sustainability, which later on negatively affects the company's performance.

Females do not perform better on the board in terms of corporate financial performance. It is because of their professional and familial obligations (Bazel-Shoham, Lee, Munjal, & Shoham, 2024; Jolevska & Cvetkoska, 2023). Due to family obligations, females are sometimes not given adequate time to pursue their professional goals. As an outcome, their involvement had no favorable and noteworthy effect on the financial performance of businesses (Dang et al., 2023; Dobija et al., 2021; Mohammad, Abdullatif, & Zakzouk, 2018). The study examines the role of female board members in a company's financial sustainability in addition to focusing on the strategic benefits of gender diversity in board effectiveness and corporate financial outcomes. We hypothesize the following in light of the foregoing argument and by the ideas outlined above:

***H1: Having females in the BOD enhances financial Sustainability.***

***SDG-5 in Board and social Sustainability.***

Researchers have studied how board diversity influences business social performance with the financial and economic elements (Boiral & Yuriev, 2024). Bătae, Dragomir, and Feleagă (2021) define social sustainability as "the achievement of performance and social impacts resulting from business programs and policies." Social sustainability is the capacity of a society or organization to uphold positive relationships among its members, equitable access to resources, and social well-being. According to Bazel-Shoham et al. (2024), the presence of female directors in the boardroom enhances the company's social sustainability because they offer distinct perspectives and leadership styles. Gurol and Lagasio (2022) emphasize the CSR principles and female board members. Females serving on BODs are more socially conscious than men, and this positively affects company success (Bazel-Shoham et al., 2024). According to them the concern for social, economic, or environmental issues is one of the traits that set women apart from other stereotypes, suggesting that the firm's dedication to these issues is mirrored in its success on the social front. Female directors often support and initiate CSR programs that benefit society, such as education, health, and community development, advocating for higher ethical standards and CSR, leading to more ethical business practices (Bussoli, Assal, Fattobene, & Graziano, 2024; Fehre & Weber, 2019).

The number of women serving as board directors contributes to a diversity of viewpoints and promotes workplace policies that are more equitable and inclusive (Zampone et al., 2024). They support work-life policies that can improve employee satisfaction and retention, such as flexible scheduling and parental leave. More females on boards increase disclosure of CSR (Moon, 2023; Zampone et al., 2024). According to Amin, Ali, ur Rehman, and Elamer (2023), there is a significant effect of females' presence in BOD on CSR reporting. Females have traits of social commitments and network contacts, which help businesses communicate with various stakeholder groups (Baghdadi et al., 2023; Kunze & Scharfenkamp, 2022). Stronger interactions with different groups of stakeholders will result in improved business social sustainability performance, as stakeholder relationships are the main causes of this performance (Bazel-Shoham et al., 2024; Furlotti et al., 2019; Gangi, Daniele, D'Angelo, Varrone, & Coscia, 2023). We hypothesize that, based on the above discussion related to female board members and social sustainability:

***H2. Having females in the BOD enhances Social Sustainability.***

***SDG-5 in Board and Environmental Sustainability.***

Environmental concerns are gaining greater attention from manufacturing companies, which concentrate on manufacturing products using economical techniques that lessen their adverse environmental consequences while conserving energy and natural resource (Torres, 2024; Wahyuningrum et al., 2023). Studies have highlighted manufacturing companies' participation in environmental responsibility due to their emissions, such as the generating of used and acquired energy, the extraction and manufacturing of acquired and consumed volatile compounds, and waste generation (Xu, Tong, Wang, & Yin, 2024). Female directors often prioritize long-term planning and sustainability, exhibiting a more holistic approach to environmental challenges by balancing financial goals with long-term ecological effects (Albitar, Borgi, Khan, & Zahra, 2023; Bazel-Shoham et al., 2024; Shakil, Tasnia, & Mostafiz, 2021).

Increasing resource efficiency and lowering carbon footprints are two examples of CSR initiatives that female directors usually support. A 2016 study that appeared in the Harvard Business Review found that Businesses that have more female board members are more likely to support pollution-reduction programs, boost energy

efficiency, and generate energy from sustainable sources (Biswas, Chapple, Roberts, & Stainback, 2023; Boiral & Yuriev, 2024).

According to Issa and Hanaysha (2023) research, there exists a connection between the BOD's organizational structure and attributes and the adoption of environmental measures. Henderson and Loreau (2023) found that People who have more females in their group are more conscious of environmental issues. A research by Gangi, Daniele, Varrone, Coscia, and D'Angelo (2024) found that having more female directors on a board had a considerable influence on a company's environmental performance, particularly in terms of eco-innovation and emission management. In a similar vein, Yuriev and Boiral (2024) highlight the value of having a diverse range of genders on boards when creating environmental policies that work, especially for companies that have an impact on the community and the environment.

To our knowledge, only some studies analyzed the link between female presence in BOD and the environmental sustainability of manufacturing companies in Pakistan. We expect that female presence in the BOD will enhance environmental sustainability performance based on the theories mentioned earlier (Boiral & Yuriev, 2024; Singh, 2024). As a result, we develop the following hypotheses:

**H3. Having females in the BOD enhances the Environmental Sustainability.**

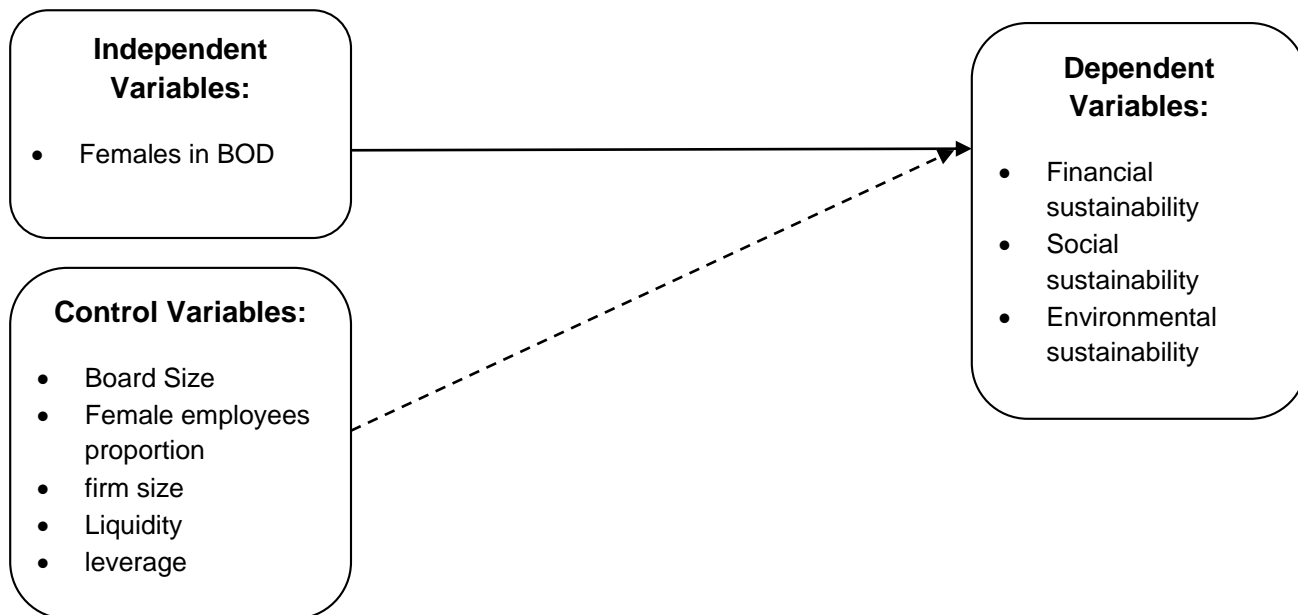


Figure 1: Conceptual Framework

**Methodology**

**Sample and Procedure for data collection**

The study sample comprises 87 manufacturing companies listed on the Pakistan Stock Exchange spanning eight years, from 2016 to 2023. Due to the lack of data from multiple companies and the fact that Pakistani companies are not required to disclose sustainability data, the sample size has been reduced from 268 to 87.

The reason for the selected period is that it provides an extensive and up-to-date analysis of sustainability performance and female board directors. Significant developments and trends in the manufacturing industry, as well as sustainable practices, characterize this time. The United Nations established 17 global sustainable development goals in 2015; as a result, starting in 2016, many countries and organizations increased their efforts to meet the goals, especially SDG-5 (Beloskar et al., 2024).

The rationale behind the selection of Pakistani manufacturing companies is their noteworthy economic contributions, encompassing GDP, employment, and export earnings. Water usage reduction, chemical management, energy efficiency, sourcing of raw materials, ethical sourcing, supply chain transparency, and fair labor practices, waste reduction, effective production planning, innovative technologies, and consumer education are some of these companies' sustainable practices (Eslami, Dassisti, Lezoche, & Panetto, 2019). The main

sources of data are the websites of the State Bank of Pakistan, the PSX, the company's annual reports, company profiles, and official websites.

**Econometric Model**

We compute the following panel data models to examine the impact of the SDG-5 in the BOD on the three performance components of sustainability, namely financial, social, and environmental).

$$FINL_{it} = \beta_0 + \beta_1 FBOD_{it} + \beta_2 BSZ_{it} + \beta_3 FEMPL_{it} + \beta_4 FS_{it} + \beta_5 LIQ_{it} + \beta_6 LEV_{it} + \varepsilon_{it} \quad (eq-1)$$

$$SOCL_{it} = \beta_0 + \beta_1 FBOD_{it} + \beta_2 BSZ_{it} + \beta_3 FEMPL_{it} + \beta_4 FS_{it} + \beta_5 LIQ_{it} + \beta_6 LEV_{it} + \varepsilon_{it} \quad (eq-2)$$

$$ENTL_{it} = \beta_0 + \beta_1 FBOD_{it} + \beta_2 BSZ_{it} + \beta_3 FEMPL_{it} + \beta_4 FS_{it} + \beta_5 LIQ_{it} + \beta_6 LEV_{it} + \varepsilon_{it} \quad (eq-3)$$

Where; FINL stands for financial Sustainability performance, SOCL stands for social Sustainability performance, and ENTL stands for environmental Sustainability performance. The dependent variable is FBOD, which represents females on the board of directors. In this study, the control variables are BSZ (board size), FEMPL (Female employees), FS (Firm size), LIQ (Liquidity) and LEV (Leverage). Our statistical analysis was carried out using STATA software.

**Table 1**

**Description of variables**

Variable	Abbreviation	Description
<b>Dependent variable</b>		
Financial Sustainability performance	FINL	Financial index technique that employs a dichotomous approach to measure a company's financial sustainability. According to Hongming et al. (2020), it has eight indicators, thus consistent with Haniffa and Cooke (2005) and (Malik & Kanwal, 2018), the scoring method is additive and equally weighted. Where, if an item is disclosed, the value is "1"; otherwise, it is "0" .
Social Sustainability performance	SOCL	Social index technique that employs a dichotomous approach to measure a company's social sustainability. According to Hongming et al. (2020), it has nine indicators, thus consistent with Haniffa and Cooke (2005) and (Malik & Kanwal, 2018), the scoring method is additive and equally weighted. Where, if an item is disclosed, the value is "1"; otherwise, it is "0"
Environmental Sustainability performance	ENTL	Environmental index technique that employs a dichotomous approach to measure a company's environmental sustainability. According to Hongming et al. (2020), it has 20 indicators, thus consistent with Haniffa and Cooke (2005) and (Malik & Kanwal, 2018), the scoring method is additive and equally weighted. Where, if an item is disclosed, the value is "1"; otherwise, it is "0".
<b>Independent variable</b>		
Females in Board	FBOD	The ratio of female directors to all directors of members in BOD.
<b>Control variables</b>		
Board size	BSZ	The total members in the board of directors at the end of period
Females employees proportion	FEMPL	The percentage of female workers compared to all employees.
Firm size	FS	Natural logarithm of total assets
Liquidity	LIQ	Total current assets divided by Total current liabilities
Leverage	LEV	The ratio of total liabilities to total assets.

**Estimation Techniques**

Using the OLS estimation methodology on pooled data and ignoring the heterogeneity issue is the most straightforward easy estimating strategy. An upwardly biased estimate of the dynamic term's coefficient is typically produced by this method. A fixed effect estimating technique is typically applied to this problem, changing that variable. However, there is still a relationship between the transformed mistake and the transformed

variable. Due to this modification, the estimate has a downward skew. To address these bias concerns, the instrumental variables technique is employed (Nadeem, Zaman, & Saleem, 2017).

All regressors are converted through differences using the different GMM (generalized method of moments), which also removes fixed effects, which addresses Endogeneity issues. System GMM addresses Endogeneity issues by (a) increasing efficiency through the addition of new instruments and (b) modifying the instruments so that they are exogenous with the fixed effects, or uncorrelated. The result is a system of two equations: the original equation and the modified equation (Khatri, 2023). The results were obtained using the `xtabond2` tool in Stata. One way to evaluate an instrument's accuracy is to use the Hansen statistic. The validity of the instruments is supported by the failure to reject the null hypothesis at the 0.05 confidence interval; However, with greater confidence intervals—especially over 0.25—failure to reject the null hypothesis increases the likelihood of an issue (Okoyeuzu, Ujunwa, Ujunwa, & Onah, 2021).

The serial correlation and autocorrelation of the error term are also examined. Upon failure of the second-order level rejection of the null hypothesis, In addition to the moment conditions being fulfilled, the error term is serially uncorrelated.

## Results and findings

### *Descriptive Statistics and Correlation*

In Table 2, descriptive statistics are displayed. As per the independent variable result, FINL, SOCL, and ENTL have mean values of 0.62, 0.53, and 0.59, respectively, when compared to the sustainability index. It shows how companies strive for sound financial sustainability practices to achieve financial sustainability; social sustainability values represent the businesses' involvement in social sustainability; and environmental sustainability values demonstrate the businesses' dedication to environmental sustainability (Boiral & Yuriev, 2024). According to the dependent variable result, Pakistani manufacturing companies have an average of 12 percent of female board members. Considering that the minimum value is zero, it indicates that some board rooms still lack a female member. The highest proportion of women on the board is 50%. Our results are similar to Fayaz, Abbas, and Zahid (2021).

**Table 2**

### *Descriptive statistics*

Variable	Mean	SD	Min	Max
FINL	0.62	0.73	-0.26	1.15
SOCL	0.53	0.56	0.02	0.78
ENTL	0.59	0.38	0.11	0.85
FBOD	15.83	11.54	0	50
BSZ	12.25	11.25	4	27
FEMPL	45.21	16.25	10.25	54.26
FS	16.25	15.69	8.25	21.65
LIQ	1.36	1.25	0.15	2.43
LEV	0.48	0.92	0.16	0.88

Note: Three Dependent Variables are: FINL is Financial Sustainability, SOCL is Social Sustainability, and ENTL is Environmental Sustainability. Independent Variable is FBOD (Females in BODs). Five Control Variables are: BSZ (Board Size), FEMPL (Females employees' proportion), FS (Firm Size), LIQ (Liquidity) and LEV (Leverage).

Table 3 displays the pairwise coefficient of correlation for each variable. At the five percentile, the correlation coefficient values are significant. Moreover, the correlation coefficients show that the social and environmental sustainability performance of Pakistani manufacturing enterprises is improved when female employees are involved. This shows that having a gender-diverse leadership team in corporations benefits these companies' overall sustainability initiatives while also advancing equality (Khatri, 2023; Zampone et al., 2024). Moreover, the result shows that there is a negative correlation between having women in the boardroom and financial sustainability. This negative correlation suggests that women in the boardroom might not take an active role in financially sustainable matters because they lack the knowledge or experience in financial reporting (Dang et al.,

2023; Galletta et al., 2022). In addition, from the values of variance inflation factor (VIF), i.e. not more than 5, indicate no issue of multicollinearity.

**Table 3**

***Correlation***

Variable	VIF	FINL	SOCL	ENTL	FBOD	BSZ	FEMPL	FS	LIQ	LEV
FINL		1								
SOCL		0.125	1							
ENTL		0.281	0.323	1						
FBOD	1.561	-0.215	0.039	0.064	1					
BSZ	1.327	0.131	0.107	-0.042	0.019	1				
FEMPL	1.956	-0.152	0.041	0.133	0.062	0.044	1			
FS	2.037	0.492	0.055	0.071	0.002	0.107	0.263	1		
LIQ	1.194	0.721	-0.119	0.066	0.033	0.124	0.786	0.493	1	
LEV	2.355	0.234	-0.362	-0.479	0.722	0.256	0.199	0.412	0.436	1

Note: Three Dependent Variables are: FINL is Financial Sustainability, SOCL is Social Sustainability, and ENTL is Environmental Sustainability. Independent Variable is FBOD (Females in BODs). Five Control Variables are: BSZ (Board Size), FEMPL (Females employees' proportion), FS (Firm Size), LIQ (Liquidity) and LEV (Leverage).

***Regression Results and Discussion***

Heteroscedasticity and autocorrelation issues cannot be solved by the pooled OLS model. The generalized method of moments- approach (GMM) (Arellano & Bond, 1991) is typically used to resolve this issue. Distinction By changing all of the independent and control variables and typically first differencing the data, GMM removes the fixed effects (Roodman, 2009).

Another problem is the existence of Endogeneity within the model signifies a breach of one of the assumptions of OLS, namely the absence of correlation between error terms and independent variables (Ullah, Fang, & Jebran, 2020). For confirming the presence of Endogeneity in the data, the J stat value is used. To validate the instruments' homogeneity, this study expects a J test statistic with a p-value of more than 5%. The results of GMM regression shown in Table 5 confirm the non-existence of Endogeneity, as the values of the J stat have more than 5% probability in all models. Furthermore, Autoregressive tests, specifically AR(1) and AR(2), are used to assess autocorrelation in regression model residuals, particularly when using the Generalized Method of Moments (GMM) estimation technique. The AR(1) test (i.e., first-order autocorrelation) ensures the validity of GMM estimation instruments and model specification, while the AR(2) test (i.e., second-order autocorrelation) verifies the instruments in GMM-based dynamic panel data models, ensuring accurate and reliable results. For accurate GMM estimation results, both tests aid in identifying problems with the model specification and the validity of the instruments. The GMM estimator was used to estimate the elastic impacts of the regression coefficients on the regression. In this study, three proxies for sustainability are used in the computations: financial, social, and environmental.

**Table 5:****Dynamic GMM Regression results**

	Equation 1 FINL	Equation 2 SOCL	Equation 3 ENTL
FBOD	-0.0028***	0.0754*	0.0245***
BSZ	0.0123**	0.5748	0.4578**
FEMPL	0.0010*	0.0541**	0.0125**
FS	0.0070	0.0333*	0.0145*
LIQ	0.0184**	-0.0229	0.0142**
LEV	-0.5780	0.8887	0.5134
Obs.	696	696	696
AR(1)	0.0034*	0.0022**	0.004*
AR(2)	0.4125	0.275	0.005
Adj. R-Sq	0.221	0.187	0.234
DW stat	1.8212	1.9254	1.6251
J-stat	284.35	303.3	275.36

Note: Three Dependent Variables are: FINL is Financial Sustainability, SOCL is Social Sustainability, and ENTL is Environmental Sustainability. Independent Variable is FBOD (Females in BODs). Five Control Variables are: BSZ (Board Size), FEMPL (Females employees' proportion), FS (Firm Size), LIQ (Liquidity) and LEV (Leverage).

\*\*\*, \*\* and \* denote significance at 1%, 5% and 10% significance, respectively.

**Financial Sustainability**

The first hypothesis's result indicates that the financial sustainability of Pakistani manufacturing companies is much adversely affected by the presence of women on the BODs. This shows a lack of active participation by women in boardrooms in financial sustainability performance. One factor contributing to this detrimental effect is the lack of financial knowledge and experience among the female board members, which makes them less concerned with their financial sustainability (Zalata, Ntim, Alsohagy, & Malagila, 2022). The second reason is that women in Pakistani society are not allowed to speak up in financial matters; this could affect boardroom discussions also. The last explanation is that women are only appointed to boards to comply with legal requirements regarding gender quotas. This result is based on an analysis of Dang et al. (2023); Dobija et al. (2021); Mohammad et al. (2018).

**Social Sustainability**

For the second hypothesis, females on BODs positively and significantly impact social sustainability. This shows that females in the boardroom actively participate in social sustainability performances. Female board members positively engage with stakeholders in their corporate social responsibilities, community engagement, ethical practices, and social networking (Awwad et al., 2023; Boiral & Yuriev, 2024). The results support Hypothesis 2. Female board members consistently strive to advance CSR (CSR) endeavors and community involvement using various initiatives that support local communities, including but not limited to education, healthcare, fair labor practices, and community development (Awwad et al., 2023; Bussoli et al., 2024; Cruz, Justo, Larraza-Kintana, & Garces-Galdeano, 2019; Gurol & Lagasio, 2022). Companies in Pakistan that have made gender diversity a priority at the board level have seen gains in social outcomes like CSR and employee satisfaction (Jizi, Salama, Dixon, & Stratling, 2014; Prabowo et al., 2017; Shakil et al., 2021).

**Environmental Sustainability**

According to environmental sustainability performance, the results indicate that the likelihood of pursuing policy emissions is higher when there are female directors present, supporting Hypothesis 3. According to Furlotti et al. (2019), female board members are constantly working to control environmental risk and create emission policies. Environmental concerns are more likely to be prioritized by female directors than by male directors (Glass, Cook, & Ingersoll, 2016). They are more likely to be in favor of rules and procedures that protect the environment. Female board members usually advocate for CSR programs that have strong environmental components, such as



reducing carbon footprints, conserving resources, and supporting renewable energy projects (Alsayegh, Abdul Rahman, & Homayoun, 2020; Bătae et al., 2021; Beloskar et al., 2024; Elmagghi, Ntim, Elamer, & Zhang, 2019; Galletta et al., 2022; Glass et al., 2016).

## Conclusion

Gender equality, the UN's fifth sustainable development target, is a fundamental human right and a need for creating a comfortable, wealthy, and sustainable society (Weiland, Hickmann, Lederer, Marquardt, & Schwindenhammer, 2021). One of the pillars of this path will be SDG-5, gender equality, in the process of accomplishing the goals for a sustainable future (Beloskar et al., 2024). This objective acknowledges that gender equality is a basic human right as well as a prerequisite for a sustainable, safe, and secure society (Boiral & Yuriev, 2024; Zamponi et al., 2024). Thus, all economic stakeholders, including the government, regulatory agencies, communities, families, workplaces, NGOs, and businesses, cooperate to take action to achieve the goals of SDG-5. Manufacturing businesses in Pakistan are vital to the nation's development, so they must adopt SDG objectives within their organizations. The integration of SDG-5 into a company's governance framework enhances governance efficacy and promotes sustainability, encompassing financial, social, and environmental aspects (Mazumder, 2024; Sekarlangit & Wardhani, 2021; Zamponi et al., 2024). It also contributes to the long-term value creation and sustainable growth of the corporation. The goal of this study is to clarify the function of SDG 5 and how it affects sustainability performance.

In this study, the financial, social, and environmental sustainability performance of manufacturing companies was examined about SDG-5 (the presence of women in BODs). The study sample comprises 87 manufacturing companies listed on the Pakistan Stock Exchange, with data spanning eight years, from 2016 to 2023. In this study, all three equations were estimated using the GMM test. The findings of its analysis show that having more women on the BODs promotes environmental and social sustainability. However, having more women on the BODs makes the company less financially sustainable (Alsayegh et al., 2020; Bătae et al., 2021; Glass et al., 2016; Meinen-Dick et al., 2014; Rajesh, 2020). Our results indicate that having more females on board in manufacturing companies in Pakistan has a significant effect on the company's sustainability (Eliwa et al., 2023; Galletta et al., 2022). The findings propose that having the representation of female directors in companies enhanced value creation, social commitments, and environmental strategies (Eliwa et al., 2023; Galletta et al., 2022; Mohammad et al., 2018). Atif, Alam, and Hossain (2020) state that female directors prefer to fund, choose, and support projects that promote CSR and environmental sustainability (Peng et al., 2024). Gender equality on boards ensures diverse viewpoints and sound governance practices, which improve SDG reporting and add to the overall sustainability of the company.

The results indicate that having women in leadership roles has a substantial impact on sustainability performance, which validates the three theories outlined in the study: the triple bottom theory, gender socialization theory, and agency theory. Agency theory posits that the BOD's role in actively supervising and delegating authority plays a pivotal role in surmounting agency challenges (Nguyen et al., 2020). According to Adams, de Haan, Terjesen, and van Ees (2015), agency theory assists women in lowering agency conflicts and improving the sustainability performance in organizations through their skills, knowledge, and emotional intelligence. According to the triple bottom theory, companies should put profit, the environment, and people first. and pushes businesses to strike a balance between their profits and their social and environmental responsibilities (Bazel-Shoham et al., 2024; Munjal & Sharma, 2023). Gender socialization theory is an additional theory that lends support to the perspective of gender differences. This theory states that women are more concerned with long-term goals and stakeholder commitments, outcomes, and strategies. For social and environmental practices and performance to be successful, these two outcomes and goals are required (Eliwa et al., 2023).

## Limitations and Future Recommendations

There are certain limitations to this study that should serve as the foundation for theoretical and practical implications that will be beneficial to academics, strategic bodies of companies, and policymakers. First, the sample consists solely of Pakistani manufacturing companies; it is recommended to test this model across other industries and nations as well. Second, the scope of this research was limited to the presence of SDG-5 in the BODs. It is suggested that researchers look at how SDG-5 is implemented in the CEO, upper management body,

and governance committees (such as the audit, Research & Development, and HR committees, among others). Thirdly, the scope of this study is restricted to SDG 5, and it is advised to examine the implications of other SDGs as well. It is suggested that the policy board of the company appoint females to their BODs and provide them with training in financial, social, and environmental sustainability to improve performance. It is also recommended that companies can achieve better financial, social, and environmental results by updating corporate governance codes to reflect best practices in diversity and inclusion.

The study highlights the significance of gender diversity policies for corporate executives and policymakers. It recommends that in order to enable women to participate effectively on boards, policymakers should establish supportive frameworks for them. This covers initiatives for developing leadership skills, providing mentorship, and addressing cultural biases. Policies in this area should promote accountability and openness in board nominations. Business executives ought to place a high priority on including women in board dynamics and using their special insights to improve governance and decision-making. Comprehensive onboarding procedures, ongoing professional development, and mentorship programs can help achieve this. As part of their sustainability strategy, business executives should support gender diversity because it can help with financial, social, and environmental issues.

Researchers should look into additional diversity criteria that were not considered in this study, such as experience, qualifications, racism, nationality, age, culture, and others that may affect sustainability performance.

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# An Empirical Investigation to Study The Impact of Employee Work Place Ostracism and Job Insecurity on The Their Work-Life Balance

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## Abstract

*This study aims to investigate the impact of employee workplace ostracism and job insecurity on employee work life balance. Co-worker ostracism, job insecurity, and employee work-life balance are inter-related concepts that have been the subject of research in recent years. Coworker ostracism has a direct effect on employee work-life balance and the study tested the impact of job insecurity as a mediator between coworker ostracism and work-life balance. A sample of 304 respondents were collected to measure the three variables and their connection. The study use self reported instrument to gauge the colleagues ostracism and their job related insecurities and its consequences on the individuals work life balance. SPSS version 25 is used for statistical analysis and Hayes process is employed for obtaining the results of mediation. The study finds that both the variables co-worker ostracism and job insecurities influence co worker work-life balance. It indicates that there is a significant relationship between coworker ostracism and job insecurity and subsequently, job insecurity mediates the relationship of ostracism and work-life balance. The results of this study suggested that organizations must take proactive steps to foster a supportive and inclusive work environment by knowing the connections between coworker exclusion, job insecurity, and work-life balance. The results of this study have implications for individuals as well. They can actively look for assistance, communicate honestly with coworkers, and research stress-reduction and work-life integration techniques.*

**Keywords:** coworker ostracism, job insecurity, work-life balance

## Introduction

Employee behavior and attitude both at work and at home are influenced by job insecurity. There will be a detrimental effect on work-life balance when employees behave differently because they are uncertain about their employment and fear of losing it, the employee's uneasiness will have a detrimental effect on their behavior, which leads to disturb work life balance (Chirumbolo & Areni, 2010). Employee unhappiness may have an effect on the organization's success (Kurnia & Widigdo, 2021). In order to improve organizational culture and employee well being effort should be made to ease feelings of disconnection and pessimism (Leung & Ladkin, 2024).

Soreness inflicted by ostracism is similar to physical pain (Riva et al., 2011; Williams & Nida, 2011). This sort of occurrence is not only painful but perhaps lead to another organizational problem which is job insecurity (O'Reilly & Robinson, 2009; Robinson et al., 2013), and antagonism (Williams & Nida, 2011). Ahmad et al. (2024) highlighted the damaging effect of work place ostracism on workers' collective and emotional well-being which includes the workers' emotional fatigue and burnout. Discouraging voice behavior will encourage organizational silos and reduce productivity (Khalid, Malik, & Atta, 2024).

Ostracism at work is a prevalent and expensive problem that requires understanding on the parts of companies as well as employees' perceptions, responses, and coping mechanisms. But researchers haven't gone far enough in these directions (Sharma & Dhar, 2021, p. 2). Our knowledge of workplace exclusion, its complex effects, and potential remedies that can improve working relationships and employee wellbeing is still lacking (Ahmad et al., 2024).

When coworkers are shunned and treated poorly, they become agitated, nervous, and want retaliation, which makes them feel unreasonable and emotional (Dhir & Srivastava, 2024). Research has shown that job instability negatively impacts worker performance, job satisfaction, and well-being (Cheng & Chan, 2008; DeWitte, 2005). Nonetheless, there hasn't been much discussion of the possible moderating role that job instability may play in the connection between work-life balance and coworker exclusion.



There are varied elements to investigate; future studies can incorporate the cultural and contextual factors which influence the elements of work life balance in diverse societal and organisational context, scant studies has been conducted on institutional structures, societal expectations about perceptions and practices to shape work-life balance (Zihan et al., 2024). This study focused on the subject of employee performance hence incorporated the suggestions of above authors identified gap. This study aims to investigate the role of job insecurity in mediating the relationship between coworker exclusion and work-life balance.

Studies have been conducted on workplace ostracism. However, emphases were not paid to the mechanism to cope with the workplace ostracism which has led it to a social endemic in the workplace. Resultantly, the diverse elements of interpersonal neglect remain ignored, i.e. employees' perception about ostracism and its coping mechanism. Factors that bring variations in employee perception, managing strategies and experiences remain un-investigated (Sharma & Dhar, 2024).

This study specifically aims to comprehend how job instability mediates the relationship between an individual's ability to maintain a healthy work-life balance and experiences of coworker ostracism. Hence the study concludes to investigate on the research questions: the direct effect of work place ostracism on work-life balance and coworker ostracisms' effect on employees' job insecurity. The study investigates significance of mediation of job insecurity on coworker ostracism and work-life balance. The objectives of this study are to explore the relationship between coworker ostracism and work-life balance with the mediating effect of job insecurity. To understand the relationship between coworker ostracism and work-life balance, and the mediating effect of job insecurity on the relationship between coworker ostracism and work-life balance.

Prior study on office isolation and work life stability has brought diverse outcomes. This study incorporates social cognitive theory to examine the relationship between coworker ostracism and work life balance that zeros in the mediating effect of job insecurity. This study developed its hypotheses on Social cognitive theory which holds that a person's cognition is influenced by their reciprocal interactions with their living environment, is what drives their conduct (Bandura, 2001). This study investigated how job insecurity and workplace ostracism affect work-life balance, based on the social cognitive theory and thus construct a multilevel model. Adding to this, Malik et al. (2020) suggested that protracted anxiety and panic can reduce workers' enthusiasm for their jobs and undermine personal drive to strive for efficiency and quality. Individuals may experience more job instability as a result, which could further impair performance by eroding their dedication to company objectives. The study based its theoretical foundation on Bandura's social cognitive theory.

## Literature Review and Hypotheses Development

### Operational definitions

#### *Workplace Ostracism*

Workplace ostracism is characterized as “an employee's perception of being overlooked or excluded from social interactions or work-related activities by others at work when one should have been acknowledged, responded to, or included” (Sharma & Dhar, 2021). “Coworker ostracism refers to the act of excluding, ignoring, or socially isolating an individual within the work environment, leading to their perceived or actual exclusion from work-related interactions, relationships, and information sharing” (Williams & Jarvis, 2006).

#### *Job Insecurity*

Job insecurity is perception to job failure or cherished job elements Klug et al. (2024). Job insecurity is the employee's perception or anticipation of the probable threat or risk of losing their job or experiencing unfavorable employment conditions (DeWitte, 2005). It has been defined as “perceived powerlessness to keep preferred continuity in a threatened process situation” by Moy et al. (2021). A person's assessment of the possibility of losing their job soon is known as perceived job instability (Vander Elst et al., 2016). The fear that one will not be able to hold their current position in the future is known as job insecurity (Witte, 1999).

#### *Work life Balance*

“Work-life balance is the ability to balance professional responsibilities with personal interests and obligations” (Brough & O’Driscoll, 2010). Work life balance has a significant role in employee performance and congenial

work environment (Leuhery et al., 2024). There is a high level of dedication and employee commitment on organizations having concern of work life balance (Weng et al., 2023). Employees' perception of organizations positive work life interventions demonstrate reduced level of anxiety and exhaustion and elevated levels of job satisfaction (Jayaraman et al., 2023; Khairy et al., 2023).

On the other hand organizations ignoring work life balance has damaging effect on employee self esteem, organizational productivity and performance. Employee negative perception of organizational support of work life balance may face increased level of anxiety, exhaustion frustration with their jobs (Ferreira & Gomes, 2023) which could lead to more absenteeism. This study investigates the antecedents of work life balance how co-worker ostracism and job insecurity affects the work life balance of an employee and hence add to the literature with the study's valuable contribution.

### ***Relationship between Coworker Ostracism and Work-life Balance***

Recent studies show that workplace ostracism regulates a series of mentally unpleasant events that is; anger (Chow et al., 2008) and negative or bad mood (Gonsalkorale & Williams, 2007) and co-worker ostracism will lead to nervousness and discouragement (Ferris et al., 2008). Ostracized employees take their adverse moods to their home, and it affects them and causes excessive tension in the work-family conflict. In particular, research shows that ostracism can cause actual pain that leads to aggressive behaviour and has a harmful impact on the employee at the workplace (Eisenberger, 2012). Furthermore, social ostracism is miserable in a workplace that is causing sadness, exhaustion (Ferris et al., 2008), ignoring, dissatisfaction (Hitlan et al., 2006), and displacement (De Clercq et al., 2019). In another study, employees become absent-minded because of a shortage of resources that is severely effecting their family commitments (Williams, 2002).

**H1: Coworker ostracism has a relationship with work-life balance.**

### ***Co-worker Ostracism and its relationship with Job Insecurity***

Intense consequences has been studied of workplace ostracism on employees and individuals, ostracism is correlated with work place isolation (Başar et al., 2024) and turnover intention (Zhang et al., 2024). Study findings revealed inverse correlation among ostracism and job satisfaction; it further explore that female colleagues are more expose to ostracism than male counterparts which leads to lower job satisfaction (Adnan et al., 2024).

According to (Haldorai et al., 2021) coworker ostracism is a form of mistreatment that occurs when individuals in an organization intentionally exclude others from social activities or situations where it was expected to include them. It is widely recognized as a prevalent phenomenon and a topic of frequent discussion in contemporary organizations (Hsieh & Karatepe, 2019). Coworker ostracism increases job-related stress among employees. A study by Glambek et al. (2014) suggests that employees who are bullied, experienced job insecurity about the stability and nature of their work, and they may face the possibility of leaving their job and being marginalized from the workforce Berthelsen et al. (2011) it is found that employees who experience bullying and isolation tend to have the intention to leave their organization, and this intention remains stable over time. However, majority of the employees who has been undergone bullying choose to remain in their current position, even up to two years after reporting the incident, which suggests that the factors that keep them in the organization are highly influential.

Coworker ostracism has been linked to poor job performance, decreased organizational commitment, work discontent, increased unproductive work behavior, and higher intentions to quit (Haldorai et al., 2021). Workers who are confident in their jobs may have a detrimental effect on the company (Oberai, 2021). Workers may believe that the company has broken the emotional contract by failing to provide a safe workplace, especially if they witness their coworkers being shunned (Tian et al., 2014). Employees may therefore view coworker ostracism as a violation of the emotional contract they have with the company, which guarantees a safe and secure work environment. Shafique et al. (2021) study show a positive correlation between deviant behavior and employment exclusion

**H2: Co worker ostracism will increase Job insecurity**

### ***Job Insecurity has a relationship with Work-life Balance***

The organisation competitive environment creates more uncertainty and brings insecurity to job and its elements.

These competitive forces push the employees in a fierce battle to secure their jobs at the cost of their work life balance (Sanman et al., 2024). The imbalance of work-life increases stress and employee turnover intention (Lestari & Margaretha, 2021). Grigoryan (2024) the study finds considerable impact on employee turnover intention because of work life balance and job insecurity.

Research conducted by Sverke and Hellgren (2002) found job insecurity is related with some negative outcomes, which must include increased stress level and decrease work-life balance. The authors found that the relationship between job insecurity and work-life balance is particularly strong, with workers reporting less time and energy for their personal lives when they felt insecurity in their jobs. Ameta's (2017) review revealed a negative correlation between work-life balance and job instability. It implies that a person with a high degree of job instability will have a less balanced work-life.

### **H3: Job insecurity has an effect on work life balance**

#### ***Job Insecurity mediates the relationship of coworker ostracism and work life balance.***

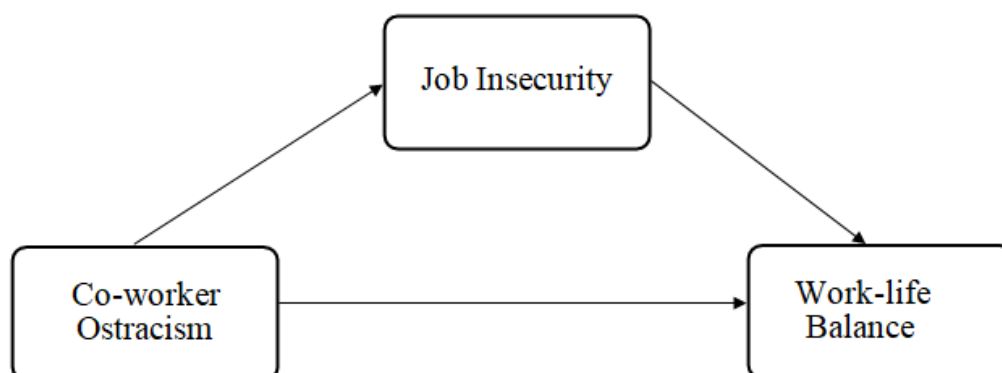
Workplace ostracism leads to employee counterproductive activities (Gunathilaka & Rathnakara, 2024). Ostracism is a universally unpleasant experience, but the extent of ostracism's aversive consequences is still being determined. Given ostracism's immediate harm, it is plausible ostracism's consequences are sufficiently strong to effect core aspects of the self. Ostracism leads to pro-social, anti-social and asocial behaviours being determined (Wirth et al., 2024).

The association between work features and employee outcomes is mediated by job security De Witte (1999) found that organizational commitment, managerial trust, and work satisfaction are all negatively impacted by job uncertainty. The study further discovered a strong correlation between job instability and absenteeism and aspirations to leave. Similarly, Kim and Kao (2014) discovered that the association between job demands and job satisfaction is mediated by job uncertainty.

Job insecurity was found to be positively correlated with psychological strain, lower job satisfaction, and lower organizational commitment in the meta-analytic analysis conducted by (Sverke et al., 2002). Ronen and Mikulincer (2012) found inconsiderate bosses can cause insecurity, which can lead to burnout or dissatisfaction in the workplace for subordinate staff members. The negative correlation between work engagement and job insecurity is explained by another study (Elst et al., 2010; Mauno et al., 2007). Higher levels of co-worker ostracism will be associated with increased job insecurity, which will lead to lower levels of work-life balance.

### **H4: Job insecurity mediates the relationship of coworker Ostracism and work life balance**

#### ***Research Framework***



## **Methodology**

This empirical study aimed to investigate the relationship between coworker ostracism and work-life balance, considering the mediating effect of job insecurity. It is a causal and cross-sectional study in a non contrived environment. 304 respondents employed in the medium and large organizations were selected to participate in

this study. Employees were informed prior to acquire response from each participant, and their privacy and confidentiality were maintained.

The survey was conducted online through Google Forms and by physical visits to the organization. Respondents were selected from a variety of organizations, including service and oriented businesses government agencies, and non-profit organizations that the results could be generalized. The average age of the participants was 29 years, and the majority of the participants were male (58%). Respondents completed the survey that assessed their experiences with coworker ostracism, job insecurity, and their work- life balance.

**Study Instruments:** The survey instrument were adapted from Hitlan and Noel (2009) Workplace Ostracism Sub scale (WOS)–17 question scale, Brondin et al. (2020) Multidimensional Qualitative Job Insecurity Scale (MQJIS) – 8 question scale, and Fisher-McAuley, et al. (2003) Work/Personal Life Subscale (WPLE) – 15 question scale.

**Measures:** Responses were given on a seven-point scale, where 1=strongly disagree to 7= strongly agree. To assess coworker ostracism, participants were asked to rate their experiences of being ignored, excluded, or socially isolated in their workplace. Work-life balance was measured by assessing the level of satisfaction and perceived effectiveness in managing work and personal life domains. Job insecurity was examined by evaluating the participants' concerns about potential job loss or uncertain career prospects.

**Data Analysis**

Statistical analysis was used as the study was a quantitative study. Statistical Package for Social Sciences (SPSS software) version 25 and Hays process macros version 4 for mediation and hypotheses testing.

**Reliability Statistics**

Table 1 describe the Cronbach Alpha value of the study variable, work place ostracism is .928, Job insecurity; .846 and work life balance; .792. The reliability of all the variables are acceptable at 0.7 is considered to be good where it is considered internally consistent.

**Table 1 Cronbach's Alpha:**

Work place Ostracism	0.928	13
Job Insecurity	0.846	8
Work life Balance	0.792	15

**Demographics**

Table 2 shows the study demographics: Majority of respondents (58%) were male, while (42%) were female. The average respondent was between 18-40 years old this suggests that the age distribution was slight skewed towards younger respondents. The level of qualification was bachelor's degree (42%) and Masters were (38.8). The majority of respondents (64%) were employed full-time, while 24% were employed part-time and 12% were contract employees. The majority of respondents (56%) were married, while 36% were single and engaged and 8% were divorced or widowed. 63% of respondents were parents, while 37% were not parents.

**Table 2 Demographic Statistics**

Variable	Range	Frequency	Percent
<b>Gender</b>	Male	176.00	57.9
	Female	128.00	42.1
<b>Age</b>	18 to 25	94.00	30.9
	26 to 40	120.00	39.5
	41 to 50	61.00	20.1
	51 to 60	2.00	9.5
<b>Marital Status</b>	Married	161.00	53.0
	Single	96.00	31.6
	Engaged	30	9.9

	Divorced	17	5.6
<b>Qualification</b>	Matric	31	10.2
	Bachelors	140	46.1
	Masters, MS/M.Phil	118	38.8
	PhD	15	4.9
<b>Experience</b>	upto 5 years	118	38.8
	6-10 years	54	17.8
	11-15 years	40	13.2
	16-20 years	39	12.8
	21 years +	53	17.4
<b>Employment Status</b>	FT	214	70.4
	PT	70	23.0
	C	20	6.6
<b>Parental Status</b>	Parent	148	48.7
	Non-parent	145	47.7
	Caregiver	11	3.6

Note: N=304, FT (full time employment), PT (part time employed), C (contract)

**Descriptive Statistics**

Table 3 shows the descriptive statics of the study. The average level of co-worker ostracism is 3.03 out of 7, with a standard deviation of 1.31. This suggests that most respondents experience some level of co-worker ostracism, but that the experience is not particularly severe. The average level of job insecurity is 3.76 out of 7, with a standard deviation of 1.22. This suggests that most respondents feel somewhat insecure about their jobs, but that the insecurity is not particularly severe. Similarly, the average level of work- life balance is 4.09 out of 7, with a standard deviation of 0.87. This suggests that most respondents feel that their work-life balance is somewhat not balanced, but that the imbalance is not particularly severe.

**Table 3 Descriptive Statistics**

	Min	Max	Mean	SD
<b>WP Ostracism</b>	1.00	6.54	3.03	1.313
<b>Job Insecurity</b>	1.00	7.00	3.76	1.228
<b>Work Life Balance</b>	1.47	6.33	4.09	.877

N=304

**Correlations**

The correlation of the variables is illustrated in the correlation Table 4 the study’s dependent variable WLB has a correlation of .496\*\* with Independent variable work place ostracism and 548\*\* with job insecurity, which is positive and significant. The study shows a strong correlation among the variables.

**Table 4 Correlations**

	WO	JI	WLP
<b>WP Ostracism</b>	1		
<b>Job Insecurity</b>	.566**	1	
<b>Work Life Balance</b>	.496**	.548**	1

**Control Variables**

The study employs two control variables Marital Status and Parental Status to find out their impact on the dependent variable.

Table 5 depicts the model summary of independent variable, mediator with dependent variable. Model is significant, correlation is sixty percent and Change in model R<sup>2</sup> is .3655 which means model is bringing thirty six percent changes in the dependent variable.

**Table 5 Model summary IV&M-DV relationship with control variables**

R	R <sup>2</sup>	F	Df <sup>1</sup>	Df <sup>2</sup>	P
0.6046	0.3655	43.056	4.000	299.000	0.000

**Regression Analysis**

Inferring the results of table 6 it is found that independent variable work place ostracism has an effect of .1767 means over seventeen percent effect on dependent variable work life balance. Job insecurity has an effect of .2862 means over twenty eight percent effect on dependent variable and the results are significant. The result also depicts the results of control variable parental status and marital status. Control variable marital status has .1070 nearly eleven percent and parental status has -.1812 negative eighteen percent effect on dependent variable work place ostracism. These findings suggest that co-worker ostracism and job insecurity are both important predictors of work-life balance

**Table 6 Summary IV&M-DV relationship with control variables**

	coeff	SE	T	P	LLCI	ULCI
WO	.1767	.0374	4.7232	.0000	.1031	.2503
JI	.2862	.0400	7.1494	.0000	.2074	.3650
Marital Status	.1070	.0516	2.0738	.0390	.0055	.2085
ParentalStatus	-.1812	.0790	-2.2950	.0224	-.3367	-.0258

The study's findings of the direct, indirect and total effect of work place ostracism, mediation of job insecurity in the relationship between work place ostracism and work-life balance had been displayed in Table 8; the direct effect of co-worker ostracism on work-life balance is also significant (B = 0.1767, SE = 0.0374, T = 4.723), indicating that co-worker ostracism has a direct impact on work-life balance. Hence H1: Co worker ostracism has an effect on work life balance is accepted.

The indirect effect of co-worker ostracism on work-life balance through job insecurity is significant (B = 0.1508, Boot SE = 0.025), suggesting that job insecurity partially mediates the relationship between co-worker ostracism and work-life balance and H2: Co worker ostracism will increase Job insecurity are accepted.

The results indicated that co- worker ostracism had a significant total effect on work-life balance (B = 0.3274, SE= 0.0334, t = 9.8118). The total effect is the composition of direct and indirect effect (.1767+.1508=.3274), which has been increased from .1767 to.3274; revealing a significant increase in total effect. Hence H3: Job insecurity has an effect on work life balance and H4: Job insecurity mediates the relationship of coworker Ostracism and work life balances are accepted.

**Table 8 Direct, Indirect and Total effect**

	Effect	SE	T	P	LLCI	ULCI
Total effect	.3274	.0334	9.8118	.0000	.2618	.3931
Direct effect	.1767	.0374	4.7232	.0000	.1031	.2503
Indirect effect(s)	.1508	.0253			.1027	.2009

**Discussion**

The Study aimed to empirically investigate the proposed mediation model to find the effect of job insecurity on the relationship of co worker exclusion and work life balance. The study questions do coworker ostracism has an

effect on work-life balance and the co worker ostracism increase effect on job insecurity is established with the acceptance of the H1: Co worker ostracism has an effect on work life balance and H2: Co worker ostracism will increase Job insecurity.

The study research question job insecurity affects employees' work-life balance and job insecurity mediates coworker ostracism and work-life balances were also measured by the study hypotheses H3: Job insecurity has an effect on work life balance and H4: Job insecurity mediates the relationship of coworker Ostracism and work life balance. It is also acknowledged that job insecurity mediates the relationship between coworker ostracism and work-life balance. Higher levels of co-worker ostracism will be linked to higher levels of job insecurity, which will lead to lower levels of work-life balance.

However, this study is not showing the inverse relationship of co worker ostracism and job insecurity with the work life balance theoretically speaking it must be the case but not always. The study finds empirical evidence to support this issue; the work life situation can become a part of employees' life and is treated as interlinked and cannot be treated always negative Greenhaus and Powell (2006) current literature is diverse to offer enough support for positive and negative outcomes (Gareis et al., 2009; Maunoetal, 2011).

The gender issue must also be studied before arriving to any conclusion i.e. men are more inclined to pursue work objectives comparing to women who are more inclined to oblige family obligations. Employees who are single have tendencies to enrich their life with work as compare to employees with parental obligations Maunoetal (2011) for this reason this study also data with respondents if they have children to care. In order to gauge this issue of parental obligation and work life balance this study also employed control variables marital and parental status to measure the impact of control variable. Results of table 6 show an effect of 11% of marital status and eighteen percent impact of parental status which is negative, means parental status has a negative effect on work life balance if studied along with work place ostracism and job insecurity, the study is in line with the author Maunoetal (2011) which states that employees' parental status can have negative consequences on work life balance.

In the light of these scholastic works this study can conclude that the relationship of work place ostracism cannot always reduce the work life balance, study table 3 of descriptive statistics is also an instrument to gauge the positive value of work life balance as the workplace ostracism and job insecurity faced by the respondents are low, secondly the most of the respondents work life balance is somewhat not balanced but it is not particularly severe, hence the study conclude that positive effect results of the work life balance is acceptable.

Increased job insecurity is linked to higher levels of coworker exclusion, and this does indeed result in a worse work-life balance. The current study supports earlier research by Khalid, Malik, and Atta (2024) that identified employee isolation is caused by ostracism. It may be concluded that the study by Shafique et al. (2021) is consistent with other research and contributes to the body of knowledge on workplace ostracism because the results show a positive correlation between deviant behavior and workplace ostracism.

This study including 304 respondents, there was a greater likelihood of stress, anxiety, and depression among those who said they felt shunned by their peers. They were also more likely to report having difficulty balancing work and personal life. The findings provide empirical evidence of the significant impact of coworker ostracism on work-life balance, both directly and indirectly through job insecurity. Consistent with previous research Chung (2018), our results demonstrate that higher levels of coworker ostracism are associated with diminish work-life balance.

The study's observation of the mediation role of job insecurity advances our comprehension of the underlying mechanisms that connect coworker ostracism with work-life balance. According to László et al. (2010) and Sverke et al. (2002), one of the most important effects of workplace abuse is job uncertainty, and our findings emphasize that job insecurity plays a mediating function in this situation. Our research specifically shows that those who face higher degrees of ostracism from coworkers are more likely to feel that their jobs are insecure, which negatively impacts their work-life balance. These results are consistent with the conservation of resources theory (Hobfoll, 1989), which postulates that people make an effort to obtain and safeguard resources, such as a stable job and a positive work-life balance. When faced with co-worker ostracism, individuals may perceive their

social and psychological resources as threatened, leading to heightened job insecurity and subsequent imbalances in work and personal life domains. Previous studies had established that employees had job insecurities Jung et al. (2020); Elshaer and Azazz (2020); Chen et al. (2022) and resultantly they tend to switch to new jobs and hence raises the turnover intention (Grigoryan, 2024).

Recognition of ostracism at early stage has development benefits (Williams, 2009). Establishing an inclusive and encouraging work atmosphere that deters coworker ostracism should be a priority for organizations. Work-life balance and overall employee well-being can be improved by putting in place policies and programs that support victims of abuse, foster strong interpersonal interactions, and address job insecurity issues (McIlveen et al., 2021). On an individual level, recognizing the potential impact of co-worker ostracism and job insecurity on work-life balance can empower employees to seek support, engage in coping strategies, and proactively manage work and personal commitments. There is a positive correlation of Work-life balance with subjective well-being, which leads to mediation of the relationship of work life balance and venture performance (Drnovšek et al., 2024).

### ***Practical Implications***

It is recommended to the organisation to identify the work stressors i.e. work place ostracism and job insecurity and create a more inclusive work environment. Creating an inclusive culture where everyone considered welcome and respected, regardless of their background, race, gender, sexual orientation, or any other factor. Provide training on how to deal with employee engagement and conflict. This training should create awareness among employees how to engage and communicate effectively, resolve conflict peacefully, and build positive relationships with their co-workers. Offer employee assistance programs i.e. counseling and coaching. These programs can provide employees with support and resources to help them cope with stress, anxiety, and other mental health problems.

It is important to set boundaries between work and personal life. This means setting limits on how much time you spend working and making sure to take breaks and time for yourself. Communicating with manager if someone is feeling overwhelmed or stressed. They may be able to help and find ways to reduce workload or improve work-life balance. Looking after one self; Aim for adequate sleep, a balanced diet, and regular exercise preferable involving in any games. Maintaining your physical and mental well-being will enhance ability to manage stress and general state of wellbeing. People's general health and well-being can be enhanced by striking a healthy balance between work and personal life, and companies can profit from a more engaged and productive workforce (Shafie et al., 2020). This study can benefit the readers and managers to understand the behavioral implications of ostracism and job insecurity which is not a loss to the employee only but for the organization as a whole.

### ***Limitations and Future Directions***

The association between job insecurity, work-life balance, and coworker ostracism has been discussed in this research; however it is crucial to recognize a number of limitations. The use of self-report measures raises the risk of social desirability and common method bias. The particular sample characteristics may restrict the findings' generalizability. Quantitative study does not provide the feeling aspect which can bring insights why despite isolation and job insecurity the respondents didn't feel imbalance in their work life. On the other hand parental status shows negative impact on work life balance. These contrasting issues may lead to future direction towards qualitative study which can bring better insights of how any sort of behaviour might lead to ostracism or job insecurity. Qualitative studies could also bring insights about the reasons of ostracism or job insecurity the problem could be further explored through qualitative studies.

While job insecurity is identified as a mediating variable, other potential mediators could influence the relationships. Recognizing these limitations, future research could employ multiple methods and objective measures, diversify the samples. Future research could also identify the effect of organizational culture and the financial impact on the work life balance to enhance our understanding of this complex relationship. Further studies can extend the present research by adding the dimension of employee performance as an outcome of the work place ostracism.

### ***Conclusions***



In conclusion, there are direct and indirect effects of coworker ostracism on work-life balance. Work-life balance and coworker ostracism are mediated by job insecurity, which means that job insecurity may intensify the detrimental impacts of ostracism on work-life balance. Companies can take action to reduce job insecurity and work place ostracism by fostering a more welcoming workplace specially when dealing with females and parents who need better work life balance.

Training staff dispute resolution techniques, and giving stress and anxiety relief through employee assistance programs. By implementing these measures, companies can assist in enhancing the work-life balance of their staff members, which may result in higher output, happier workers, and better staff morale. In a similar vein, people may assist themselves by speaking with their supervisors, making an effort to interact with their peers in an effective manner, and taking care of themselves in order to maintain a healthy work-life balance.

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# Corporate Sustainability Performance Measurement: Narrative Review of Literature on Dimensions of Corporate Sustainability Indices

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## Abstract

*The concept of corporate sustainability has gained immense significance in the last few decades. Several indices have been developed to measure corporate sustainability performance (CSP) among different sectors of industry and corporate firms. These indices cover different aspects of sustainability practices, however, the concept of corporate sustainability performance has widened with the emergence of ESG, Sustainable Development Goals (SDGs) and circular economy (CE) concept and these dimensions need to be included in an index of sustainability performance. The aim of this study is to review different corporate sustainability indices (CSI) and analyze the dimensions of sustainability upon which they are based. This study also reviews the utilization of indices for measuring the impact of corporate sustainability practices on firm's financial performance (FFP). A comprehensive search of literature was carried out to review different CSI and narrative review methodology was utilized to assess the utility of the indices. Specific search strings were formulated and Dimensions database was used to extract bibliographic data. This study will enable researchers to find CSI dimensions that best suits their research objectives. The items of a particular dimension of sustainability have not been covered in this study. This study will also provide the limitations of existing indices and provide future directions in development of integrated sustainability measurement indices.*

**Key Words:** Corporate Sustainability, Index, ESG, SDGs

## Introduction

The concept of sustainability gained momentum in the 1950's with the writing of Bowen (1955) in his book "Social responsibility (SR) of the businessman" (Bowen, 1953). Concept of SR led to "Corporate Social Responsibility" (CSR). CSR is dominated by the social aspect of sustainability, therefore gradually it was taken over by the broader concept of Environmental, Social and Governance (ESG) sustainability. ESG was incorporated to reflect the firms' efforts in integrating sustainability in their business (Halid et al., 2023). ESG sustainability, Circular Economy (CE) and the Sustainable Development Goals 2030 (SDGs) are important aspects of the sustainability paradigm. ESG reporting, i.e. the disclosure of ESG activities to stakeholders (R. Gray, 1994) has become quite popular among organizations primarily due to the relentless pressure of stakeholders (Dissanayake et al., 2016). The fundamental tool for assessment of corporate sustainability are the indicators/indices that are simple measures used to quantify the state of environmental, social or economic development in a specific firm. These indices collect the sustainability performance parameters from the sustainability reports of firms. However, a plethora of different frameworks are used by firms for presenting their corporate sustainability performance (CSP) to stakeholders. There is lack of standardization in this field and some CSIs may be presenting limited view of their contributions to people, planet and profit. This lack of

standardization may have occurred due to different interpretation of CSP among different firms, thus making it difficult to compare the performance of firms. With the emergence of SDGs and its rapid adaption at national and global level, the sustainability paradigm could have been amended to make SDG reporting mandatory for corporate firms; similarly the emerging concept of circular economy has also been included in the broader definition of sustainability. These new dimensions have given a new shape to the paradigm of sustainability, therefore, this study will also present CSIs that are based on ESG as well as SDGs and CE. Rating of sustainability reports through index enables the regulatory bodies to identify the sustainability performance of listed firms and it also enables tracking the progress of sustainability efforts over extended time periods. An index comprising all the paradigms of sustainability would provide a holistic picture of the sustainability efforts of a firm. This study found an obvious gap in available indices that encompass all dimensions of sustainability. Therefore, this study attempts to identify dimensions of sustainability that should be incorporated in a corporate sustainability index for listed firms of a developing economy.

## Literature Review

### *Sustainability and Sustainable Development*

Sustainability is concerned with improving and sustaining a healthy ecological, social and economic system, for sustainable development (Mensah, 2019). The issue of sustainable development has gained huge world urgency. The concept of SD gained worldwide recognition when a formal definition of the term was coined during the World Commission on Environment and Development (WCED) in which the famous Brundtland report identified SD as “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987). A massive consensus among the global community resulted in the declaration of the UN Sustainable Development Goals (SDGs) (UNGA, 2015). SD urges the concerned to improve the standard of living without jeopardizing the integrity of the earth’s environment and natural systems like depletion of forests and water resources (Browning & Rigolon, 2019). The concept of Triple bottom line (TBL) was introduced by Elkington (1998). Triple bottom line (TBL) and sustainability are two related constructs that are used interchangeably in the literature. The main components of TBL are three P’s i.e. profit, people and the planet (Elkington, 1998). This means that the firms should focus their sustainability efforts in the direction of environmental and social as well as the economic aspect.

The SECP is the apex regulator of Pakistan. The SECP in 2002 issued the CCG as the key step in corporate governance improvement in Pakistan (Ullah et al., 2021). Later on the SECP issued the CSR voluntary guidelines in 2013 for promoting Corporate Sustainability practices (CSP). Thereafter the CSR reporting increased among listed firms (Lone et al., 2016). In the same vein the CCG 2012 required the listed firms to report their non-financial information related to sustainability or information that is related to public interest (SECP, 2012). The latest code (SECP, 2019) makes the reporting of sustainability issues mandatory however, the content and format has been left to the firm. The Code makes it voluntary for companies to post their policies related to corporate social responsibility/sustainability/ ESG related matters on the company website. PSX also issued a “Primer on ESG Reporting” for listed firms and has encouraged listed firms to adapt ESG reporting (Pakistan Stock Exchange, 2024). The number of firms issuing sustainability reports are now gradually increasing (Hasan et al., 2022). The lack of a standardized sustainability reporting framework makes the job of rating the sustainability performance difficult as different firms may report only those parameters that they have performed and leave out those in which their efforts are invisible.

### *Environmental, Social and Economic Sustainability (ESG)*

The term ESG was coined in 2004 (Swiss Federal Department of Foreign Affairs, 2004). ESG is used by investors trying to carry out ESG based investing or “responsible investing” (Rau & Yu, 2023). On the other hand CSR is more related to the socially responsible actions of the corporation. There are three dimensions of sustainability are economic sustainability, social sustainability and environmental sustainability (Dyllick & Hockerts, 2002; Samuel et al., 2013). Most of the ESG rating agencies also use these same three dimension to arrive at a rating of ESG score of a firm (Larcker et al., 2022). ESG indicators have gained across the board acceptance with investors (Serban et al., 2022)..

### ***Environmental Sustainability***

Pakistan is the sixth most climate threatened country and the devastating effects were evident in the August 2022 floods that submerged one third of the country and wiped out a million homes and causing 1500 casualties. There are more than five million SMEs and hundreds of Large scale manufacturing firms in Pakistan and they cause heavy degradation of environment due to untreated waste, excessive usage of water, excessive use of fossil fuel based energy, hazardous waste etc. The environment aspect cause loss of bio-diversity, degradation of natural systems, pollution of rivers and air that are extremely threatening to the world and future generations (CNN, 2022). Environmental sustainability is defined as: “the environmental dimension of sustainability concerns the organization’s impact on living and non-living natural systems, including land, air, water and ecosystems” (Gray, 1994).

### ***Social Sustainability***

Social aspect of sustainability is the pillar of social justice in a firm. It concentrates on the humans involved with the firm. These can be the stakeholders like the internal employees or the external stakeholders. The main focus of social sustainability is on human well-being and benefits like pay package, salary, health care, equal opportunities, gender diversity, gender equality etc. The firm is supposed to look after the comfort and well-being and improve the bonding and good ties with stakeholders (GRI, 2021). Firms are supposed to look after the well-being of society and take concrete steps to improve the welfare of society (Schwartz & Carroll, 2003). Social sustainability concentrates on the welfare of the society (WCED, 1987). According to GRI “the social dimension of sustainability concerns the impacts the organization has on the social systems within which it operates” (GRI, 2013, p. 64).

### ***Economic Sustainability***

The main goal of business enterprises is to improve profits, therefore, economic aspect of sustainability is of prime importance to firm and its shareholders. However, economic sustainability seems against unimpeded profiteering as was presented in the shareholder theory (Friedman, 1967). Opposed to this, the stakeholder theory makes it incumbent upon the firm to consider the welfare of the society (Freeman, 2010). It stipulates that firms should look for strategic success by looking at profits on the long-term instead of short-term focus. The stakeholders include the employees as well as the whole society with its economic implications at national and global level. Economic sustainability demands to maintain long market presence while remaining economically feasible, this leads to good financial and suitability performance of the company. The GRI defined economic sustainability as “the organization’s impacts on the economic conditions of its stakeholders, and on economic systems at local, national, and global levels” (Azapagic, 2004).

### ***Circular Economy***

The linear economy model takes resources from the environment, converts it to usable product and at the end of life, product is thrown into the environment in the form of waste. As opposed to this, the circular the product are converted to disposable waste after completing their useful life (Gonçalves et al., 2022). However, this traditional system has resulted in creating mountains of undisposed waste that is polluting the streams and oceans as well as in the land. The sustainable method of production called the circular model allows the recovery and reuse of waste material by putting it back into the supply chain. This method is more friendly to the environment (Ghisellini et al., 2016). Implementation of CE based business models can be useful for enhancing sustainability at global level (Yang et al., 2023). Thus CE leads to sustainable development and is seen as a useful strategy to implement the concept of sustainable development (Geissdoerfer et al., 2017).

Several countries are taking an active lead towards the Circular Economy (CE) model through regulatory frameworks. The top among them is China, that has included the CE model in its national economy (Geng et al., 2012). The European Union has also issued legislation that guides the business to follow a circular economy model throughout the product life cycle by recycling, reducing and recovering the waste. (European Environment Agency, 2022). The US has also taken several steps to improve the waste and its harmful environmental effects through policies that are conducive towards the 3R concept. There is a tendency to move beyond the normal waste

management to wider material management system (Heck, 2006). Although the concept of CE gained popularity in the last decade but there is limited research on framework for circularity measurement of the service, product or supply chain (Elia et al., 2017).

Nobre & Tavares (2021) define Circular Economy “an economic system that targets zero waste and pollution throughout materials lifecycles, from environment extraction to industrial transformation, and to final consumers, applying to all involved ecosystems. Upon its lifetime end, materials return to either an industrial process or, in case of a treated organic residual, safely back to the environment as in a natural regenerating cycle. It operates creating value at the macro, meso and micro levels and exploits to the fullest the sustain-ability nested concept. Used energy sources are clean and renewable. Resources use and consumption are efficient. Government agencies and responsible consumers play an active role ensuring correct system long- term operation”. Kirchherr et al. (2017) found 114 definitions of Circular economy and found that most of them consist of three activities i.e. “reduce, reuse and recycle”. Other studies (Jawahir & Bradley, 2016; Reike et al., 2023) have recommended 6R typology comprising of “Reduce, Reuse, Recycle, Reproduce, Redesign, Recover”.

A explanation of each of the terms adapted from Barnabè & Nazir (2022) is given below:

**Table 1: 6Rs of Circular Economy**

S#	Typology of R-process	Description
1.	Reduce	Focused on the initial phases of product life cycle where efforts are put in to reduce utilization of resources as well as reduced waste generation and emissions (Jawahir & Bradley, 2016) (Reike et al., 2018)
2.	Reuse	It means the reuse of a product several times, as a whole or its parts after completion of its first cycle use. (Kirchherr et al., 2017)
3.	Recycle	Ability to convert materials that are waste into new materials or products. (Kirchherr et al., 2017) (Reike et al., 2018)
4.	Reproduce/ Remanufacture	It involves reprocessing products that have been already used, and bringing them back to their original functionality. (Jawahir & Bradley, 2016) (EMF, 2015)
5.	Redesign/ Repurpose	It includes updating product design for next generation of products by utilizing materials and products from previous generation of products. (Morse, 2015) (Morseletto, 2020)
6.	Recover	Process by which products at the end of their utilization are collected, disassembled and cleaned to be used again in new product life cycles.(C. Gray & Charter, 2007)

Source: (Barnabè & Nazir, 2022)

## The UN Sustainable Development Goals

SDGs is a highly researched area with most of the related articles categorized in the area of sustainability (Yamaguchi et al., 2023). The business entities now feel obliged to act in a responsible attitude towards its stakeholders as well the environment after the UN SDGs found worldwide acceptance in 2015. Although the SDGs are measured at a national level, but the entities contributing to the damage to the environment are the corporations and industries of that particular nation. Corporate entities play a major role in introducing measures to arrest the trend of environmental degradation and act responsibly towards its stakeholders and thus contribute in improving the sustainable development at the national level (Soysa et al., 2023). Pakistan occupies an unenviable world ranking of 137 among 193 countries with a score of 57 as of 29 July 2024 (Sachs et al., 2021). There are 17 goals with 169 targets in the UN SDGs (UNGA, 2015). The list of SDGs, adapted from Yamaguchi et al. (2023) is given in Table 2 below:



**Table 2: UN SDGs**

Goal	Goal Name	Targets	Indicators
1	No poverty	7	13
2	No hunger	8	13
3	Good health	43	28
4	Quality education	10	12
5	Gender equality	9	14
6	Clean water & sanitation	8	11
7	Renewable energy	5	6
8	Good jobs and economic growth	12	16
9	Innovation and infrastructure	8	12
10	Reduced inequalities	10	14
11	Sustainable cities & communities	10	15
12	Responsible consumption	11	13
13	Climate action	5	8
14	Life below water	10	10
15	Life on land	12	14
16	Peace and justice	12	14
17	Partnerships for goals	16	24

Source: <https://sdgs.un.org/goals>

## Corporate Sustainability Indices

Several globally adapted CSI are Dow Jones Sustainability Index (DJSI) (Index, 2013), Task Force on Climate-related Financial Disclosures (TCFD), Global Reporting Initiative (GRI) (GRI, 2021)(GRI, 2021), Sustainability Accounting Standards Board (SASB), Carbon Disclosure Project (CDP), ISO 14000 Environment Management Systems<sup>ii</sup>, ISO 26000 Social Responsibility Standard<sup>iii</sup>, and Integrated Reporting Framework<sup>iv</sup>(IR), Organization for Economic Cooperation and Development (OECD) guidelines for reporting their sustainability performance. These reporting standards and initiatives were issued to ameliorate the sustainability reporting issues (Goyal & Rahman, 2014).

## Measurement of Corporate Sustainability through Index

An index is a quantitative measure that provides a numeric indicator of a firm's sustainability performance in the area of interest. The sustainability index consists of carefully selected items that give a holistic picture of the sustainability performance (Marston & Shrivs, 1991; Zahid et al., 2019). A disclosure index is extensively utilized for measurement of the extent of sustainability performance (Madi, 2012). An index has several benefits and can be utilized to: (a) gauge the sustainability performance of a firm on a temporal level, (b) compare firms' performance in sustainability arena, (c) enable regulatory bodies to study the compliance and effectiveness of sustainability directives, and (d) the index can be utilized by researchers to find the impact of sustainability practices on firm performance. The financial performance can be characterized by different measures since there is no consensus on the best parameters (Dalton & Dalton, 2011). However, three methods are widely used for measuring financial performance as stipulated by Orlitzky et al. (2003): accounting measures like the Return on Sales( ROS), Return on Equity (ROE), and Return on Assets (ROA) (Jewell & Mankin, 2011); market measures like cumulative abnormal return (CAR) and Tobin's Q and perceptual measures. More than two types of measures can also be used to measure the relationship between CSP and CFP (Garcia-Castro et al., 2010; Margolis & Walsh, 2003; Rodgers et al., 2013))

## Theoretical Framework

The stakeholder theory (Donaldson and Preston, 1995; Freeman, 1984, 2010) is extensively employed for drawing conceptual frameworks for ethical responsibilities of business (Gupta et al., 2020; Wijnberg, 2000). Donaldson & Preston (1995) has three fundamental elements i.e. instrumental, normative, and descriptive. Stakeholder is any individual or group who can affect or be affected by a business entity or its purpose or its objectives (Freeman, 1984). The normative aspect is the ethical element of the stakeholder's theory and gives paramount importance to the interest of the stakeholders irrespective of the firm's profit. The concept of introducing sustainability within a firm's operation aligns itself with the stakeholder theory. By being sustainable, the firm is taking care of the long term benefit of the stakeholders on the long run. Descriptive aspects of stakeholder theory deals with stakeholder salience, i.e. the relative importance of each stakeholder group for the company. Each stakeholder group has its own interests that can exert specific influence over the firm's operations and the company should find a balanced method to balance the interests of each stakeholder group. The instrumental approach uses specific data to find the most appropriate method for management of stakeholders for achieving the targets of the company. This approach implies that a firm gains competitive advantage by aligning itself to stakeholder satisfaction and this in turn leads to improved financial gains. Any framework for reporting sustainability practices should be based on the Stakeholder theory. Popular international sustainability reporting standards, like GRI and SASB standards are based on the Stakeholder's theory. Consequently, any index that rates sustainability performance should gauge all sustainability paradigms. This study suggests that ESG, SDGs as well as the Circular economy should be integral parts of a sustainability reporting index.

## Methodology

This study used the narrative review methodology to answer the research objectives. The process consists of four major steps that are: (a) formulation of keywords, (b) search of articles from popular databases based on keywords, (c) Title and abstract identification (d) Full text assessment (e) exclusion of irrelevant or duplicate articles, and (f) Data analysis and synthesis.

Using the keywords Index, indicators, indices, circular economy and "sustainable development goals" and their synonyms, the following search strings were formulated: (a) (Index OR Indices OR Indicators) AND "circular economy" AND ("Sustainable Development Goals" OR SDGs), (b) (Index OR Indices OR Indicators) AND "circular economy" AND ("environmental, social and governance" OR ESG), (c) (Index OR Indices OR Indicators) AND "Circular economy" AND ("Sustainable Development Goals" OR SDGs) AND ("Environmental, social and governance" OR ESG). For ESG, the time duration was 2005 onwards whereas for SDGs, time interval was 2015 onwards.

Dimensions database was selected since it provides several facilities like: (a) save search results; (b) export search results in .csv, bibtex, .ris format; (c) filter search results based on publication year, type of access (closed, all open access etc.), publication type (e.g. article, book chapter, proceedings, book, seminar etc.); and (d) limiting search to title or full data. Moreover, there is adequate evidence in literature about the effectiveness of Dimensions as a research database (Singh et al., 2021; Thelwall, 2018). 370 articles were downloaded based on the search strings and exported to citation manager as well as MS Excel. Subsequently duplicates were identified and removed and papers without a DOI were also removed. The title and abstract of the downloaded articles were checked and irrelevant as well as duplicate articles were removed. Articles that specifically focused on development of index for corporate sustainability paradigms including ESG, SDGs and CE were finally selected (Mensah, 2019).

## Results

Indices developed by researchers in academia fall into several categories: (a) indices that are based on environmental, social, and economic (governance) aspect of sustainability, (b) indices that measure the adaption of circular economy / circularity of a firm, (c) indices that measure the adaption of SDGs, and (d) indices that measure a combination of the above three sustainability paradigms in a single measure. The examples of these are given in Table 1. Most of the indices are based on environmental, social and economic aspects of

sustainability; in this case only few studies have measured the impact of CSP on CFP using the index developed during the study. Indices are also available that measure circularity of a manufacturing process.

**Table 3: Corporate Sustainability Indices**

Objective	Measured dimension(s)	Impact of CSP on CFP	Reference
To develop a sustainability performance index to measure and evaluate the sustainability performance of industries	ESG	Not assessed	(Satish Pandian et al., 2013) (M. P. Singh et al., 2021) (Garg, 2017) (Emma Pravitasari et al., 2018) (Beekaroo et al., 2019) (Papoutsis & Sodhi, 2020) (Bahurmoz, 2019) (Zhou et al., 2012) (Panait et al., 2022) (Younas et al., 2021) (Dobrovolskienė & Tamošiūnienė, 2016) (Molla & Ibrahim, 2019) (Bonilla-Priego et al., 2014) (Zafar & Sulaiman, 2020) (Ghazali & Zahid, 2015) (Nair & Nayar, 2020) (Molla & Ibrahim, 2019) (Ur Rahman et al., 2020)
To develop a sustainability performance index and evaluate the impact of CSP on CFP	ESG	Assessed	(Rahman et al., 2023) (Jamil & Siddiqui, 2020) (Jan et al., 2021) (Zahid et al., 2023) (Jallo & Mus, 2024) (Tsatsaronis et al., 2024)
To develop an index to measure circular economy strategies	CE	Not assessed	(Elia et al., 2017) (Geng et al., 2012) (Pauliuk, 2018)
To develop a sustainable circular index for manufacturing companies	ESG and CE	Not assessed	(Azevedo et al., 2017)
Measuring the impact of circular economy performance on financial performance	ESG and CE	Assessed	(Esposito et al., 2024)
To develop a sustainability performance index based on ESG and SDGS	ESG and SDGS	Not assessed	(Soysa et al., 2023)

## Conclusions and Future Recommendations

A number of corporate sustainability indices were reviewed in this study and the summary presented in Table 1 shows that most of the indices were developed around the environmental, social and governance aspects of sustainability. Some of studies used the index to further examine the effect of CSP on CFP; these regression studies also used mediators in some instances. Some indices have been typically developed for measuring

circularity of a process. Indices that measure ESG as well as SDGs are also available. None of the indices measures ESG, SDG and CE in a single index. Therefore indices that include ESG, SDGs as well as CE may be designed in future research. This study has implications as it can be utilized by regulatory bodies to design an index for the listed firms.

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## Infrastructure Development (Non-Physical), Economic Growth and Policy Choices: A Cross-Country Analysis

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### **Abstract**

*The relationship between the non-physical infrastructure and development has always been an eye catching issue. The following study inspects the influence of non-physical infrastructure on economic growth of Asian countries. Countries from where data is selected for examination are China, India, Bangladesh, Iran and Sri Lanka. The data of has been regressed from 1970 to 2019. Unit test technique has been employed and ARDL mechanism was chosen for long term and short-term analysis. The findings explain the substantial relationship between non-physical side of infrastructure development and economic growth. Social infrastructure variables i.e education and health showed positive significant relationship with economic growth. Policy has been recommended for economic growth is based on weightage approach to derive the quantitative value of the variables and then prioritize the sectors in which the government should invest according to the significance of variable.*

**Keywords:** Economic growth, Infrastructure development, Non-Physical Infrastructure.

### **Introduction**

The role of infrastructure for economic development has been well documented in the literature (Aschauer, 1989; Calderon & Servén, 2003; Estache, 2006; Munnell, 1990; Sahoo & Dash, 2008, 2009; World Bank, 1994). Infrastructure development, both economic and social, is one of the major determinants of economic growth, particularly in developing countries. There is a heated debate regarding the relationship between the economic growth versus infrastructure development and its policy implications. Multipurpose studies regarding these issues were conducted since the late 90's. The role of infrastructure is very much important in economic growth over long run. There are two types of infrastructure defined by the researchers Physical Infrastructure and Non-Physical Infrastructure.

In Pakistan insignificant studies have conducted in this saga, due to transitory / weak governance regimes and their policies i.e., transitions from nationalization to privatization, war against terrorism, short run decision makings. The loss Pakistan encountered along the imposed war against terrorism in terms of, loss of financial paucity, deteriorating law and order situations affecting country's basic infrastructure and subsequently impeding economic growth. The studies conducted are less focus on non-physical infrastructure and its implications on economic growth.

### **Research Problem**

Infrastructure investment in Pakistan is less diverted towards non-physical infrastructure i.e. education and health sector. According of previous studies the impact of investment on non-physical infrastructure is more significant with long lasting impact. In the light of this the research problem will look into the factors which are more inclined

towards investment in non-physical infrastructure. So, this have been further operationalized into following research questions.

### **Research Questions**

The previous studies demonstrated the a rather positive relation between the public investment in infrastructure and economic growth. In the light of this there are following research questions.

- Does non-physical infrastructure play significant role in the economic growth?
- What will be the impact of non-physical infrastructure on economic growth in short and long run?

### **Research Significance:**

According to the studies there is a significant role of non -physical infrastructure in economic development. The biggest example of that is China where there is huge government spending in social infrastructure development. The paper published by (Nannan & Jianing, 2012) shows that the non-physical side has its own share when it comes to have an effect on economic growth. The paper has established that non-physical side of infrastructure has more effect on economic growth than that of physical side.

My study will guide the policies regarding non-physical side of infrastructure that may help achieve infrastructural development in future in Pakistan and should be given more weightage when it comes for government to spend for development or how should government focus on the non-physical infrastructure development.

### **Literature Review**

The observed research on effect and the role infrastructure plays in economic growth started after the foundational work by (Aschauer, 1989) where Aschauer reasoned that public spending is reasonably productive, and the decrease in the U.S productivity was in direct relevance to decline in the public infrastructure. Subsequently Munnell (1990), Garcia-Mila and McGuire (1992), Uchimura and Gao (1993), found high output elasticity of public infrastructure investment though comparatively lower than Aschauer.

Further, it has been found that social infrastructure such as education, health, and housing are essential to promote better utilization of physical infrastructure and human resources, thereby leading to higher economic growth and improving quality of life (Hall & Jones, 1999). Another focus in the literature is on optimal and efficient use of infrastructure for economic growth.

Criticizing these earlier studies Hulten (1997) and Canning and Pedroni (2004) emphasize that there is an optimal level of infrastructure maximizing the growth rate and anything above would divert investment from more productive resources, thereby reducing overall growth.

Investment in education also create expansion in the health expenditure. The investment in education leads to the well trained and well-equipped labor force that leads to economic growth (Awais, Kiani, Thas Thaker, Raza, & Qaim, 2021; Nasir, Awais, & Syed, 2017). With that keeping in mind the health sector also effect the labor force in a way that the productivity doesn't get effected so that leads to more work hence increase in the economic growth (Pravesh, n.d.) The paper discussed the previous results and tried to redefine the linkage between the education expenditure and economic growth in the Indian economy. The time series data has been taken of 28 years i.e from 1980 till 2008 for the estimation purpose, econometric modeling has been used. The long-run results show that there is a significant relation present between the education expenditure of government and economic growth. But the ECM technique showed that the impact of the education expenditure per labor has a lesser effect on the economic growth than that of the physical capital per labor. The results depicted that there is 0.28% increase in the GDP of India with an increase of 1% in physical labor per labor. On the other hand there is 0.11% increase in the GDP with an increase in 1% in government expenditure on the education per labor (Saiful Islam, Abdul Wadud Qamarullah Bin Tariq Islam, Abdul Wadud, & Bin Tariq Islam, n.d.), if we discussing about Asian countries we cannot ignore the Bangladesh. As it has the greater GDP among the SARC nation. The cited paper examined the casual relationship between the education and GDP (income). Multivariate approach has been used for estimation of the data that has been chosen from 1976-2003. ( Zhang, Zhang, & Lee, 2001) the paper captured

the result of mortality in terms of fertility and what will be the effect of that on the child education investment. There are child policies in China, which helped contain the population of China. The paper showed that there was positive relationship between the mortality decline and economic growth in such a way that mortality decline effect the investment of parents on a child more that help the economy in the future thus cause the economic growth. Islam, (2014) shows the Bangladesh health system heavily rely on government spending for health facilities supply and financing for health sector infrastructure. Health sector receive a little attention from the total resources of Bangladesh economy that means a lot of stubborn issues relating health sector. Only 3% of total GDP of Bangladesh is invested in health sector (WHO). In that investment 34% is financed by the government and 66% from foreign debts that cause inequity. That causes a serious issue in health sector. The assessment of data that is secondary, the paper tried to capture the health issues in the Bangladeshi economy. The result shows that there is high complexity in the health sector of Bangladesh and inefficient labor force. Also, the political instability and inefficient allocation of funds to health sector damaged the health sector. Bangladesh economy has showing positive impact towards achieving MGD4 and MGD5, the health related MDGs. The private sector is growing on small territorial levels providing basic health services. Bangladesh after showing that much progress still lack a descriptive policy regarding primary health sector. The challenges faced by the Bangladesh economy is the lack of leadership and political stability. Only the strong leadership can bring upon the change in the health system and health investment. The policies and the framework that will work more efficiently for the betterment of health and betterment in health facilities for the Bangladeshi population. Likewise, in Iran the studies shows the impact of infrastructure on the economic growth (Review, Sojoodi, Zonuzi, Mehin, & Nia, 2012). The drawback in infrastructure amount in Iran, that became a major issue in less economic growth in developing low income country like Iran. In recent years. There is a raise in infrastructure investment in Iran afterwards. The paper captures the effect of from 1985 to 2008 of infrastructure on economic growth of Iran. ARDL framework has been used for estimation. Infrastructure capital is used as input function into aggregate production function.

In context of Pakistan there is no such study that compromises of the comparison between which should we choose and why would we choose that side of infrastructure. In china a study is made what should we choose physical or non-physical infrastructure (Nannan & Jianing, 2012).

### ***Research Gap***

The literature above gives a thorough image of studies that are conducted in different parts of the globe regarding infrastructure development and economic growth. From developed economies to the developing economies. The literature mainly comprises of Physical infrastructure development and its effect whether its long run or short run. There is not much debate whether there physical or non-physical infrastructure should be a priority for a government while making policies. What weightage should be giving according to the effect it having on a particular economy.

The research gap that has identified is that there isn't enough research present that has shown that either infrastructure investment/development can be used as a tool to maintain or increase the rate of economic development and also which side of infrastructure either physical or nonphysical infrastructure should be used in a long run for better economic growth.

### ***Hypothesis***

#### ***Hypothesis 1***

$H^0$  = There is significant relationship between non- physical infrastructure and other variables defined in study. Also, it can be used in long run for economic development.

$H^1$  = No significant relationship between non- physical infrastructure and other variables defined in study. Also. It cannot be used in long run for economic development.

## Model, Data and Methodology

### Research Design

Direction, technique and research design depends upon the types of inquiry in qualitative, quantitative and mix-method approach (Creswell, 2014). This research is directed towards quantitative methods to look at the elements of infrastructure development, economic growth and policy choices by analyzing the indicators in physical and non-physical infrastructure. Researcher has selected descriptive research design for this research because data required for this research is external, secondary taken from World Bank statistics. As this research is based on quantitative research methods with descriptive design; data has been produced and results have been described in tabular form. Data and result have been produced in order to meet the objective of research.

### Econometric Model

ARDL model was introduced by Pesaran et al. (2001) in order to incorporate I(0) and I(1) variables in same estimation. The autoregressive model is used for decades to model the economic relationships between economic variables in a single equation. ARDL approach is used for forecasting and to disentangle long run relationship from short run dynamics. Its popularity stems from the fact that cointegration of non-stationary is equivalent to error correction process also there is no need to determine the order of integration amongst the variable in advance. All other approaches require that the variables should have same order of integration. In addition it is statistically much more significant approach for the determination of cointegration relationship in small samples while allowing different optimal lag of variables.

The model for the estimation is ARLD Model. ARLD was used by (Y.Shin, M. Hashem, n.d.) (Richard J. Smith, n.d.) (Z. Khan, Rabbi, Ahmad, & Siqun, 2019).

$$\Delta Y_{GDP(it)} = \alpha_1 Mot_{it} + \alpha_2 Beds_{it} + \alpha_3 Phys_{it} + \alpha_4 School(P)_{it} + \alpha_5 School(S)_{it} + \mu_{it} \dots \dots \dots \text{Eq 1}$$

It's a Log-Linear model as the values of GDP Per Capita changed to log values to change it to percentage values. The independent variables are Mortality as Mot, Beds as Beds Per Hospital Per (1000), Physicians (Per 1000) as Phys School Enrollment (Primary) Gross% as School(P), School Enrollment (Secondary) Gross% as School (S). Whereas (i) is cross section and (t) is time from 1970-2019.  $\lambda_1, \lambda_2, \lambda_3, \lambda_4, \lambda_5$  and  $\lambda_6$  are coefficient and  $\mu_{it}$  is the error term.

$$\Delta Y_{GDP(it)} = \lambda_1 Mot_{it} + \lambda_2 Beds_{it} + \lambda_3 Phys_{it} + \lambda_4 School(P)_{it} + \lambda_5 School(S)_{it} + \mu_{it} \dots \dots \dots \text{Eq2}$$

### Data

The data will be used, is panel data of last 50 years and 6 countries Pakistan, India, China, Bangladesh, Iran and Sri Lanka. The data source is World Bank.

### Results and Interpretation

Table 1.1:

#### Unit Root Test:

<i>Results of Panel Unit Root Tests</i>		
<b>Levin-Lin-Chu (2002) (LLC)</b>		
<b>Variables</b>	I(0)	I(1)
<b>GDP</b>	0.64672 (0.741)	8.44175 (0.000)
<b>Mortality</b>	-0.71905 (0.2361)	-1.793 (0.428)

<b>Beds per hospital</b>	-1.64734 (0.0497)	-14.0748 (0.000)
<b>Physicians</b>	0.06721 (0.5268)	-9.34557 (0.000)
<b>School enrollment (Primary)</b>	-1.76905 (0.0384)	-8.09466 (0.000)
<b>School enrolment (secondary)</b>	0.50954 (0.6948)	-3.8801 (0.00001)

The results of Table 1.0 illuminate that the variables are integrated at  $I(1)$ . The results support us to use ARDL Bound Test approach for cointegration.

**Table 1.2:**

**Long Run Analysis:**

*Long Run Equation*

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
<b>Hospital Beds Per 1000</b>	-0.728308	0.268222	-2.715315	0.0073
<b>Mortality</b>	0.004659	0.001533	3.038937	0.0027
<b>Physicians</b>	0.10085	0.036449	2.766879	0.0063
<b>School Enrollment (Primary)</b>	0.016039	0.007665	2.092606	0.0378
<b>School Enrollment (Secondary)</b>	0.034064	0.010482	3.249924	0.0014

Table 1.1 shows the results for the long run. 1% change in Mortality changes the GDP by 0.004 % as the Mortality is decreasing variable, due to health expenditures and also the research advancements in the medicine and treatments the mortality rate is decreasing in adults that's a booster for the labor power and onwards to the economic growth and productivity. 1% change in Physicians changes the GDP by 0.1008%, physicians work for the economic growth in two ways first, the act as rent seekers that means more the number of physicians more benefit for the economic activity and also more number of physicians means less time of labor force out of work during illness that means less productivity loss so that has direct effect on GDP (Reilly, 2012). 1 % change in School Enrollment (Primary) and School Enrollment (Secondary) effect the GDP 0.016 & 0.031% respectively, increase in school enrollment directly affect the GDP the higher the level of education higher the effect as explained before by the (Afzal et al., 2011). Lastly Beds per Hospital, 1% change in beds per hospital decreases the GDP 0.72 %, as a matter of fact the government spending's on health is stagnant that means ever low number of beds available according to the population increase in the country, also the government hospitals are overcrowded and private hospitals are unaffordable by the public. As developing country, the most population is either middle class or lower middle that means low affordability of private health services and that means overcrowding in government provided facilities leading to unproductivity.

**Table 1.3:**  
**Short Run Analysis**

<i>Short Run Equation</i>				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
$\lambda$	-0.097585	0.037756	-2.584657	0.0105
D(GDP(-1))	-0.044608	0.114935	-0.388116	0.6984
D(MORTALITY(-1))	0.010116	0.009106	1.110955	0.2681
D(PHYSICIANS(-1))	1.320096	1.272394	1.03749	0.3009
D(SCHOOLP(-1))	-0.001722	0.002282	-0.754502	0.4515
D(SCHOOLS(-1))	-0.004351	0.003335	-1.304458	0.1938
C	0.321247	0.160305	2.003968	0.0466
<b>Mean dependent var</b>	0.111017	S.D. dependent var	1.064845	
<b>S.E. of regression</b>	1.257494	Akaike info criterion	-1.431262	
<b>Sum squared resid</b>	281.47	Schwarz criterion	0.074943	
<b>Log likelihood</b>	336.6893	Hannan-Quinn criter.	-0.828477	

Table 1.2 reports the short run findings, major portion of variables show insignificant relationship with the GDP, school enrollment (primary & secondary), physicians, mortality, industry (construction), electricity consumption and energy consumption (oil). The significant variable beds per hospital.  $\lambda$  denotes the speed of adjustment towards the equilibrium or the convergence towards the long-run equilibrium, at every year 9.7% adjustment takes place. Most of the variables shows the negative impact on economic growth, in long-run these variables showed the positive impact on the economic growth. That means sudden boom in the education, health and physical infrastructure don't show any positive impact on economic growth. But in long-term these investment does bear the fruit of economic growth. That means government shouldn't stop investment in education, health, construction industry and energy infrastructure sector.

## Conclusion and Policy Recommendations

### Conclusion

Infrastructure development plays crucial role in economic growth most importantly non-physical infrastructure. ARDL approach was used to capture the effect of non-physical of infrastructure in long and short term. The results show the significance of both sides of infrastructure. Non-physical variables have positive and significant effect on economic growth in long run except Beds per hospital. Which somehow contradict with the existing studies (Chaudhry et al., 2013), specifically Beds per Hospital. The health expenditure is stagnant for past decade resulting in less investment in the health sector which made the results show negative relation between the variable and the economic growth. Other variable does show the significance and the movement towards the long run equilibrium.

Education sector shows the level wise greater impact on the economic growth and has high response effect towards the government expenditure. Hospital beds show negative effect on economic growth that is arguably opposing the previous findings. Policy Shift is required in health department. The physicians showed the higher impact on growth, as it contains both the health side and the educational side. More physicians mean less time for labor force out of work and basic health services available at the nearest point. from educational point of view that means more research towards cures and health related techniques. Likewise, in China, the growth is

infrastructure lead, according to studies yearly 1500 km roads are added to road infrastructure. If you see the most recent infrastructural development you can see the efficiency on institutional level in infrastructural development, the hospital development in China was remarkable they have taken only days to establish the hospital for the corona cure and many other cure centers. If we can see that example as a benchmark for the Chinese economy and their intuitional values. After the revolution in 1949, the china changed their constitution and move towards communalism. The government started investments in infrastructural development. The investment in infrastructure and the in-education infrastructure has grown greatly. the main example for the educational growth is that all the CEO's around the world in leading software industries are Indians. Also, the multi-national are investing in huge amount in Indian economy. That means high investment in infrastructure. Also, Indian policy according multi-national companies are that you have to share the technology after a decade of the plantation of the industry. India is leading in car industry. Whereas in Pakistan we don't have one car producing domestic company with international recognition. With having highest share of middle class, India has larger share of poverty-stricken population. They need a lot investment in health infrastructure like we do. In contrast to that there is a lot of Indian physicians capturing the international physician's market Hence, India should reconsider its policies to ensure better health infrastructure for its people. As of Bangladesh, the country has been through many ups and downs. From the very start country is been through much loss in political manner.

### ***Policy Recommendations***

From the policy perspective the study suggests that investment in non-physical infrastructure contributes positively towards growth. Governments should invest in the sectors like education and health to have a maintained economic growth.

The School enrollment shows that the higher level of education gives the highest growth, so the government spending should be greater towards the higher education. The public health of residents always play a vital role in the development and progress of society The stagnant spending on hospital infrastructure is having negative effect on the economy demanding a drastic change in policy by increasing the spending on Public health investment which will have a positive impact in promoting the development of national health and medical and health undertakings, improving the overall health quality of citizens and promoting the harmonious development of society.

Overall the results suggest that it is necessary to design an economic policy that improves the human capital formation by heavily investing in education sector.

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# Digital Finance and Carbon Emission with Mediating Role of Consumption Structure: A Comparative Study Between Developed and Developing Countries

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## Abstract

*Digital finance has an advantage for promoting the reduction in cost, reduce the transaction cost and it also decreased the CO<sub>2</sub> emission. The whole environment of the world change due to the global warming in the temperature of the world and this temperature is increased due to the carbon emission into the environment and the reduction of CO<sub>2</sub> emission is done with the help of the digital finance. The main objective or purpose of the current study is to analyses the relationship between the digital finance and the carbon emission of the developing and underdeveloped countries. In current study the researcher also uses the mediating role of the consumption structure of the countries. They also point out that the future researchers should increase the time period of the data collection for better results and innovation effect on the carbon emission. The data has been collected from the developing and developed countries from 2013-2023. In developing countries Pakistan and India are taken and in developed countries Japan and Australia are selected. Descriptive statistics, Endogeneity tests, robustness tests, heterogeneity tests, correlation matrix and the regression analysis will be done by using the Stata. In regression analysis mediations steps are followed. Current study provides the policy implications to the top management of the companies as well as to the countries so that how can they control the emission of the carbon into the environment and how the consumption structure is control whether it's development-oriented consumption or enjoyment oriented consumption. The policy makers should encourage the people so that they can use the low carbon emission products which also improves the environmental condition of the countries.*

**Keywords:** *Digital finance, Carbon emission, Consumption level, Regression analysis, Development oriented consumption and Enjoyment oriented consumption*

## INTRODUCTION

The combination of the information technology and the traditional finance is known as the digital finance. Digital finance has also a same or the similar characteristics of the traditional finance. When the manufacturing and the financial development of the country becomes same then the industrial capital and the financial capital also becomes the same and it also needed by the real economy of the country (Chauvet & Jacolin, 2017). So that's why the upgrading and the optimization of the industrial structure also created. The potential problems also created due to the excessive financial development of the countries. The industrial hollowing out and the abnormal financial development would immoderate the speculation which also cause the excessive financial development (Webber, 2001).

The scope of traditional finance is improved with the help of the digital finance and it also help the delivery of the services to the general public of the countries (Liu et al., 2021). The relationship of the carbon emission efficiency on the digital finance in 283 cities are examined by Zhang and Liu (2022). The offline transactions are decreased due to the digital finance and the capital is directly flow to the low carbon emission industries. It ultimately improves the efficiency of the carbon emission because digital finance creates a low carbon impact. The financial development of the cities or country also plays a vital role in the carbon emission and it also examine the economy and the environment relationship (Wang et al. 2023). Due to the financial development influence

the carbon emission shows U shape of ICT and this is because when the financial development of the country is low it creates the U shape of the carbon emission (Wang et al., 2024).

The previous literature also supported the mechanism of the digital finance because it influences the carbon emission of the country and it is still infancy topic in the previous literature. The technological innovation also shows the significant influence on the digital finance of the countries and among the different potential mechanism of the countries. According to the Wu et al., (2023) the technological innovation and the upgrading industrial structure are considered as the essential mediation mechanism in between the digital finance and the carbon emission of the countries.

The result of the Hao et al. (2023) and Ma (2022) shows the positive relationship between the digital finance and the carbon emission reduction and it becomes possible when the countries invest mostly in the green technological innovation (GTI). The efficiency of the carbon emission also significantly related with the technological innovation of the countries (Wu et al., 2023). The disparities of the carbon emission reduction show the comprehensive impact on the digital finance due to the production technology innovation (PTI) and the green technological innovation (GTI) framework.

The financial services on demand for the small, medium and micro enterprises and farmers becomes so difficult because the companies not easily provide the financial services to the companies (Wang & Guo, 2022). The financial inclusion and financial discrimination also impact on the traditional finance which also becomes the main factor for the real economy of the country (Kling, 2021). The development of the digital finance becomes possible because the countries have not enough traditional financial services for the general public. It also improves or increase the scope of the financial services which ultimately increased the allocation of the financial resources of the countries which at the end improves the industrial structure upgradation and the economic development of the countries becomes possible (Wang & Wang, 2021).

There are some main research questions of current study i.e.

- I. What is the relationship between the digital finance and the carbon emission?
- II. What is the mediating role of consumption structure in between the digital finance and the carbon emission?

On the basis of the above mentioned research questions some of the research objectives of current study i.e.

- I. To examine the direct relationship in between the digital finance and carbon emission.
- II. To examine the mediating role of the consumption structure in relationship between the digital finance and carbon emission.

Ye et al., (2023) examined the relationship between the digital finance on the carbon emission. They also analyzed the relationship with the help of the mediators i.e. production technology, innovation technology and the green technology innovation. They analyzed that digital finance indirectly reduces the carbon emission of the country and they suggest that future studies should use this relationship with different context and also takes the consumption structure as a mediator in between the digital finance and carbon emission. So, current study used this gap and analyzed the relationship of the digital finance with the carbon emission with mediating role of the consumption structure in developing and the developed countries.

## Literature Review

The concept of the artificial intelligence has been used for the utilization of the digital finance and with the help of the block chain the financial services are provided which at the end improve the qualitative efficiency of the services (Liu et al., 2022). There is a two direct impact of the digital finance on the carbon emission. Firstly, with the help of the online platforms the financial institutions provide the credit to the borrowers and ultimately it also reduced the offline resource and energy consumption which also reduced the carbon dioxide emissions into the environment (Zhang et al., 2023).

The green development requirements are fulfilling with the help of the resource allocation efficiency of the digital finance (Lee et al., 2023). Secondly, the technological benefits can also help the information asymmetry and within the lenders and the borrowers (Demertzis et al., 2018). The digital finance leverage and the financial

institutions would accurately and efficiently provide the enterprises which are the environmentally friendly and provide the loans to the low consumption and the low-emission businesses which also contribute to the alleviating the pressure of environment.

With the help of the three potential mechanisms the digital finance indirectly affects the CEI. The production process improves and the usage of the energy efficiency with the help of the technological innovation would increase the CEI with the help of the digital finance capital. The carbon emission would rebound the technology innovation and the environmental innovation because digital finance facilitates the technological innovation in the production process (Wang & Wei, 2020). The technological innovation would also stimulate the potential of innovation in the digital finance (Wang et al., 2022). The technological innovation also increased the carbon dioxide emissions it would ultimately decreased the efficiency of the carbon emission. The production efficiency improves with the help of the technological innovation and it also decreased the production costs.

The energy consumptions are indirectly increased with the help of the technological innovation and it at the end increased the carbon emissions. Secondly, PTI and GTI are essential to possess the distinct attributes for the digital finance. The environmentally friendly innovation domains can emphasize the advancements of the GTI (Du et al., 2021). Digital finance would directly support the green innovation and research and development and also decreased the carbon emissions, it also guides the government about the financial capital for the green innovations. According to the study of the Feng et al. (2022) and Li et al. (2022) the financial constraints and the financial barriers are increased when the companies used more of the digital finance for the financial development; but the financial support of the companies are increased with the help of the technological innovation which is done with the help of the digital finance. Green technologies are considered as the best or the most common factors which enhance the financial development of the companies. The direct environmental benefits are occurring with the help of the financial development and the use of the green technologies by the companies.

The previous researchers focus on the theoretical discussion and the empirical studies with the relationship of the digital finance and the inclusive development of the companies with the carbon emissions and both the local and the international researchers focus on these main factors (Ding et al., 2022; Wang et al., 2023a). There are two main points which should be considered after the results of the previous researchers. Firstly, the carbon emission is reduced with the help of the digital inclusive finance because it decreased the offline transactions of the companies. By facilitating the trade openness of the companies the financial development decreased the energy related emission so it ultimately decreased the carbon emissions and it is studied by Shahbaz et al. (2013) Boutabba (2014). According to the study of the Dong et al. (2022) the carbon emission efficiency of the companies are increased with the help of the digital inclusive finance because it increased the regional innovation level as well as the entrepreneurial activities and this point is also supported by the Zhang et al. (2022).

The offline enterprises are digitalized with the help of the digital finance and it is done due to the digital inclusive finance of the companies. The high transaction cost is reduced due to the online financial services and it is supported by the transaction cost theory of finance. The transaction uncertainty and the high transaction frequency are becoming possible with the help of the resource consumption costs of the companies and it ultimately increased the carbon emission reduction of the companies (Yang et al., 2022). The “Ant Forest” platform which is one of the main or important service platform of the environmental services and it also increased the public engagement in the environmental activities which also motivate the individuals to follow the low carbon emission into the environment (Sun et al., 2021).

The number of transactions or the search costs by the consumers are also reduced with the help of the digital inclusive finance because it transfers the information to the enterprises when they need loans with the help of the digital platforms. The financing costs of the companies are decreased and it also improves the resource consumption which are considered as unnecessary (Li et al., 2023). The advanced digital technologies are attached with the digital inclusive finance i.e. it handles the large set of data and the block chain for the company-specific information so it also strengthens the transparency of the information. The financing failure which are caused due to the information asymmetry are also reduced and it ultimately achieved the carbon emission reduction goals.

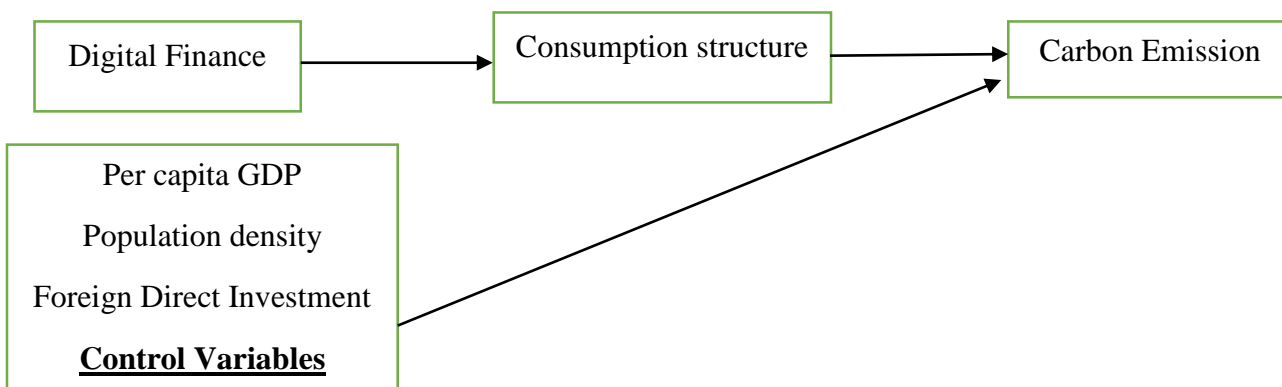
From an emerging sector services, the digital inclusive finance provides the attributes which are provide the minimal energy consumption, decrease in the pollution level and the efficiency improved and it is for the industrial level. The carbon emission is reduced due to the comparison of the conventional industries and it also becomes more favorable for the progression concept (Qin et al., 2022). The purview of the financial services is broadening and it becomes possible for the digital inclusive finance and it shatter the financing barriers which are encountered by the small and the medium size enterprises. The green transformation is supported with the help of the industrial upgrading which also facilities the optimal resource allocation which results in the high efficiency of the resources (Zhang et al., 2023).

With the help of the knowledge spillover, influencing market size and factor combinations the digital finance can increased the more entrepreneurial opportunities (Baker, 2021). The urban innovation and the entrepreneurship are improved because of the expansion of the digital finance which also creates the more fluid financing environment for the technology intensive and innovative industries (Nambisan et al., 2019). The industrial structure adjustment would stimulate the level of urban innovation and entrepreneurship. In creation the job the entrepreneurial activity creates an endogenous driver for the economic growth, structural transformation and the industrial upgrading (Thurik, 2003). The innovative-intensive industries and the technology-intensive industries are become the source of market resource allocation and it also promotes the innovation method and the entrepreneurship of the market industries.

The household consumption and the individual consumption are affected due to the digital finance and it also impact on the innovative behavior of the firms. The digital finance significantly increased the household consumption of the people. The consumption on the health care, education and the recreation which also improves the services of the goods are also influences due to the digital finance of the industries. The product market would impact due to the consumer purchasing power and it is supported by the microeconomic theories which also impact the industry structure.

The time and the distance in time are saved with the help of the digital finance and it also provide the efficient information transmission which also reduced the access cost of the financial services for the public and in depth the inter regional economic activity relationship. The spillover effect of the digital finance is also studied by the previous researchers. The relationship of the digital finance and the carbon emissions are studied by the Wang and Guo (2022). The digital finance on the economic growth and the urban ecological efficiency are analyzed with the help of the digital finance spillover. The local industrial structure also influenced due to the peripheral area of the digital finance. The spatial autocorrelation effect of the industrial structure also supports this evidence.

On the basis of the above mentioned literature following research framework has been created. Digital finance is taken as independent variable; carbon emission is taken as independent variable; consumption structure is taken as mediator in between digital finance and carbon emission; per capita GDP, industrial structure, population density and the foreign direct investment are taken as the control variables.



This portion of current research paper shows that how the data has been collected and how the analysis of the study has been done. The data of the current study has been collected from World Development Indicators official websites. Data of the control variables are also collected from the International Monetary Fund website. In current

study the researchers take developing and the developed countries for the analysis. For the developing countries Pakistan and India has been selected and for the developed countries Japan and Australia has been selected. Following formulas are used to measure the impact of the digital finance on the carbon emission with mediating role of the consumption structure. For the data analysis the researcher selected 2013-2023-time period because for the panel data analysis usually researchers take 10 years of data. It also helps the researcher to generalize the results according to the 10 years of data.

### ***Independent Variable***

The ratio or the proxy of the degree of digitalization of the countries is considered as a proxy for the measurement of the digital finance. Secure internet servers (per 1 million person) used as a proxy to measure the digital finance of the countries (Ye et al., 2023). The data has been collected from the World Development Indicators website.

### ***Dependent Variable***

The calculation of the Zhang and Zhang (2015) and the Dong et al. (2022) for the calculation of the carbon emission are used in this study. They used the eight fossil energy sources i.e. raw coal, coke, crude oil, fuel oil, gasoline, kerosene, diesel and the natural gas.

### ***Mediator***

Consumption structure is taken as a mediator in this study. According to the method given by the Xing and Ye (2022) the consumption structure is calculated by using the relative proportion of the non-material consumption to the total household consumption as a proxy for measuring the consumption structure of the countries.

### ***Control Variables***

***Per Capita GDP:*** each country level of the economic development is taken as a per capita GDP of the country.

***Density of Population:*** The logarithm of the ratio of the total resident of the population to the required regional area is used.

***Foreign Direct Investment:*** The logarithm of the amount of the total foreign direct investment are used for the FDI calculation.

### ***Econometric Equations***

$$CO2E_{i,t} = \beta_0 + \beta_1 DF_{i,t} + \beta_2 GDP_{i,t} + \beta_3 Pop\ den_{i,t} + \beta_4 FDI_{i,t} + \epsilon_{i,t} \quad (1)$$

$$CS_{i,t} = \beta_0 + \beta_1 DF_{i,t} + \beta_2 GDP_{i,t} + \beta_3 Pop\ den_{i,t} + \beta_4 FDI_{i,t} + \epsilon_{i,t} \quad (2)$$

$$CO2E_{i,t} = \beta_0 + \beta_1 CS_{i,t} + \beta_2 GDP_{i,t} + \beta_3 Pop\ den_{i,t} + \beta_4 FDI_{i,t} + \epsilon_{i,t} \quad (3)$$

First equation shows the direct relationship between the independent variable and the dependent variable along with the control variables. Second equation shows the relationship of independent variable and mediator along with the control variables. Third equation shows the relationship of the mediator and the dependent variable along with the control variables. CO2E shows the carbon emission of the countries; DF shows the digital finance of the countries; GDP shows the per capita gross domestic product of the countries; Pop den shows the population density of the countries; FDI shows the foreign direct investment of the countries; CS shows the consumption structure of the countries;  $\beta$  shows the constant terms;  $\epsilon$  shows the error term; i for the number of the countries and t for the time period.

## **Results and Analysis**

The current study is analyzed with the help of the Stata software. Panel data analysis has been done because the nature of data is panel. The researcher has been done some basic tests for the analysis i.e. descriptive statistics, correlation matrix, panel unit root test and the regression analysis.

Table 4.1 shows the descriptive statistics of developing countries i.e. Pakistan and India. The result of the descriptive statistics of Pakistan shows that the mean or the average value of the CO2E is 5.225 which means on average the CO2E is 5.225 but the result of India shows 2.1155 which means that the CO2E of Pakistan is higher as compared to the India and it also shows that the pollution is maximum in Pakistan as compared to India. DF

shows that the mean or the average value of digital finance of Pakistan shows \$38.28 billion but the DF of India shows \$112.58 billion. The result shows that the digitalization of the India is higher as compared to Pakistan. CS shows that the Pakistan consumption is \$5.003 billion but the consumption of India shows \$0.703 billion on the non-material and the household expenses. The result shows that the Pakistani consumption is higher as compared to the Indian consumption. GDP shows that the earning of the country into the country as domestic product.

The result of the developing countries shows that the GDP of Pakistan is \$1451.89 billion while the GDP of India shows \$1843.63 billion. The result shows that the GDP of India is higher as compared to the Pakistani GDP. Popden shows the population density of the country that how much dense the population of the country in the particular time period. The result shows that the mean or the average value of Popden is 278 while the result of Indian population shows 415 which means that the total population of the India is higher than the total population of Pakistan. FDI shows that the mean or the average value of Pakistan shows \$1.9 billion but the Indian result shows \$42.44 billion which is quite higher ratio as compared to Pakistan so that it shows that the Indian FDI is much higher than the Pakistani FDI.

**Table 4.1**  
**Descriptive Statistics of Developing countries**

Name of the Variables	Pakistan				India			
	Mean	Std. Dev	Min	Max	Mean	Std. Dev	Min	Max
CO2E	5.225	2.1155	5.042	5.375	1.7636	0.1433	1.5	2
DF	38.285	19.039	0.5451	110.56	112.58	58.61	1.6612	474.27
CS	5.003	2.2883	4.6651	5.545	0.7035	0.0561	0.6211	0.782
GDP	1451.89	718.892	1259.7	1620.7	1843.63	921.85	1434	2411
Popden	278	136.23	258	300	415.26	214.03	392.77	434.6
FDI	1.9	0.447	1.33	2.58	42.44	21.07	24	64.36

**Note:** CO2E shows the carbon dioxide emission of the countries; DF shows the digital finance of the countries; CS shows the consumption structure of the countries; GDP shows the per capita gross domestic product of the countries; Popden shows the population density of the countries and FDI shows the foreign direct investment of the countries.

Table 4.2 shows the descriptive statistics of developed countries and for the developed countries the researcher selected Japan and Australia. The result shows that the CO2E of the Japan shows 9.2 mean value while the Australia shows 14.5 mean value which means that the Australia emission of CO2 is higher than the Japan. DF shows 6118.01 mean value of Japan while the Australia shows 22848.84 which means the digitalization of Australia is much higher than Japan. CS shows that the mean value of the Japan shows 7.03 and the Australia shows that 8.25 which means that the household consumption of the Australia is much higher than the consumption of Japan. GDP of Japan shows \$ 9633.91 billion and the Australia shows \$ 39243.63 billion which is much higher than the Japan GDP. Popden shows 333.17 of Japan while the Australia population density shows 337.8 which means that the Japan population is higher than the Australian population. FDI shows 28.02 mean value of Japan while the Australia shows 234.85 mean value which means that the Australian FDI is much higher than the Japan FDI.

**Table 4.2**  
**Descriptive Statistics of Developed countries**

Name of the Variables	Japan				Australia			
	Mean	Std. Dev	Min	Max	Mean	Std. Dev	Min	Max
CO2E	9.2	4.7912	8	10.3	14.5	7.3435	7.1	8
DF	6118.01	3059.04	552.90	2848.72	22219.84	108.09	1.199	948.45
CS	7.029	3.7509	5.2918	8.257	0.7261	0.0384	0.6556	0.7909
GDP	9633.91	19816.16	34017	49145	39243.63	4127.87	6301	12720
Popden	333.17	166.929	326.2	337.8	147.43	73.888	143.9	149.11
FDI	28.02	14.347	0.55	62.58	234.85	114.96	166.08	334.07

**Note:** CO2E shows the carbon dioxide emission of the countries; DF shows the digital finance of the countries; CS shows the consumption structure of the countries; GDP shows the per capita gross domestic product of the countries; Popden shows the population density of the countries and FDI shows the foreign direct investment of the countries.

The graph shows overall result of the variables used in the study. In creation of this graph mean or the average values of the variables are used. The result shows that the GDP of the countries on average is higher as compared to the other variables used in the study. DF shows that most of the population of the country used the modern technology which is digital finance used for the daily operations.

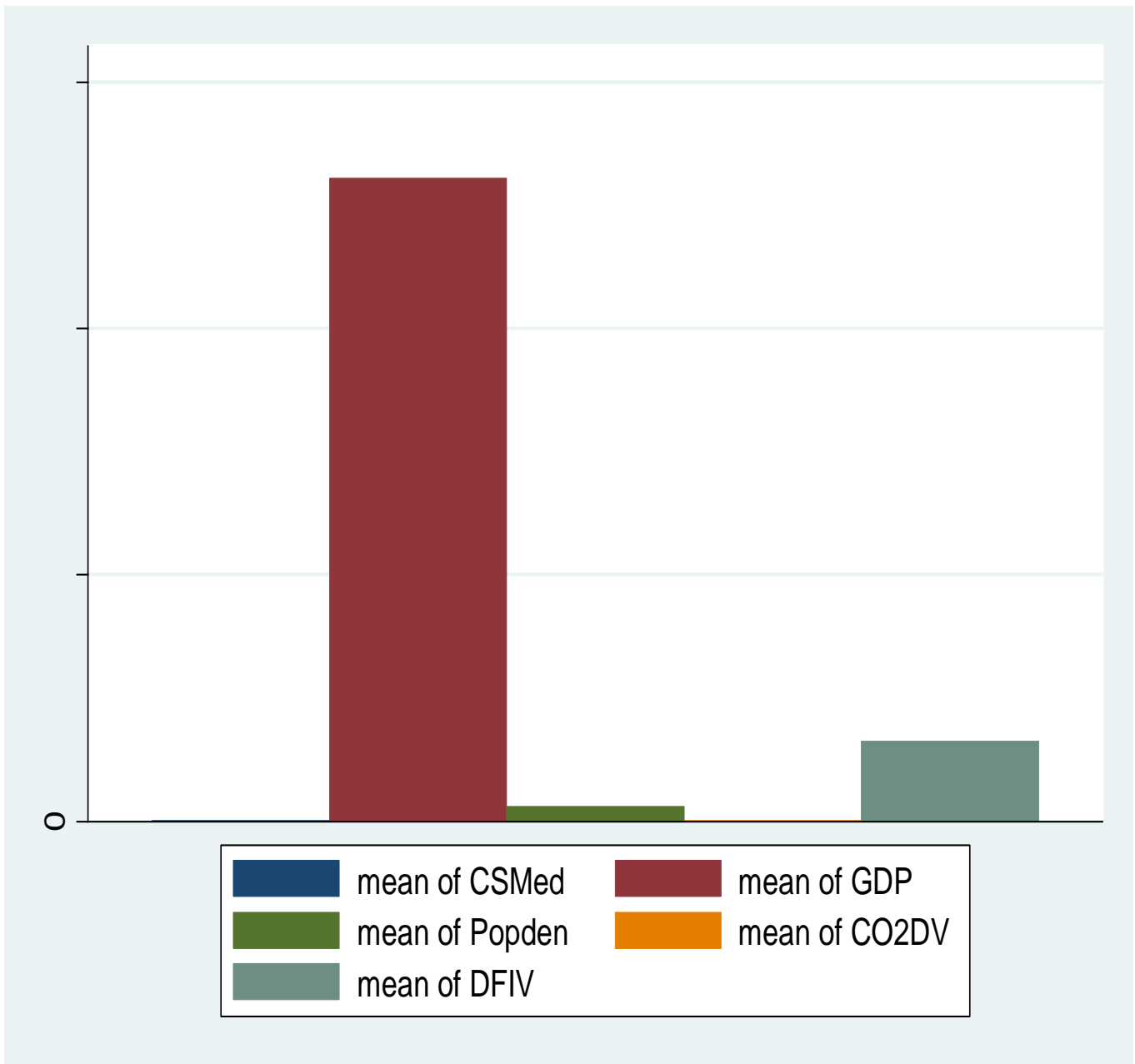


Table 4.3 shows the correlation matrix of the developing as well as the developed countries as an overall result but the individual results of the countries are also mentioned in appendix. The result of correlation matrix shows that DF and CO2E are positively related with each other's; CS and CO2E is positively related because when the CS increased then the CO2E of the countries are also increased; CS and DF are also positively related; GDP and CO2E shows positive relationship which means if the GDP of the country increased it would also increase the CO2E of the countries; Popden and CO2E are negatively related because when the population of the country increased it would decreased the CO2E of the countries and if the popden decreased then the CO2E also decreased; FDI shows positive relationship with the CO2E; DF and FDI are negatively related; FDI and CS are negatively related; FDI and GDP are negatively related and last but not the least FDI and Popden are also negatively related.

**Table 4.3**  
**Correlation Matrix**

	CO2E	DF	CS	GDP	Popden	FDI
CO2E	1					
DF	0.3076	1				
CS	0.5604	0.4696	1			
GDP	0.4712	0.5158	0.6100	1		
Popden	-0.5355	0.1104	0.1648	0.0710	1	
FDI	0.2564	-0.0970	-0.5810	-0.1083	-0.4399	1

**Note:** CO2E shows the carbon dioxide emission of the countries; DF shows the digital finance of the countries; CS shows the consumption structure of the countries; GDP shows the per capita gross domestic product of the countries; Popden shows the population density of the countries and FDI shows the foreign direct investment of the countries.

The below graphs show the CO2 emission of developed and developing countries. The result shows that the emission of CO2 is increased in Pakistan because the digitalization increased which also increased the consumption of the energy resources. As compared to the result of India the CO2 emission is much higher as compared to Pakistan. The CO2 emission of Pakistan is higher but it increased gradually. The graph of Japan shows that CO2 emission fluctuates with time period and the result of Australia shows that CO2 emission is increased with time because of the ozone effect.

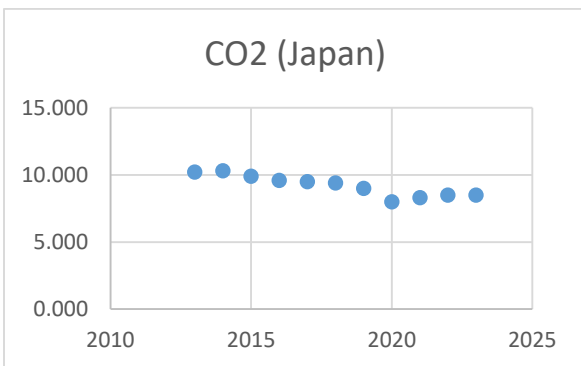
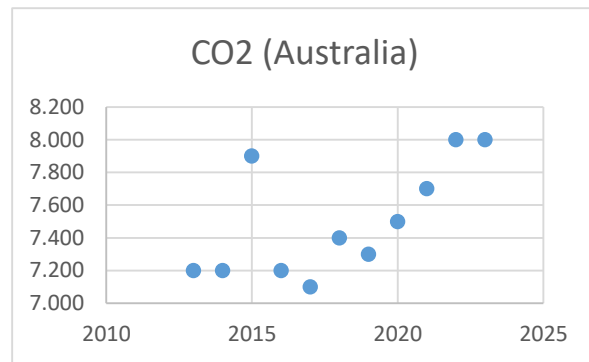
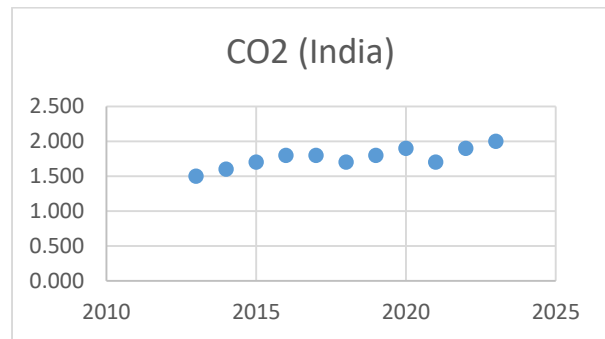
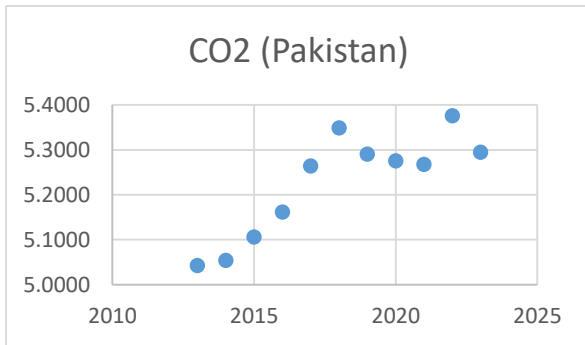


Table 4.4 shows the generalized methods of moments regression analysis. The result of model 1 shows the direct relationship of DF and CO2 emission. The result of model 1 with the help of GMM model shows that the result of DF and CO2 are not significant because the p-value is higher than 0.05. Digital finance become the source of



reducing the transaction cost, improve the speed of the transaction and also decreased the CO2 emission because the new source of technology is used by the companies which also results in decreasing the CO2 emission (Nambisan et al., 2019). Model 2 shows the relationship of DF and CS because it's the mediation paths and the researcher takes CS as dependent variable with DF. The result of model 2 shows that DF is positively and significantly with the CS of the developed and developing countries because with the increase in the consumption structure the digital financial inclusion is also increased. Model 3 shows the relationship of the CS and CO2 emission. The result of model 3 shows the relationship of consumption structure and the carbon emission of the countries. The result shows that CS has 0.002 p-value and the coefficient sign shows positive value which means that CS is positively and significantly related with CO2 emission. Overall the result of the GMM model shows that with the addition of the consumption structure in between the DF and CO2 the results become more significant and more clear results are shows.

**Table 4.4**

**The impact of digital finance inclusion on the CO2 emission with mediating role of consumption structure**

Name of Variables	Generalized Methods of Moments		
	Model 1	Model 2	Model 3
<b>DF</b>	(-0.00035) 0.077	(0.0010) 0.000***	
<b>CS</b>	-	-	(0.2161) 0.002**
<b>GDP</b>	(0.00148) 0.000***	(0.0008) 0.007	(0.0012) 0.000***
<b>Popden</b>	(-0.0213) 0.000***	(-0.0167) 0.000***	(-0.018) 0.000***
<b>FDI</b>	(-0.0061) 0.000***	(-0.0271) 0.000***	(-0.0029) 0.894
<b>C</b>	(10.7801) 0.000***	(9.0290) 0.000***	(8.934) 0.000***

**Note:** DF stands for digital finance; CS stands for consumption structure; GDP stands for gross domestic products; popden shows the population density of the countries and FDI shows the foreign direct investment of the countries.

Table 4.5 shows the direct relationship of dependent variable and independent variable of developing countries i.e. Pakistan and India. The result of the developing countries shows that the digitalization in Pakistan negatively related with the carbon emission because when the digital finance increased it would increase the emission of carbon dioxide into the environment. The result of India shows that DF is positively and significantly related with CO2E because when the digitalization increased it would also increase the emission of the carbon dioxide into the environment which also cause the global warming. In Pakistani result GDP shows negative and insignificant relationship with CO2E and in India it shows positive and significant relationship. Popden shows positive and significant relationship with CO2E but in India it shows positive and insignificant relationship. FDI shows positive and significant relationship with CO2E in Pakistan and in India it shows negative and significant relationship with CO2E. R-square of Pakistan shows 93.31% which means overall 93.31% of the CO2E relationship is explained with the help of DF. In India DF explains 86.23% of the relationship with CO2E. Overall the direct relationship model of Pakistan is better as compared to India.

**Table 4.5**  
**Relationship of Digital finance and Carbon emission of developing countries**

Variables	Pakistan		India	
	t-stats	p-values	t-stats	p-values
DF	1.36	0.003**	0.57	0.002**
GDP	-0.49	0.640	2.35	0.05*
Popden	2.99	0.024**	1.70	0.987
FDI	2.58	0.042**	-0.02	0.001**
C	4.68	0.003**	0.54	0.000***
<b>R-square</b>	0.9331		0.8623	

**Note:** DF shows digital finance; GDP shows gross domestic product; Popden shows the population density of the countries; FDI shows the foreign direct investment.

Table 4.6 shows the direct relationship of digital finance and carbon emission of developed countries i.e. Japan and Australia. The result of the developed countries shows that the digitalization in Japan positively related with the carbon emission. The result of Australia shows that DF is positively and significantly related with CO2E. In Japan result GDP shows negative and significant relationship with CO2E and in Australia it shows positive and insignificant relationship. Popden shows positive and highly significant relationship with CO2E but in Australia it shows negative and significant relationship. FDI shows positive and insignificant relationship with CO2E in Japan and in Australia it shows positive and significant relationship with CO2E. R-square of Japan shows 91.24% and in Australia R-square shows 65.80%. The result of R-square means that the result of Japan explained more results as compared to the results of Australia.

**Table 4.6**  
**Relationship of Digital finance and Carbon emission of developed countries**

Variables	Japan		Australia	
	t-stats	p-values	t-stats	p-values
DF	2.60	0.040**	0.47	0.002**
GDP	-0.67	0.027**	0.25	0.809
Popden	3.80	0.000***	-0.15	0.004**
FDI	0.64	0.547	0.54	0.005**
C	3.64	0.013**	0.42	0.002**
<b>R-square</b>	0.9124		0.6580	

**Note:** DF shows digital finance; GDP shows gross domestic product; Popden shows the population density of the countries; FDI shows the foreign direct investment.

Table 4.7 shows the relationship of independent variable and mediator of developing countries i.e. Pakistan and India. The result of the developing countries shows that the digitalization in Pakistan positively and significantly related with the consumption structure because when the digitalization of the country increased it would also increase the consumption of the people of the country. The result of India shows that DF is positively and significantly related with CS. In Pakistani result GDP shows positive and highly significant relationship with CS and in India it shows positive and insignificant relationship. Popden shows negative and highly significant relationship with CS but in India it shows negative and insignificant relationship. FDI shows negative and significant relationship with CS in Pakistan and in India it shows positive and significant relationship with CS. R-square of Pakistan shows 87.15% and in India it shows 95.39%. Overall the result of India is better than the result of Pakistan because the R-square value is higher in Indian result.

**Table 4.7**

**Relationship of Digital finance and Consumption structure of developing countries**

Variables	Pakistan		India	
	t-stats	p-values	t-stats	p-values
<b>DF</b>	2.71	0.010**	0.58	0.001**
<b>GDP</b>	7.52	0.000***	1.10	0.353
<b>Popden</b>	-6.91	0.000***	-0.28	0.792
<b>FDI</b>	-11.05	0.000***	0.04	0.000***
<b>C</b>	10.15	0.000***	1.10	0.000***
<b>R-square</b>	0.8715		0.9539	

**Note:** DF shows digital finance; GDP shows gross domestic product; Popden shows the population density of the countries; FDI shows the foreign direct investment.

The result of table 4.8 shows the result of the relationship of digital finance with the CS of the developed countries i.e. Japan and Australia. The result of the developed countries shows that the digitalization in Japan is positively and significantly related with the consumption structure because Japan is considered as the most developed or the most digitalized country according to the use of the technology. According to the Hao et al., (2023) the consumption of the energy resources and the industrial adjustments should be analyzed and have impact on the CO2 emission. The result of Australia shows that DF is positively and significantly related with CS because Australia is also considered as one of the most developed country of the world and on the technology basis the people of Australia used most of the digital technology for the daily use. In Japan result GDP shows negative and highly significant relationship with CS and in Australia it shows negative and insignificant relationship.

Popden shows negative and significant relationship with CS because the population of the Japan is not very dense and it does not directly impact on the digitalization of the country; but in Australia it shows positive and significant relationship because Australia is considered as one of the most population dense country in the world according to the population so it also impacts on the CS of the country. FDI shows negative and insignificant relationship with CS in Japan because in Japan the technology is very high quality and the country not in need of having the foreign investment across the world but in Australia it shows negative and significant relationship.

**Table 4.8**

**Relationship of Digital finance and Consumption structure of developed countries**

Variables	Japan		Australia	
	t-stats	p-values	t-stats	p-values
<b>DF</b>	1.90	0.010**	0.080	0.040**
<b>GDP</b>	-14.60	0.000***	-1.14	0.297
<b>Popden</b>	-2.88	0.028**	0.11	0.005*
<b>FDI</b>	-1.67	0.147	-1.72	0.003*
<b>C</b>	3.98	0.002**	0.53	0.000***
<b>R-square</b>	0.9820		0.9147	

**Note:** DF shows digital finance; GDP shows gross domestic product; Popden shows the population density of the countries; FDI shows the foreign direct investment.

Table 4.9 shows the relationship of mediator to the dependent variable i.e. the relationship of the consumption structure on the carbon emission of the developing countries. The result of the below table shows that CS is

positively and significantly related with the CO<sub>2</sub>E in Pakistan as well as in India. GDP shows positive and highly significant relationship with CO<sub>2</sub>E and in India it also shows positive and significant relationship. Popden shows negative and highly significant relationship in Pakistan and positive and insignificant relationship with India. FDI shows negative and insignificant relationship in Pakistan while in India it shows positive and insignificant relationship.

**Table 4.9**  
**Relationship of Consumption structure and Carbon emission of developing countries**

Variables	Pakistan		India	
	t-stats	p-values	t-stats	p-values
CS	3.08	0.004**	2.42	0.05*
GDP	13.64	0.000***	1.82	0.001**
Popden	-11.11	0.000***	0.03	0.978
FDI	-0.13	0.895	0.48	0.652
C	11.92	0.000***	0.05	0.000***
<b>R-square</b>	0.9717		0.8533	

**Note:** DF shows digital finance; GDP shows gross domestic product; Popden shows the population density of the countries; FDI shows the foreign direct investment.

Table 4.10 shows consumption structure and carbon emission of developed countries i.e. Japan and Australia. The result of below table shows that CS is positively and significantly related in both countries with the CO<sub>2</sub>E because when the consumption of the people on the daily use increased it would also increase the CO<sub>2</sub>E into the environment. GDP shows positive and significant relationship in both countries Japan and Australia. Overall the result of the Japan shows most effective results as compared to the result of Australia result.

**Table 4.10**  
**Relationship of Consumption structure and Carbon emission of developed countries**

Variables	Japan		Australia	
	t-stats	p-values	t-stats	p-values
CS	1.12	0.003**	0.86	0.025*
GDP	1.15	0.010***	0.65	0.004**
Popden	-1.15	0.000***	0.98	0.03**
FDI	0.13	0.005	0.22	0.012
C	0.05	0.000***	1.64	0.000***
<b>R-square</b>	0.8455		0.6841	

**Note:** DF shows digital finance; GDP shows gross domestic product; Popden shows the population density of the countries; FDI shows the foreign direct investment.

## Discussion and Conclusion

The current study analyses the relationship between the digital finance and the carbon emission of the developing as well as the developed countries. The study also takes the consumption structure as a mediator. The study takes Pakistan and India as a developing countries; while Japan and Australia as a developed countries. The data has been collected from the World Development Indicators website. From 2013-2023 the data has been collected for the analysis of the study. The result of the study shows that the DF is positively and significantly related with the developing countries while in the developed countries it also shows positive and significant relationship. CS shows positive and significant relationship with the CO<sub>2</sub>E because when the household consumption of the country increased it would also increase the CO<sub>2</sub>E automatically. The increased consumption structure intricately mediates the impact of digital inclusive finance on carbon emissions. Within this framework, digital inclusive finance acts as a catalyst for upgrading consumption. According to the results of Shahbaz et al. (2013) digital finance is the main or the most important factor which reduces the CO<sub>2</sub> emission. They studied digital finance and CO<sub>2</sub> emission in China and according to the Shahbaz et al. (2013) results the reduction in the CO<sub>2</sub> emission is done with the help of the digital finance.

The current study shows some recommendations for the policy makers i.e. digital finance directly related with the consumption structure of the developing as well as the developed countries so that the local authorities would also improves the policy standards because it also directly related with the CO<sub>2</sub>E of the developed and developing

countries. The policy makers should encourage the people so that they can use the low carbon emission products which also improves the environmental condition of the countries. Different policy for the strategies should create which also improves the consumption structure of the people.

The current study has some limitations; firstly, the current study only takes two developing countries and two developed countries. So, in future the researchers take some extra countries so that the results should be improved with the help of the more data on the countries. Secondly, the current study only takes the macroeconomic data for the analysis. In future the researchers should take the microeconomic data for the analysis.

**Appendix**

**Table 1**  
**Correlation Matrix of Pakistan**

	CO2E	DF	CS	GDP	Popden	FDI
CO2E	1					
DF	0.5109	1				
CS	-0.3252	0.4768	1			
GDP	0.3665	0.0280	-0.4442	1		
Popden	0.2380	0.4794	-0.0683	0.5151	1	
FDI	0.6511	0.1616	-0.0815	0.6152	0.2740	1

**Note:** CO2E shows the carbon dioxide emission of the countries; DF shows the digital finance of the countries; CS shows the consumption structure of the countries; GDP shows the per capita gross domestic product of the countries; Popden shows the population density of the countries and FDI shows the foreign direct investment of the countries.

**Table 2**  
**Correlation Matrix of India**

	CO2E	DF	CS	GDP	Popden	FDI
CO2E	1					
DF	0.4009	1				
CS	-0.3351	-0.2415	1			
GDP	0.2349	0.4414	-0.5422	1		
Popden	0.4223	0.5955	-0.6152	0.6592	1	
FDI	0.6159	0.5019	-0.6299	0.6399	0.2866	1

**Note:** CO2E shows the carbon dioxide emission of the countries; DF shows the digital finance of the countries; CS shows the consumption structure of the countries; GDP shows the per capita gross domestic product of the countries; Popden shows the population density of the countries and FDI shows the foreign direct investment of the countries.

**Table 3**  
**Correlation Matrix of Japan**

	CO2E	DF	CS	GDP	Popden	FDI
CO2E	1					
DF	-0.6155	1				
CS	-0.4661	0.4511	1			
GDP	0.3375	-0.3637	-0.4932	1		
Popden	0.2810	-0.3933	-0.5484	0.4282	1	
FDI	-0.6118	0.6199	0.4012	-0.3441	-0.5792	1

**Note:** CO2E shows the carbon dioxide emission of the countries; DF shows the digital finance of the countries; CS shows the consumption structure of the countries; GDP shows the per capita gross domestic product of the countries; Popden shows the population density of the countries and FDI shows the foreign direct investment of the countries.

**Table 4**  
**Correlation Matrix of Australia**

	CO2E	DF	CS	GDP	Popden	FDI
CO2E	1					
DF	0.2848	1				
CS	-0.4949	-0.5843	1			
GDP	0.3256	0.2865	-0.4913	1		
Popden	0.4722	0.6134	-0.5211	0.3386	1	
FDI	0.2865	0.1312	-0.3187	0.0422	-0.2258	1

**Note:** CO2E shows the carbon dioxide emission of the countries; DF shows the digital finance of the countries; CS shows the consumption structure of the countries; GDP shows the per capita gross domestic product of the countries; Popden shows the population density of the countries and FDI shows the foreign direct investment of the countries.

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## Social Media: A Catalyst to Environmental Sensing for Supply Chain Management

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### Abstract

*In today's dynamic business environment organizations are competing in volatile marketplaces and to stay competitive they need to explore new market opportunities and develop innovative ideas and flexibility to respond to fluctuations in the business environment. The purpose of this research is to explore how the use of social media improves sensing capability of organizations for a better supply chain management. Following an interpretive research paradigm, this study employed a post priory inductive research approach and a qualitative research methodology to explore the perspectives of supply chain professionals and academics on the use of social media in supply chain management (SCM). Primary data was collected through semi-structured interviews. Thematic analysis was used to derive insights from the interviews with supply chain professionals and academics. Results from 10 supply chain professionals suggest that turbulent environments increase a firm's scanning activities on supply market, while intense competition increases the firm's scanning on both supply and customer markets via social media. We can expect infusion of social media enabled sensing techniques in upstream as well as downstream of the supply chain. From Environmental sensing point of view, we propose that how companies can implement the social media in supply chain management and what benefits from social media they can get. While this study provides valuable insights, it has several limitations. The qualitative nature of the research, with a limited sample size of ten interviewees, may not fully capture the diverse experiences and perspectives within the industry. The focus on Pakistani companies may limit the generalizability of the findings to other regions with different technological advancements and cultural contexts. Additionally, the relatively recent adoption of social media in SCM means that long-term effects and trends were not fully explored. The study primarily relied on self-reported data, which may be subject to bias. Environmental sensing is a pre requisite for effective reconfiguration and seizing of new opportunities in the business environment. Information technology and different market intelligence tools facilitate in environmental sensing thus having a transformational role in supply chain management. Similarly, internet and social media also play important role particularly in transforming digital supply chains. The information available on use of social media in supply chain management for improving sensing capability is sparse. Therefore, the significance of this research is twofold. First it aims to contribute in the existing theory and literature by exploring a relatively scarcely researched phenomenon of social media enabled environmental sensing for supply chain management. Secondly it aims to develop new courses of actions for practitioners and policy makers for active integration of social media technology and platforms for improving supply chain management.*

**Keywords:** Social media, environment sensing, supply chain management, networking

### Introduction

In today's dynamic business environment organizations are competing in volatile marketplaces and to stay competitive they need to explore new market opportunities and develop innovative ideas and flexibility to respond to fluctuations in the business environment (Dubey et al., 2018; Teece, 2019; Wu, Tseng, Chiu, & Lim, 2017). It

has become essential for supply chain managers to augment their ability to proactively sense and respond to changes in the environment using different social media platforms. An industry report conducted by *Supply Chain Management World* highlighted that supply chain professionals observe improved customer feedback, better demand sensing and a deeper insight on supply chain risk and disruptions (Song et al., 2022). Aslam, Blome, Roscoe, and Azhar (2018) confirmed in their study that environmental sensing is a pre requisite for effective reconfiguration and seizing of new opportunities in the business environment. Few other studies have also reported the importance of sensing capability for improving the business performance (Balogun et al., 2024; Pu, Qiao, & Feng, 2023; Torres, Sidorova, & Jones, 2018). Based on this notion this study aims to explore the importance of environmental sensing and scanning for supply chain management. The strategic importance and potential of environmental sensing for supply chain management leads to our first research question (RQ 1).

Research on social media enabled environmental sensing and supply chain management support the fact that sensing changes and turbulence in supply chain environment using social media platforms and technologies may resolve information delays, and early information on upcoming changes in the business environment (Guechtouli & Purvis, 2024; Li, Yang, Sun, & Sohal, 2009; Song et al., 2022). A study on a multinational fashion brand indicates that the company integrates historical demand projections with social media enabled market intelligence involving trending keywords and sentimental indicators that facilitate in early prediction of regional and seasonal demand. This information is instrumental in fast fashion designing and early introduction of products in the market (Osborn, 2015). New technology, social media and market analytics are instrumental in improving sensing capability for supply chain management (Melnik & Stanton, 2017). The information available on use of social media in supply chain management for improving sensing capability is sparse and is in infancy thus leading to our second research question (RQ 2)

Information technology and different market intelligence tools facilitate in environmental sensing thus having a transformational role in supply chain management (Fabbe-Costes, Roussat, Taylor, & Taylor, 2014). Similarly, internet and social media also play important role particularly in transforming digital supply chains. We can expect infusion of social media enabled sensing techniques in upstream as well as downstream of the supply chain (Song et al., 2022). Companies can improve product development process by using customer generated content on social media (Rathore, Ilavarasan, & Dwivedi, 2016). Suppliers and buyers can explore their external environment by using social media enabled initiatives (Rapp, Beitelspacher, Grewal, & Hughes, 2013). International retail chains like *Best Buy* and *Costco* use social media to have customer opinions and other semantics for better supply chain decision making. Similarly, they use supply market intelligence to monitor their supply base (Smith, 2017). A study on pharmaceutical industry in Thailand indicates that social media plays an important role for creating demand for products and creates a link among different industries and stakeholders (Kerdpitak, Kerdpitak, Heuer, Li, & Chantranon, 2024). A study of Jordanian telecommunication firms underscores the application and importance of social media for improving agility, responsiveness, collaboration and informed decision making (Mansour, Harahsheh, Wazani, & AlTaher, 2024). The strategic importance of use of social media in in supply and demand side of supply chain leads to third research dimension of our study (RQ 3).

Despite the importance of social media enabled environmental sensing and supply chain management many organizations are not actively using it for improving their supply chain management process. A survey revealed that most of the companies are using social media for marketing and service but not actively using it for supply chain management (O'leary, 2011). Therefore, are study aims to explore why firms are exploiting social media for managing their supply chains thus leading to our fourth research question (RQ 4). Therefore, this study aims to explore

**RQ1.** *Why environmental sensing and scanning is important for supply chain management?*

**RQ2.** *How can firms implement social media in their supply chain management to sense the uncertain business environment?*

**RQ3.** *How social media can affect supply chain activities in both supplier and customer market?*

**RQ4.** *Why firms are not using social media, in their supply chain management?*

The significance of this research is twofold. First it aims to contribute in the existing theory and literature by exploring a relatively scarcely researched phenomenon of social media enabled environmental sensing for supply chain management. Secondly it aims to develop new courses of actions for practitioners and policy makers for active integration of social media technology and platforms for improving supply chain management.

The paper is divided into four sections. The first part explains the background of research and key research questions to be explored. The second part highlights literature and theoretical foundations to explore social media as catalysts to environmental sensing and supply chain management. The third section explains methodology and analysis of the empirical material and the fourth and last section highlights discussion and conclusion with future research dimensions.

## **Literature Review**

### ***Theoretical Foundations***

Literature on social media use for improving sensing capability and supply chain management of the firms, highlights following theories that support this research.

### ***Resource Based View***

Customer based resources that are a subset of market resources are a major source of competitive advantage for organizations. Information processing capabilities are important resources embedded in organizations' processes that are used for processing customer related information (Barney, 2000; Varadarajan, 2020). An outside in approach to resource based view theory highlights three adaptive capabilities that can help organizations adapt with the changes in their business environment including vigilant market learning, experimentation for continuous learning and building relationships by means of networking technologies. Firms by using market sensing, customer engaging and partner linking capabilities can improve product development (Day, 2011; Mu, Bao, Sekhon, Qi, & Love, 2018)..

### ***Dynamic Capability Framework***

Dynamic capability interpretation of the resource based view explains that organizations ability to sense and seize valuable information to exploit market opportunities is an important source of competitiveness (Teece, 2007; Zabel, O'Brien, & Natzel, 2023). In supply chain management process dynamic capabilities emerge through effective communication among stake holders and supply chain partners (Handfield, Cousins, Lawson, & Petersen, 2015). Social media enables development of customer focused supply chains. The information gathered through social media can be converted to valuable knowledge to realize competitive advantage (Agnihotri, Kalra, Chen, & Daugherty, 2022).

### ***Integration Theory***

Social media platforms facilitate two-way communication between organizations and their customers (Madakam & Tripathi, 2021). According to integration theory social media platforms effectively provide a connection between exposure, feedback and sharing of information (Alomayri, 2016; Sinclair & Vogus, 2011).

### ***Value Co Creation Theory***

Organizations build social capital by establishing interaction with their customers through social networks. Social media enables customer-firm value co creation through knowledge exchange (Vargo, Maglio, & Akaka, 2008; Zhang, Gupta, Sun, & Zou, 2020). Social media enabled cognitive, structural and relational linkages enable value co creation thus improving organizations performance and new product development (Zhang et al., 2020).

### ***Role of Environmental Sensing in Supply Chain Management***

Environmental sensing is concerned with generating information about the business environment for identifying potential opportunities and threats (Winter, 2018). Organizations are operating in dynamic and complex customer markets where not only the product demand is volatile but quality expectations also change frequently. Social media monitoring and analytics provides organizations with a better demand sensing capability (Balogun et al., 2024; Lee, 2018; Pu et al., 2023). Organizations become more agile through improved market sensing capability

as they have a better understanding of their supply chain partners and they can proactively response supply chain uncertainty (Ngai, Chau, & Chan, 2011). Supply chain agility requires supply chain adaptability and market sensing capability creates supply chain adaptability that is the pre requisite for building efficiency and flexibility in supply chain design to meet uncertainty (Christopher & Holweg, 2011; Day, 2014; Schoenherr & Swink, 2015). Environmental sensing helps in supply chain decisions like production planning, managing lead times, allocation of logistics resources and managing inventory cost (Kembro, Näslund, & Olhager, 2017; Winter, 2018). Sensing is one of the important constructs in operations and supply chain management literature but has got limited attention in prior research (Vanpoucke, Vereecke, & Wetzels, 2014). Sensing is an important component of dynamic organizational capabilities required to seize and reconfigure opportunities from external business environment, managing the demand volatility and sustaining competitiveness (Teece, Peteraf, & Leih, 2016). Therefore, it is among the top priority organizations to sense opportunities and relevant information from their business environment (Endres, Endres, & Berg, 2018). Sensing involves process large volume of information within limited timeframe. Infusion and integration of information technology and analytical tools aids in real time information sharing, and accelerating information scanning and monitoring process (Mikalef & Pateli, 2017).

### ***Social Media Enabled Environmental Sensing Capability***

The competitive global business environment requires supply chain managers to understand the importance of social media for transforming traditional supply chain management process into customer driven responsive supply chains (Agnihotri et al., 2022). It has been highlighted by the prior research that leveraging IT for environmental scanning develops dynamic sensing capability of supply chains. In the past managers used direct interaction with key stakeholders and internet browsing as a source of environmental scanning that involved more complexity and significant amount of time and effort (Zsidisin, Hartley, Bernardes, & Saunders, 2015). Social media along with business intelligence tools and simplified methods of environmental scanning improved supply chain competitiveness and timely strategic decisions. For instance, automotive industry observed better quality management by exploiting customer complaints data available through online automobile customer network (Abrahams, Jiao, Wang, & Fan, 2012; Lau, Liao, Wong, & Chiu, 2012). Social media enables effective and efficient communication between organizations and their supply chains (Chua & Banerjee, 2013). Smallest variations in customer demand are amplified in various segments of supply chain resulting in bullwhip effect. Social media enables monitoring and tracking changes in customer base thus facilitating in managing uncertainty in customer demand (Bilovodska, Syhyda, & Saher, 2018; Hanafi, Amrozi, & Syafrizal, 2022). Social media adoption is critical for supply chain digitalization. It is an excellent source of large volume of information about customers and suppliers and facilitates in improving integration across the chain through enhanced communication (Huang, Potter, & Eyers, 2020; Sanders, Boone, Ganeshan, & Wood, 2019). Social media provides discussion platforms thus improving quality of knowledge base and sharing of useful knowledge among supply networks (Cheng & Krumwiede, 2018; Ozlen, 2021).

### ***Use of Social Media Platforms for Supply Chain Management***

Social media has been recognized among the significant digital tools used for supply chain management activities including sourcing and supplier selection, forecasting, inventory management, product development, logistics, sales management, risk management, customer relationship management and managing connections with key supply chain partners (Banerjee, Ries, & Wiertz, 2020; Chae, McHaney, & Sheu, 2020; Devi & Ganguly, 2021; Huang et al., 2020).



**Source:** *An overview of the impact of social media in supply chain and customer in Bangladesh* (Islam, Ruksana, Raihan, Zahin, & Afrin, 2022)

Literature highlights the application of following social media platforms as a catalyst to environmental sensing and supply chain management.

**Facebook:** Boldt et al. (2016) explain the use of Facebook data for generating forecast for different categories of products at Nike. By using Social Data Analytics Tool (SODATO) they collect data from ten of the most active Facebook pages of Nike. Number of likes on each page have been taken as an indicator of Nike's Facebook presence and product portfolio. A study combined sales and advertising information of an online retailer with social media information from Facebook. The results indicated an improved sales forecast accuracy that can have a positive influence on other supply chain functions including purchasing and inventory management (Cui, Gallino, Moreno, & Zhang, 2018). Another study analyzed the customer messages from Costco and Walmart's Facebook pages and highlighted the value co creation in terms of communication with the stores, communication with other customers, expressing emotions and sharing experiences with stores 'employees (Peeroo, Samy, & Jones, 2017). Sarma, Das, and Bera (2020) propose the use of Facebook disaster map for evaluating efficient and low cost transportation plan in humanitarian logistics management.

**Instagram:** A study of Australian SMEs reveals Instagram to be among the most important social media platforms for improving customer engagement and customer relationship management (Nguyen, Sukunesan, & Huynh, 2021). Manufacturing companies like textile and apparel can use customer opinion and feedback from Instagram for improving sustainable practices and supply chain transparency (Modi & Zhao, 2018).

**Twitter:** Janjua, Nawaz, and Prior (2023) proposed a methodology for identification of supply chain disruptions using Twitter feeds in real time. E retail logistics firms use Twitter for sharing information related to online ordering, delivery dates, location and order tracking. They are also able to promptly respond to customer queries (Bhattacharjya, Ellison, & Tripathi, 2016). A study of beef supply chain highlights the use of Twitter data of customers' feedback regarding different products to back track supply chain and waste management (Mishra & Singh, 2018). Messages from twitter can facilitate in different supply chain events including notification of arrival and departure of shipments from warehouse, coordinating shipment handling and transportation management (Akundi et al., 2018; O'leary, 2011)

**LinkedIn:** Food retail chains act as intermediaries between customers and different supply chain partners and have a potential to promote sustainable production and consumption using social media platforms like LinkedIn (Sadeghi-Esfahlani & Bitsch, 2023). LinkedIn can be used as an active tool for B2B sales and demand generation (Dasanayake, 2022).

**TikTok:** Prior research has highlighted the growth of e-commerce live streaming industry. A study of food retailers analyzes the use of TikTok cloud warehouse system to minimize operational cost (Bao, Liu, & Zhang, 2024).

**WhatsApp:** Social networking platforms can be used for real-time communication and information sharing and can facilitate in monitoring and evaluation in value chains (Chesoli, Mutiso, & Wamalwa, 2020). WhatsApp like other social media platforms can be used for active collaboration and communication with suppliers and customers (Tungande, Meyer, & Niemann, 2020).

**YouTube:** The current academic research highlights the importance of using YouTube for B2B communication and developing social ties with key stakeholders (Klein, 2022).

**Table-1:**  
**Use of Social Media Platforms for Supply Chain Management**

Social Media Platforms	Application	Reference
<b>Facebook</b>	<ul style="list-style-type: none"> <li>• Forecasting,</li> <li>• Improved purchasing and inventory management</li> <li>• Humanitarian logistics and transportation management,</li> <li>• Value co-creation for retail stores and logistics firms</li> </ul>	<ul style="list-style-type: none"> <li>• (Boldt et al., 2016)</li> <li>• (Cui et al., 2018)</li> <li>• (Sarma et al., 2020)</li> <li>• (Peeroo et al., 2017)</li> <li>• (Belal, Nordin, Hasan, &amp; Kosaka, 2020)</li> </ul>
<b>Instagram</b>	<ul style="list-style-type: none"> <li>• CRM</li> <li>• Improving supply chain sustainability and transparency through customer feedback</li> </ul>	<ul style="list-style-type: none"> <li>• (Nguyen et al., 2021)</li> <li>• (Modi &amp; Zhao, 2018)</li> </ul>
<b>Twitter</b>	<ul style="list-style-type: none"> <li>• Identifying supply chain disruptions</li> <li>• E-retail logistics services (ordering, location, tracking, customer complaints management)</li> <li>• Waste minimization</li> <li>• Knowledge exchange</li> <li>• Transportation Management</li> <li>• Coordinating shipments from warehouse</li> <li>• Information about arrival and departure of shipment from warehouse</li> </ul>	<ul style="list-style-type: none"> <li>• (Janjua et al., 2023)</li> <li>• (Bhattacharjya et al., 2016)</li> <li>• (Mishra &amp; Singh, 2018)</li> <li>• (Mills, Reed, Skaalsveen, &amp; Ingram, 2019)</li> <li>• (Akundi et al., 2018; O'leary, 2011)</li> </ul>
<b>LinkedIn</b>	<ul style="list-style-type: none"> <li>• Promoting social responsibility in retail operations (sustainable production and consumption)</li> <li>• B2B sales generation</li> </ul>	<ul style="list-style-type: none"> <li>• (Sadeghi-Esfahlani &amp; Bitsch, 2023)</li> <li>• (Dasanayake, 2022)</li> </ul>

<b>TikTok</b>	<ul style="list-style-type: none"> <li>• Cloud Warehousing system to manage operational cost</li> </ul>	<ul style="list-style-type: none"> <li>• (Bao et al., 2024)</li> </ul>
<b>WhatsApp</b>	<ul style="list-style-type: none"> <li>• Monitoring and evaluation</li> <li>• Collaborative communication with customers and suppliers</li> </ul>	<ul style="list-style-type: none"> <li>• (Chesoli et al., 2020)</li> <li>• (Tungande et al., 2020)</li> </ul>
<b>YouTube</b>	<ul style="list-style-type: none"> <li>• Social communication and building social connections</li> </ul>	<ul style="list-style-type: none"> <li>• (Klein, 2022)</li> </ul>

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**Source:** *Literature Review on Application of Social Media for Supply Chain Management*

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### ***Social Media for Improving Upstream Supply Chain Activities***

Suppliers and related organizations in any supply chain can generate real time content through social media platforms that can be a useful supply market data source for buying organizations. Buyers can have quick access to suppliers, distribution schedules, process innovations and other relevant information that facilitate in timely matching the supplies with manufacturing process. Social media also facilitate in frequent communication among supply chain partners thus resulting in proactive and timely decision making (Chae, 2015). In their research Banerjee et al. (2020) explain that social media platforms can facilitate in supplier selection through electronic word of mouth and using feedback ratings. Social media allows manufacturers and suppliers to observe customer response effectively and at the same time helps customers to understand the contribution of different supply chain partners (Devereux, Grimmer, & Grimmer, 2020). Social media enables supplier involvement in product development process and improves financial and market performance by improving innovativeness (Cheng & Krumwiede, 2018). Another study reveals the use of social media for green supplier selection (Lin, Hung, Lin, & Hsieh, 2017).

### ***Social Media for Improving Downstream Supply Chain Activities***

Social media applications enable organizations to have better insights about their customer base that facilitate in improving customer related functions such as key account management (Lacoste, 2016). Some organizations are using data from Twitter to do sentiment analysis that facilitates in correct identification and understanding of customer demand (Chae, 2015). In packaged goods industry information from social media enables identification of trends and responses that guide in marketing and fulfillment decisions (Sherman & Chauhan, 2016). Similarly, customer relationship management staff can have direct interaction with customers through social media platforms that not only helps in rectifying product quality issues but also guides in adjusting production accordingly (Song et al., 2022). Customers reviews and feedback on different products and services helps retailers to improve their operations and marketing strategies and improving overall customer brand related experience (Ramanathan, Subramanian, & Parrott, 2017). Customers being last stage of supply chain use social media searching product information, generating a word of mouth and their own content that facilitates other users while searching and purchasing products (Jermisittiparsert, Sutduean, & Sriyakul, 2018).

**Table 2:**  
**Application of Social Media in B2C Supply Chain Management**

Supply Chain Areas	Application of SM	Reference
Logistics Management	Shipment arrival, departure timetables	(O'leary, 2011)
Demand and Sales Management	Information about new products, promotions, and sales	(Lindsey-Mullikin & Borin, 2017)
Matching Supply and Demand	Customer sentiment analysis and forecasting future demand	(Cui et al., 2018)
Developing Innovative Products	Customer feedback on new and potential products and services	(Chae et al., 2020)
Stakeholder Engagement	Sharing user manuals, tutorials CSR reports and success stories	(Reilly & Hynan, 2014)

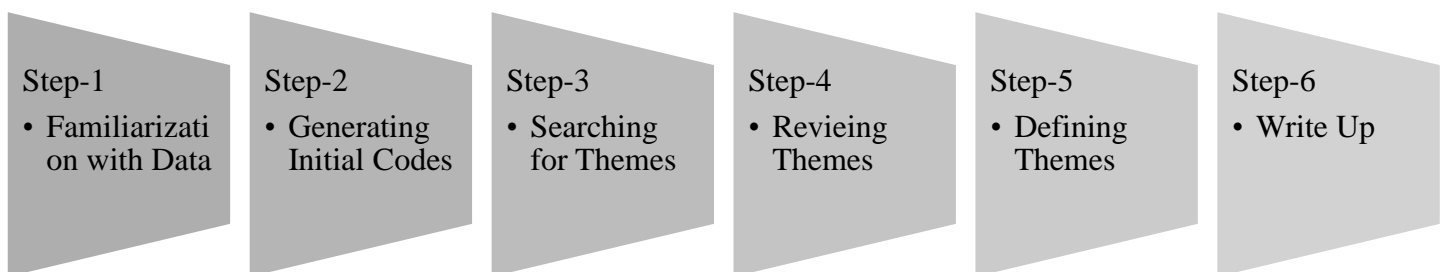
**Source:** *Exploring Social Media Use in B2B Supply Chain Operations* (Chae et al., 2020)

***Reluctance in Using Social Media Enabled Environmental Sensing for Supply Chain Management.***

Irrespective of the importance and benefits of using social media, limited organizations are utilizing the intelligence of social media in their supply chains (Ariffin, Ab Yajid, & Azam, 2020). The firms have not yet capitalized on the benefits expected through the active use of social media and only three percent organizations are actively using social media to have insight about their customer base (Alicke, Glatzel, Hoberg, & Karlsson, 2017). A study on container shipping industry highlights the use of social media by analyzing Facebook messages. The study reveals that most of the companies in this industry are not using social media technologies actively and have limited knowledge about the application of social media strategies (Bitiktas & Tuna, 2020). Unlimited content sharing by customers through social media platforms is one of the challenges for organizations to use social media actively in their supply chain management activities (Tungande et al., 2020). Despite the importance of social media usage in improving supply chain management process limited empirical investigation has been made to understand how the use of social media in supply chain can realistically help organizations to improve efficiency. The contribution of social media to operations and supply chain management is still not clear (Cui et al., 2018).

**Methodology**

Following an interpretive research paradigm, this study employed a qualitative research methodology to explore the perspectives of supply chain professionals and academics on the use of social media in supply chain management (SCM). Qualitative research is well-suited for this purpose as it allows for in-depth exploration of participants' experiences within their historical and social contexts (Cresswell, 2013). The study utilized an exploratory research design with a post priori inductive research strategy, which is effective for identifying common patterns or themes from empirical data and deriving general principles through thematic analysis. Six phase method of thematic analysis has been used explained by (Braun & Clarke, 2006).





### *Data Collection*

Primary data was collected through semi-structured interviews, chosen for their flexibility and ability to elicit detailed responses. Semi-structured interviews, as defined by (Bryman & Cassell, 2006), involve a series of open-ended questions that can be varied in sequence, allowing interviewers to probe further based on participants' significant replies. This approach ensured that rich, nuanced data was gathered, capturing the complexities of social media use in SCM (Adeoye-Olatunde & Olenik, 2021; Shoozan & Mohamad, 2024).

### *Respondents Profile*

The study included a total of ten interviewees, divided equally between industry professionals and academics to provide a balanced perspective. The profiles of the respondents are as follows:

#### 1. Industry Professionals:

- **Respondent 1:** Senior Supply Chain Manager at a leading FMCG company.
- **Respondent 2:** Logistics Coordinator at an international manufacturing firm.
- **Respondent 3:** Procurement Officer at a major retail chain.
- **Respondent 4:** Operations Manager at a logistics company.
- **Respondent 5:** Supply Chain Analyst at a tech startup.

#### 2. Academics:

- **Respondent 6:** Professor of Supply Chain Management at a renowned university.
- **Respondent 7:** Associate Professor specializing in Logistics and Operations.
- **Respondent 8:** Senior Lecturer in Business Analytics.
- **Respondent 9:** Research Fellow with a focus on Digital Supply Chains.
- **Respondent 10:** Lecturer in Information Systems and SCM.

### *Interview Process*

The interviews were conducted face-to-face, with appointments scheduled via email five days in advance. Each interview followed a prepared guide of descriptive open-ended questions, allowing respondents to share their experiences and insights freely. The flexibility of semi-structured interviews enabled researchers to delve deeper into specific areas of interest as they arose during the conversations.

### *Data Analysis*

After conducting the interviews, the researchers transcribed the discussions and developed initial codes based on the responses. These codes were then grouped into broader themes, which were reviewed and refined to ensure they accurately represented the data. The thematic analysis involved defining and naming each theme, supported by direct quotes from the respondents to illustrate key points. This methodology provided a robust framework for understanding the role of social media in SCM, capturing the nuanced perspectives of both industry professionals and academics. The findings and comprehensive summary of the developed themes are presented in the next chapter.

## **Analysis of Empirical Material**

We conducted a thematic analysis to derive insights from the interviews with supply chain professionals and academics. This involved familiarizing ourselves with the transcripts, coding significant data, grouping these codes into broader themes, and refining these themes for accuracy and coherence. For this purpose, open, axial and selective coding was made. The final themes were defined and illustrated with direct quotes, forming a cohesive narrative that highlights the role of social media in enhancing supply chain management practices in Pakistan.

### *Theme 1: Social Media Penetration in Pakistan*

This theme explores the extent and nature of social media usage in Pakistan, particularly focusing on its penetration and impact on daily activities.

Respondents emphasized the rapid increase in social media usage due to the proliferation of 3G and 4G networks. According to Respondent No. 3, "The number of internet users has increased by 30% since last year, primarily due to faster internet services." This sentiment was echoed by Respondent No. 7, who noted that "84% of internet users in major cities access social media daily, predominantly through mobile devices."

The interviewees highlighted that the primary demographic engaging with social media comprises individuals aged 21 to 35, mainly university students. This age group heavily relies on social media for information and interaction, making it a critical channel for companies to engage with their audience. Respondent No. 1 pointed out, "With the increased accessibility and affordability of mobile data, social media usage is expected to grow even further."

This widespread use has led companies to view social media as a valuable tool for sensing the market environment. Respondent No. 4 mentioned, "Social media acts as a strong medium to influence consumer behavior, where people freely express their opinions about products and services." Thus, companies have a unique opportunity to harness this data for better demand sensing and market analysis.

### ***Theme 2: Demand Sensing through Social Media***

This theme delves into how companies can use social media to understand and respond to consumer demand. Respondents No. 2, 5, 6, and 8 all agreed that social media platforms are crucial for capturing real-time consumer insights. Respondent No. 2 elaborated, "Consumers today act as brand ambassadors, sharing their experiences and opinions freely on social media. This information is invaluable for companies to adjust their strategies swiftly."

For instance, Respondent No. 5 noted, "When a customer is considering buying an electronic device, they often search social media for reviews and comments. Positive feedback increases the likelihood of purchase, thus highlighting the importance of social media in shaping demand."

The consensus among the respondents was that social media provides a dynamic and immediate source of feedback that can help companies detect changes in consumer preferences more quickly than traditional methods. Respondent No. 6 emphasized, "Demand sensing through social media allows companies to stay ahead of trends and shape their demand-shaping processes more effectively."

### ***Theme 3: Improving Forecast Reliability***

This theme addresses how social media can enhance the accuracy of demand forecasting in the face of market uncertainty. Respondents No. 1, 3, 4, and 7 all highlighted the challenges of forecasting demand in an uncertain market environment like Pakistan. Respondent No. 1 stated, "The unpredictable nature of the market makes it difficult to predict future demand accurately, which is a major challenge for supply chains."

In this context, social media offers a valuable solution. Respondent No. 3 explained, "By analyzing social media data, companies can gain insights into customer preferences and trends, which can help improve the accuracy of demand forecasts." For example, tracking mentions of product colors or styles can provide early indicators of consumer interest, as noted by Respondent No. 4.

Respondent No. 7 pointed out that "Social media not only helps in predicting demand but also in planning and inventory management by providing real-time insights into consumer preferences." This enables companies to maintain optimal stock levels and reduce the risk of overproduction or stockouts.

### ***Theme 4: Real-Time Information***

This theme explores how social media facilitates the exchange of real-time information between companies and consumers. Respondents No. 1, 2, 4, and 9 all agreed that social media has revolutionized the way companies gather and disseminate information. Respondent No. 1 remarked, "In the past, companies relied on emails and phone calls, which were slow and limited in scope. Social media allows for real-time feedback and interaction."

Respondent No. 2 highlighted the immediacy of social media, stating, "Consumers can post their opinions about a product instantly, and companies can monitor these posts to gather real-time data." This continuous flow of information enables companies to respond quickly to consumer feedback and make necessary adjustments.

Respondent No. 4 added, "Social media also facilitates informal interactions, where consumers can express their views candidly. This helps companies understand the true sentiments of their customers." This transparency and immediacy of information sharing enhance the overall responsiveness and adaptability of supply chains.

#### ***Theme 5: Building Trust Between Companies and Customers***

This theme examines how social media can help build and strengthen trust between companies and their customers. Respondents No. 3, 5, 7, and 10 emphasized the role of social media in fostering trust and transparency. Respondent No. 3 noted, "Social media allows companies to interact directly with their customers, addressing their concerns and queries promptly." This direct communication helps build a sense of trust and reliability.

Respondent No. 5 pointed out, "Customers appreciate when companies are responsive and transparent on social media. It makes them feel valued and heard." This sentiment was echoed by Respondent No. 7, who mentioned, "Building trust through social media is essential for maintaining long-term customer relationships."

Moreover, social media analytics provide companies with deep insights into customer demographics, preferences, and behaviors. Respondent No. 10 stated, "Understanding these insights helps companies tailor their products and services to meet customer needs more effectively, further strengthening trust."

#### ***Theme 6: Demand Insight and Communication***

This theme explores how social media can provide detailed demand insights and improve communication between companies and their customers. Respondents No. 2, 4, 6, and 9 all highlighted the importance of demand insights derived from social media. Respondent No. 2 explained, "Social media platforms offer a wealth of data that companies can analyze to understand consumer demand patterns."

Respondent No. 4 emphasized the role of effective communication, stating, "By engaging with customers on social media, companies can gain valuable feedback and insights that help them improve their products and services." This continuous interaction helps companies stay aligned with consumer expectations.

Respondent No. 6 added, "Social media allows for real-time communication, which is crucial for addressing customer issues promptly and maintaining a positive brand image." This dynamic interaction enhances customer satisfaction and loyalty.

Respondent No. 9 concluded, "Overall, social media provides a powerful platform for companies to gather demand insights and communicate effectively with their customers, leading to improved demand management and customer service."

#### ***Theme 7: Creation of Learning Curve***

This theme discusses how social media contributes to the continuous learning and improvement of supply chain processes. Respondents No. 1, 3, 5, and 8 all recognized the role of social media in facilitating a learning environment. Respondent No. 1 noted, "Social media enables companies to gather feedback quickly and implement changes based on consumer responses, creating a continuous learning loop."

Respondent No. 3 pointed out, "By monitoring social media trends and feedback, companies can identify areas for improvement and innovation." This helps companies stay ahead of the competition and continuously enhance their processes.

Respondent No. 5 highlighted the collaborative aspect of social media, stating, "Social media fosters collaboration among supply chain partners, allowing for the exchange of ideas and best practices." This collective learning leads to improved efficiency and effectiveness.

Respondent No. 8 concluded, "Social media not only helps in detecting new innovations but also in understanding product attributes and pricing trends. This comprehensive insight drives continuous improvement and business growth."

***Theme 8: Barriers to Social Media Adoption***

This theme identifies the challenges and barriers that prevent companies from adopting social media in their supply chain management. Respondents No. 2, 4, 6, and 7 all discussed various barriers to social media adoption. Respondent No. 2 explained, "One major barrier is the traditional hierarchical structure of organizations, which impedes the integration of social media tools."

Respondent No. 4 noted, "Many companies perceive social media as a platform for socializing rather than a business tool. This misconception limits its adoption in SCM." This viewpoint was supported by Respondent No. 6, who mentioned, "Some companies even ban social media usage during work hours, fearing it will distract employees."

Respondent No. 7 highlighted the issue of information security, stating, "Companies are afraid that critical information might be leaked through social media, affecting their overall supply chain." These barriers need to be addressed through education and awareness programs to realize the full potential of social media in SCM.

***Theme 9: Change Management***

This theme explores the resistance to change and the importance of managing change effectively when implementing social media in supply chain management. Respondents No. 1, 3, 5, and 10 all emphasized the challenges associated with change management. Respondent No. 1 stated, "Implementing social media requires a cultural shift within the organization, which is often met with resistance from employees."

Respondent No. 3 noted, "Employees may perceive the implementation of social media as an additional workload, especially if they are not well-versed in using these platforms." This sentiment was echoed by Respondent No. 5, who mentioned, "Training programs are essential to help employees understand the benefits and proper use of social media in SCM."

Respondent No. 10 concluded, "Effective change management involves clear communication, training, and support systems to ensure a smooth transition and acceptance of social media tools within the organization."

***Theme 10: Clear Policies and Training***

This theme discusses the need for clear policies and comprehensive training programs to support the successful implementation of social media in supply chain management. Respondents No. 2, 4, 6, and 9 all highlighted the importance of establishing clear policies and providing adequate training. Respondent No. 2 explained, "Clear policies and guidelines on social media usage are crucial to avoid any misuse and ensure effective implementation."

Respondent No. 4 noted, "Training programs should be conducted to educate employees on social media etiquette, brand reputation management, and online crisis management." This sentiment was supported by Respondent No. 6, who mentioned, "Employees need to be aware of what constitutes acceptable usage and the potential penalties for leaking critical information."

Respondent No. 9 concluded, "Comprehensive training and clear policies will help employees understand the objectives of using social media in SCM and how to leverage it effectively to achieve those goals."

***Theme 11: Roles and Responsibilities***

This theme emphasizes the need for clearly defined roles and responsibilities to ensure efficient use of social media tools in supply chain management. Respondents No. 1, 3, 5, and 8 all discussed the importance of defining roles and responsibilities. Respondent No. 1 stated, "Clearly defined roles and responsibilities ensure that everyone understands their tasks and avoids any overlap or confusion."

Respondent No. 3 noted, "Assigning specific roles for managing social media channels helps in maintaining accountability and ensures that the platforms are used effectively." This viewpoint was supported by Respondent No. 5, who mentioned, "A support system should be established to assist employees in navigating social media challenges and provide immediate help when needed."

Respondent No. 8 concluded, "Defined roles and responsibilities, along with a strong support system, will enhance the utilization and effectiveness of social media tools in SCM."

### ***Theme 12: Instruction and Ground Rules***

This theme highlights the need for detailed instructions and ground rules to guide the use of social media in supply chain management. Respondents No. 2, 4, 6, and 9 all emphasized the importance of providing detailed guidelines. Respondent No. 2 explained, "A comprehensive document covering responsibilities, rationale, and guidelines on social media usage should be provided to all employees."

Respondent No. 4 noted, "Employees should be informed about what kind of information they can share on social media and the potential penalties for leaking critical information." This sentiment was supported by Respondent No. 6, who mentioned, "Transparency in communication and posting accurate information is essential to maintain trust and avoid misinformation."

Respondent No. 9 concluded, "Detailed instructions and ground rules will help employees use social media responsibly and effectively, enhancing the overall SCM process."

### ***Theme 13: Regulation Considerations in SCM***

This theme explores the regulatory considerations and best practices for implementing social media strategies in supply chain management. Respondents No. 1, 3, 5, and 8 all discussed the importance of regulatory considerations. Respondent No. 1 stated, "Listening to and understanding the information obtained from social media is crucial for improving SCM strategies."

Respondent No. 3 noted, "Interacting with users and supply chain partners through social media channels helps in building a strong brand image and engaging with the audience effectively." This viewpoint was supported by Respondent No. 5, who mentioned, "Ensuring consistency across different social media platforms is important to avoid confusing customers and maintain a cohesive brand image."

Respondent No. 8 concluded, "Supply chain professionals must be transparent and honest when updating information and correcting errors promptly to maintain trust and build long-term relationships with supply chain partners."

## **Discussion**

This study explored the transformative role of social media in supply chain management (SCM) within the context of Pakistan, addressing four key research questions.

Environmental sensing and scanning are crucial for SCM as they enable organizations to stay agile and responsive to market changes. The findings underscore the significance of social media as a powerful tool for environmental sensing, offering real-time insights into consumer behavior and market trends. This allows companies to proactively identify opportunities and mitigate risks, thereby enhancing their competitive edge. These findings are consistent with the research findings of (Aslam et al., 2018; Song et al., 2022; Winter, 2018; Zabel et al., 2023).

The study revealed practical ways firms can integrate social media into their SCM practices. Clear policies, comprehensive training, and defined roles and responsibilities are essential for effective implementation. Social media platforms like Facebook, Twitter, and LinkedIn provide valuable data for demand sensing, forecasting, and real-time communication, which are pivotal in navigating the uncertainties of the business environment as explained by different research scholars (Guechtouli & Purvis, 2024; Kerdpitak et al., 2024; Mansour et al., 2024).

Social media significantly impacts both supplier and customer markets by facilitating better communication and collaboration. It enables companies to gather and analyze consumer feedback, leading to improved product development and customer service. On the supplier side, social media helps in monitoring supplier performance and managing relationships, thereby streamlining supply chain operations (Agnihotri et al., 2022; Dasanayake, 2022; Devi & Ganguly, 2021).

Despite its benefits, many firms hesitate to use social media in SCM due to misconceptions, hierarchical barriers, and concerns over information security. The study highlighted the need for change management to overcome these barriers, emphasizing the importance of educating employees about the strategic value of social media in SCM (O'leary, 2011).

## Limitations

While this study provides valuable insights, it has several limitations. The qualitative nature of the research, with a limited sample size of ten interviewees, may not fully capture the diverse experiences and perspectives within the industry. The focus on Pakistani companies may limit the generalizability of the findings to other regions with different technological advancements and cultural contexts. Additionally, the relatively recent adoption of social media in SCM means that long-term effects and trends were not fully explored. The study primarily relied on self-reported data, which may be subject to bias. Despite these limitations, the findings offer a foundational understanding and highlight the potential of social media in enhancing supply chain management, paving the way for more extensive future research.

## Future Directions & Conclusion

This study opens several avenues for future research in the field of social media and supply chain management. Future studies could expand the sample size to include a broader range of industries and geographic locations, offering a more comprehensive understanding of social media's impact across different contexts. Investigating specific social media platforms and their unique contributions to SCM could yield deeper insights into platform-specific strategies. Additionally, quantitative studies could complement our qualitative findings by statistically validating the benefits and challenges identified. Exploring the role of emerging technologies, such as artificial intelligence and machine learning, in enhancing social media analytics for SCM could further enrich the understanding of this dynamic field. Finally, longitudinal studies tracking the long-term effects of social media integration in SCM could provide valuable insights into its sustainability and evolving impact.

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## A Qualitative Study Exploring the Challenges in Tax Fraud Investigations

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### **Abstract**

*The purpose of this study is to explore challenges in Tax Fraud Investigations faced by the investigating officers and the study explores and highlights the real problems associated with such investigations. The study involves in-depth interviews of fifteen investigating officers working in IRS Intelligence. Data collection involved focused group interviews, individual indepth interviews and document analysis. The data were analyzed with the help of grounded theory and thematic analysis. Research study suggests that in order to achieve quality performance of Tax Fraud Investigations, it is very crucial to improve performance of investigating officers which may be possible if the challenges highlighted by this research are overcome. It may further add value to the overall domestic revenue mobilization efforts of Federal Board of Revenue besides creating deterrence for fraudulent elements. Findings of the study are limited to the perspectives of fifteen participants. A similar study with larger population in all the offices of IRS Intelligence as well as other investigating agencies could have provided even more concrete and exhaustive results. Overcoming of such challenges and problems in Tax Fraud investigations may invariably enhance the performance of investigating officer entrusted with tax fraud investigations and may further increase the effective and efficient monitoring and enforcement activities while minimizing the evasion of due taxes by fraudsters. The study further provides valuable insight into the prevalent investigation processes which may be used by the legislators for making policies accordingly. The valuable insights into the problems faced by the investigating officers may help the investigating agency to fix those problems for better performance and in safeguarding the revenue of state. This is the first study of its kind conducted on problems and challenges faced by the investigating officers conducting tax fraud investigations.*

**Keywords:** Tax Fraud Investigations, IRS, Investigating Officer, Domestic Revenue Mobilization, FBR.

### **Introduction**

Taxation is not only a basic tool for generating revenue for the state but also a policy mechanism for sustainable development and growth of a country. Developing countries are under significant stress from within the country and from outside the country to concentrate on domestic revenue mobilization and to reform their tax systems accordingly (Ullah et al., 2021). There is a long informed research on developing countries as to whether they will ever be able to mobilize revenues domestically (Genschel & Seelkopf, 2016) and to explore the reasons as to why the developing countries are unable to enhance performance of revenue mobilization (Besley & Persson, 2014). Domestic revenue source is the main sustainable source of revenue which could only form basis for attaining Sustainable Development Goals of United Nations. However, the advice and support from international sources towards domestic revenue mobilization misses important element of commitment and ownership (Bird, 2013; Dom, 2019; Moore, Prichard, & Fjeldstad, 2018).

Pakistan is one of those developing countries that is struggling hard to raise domestic revenue since decades (Cyan et al., 2016). Such efforts for raising domestic revenue included Tax Reforms Commission in 1990, Resource Mobilization and Tax Reforms Commission in 1992, Task Force for Tax Reforms and Tax Changes in Tax Administration in 2000, IMF recommendations for tax reforms in 2001, Hiring of private professionals for HRM, Research and Facilitation in 2001, World Bank's Project Preparation Facility for FBR in 2002, World Bank's Tax Administration Reform Project in 2005, Pakistan Tax Gap Estimate by Andrew School of Policy Studies in 2008,

Tax Reforms Commission in 2014, World Bank's Pakistan Revenue Mobilization Project in 2019, IMF Technical Assistance in 2020 and ADB's Resource Mobilization Program in 2022. However, the outcome of all such efforts aiming at domestic revenue mobilization and enhancing the performance of tax administration was disappointing and these efforts failed to give desired results (Bukhari & Haq, 2020; Chaudhary & Hamid, 2001). And the tax to GDP ratio of the country could not achieve the desired and acceptable standard of 15% and remained stagnant at 10% (World Bank, 2021). Consequently, at the end of the day, there is no choice but to knock the doors of international donor agencies and to follow their conditions accompanied with the loans. Due to minimal domestic revenue, the country at large faces severe economic crisis along with challenges of meeting huge debt servicing and defense needs, provision of quality public services and taking off on economic fronts. The life of the masses of country also became miserable as they witness escalating charges of basic utilities like electricity, gas and petroleum.

Findings of research on Tax Administration Reforms carried out for seven years as mentioned in the 'The Role of Taxation in Pakistan's Revival' by Oxford University Press and written by Jorge Martinez-Vazquez & Musharraf Rasool Cyan. It was noted that the reforms costed millions of dollars but outcome remained poor since there was no positive improvement in tax to GDP ratio and neither the country was able to mobilize domestic revenue and instead kept reliance on lending by international donor agencies.

One of the most important factors responsible to poor revenue collection by the state machinery was poor performance of tax administration. Federal Board of Revenue (FBR) is the premier revenue collection agency responsible for enforcement and collection of all the federal taxes including Income Tax, Sales Tax, Federal Excise Duty and Custom Duty. Lack of strict monitoring and enforcement of tax laws encourages the taxpayers to evade due taxes. There have been a number of instances where tax frauds were noticed amounting in billions. Tax frauds not only badly affects the state's revenue but also at the cost of genuine businesses and taxpayers contributing towards legitimate government revenue.

## **Problem Statement**

Currently, the country Pakistan is coming across serious challenges in its efforts to generate tax revenue from domestic sources instead of relying on international donor and funding agencies. Consistent efforts in this regard included various substantial and notable reform programs since 1990. However, these reforms failed to produce the desired results and revealed unsatisfactory outcome leaving the state of the country's economic outlook in miserable condition (Bukhari & Haq, 2020; Chaudhary & Hamid, 2001; Cyan et al., 2016).

Research on tax gap analysis of Pakistan conducted by World Bank reveals that the country's tax administration has a potential to mobilize domestic revenue of 26 percent of its Gross Domestic Product (GDP) and whereas, the current tax to GDP ratio of the country stands at around 10%. As per World Bank's report the country can achieve more than double tax to GDP ratio subject to raising compliance level of tax laws through strict monitoring and enforcement (Rontoyanni, 2019). The premier tax collecting agency of the country is capable of collecting double of the total revenue it collects. The World Bank project information document of Pakistan shows that tax gap in Value Added Tax (Sales Tax) is approximately 67% (Cevik, 2018; World Bank, 2019).

Reasons for inability of developing countries to mobilize revenue through domestic sources is mainly connected to poor monitoring, enforcement and compliance of tax laws. Taxpayers are nowadays more involved in tax evasions and fraud through illegal procedures and practices. There is a global consensus that the curbing such practices of tax frauds through better enforcement could result in better revenue mobilization (Alleyne & Harris, 2017; Fagbemi et al., 2010; Saxunova & Szarkova, 2018).

## **Literature Review**

Domestic revenue mobilization is the foremost agenda of United Nations Sustainable Goals, 2030 for peace and prosperity of the world at large and specifically for the developing nations. The significance of domestic revenue mobilization is to make available sustainable source of revenue for the developing countries which could provide them sustainable path towards growth (UN, 2015). And without raising domestic revenue or inability to raise tax revenue domestically, the countries may not be able to render important public series to their masses, making investment in basic infrastructure for public, catering for defense expenditure from external threats, making life

of masses peaceful by maintaining law and order and redistribution of wealth among the citizens. Mainly this new agenda of the world is primarily focuses on reforms by the respective governments of to foster and increase their tax revenue by improve the tax administrations responsible for collecting revenue of the state. The reason for all this new shift is to cater for the huge gap in domestic resources of developing countries for supporting their in-house development needs (Lieberman, 2002).

Tax revenue is one of the basic sources of income for the states in order to fulfill their country needs including development programs, welfare of the society and defense and the states are knows by their power to tax (North 1981: 21). Due to the global challenges with regards to domestic revenue mobilization, the social and political scientists including IMF and OECD have conducted various studies and it was observed that the world loses billions of dollars only due to poor performance of tax machineries.

Different countries all over the world made all their efforts to increase domestic revenues and for this purpose they preferred reforms which included policy reforms as well as tax administration reforms and there were some countries that preferred only one of them. Hence, tax administration reforms carries equal importance as policy reforms (Bernardin et al., 2020). In fact the taxing persons and incomes is equally important as how to collect these taxes which shows an important element of tax administration and its pivotal role in collection of taxes imposed under the different tax statutes. The reforms in tax administration invariably start with unearthing different challenges and problems in administration of taxes and the best tool is diagnostic study of tax organization with the purpose of devising plan of action (Silvani & Baer, 1997). The tax administration of Pakistan is also capable of collecting even double of its existing tax collection by improving enforcement (Bukhari & Haq, 2020). And this objective can only be achieved through an efficient and effective tax organization (Silvani & Baer, 1997). Most of the countries achieved such goals by reforming their tax administration (Bernardin et al., 2020). In other words, what and whom to tax go hand in hand with how to collect these taxes which emphasizes the crucial role of tax administration.

The developing countries face significant amount of revenue loss and their inability to collect taxes due to poor monitoring and enforcement of tax laws. Reasons for not able to mobilize tax revenue from domestic sources include poor enforcement and compliance practices, tax evasion and lack of tax education to the masses (Fagbemi et al., 2010). In today's world the taxpayers are more involved in avoiding and evading due taxes instead of complying with the requirement of tax laws. Tax evasion is non-payment of due taxes through the use of illegal sets of procedures and tax avoidance uses legal means to avoid due taxes (Alleyne & Harris, 2017). Tax evasion and tax frauds is a threat to the countries and to the whole society at large. There is a global consensus for making efforts to curb the practices of tax fraud, tax evasion and non-compliance of tax laws (Saxunova & Szarkova, 2018).

In Pakistan, tax fraud has been defined under all the tax laws and it refers to the willful default of the taxpayer with the intent to deceive tax authorities. Resultantly the government as well as the tax machinery face hectic challenges while dealing with revenue losses on account of tax frauds (Adegbite et al., 2018; Omodero, 2015). The tax authorities, therefore, use different tools including tax audit and fraud investigations in order to determine the amount of revenue losses and to gather admissible material evidence for the purpose of possible prosecution of accused persons in courts of law (Adam, 2001). Such audit and investigations are intended to reveal hidden sources of income and in search of evidence of undeclared income or turnover (Ojo, 2016). Audit and investigation is, therefore, an examination of the tax record of taxpayers in order to ensure that tax laws and rules made thereunder have been properly complied with and to examine the possible evasion of due taxes.

Tax audit and investigations are considered as an important tool of compliance of tax laws by all the countries of the world and it results in maximization of government revenue of developing countries (Bassey, 2013). In the prevailing self assessment nature of taxes, the countries focus on examination of tax records of individuals and companies by tax officers so as to assess the compliance of tax laws (Okonkwo, 2014; Ojo, 2016). The underlying purpose of tax audit and investigations is to unearth degree of tax evasion and frauds being carried out by the taxpayers and creating deterrence to improve tax compliance and safeguarding the revenue of the state (Kircher, 2008). Audit and investigations comprises of different types including desk audit which is conducted within the tax offices by the audit and investigating officers on the basis of online data available with them and without any

notice to the taxpayer and accordingly the tax liability is determined (Adediran, Alade, & Oshode, 2013; Bassey, 2013). Desk audit sometimes lead to detailed audit at the premises of the taxpayer in order to acquire further explanations and documentary evidence from the taxpayer. Such investigations where physical verifications are also involved alongwith documentary evidence from the premises of taxpayers result in better compliance on the part of the taxpayers (Olaoye & Ogundipe, 2018; Onoja & Iwarere, 2015). Besides tax audit and investigations, forensic investigations is another tool to conduct specialized investigations by the highly professional investigating officers to examine and gather material evidence in complex financial transactions which is admissible before a court of law (Oyedokun, 2020).

Compliance of tax laws is significantly dominated by the cultural values of the tax machinery being responsible for monitoring and enforcement of tax laws and the performance of tax authorities is dependent on such values and culture (Malik, Awais, & Hussain, 2018). Education and tax awareness also plays an important role to comply with the tax laws (Ahmed & Wahab, 2019; Anwar & Mansoor, 2017).

## **Methodology**

### ***Study Setting***

This study was conducted in Islamabad and Peshawar having more than ten field formations of FBR including two major formations of IRS Intelligence and its headquarters. Total number of fifteen participants were selected for the purpose of detailed interviews and the interviews were conducted in respective offices. Since the scope of this research study is limited to IRS Intelligence which is one of the enforcement agency of Federal Board of Revenue dedicated to tax fraud investigation and prosecution, therefore, population of the study consisted of investigation officers working within IRS Intelligence or transferred and currently posted in other field formations of FBR.

### ***Research Design***

The research consists of qualitative design to investigate and explore the problems associated with tax fraud investigations. Rich data was collected from key informants i.e the investigating officers having in-depth knowledge and experience of the whole process of tax fraud investigations. The saturation of data was finalized when no new themes were emerged during the process of data collection.

### ***Data Collection***

One of the essential component in qualitative research is the determination of scope of research, same size and sampling strategies (Dworkin, 2012; Robinson, 2014; Sanjari et al., 2014, Yin, 2013). Qualitative research carries most important features like respondents that are hand-picked, along with purposive sampling in contrast with the random sampling technique (Robinson, 2014; Yin, 2013). The purposive sampling in qualitative research is more advantageous than statistical sampling as it provides the researcher direct approach and access to the sources of data where problem exist or phenomenon is experienced (Robinson, 2014; Yin, 2013). Therefore, collection of primary data was preferred through purposive sampling in this research.

The whole process of data collection was organized by the researcher itself for being part of the participants' organization. Prior to data collection, three different focused group interviews were conducted wherein the researcher familiarized the participants with the purpose and objectives of the research study. The researcher who led the whole discussion process ensured that focused group conversation allowed exchange of views and opinions of participants with regards to the challenges they face during the tax fraud investigations. Subsequently, after focused group interviews, all the individual participants were interviewed to further probe into the challenges of tax fraud investigations and to clarify the concepts in more detail by taking individual opinions of each participant. Besides focused group interviews and qualitative interviews of the participants, the researcher also analyzed documents especially a few reports and subsequent legal proceedings so as to corroborate the information collected with the supportive documents. The main area of research focused on problems faced by the investigating officers during tax fraud investigations and accordingly semi

## Data Analysis

The whole data, collected from all the three methods including focused group interviews, individual participants' interviews and document analysis, was analyzed using grounded theory approach. First the researcher got familiar with the findings by going through the data in detail and then developed codes and sub-codes. After going through all the codes and deep understanding of the data, themes were developed.

## Research Findings

The analysis of data collected in response to the research question was carried out by using grounded theory approach to qualitative data analysis and themes and theories grounded directly into the data were identified by line by line coding. The analysis of data provided rich and indepth knowledge about the phenomenon.

### *Challenges in Tax Fraud Investigations:*

5.1 *Barriers of Technology* – One of the major challenge for investigating officers while conducting Tax Fraud investigations was barrier of Technology. Most of the investigations were carried out on the basis of manual record which was a hectic and time consuming task. The investigating officers were of the view that use of information technology could have resulted in better performance.

5.2 *Non-availability of Technology and Tools* – The contemporary tax fraud investigations use advanced technologies, tools and software to properly investigate the fraud investigations. Non-availability of such facilities cannot yield better outcome and may not provide in-depth analysis of more complex tax frauds.

5.3 *Complex nature of Informal Economy* – The existence of informal economy was yet another big challenge hindering the process of investigations. It was a complex job to trace the connections of fraudulent elements from within the informal economy having nothing on record to establish linkages.

5.4 *Legal and Regulatory Challenges* – There were issues in legal and regulatory framework as the participants reported that on a number of occasion the investigations were stopped due to stay orders from court. And once the investigations get stopped, the momentum of hot pursuit also get slow down and ultimately adversely affecting the performance of investigating officers and results in extending benefit to the fraudsters.

5.5 *Lack of expertise in Forensic Audit* – The participants stated to have conducted tax fraud investigations to the best of their capabilities and efforts, however, they believed that the quality of such investigations could be significantly enhanced with the use of latest forensic techniques for which they were not trained. It was also stated that they should have been supported with forensic experts to assist in fraud investigations by using modern techniques of forensic accounting and methods like advanced software of data analytics, data mining and blockchain analysis. This would be a shift from traditional investigation techniques to advanced techniques which would enable them to unearth more complex tax frauds.

5.6 *No access to Data* – The investigating officers reported that there is a huge data bank of all the taxpayers, however, they had limited access to such data. Even the Data Base Operators have limited access which hinders the smooth functioning of the investigations and sometimes immediate and readily required information is not available on time.

5.7 *No access to Bank Accounts* – The participants stated that in most of the cases where huge business transactions are found in different bank accounts, it is very difficult job to trace each and every transaction in search of evidence of Tax Fraud. For this purpose they have to request the concerned banks to provide requisite information which takes time and hence investigations could not be completed in time and in an effective manner. Even sometimes the requisite information is not received due to one reason or the other and hence the investigations are completed on the basis of available evidence thus affecting the quality of investigations.

5.8 *Overburdened Investigating Officers* – Almost all the participants stated to have overburdened with different assignments or with multiple investigations at the same time. Therefore, they were unable to completely focus on a single investigation and this way their performance was badly effected along with the quality of investigations.



5.9 *Lack of Human Resource* – It was also shared by the participants that the number of human resource at their work place is very low. They stated that besides the main tasks of investigation, they have to personally look for other clerical jobs which results in unnecessary wastage of time and the same can be effectively utilized in investigation proceedings.

5.10 *Corruption and Inefficiency in Tax System* – The participants were of the view that corruption and malpractices within FBR severely undermines the whole process of tax fraud investigations which may further result in loss of impartiality, credibility, trust and deterrence.

5.11 *Cash Based Economy* – It was reported that most of the undeclared taxable business transactions are carried out in cash by the fraudulent elements with the intent to avoid checking and capture by the tax authorities. Tracing of such transaction is very difficult and time consuming and sometimes even impossible for investigating officers to gather evidence in this regard which is admissible before court of law.

5.12 *Role of Financial Institution* – Some of the participants also stated that the role of financial institutions is very important and their cooperation and coordination with the tax authorities may enhance the performance of tax fraud investigations in more effective and timely manner.

5.13 *Tax Education and Public Awareness* – Participants conducting tax fraud investigations shared that in some cases it was observed that dummy businesses are registered with tax authorities in the name of unknown person having no such active participation in such businesses or sometimes having no such knowledge that such business is registered in their names. Similarly benami bank accounts are opened in the name of irrelevant persons just to avoid identification of actual fraudsters. It was viewed that tax education in this regard can play an important role in discouraging fraudulent activities.

5.14 *Lack of Effective Enforcement Activities* – The participants also reported that lack of enforcement and compliance activities by field formations of FBR also creates unnecessary hurdles in smooth investigation proceedings.

5.15 *Role of Consultants* – The participants also shared different roles of tax consultants involved in facilitating the tax fraudsters in organized crimes and further helping them out of investigation proceedings.

5.16 *Lack of Digitalization* – Digitalization was considered as the most important area in tax fraud investigations by all the participants. They were of the view that through digitization, their performance can be multiplied with much better results than expected. It was stated that tailor made system generated information during the whole investigation process may provide focused and right direction to the investigating officers which may result in timely completion of different inquiries.

5.17 *Resource Constraints* – Resource constraints also significant negative impact on quality of tax investigations which included lack of skilled and specialized staff, lack of forensic and legal experts, limited support staff, lack of financial resources for specialized training and development and limited collaboration with other agencies.

5.18 *Data Sharing and Access to Information* – The participants stated that in most cases they have to request for required information to different agencies and government departments in respect of the ongoing investigations. They were of the view that if such data is shared with IRS Intelligence and given access to such information, then their performance may get better.

5.19 *Lack of Coordination with other Law Enforcement Agencies* – The respondents stated that a coordinated effort of all the law enforcing agencies against tax crimes may yield better results, however, there was no such coordination especially at the investigating officers' level.

5.20 *Lack of Advanced Data Analytics* – It was reported that investigations did not use advanced data analytics which may provide a comprehensive and more accurate picture of tax affairs of fraudulent elements and thereby facilitating the whole process of Tax Fraud Investigations.

5.21 *Social and Cultural Values* – The prevailing culture in tax administration was also termed as a challenge for investigations in Tax Fraud cases when such elements carry sympathies of the others.

5.22 *Influential Entities and their Resistances* – The challenge of resistance from influential entities also resulted in poor performance or failing to achieve desired results from tax fraud investigations.

5.23 *Lack of Training in Global Best Practices* – The investigating officers stated to have no such practice of providing international best practices trainings to them in the field of forensic audit and investigations and it is their own efforts to give best results at work as per their own understanding and experience.

5.24 *New and Innovative Techniques of Fraud* – The participants also observed that once the IRS Intelligence capture some kind of frauds countrywide, these scrupulous elements resort to some other new and innovative techniques of fraud so as to keep their illicit business going on. Hence, it was required that they should be apprised of such new techniques of fraud through training.

## Conclusion and discussion

Findings of the research study reveals that tax fraud investigations at IRS Intelligence involve major persistent problems and challenges which have significant impact on quality outcome and better performance of investigating officers. The research suggests that within the limited resources and prevalent circumstances and challenges, the investigating officers put all their efforts to properly investigate the tax fraud cases within the shortest possible time and on the basis of available record and evidence. In certain circumstances, the investigating officers find no choice but to conclude investigations as further probe may not be possible within the available resources and information.

In presence of the challenges explored during this research study, it further reveals that the investigating officers may be under consistent pressure, stress and anxiety at work and especially during the whole investigation proceedings. The investigating officers find themselves on fighting on two different situations, the complex tax fraud investigations and challenges and constraints of limited resources which significantly affect their ability to conduct effective investigations in tax fraud cases.

Therefore in order to achieve quality performance of Tax Fraud Investigations, it is very crucial to improve performance of investigating officers which may be possible if the challenges highlighted by this research are overcome. Invariably the study adds value to the overall domestic revenue mobilization efforts of Federal Board of Revenue besides creating deterrence for fraudulent elements.

## Limitations

The scope of this research study was limited to investigating officers working in IRS Intelligence of Federal Board of Revenue. Extending the scope of this research to the entire organization of Federal Board of Revenue may give a bigger and more comprehensive understanding of challenges faced by the tax administration of Pakistan. However, time and resource constraints do not allow further probe of the problem.

## Future Research

This research covers one of the most important areas of tax administration of Federal Board of Revenue and suggest valuable insight from the participants to improve their performance in the field of Tax Fraud Investigations. A complete diagnostic study of FBR would give a more robust and comprehensive understanding of the problems and challenges faced by tax administration for addressing the major issues in domestic revenue mobilization.

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# Impact of high performance work systems on employee turnover intention: a mediating role of burnout of Banking Sector of Pakistan

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## Abstract

*Employee turnover is a significant concern for organizations, particularly in the dynamic landscape of the banking sector in Pakistan. This study investigates the impact of high performance work system on turnover intention, with a focus on the mediating role of burnout. A quantitative approach in the study is used. Based on the available literature on the variables which are specified in the proposed theoretical model, four research hypotheses are developed. A sample of 300 employees from various banks in Pakistan participated in the study. Convenience sampling technique was used for data collection. Reliability analysis was conducted before proceeding to a detailed analysis of the study. SEM multivariate data analysis technique was used. The analysis revealed significant associations between the study variables including high performance work systems, burnout and turnover intention of employees. The findings underscore the importance of high performance work system that prioritize employee well-being and address factors contributing to burnout. By understanding and addressing these dynamics, organizations in the banking sector of Pakistan can develop targeted interventions to enhance employee retention and organizational effectiveness.*

**Key words:** High performance work system, employee turnover, burnout

## Introduction

The banking sector in Pakistan, like many other industries globally, is undergoing rapid transformation driven by technological advancements, regulatory changes, and evolving customer expectations. Amidst these changes, the role of human resource practices in shaping workforce performance and organizational effectiveness has become increasingly critical. High performance work systems (HPWS), a set of coherent human resource practices designed to enhance employee skills, commitment, and productivity, have gained prominence as a strategic approach to managing human capital. HPWS encompasses various practices, including rigorous recruitment processes, comprehensive training programs, performance-based rewards, and participative decision-making mechanisms (Garg & Dhanpat, 2022).

However, the relationship between HPWS and employee turnover intention is complex and may be influenced by various mediating factors, one of which is burnout. Burnout, characterized by emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment, is a prevalent issue in high-pressure environments such as the banking sector (Chou & Yuan, 2022). Employees in this sector often face intense

workloads, high performance expectations, and the constant pressure to meet targets, all of which can contribute to burnout. The mediating role of burnout in the relationship between HPWS and turnover intention is critical to understanding how these High performance work systems impact employees' psychological well-being and their decisions to remain with or leave the organization (Wu et al., 2023).

The banking industry in Pakistan is a significant contributor to the national economy, employing a large workforce that plays a crucial role in financial intermediation and economic development. However, this sector is also known for its high-stress work environment, which can exacerbate issues related to employee burnout and turnover. By examining the mediating role of burnout in the relationship between HPWS and turnover intention, this study aims to provide a comprehensive understanding of the factors that influence employee retention in this critical sector.

The interplay between HPWS, burnout, and turnover intention is a complex but vital area of study. By investigating these dynamics within the banking sector of Pakistan, this study aims to offer valuable contributions to both theory and practice. It highlights the importance of not only implementing high-performance work practices but also fostering a work environment that mitigates burnout, thereby enhancing employee retention and overall organizational success (Ali et al., 2023).

Understanding the mediating role of burnout is important because it provides insight into the underlying mechanisms through which High performance work systems influence employee turnover intentions. By examining the relationship between High performance work systems, attrition, and turnover goals, organizations can identify potential areas for intervention and develop targeted strategies to reduce turnover risk.

The banking sector in Pakistan provides an interesting context for studying these dynamics. As the sector grows rapidly and competition becomes fiercer, banks increasingly understand the importance of effective human resource management to retain talent and maintain a competitive edge. In addition, cultural, economic, and regulatory factors specific to Pakistan may influence High performance work systems regarding employee turnover intentions, highlighting the need for context-specific research. mitigate turnover intentions and how burnout influences this relationship.

The banking sector in Pakistan faces a significant challenge with high employee turnover rates, which can have detrimental effects on organizational stability, customer satisfaction, and overall performance (Xhang, 2023). Employee turnover intention, the propensity of employees to voluntarily leave their current positions, remains a pressing issue that incurs substantial costs related to recruitment, training, and the loss of experienced personnel (Rashid, 2024).

The primary purpose of this study is to investigate the impact of high performance work systems on employee turnover intention within the banking sector of Pakistan, with a specific focus on the mediating role of burnout. The banking sector in Pakistan is not only a critical component of the national economy but also an industry marked by high stress and intense competition. Understanding the dynamics that influence employee turnover is essential for developing strategies that enhance organizational stability and performance.

A theoretical perspective on the role of occupation regulators in implementing high performance work systems and also emphasised practical insights into these systems. When high performance work systems and work controllers work together to achieve turnover objectives, our results support the premise that anxiety and character load are arbitrated fractionally. Research of Malik et al, (2020) that implementing a high-performance work system has the potential to reduce employee turnover, boost output, improve customer happiness, and, in the long run, boost organisational success.

Previous studies have extensively documented the positive impacts of HPWS on various organizational outcomes, including job satisfaction, organizational commitment, and employee performance (Garg & Dhanpat, 2022). However, the specific mechanisms through which HPWS influence employee turnover intention, particularly in high-stress environments like the banking sector, are not well understood. One major gap in the existing research is the insufficient attention given to the role of burnout as a mediating factor in the relationship between HPWS and employee turnover intention.

The objective of the study is to analyse the impact of high performance work systems on employee turnover intention. In addition to it, the study will also analyse the mediating role of burn out in between high performance work systems and turnover intention.

## Literature Review

### *Burnout and high performance work system (HPWS)*

Burnout and High performance work systems are pivotal constructs in the fields of organizational behavior and human resource management, particularly within high-stress industries such as banking. Burnout, defined by emotional exhaustion, depersonalization, and a diminished sense of personal accomplishment, has significant adverse impacts on both employee well-being and organizational outcomes (Maslach, Schaufeli, & Leiter, 2001). HPWS, comprising a set of interrelated human resource practices designed to enhance employee skills, motivation, and commitment, is often lauded as a strategic tool for improving overall organizational performance (Jiang et al., 2012). The intricate relationship between burnout and HPWS demands a comprehensive understanding of how these systems interact and influence one another.

HPWS aim to create a high-engagement, high-performance work environment through practices such as selective staffing, extensive high performance work systems, performance-based rewards, and participative decision-making processes (Lepak, Liao, Chung, & Harden, 2006). These practices are designed to boost employee capabilities and motivation, thereby enhancing job satisfaction and organizational commitment. However, the high demands and expectations inherent in HPWS can also contribute to elevated stress levels and potential burnout among employees (Chou & Yuan, 2022). For instance, the continuous pressure to perform at peak levels and achieve stringent targets can lead to emotional exhaustion, a fundamental element of burnout (Kim & Wang, 2022).

Research has shown that the specific configuration of HPWS practices and the organizational context in which they are implemented are crucial determinants of their impact on burnout. For instance, elements of HPWS such as participative decision-making and employee involvement can mitigate the adverse effects of high job demands by providing employees with a sense of control and autonomy, thereby enhancing psychological resilience and reducing burnout (Peccei et al., 2022). Conversely, practices that emphasize intensive workloads and high performance targets without adequate support can exacerbate stress and lead to burnout (Zhang, Liu, & Wang, 2023).

Elements of HPWS such as participative decision-making and employee involvement can mitigate the adverse effects of high job demands by providing employees with a sense of control and autonomy. These components can enhance employees' psychological resilience, thereby reducing the likelihood of burnout (Peccei, Van De Voorde, & Van Veldhoven, 2013). Conversely, practices that emphasize intensive workloads and high performance targets without adequate support can exacerbate stress and lead to burnout. Hence, the effectiveness of HPWS in reducing burnout and turnover intention largely hinges on the specific configuration of practices and the organizational context in which they are deployed (Zhang, Liu, & Wang, 2023).

Recent studies emphasize the importance of supportive work environments and the provision of resources to counteract the negative effects of high-performance demands. For example, providing employees with access to training, development opportunities, and wellness programs can help alleviate the stress associated with high performance expectations (Garg & Dhanpat, 2022). Additionally, fostering a supportive organizational culture that prioritizes employee well-being and work-life balance is crucial for preventing burnout and enhancing the overall effectiveness of HPWS (Wu et al., 2023).

Recent studies underscore the significance of supportive work environments and the provision of resources to counteract the negative effects of high-performance demands. For example, access to training, development opportunities, and wellness programs can help mitigate the stress associated with high performance expectations (Garg & Dhanpat, 2022). Additionally, fostering a supportive organizational culture that prioritizes employee well-being and work-life balance is crucial for preventing burnout and enhancing the overall effectiveness of HPWS (Wu et al., 2023).

**Burnout and turnover intention**

Burnout and the profit motive are major challenges in organizations worldwide, affecting both individual employees and organizational performance. Burnout, characterized by emotional exhaustion, personal deprivation, and decreased performance, is often seen as a predictor of turnover intentions when employees consider leaving their workplace or current organization. The relationship between moderation and profit motives is complex and multifaceted, based on various organizational and individual factors.

Another important theoretical framework used to understand the relationship between burnout and turnover intentions is the demand-resource (JD-R) model (Demerouti & Bakker, 2020). According to this model, high job demands, such as workload and time pressure, and limited resources, such as autonomy and social support, can exhaust employees. Burnout also increases turnover intentions, as employees try to reduce the negative effects associated with burnout by leaving their workplace or current organization.

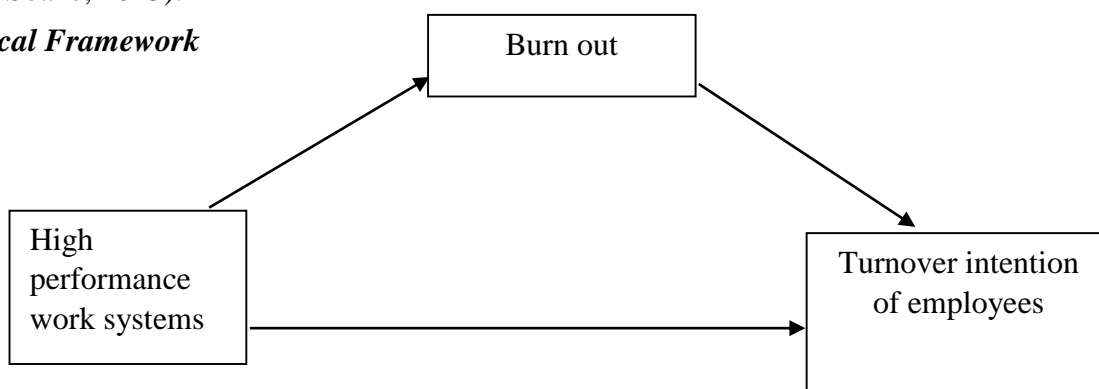
Empirical studies consistently show the effect of fatigue on profit motives (Moss, 2021). Emotional exhaustion, doubt, and decreased job satisfaction may cause employees to consider leaving their workplace or organization. In addition, burnout reduces employees' commitment to their organization, reduces their sense of purpose and achievement, and also increases the profit motive (Moss, 2021).

**High Performance System (HPWS) and turnover intention**

The relationship between High performance work systems and turnover intention has been a subject of significant interest in organizational research, particularly in high-stress industries like banking. HPWS, characterized by a set of human resource practices aimed at enhancing employee skills, motivation, and commitment, are often touted as a means to reduce turnover by fostering a supportive and engaging work environment. However, the effectiveness of HPWS in mitigating turnover intention is influenced by various factors, including organizational culture, job demands, and employee perceptions. Moreover, the effectiveness of HPWS in reducing turnover intention is contingent upon the perceived fairness and transparency of High performance work systems within the organization. If employees perceive that High performance work systems such as performance appraisal and reward allocation are unfair or biased, they may become disengaged and more likely to consider leaving the organization (Kim & Wang, 2022). Additionally, the organizational culture and leadership style play a crucial role in shaping employee perceptions of HPWS and their impact on turnover intention. A supportive and inclusive organizational culture, characterized by open communication and trust between employees and management, can enhance the effectiveness of HPWS in reducing turnover intention (Sun, 2021).

Research has also identified the mediating role of job satisfaction and organizational commitment in the relationship between HPWS and turnover intention. HPWS are theorized to enhance job satisfaction and organizational commitment by providing employees with opportunities for skill development, involvement in decision-making, and recognition for their contributions (Peccei, Van De Voorde, & Van Veldhoven, 2022). These positive outcomes, in turn, are expected to reduce turnover intention by increasing employees' attachment to the organization. However, the relationship between HPWS, job satisfaction, organizational commitment, and turnover intention is complex and may be influenced by various individual and contextual factors (Alfes, Shantz, Truss, & Soane, 2023).

**Theoretical Framework**





## Hypothesis

H1: High performance work system has a significant influence on burnout

H2: Burnout has a significant influence on turnover intention of employees.

H3: High performance work system has a significant influence on turnover intention of employees.

H4: Burnout mediates the relationship of high performance work systems and turnover intention of employees.

## Methodology

This study was conducted to investigate the relationship between High Performance System (HPWS) practices and employee turnover in the banking industry of Pakistan. To understand the complexity of interest, research uses positivism to identify trends, establish correlations, and analyze empirical data. By systematically measuring variables related to High performance work systems and burnout objectives, researchers can draw strong conclusions and identify meaningful patterns from the data. This approach allows researchers to formulate hypotheses based on empirical evidence and gain potential insights from statistical analysis.

Questionnaire was adopted and google forms was made for the online fill up of questionnaire and this included an informed consent for the targeted audience of this study in which only banking employees are incorporated as the targeted audience of this study. The scales were adapted from different resources. The study included banking employee as the population of the study and there was a sample collection around 300 participants by using convenience sampling technique. The statistical tool used for this study was SPSS.

## Results and Analysis

### Reliability Analysis

Reliability testing involves the calculation of Cronbach's alpha coefficient, which measures the internal consistency of the items in the scale. A high Cronbach's alpha value indicates that the items are highly correlated within the scale and consistently measure the same underlying construct. Generally, Cronbach's alpha values of 0.70 or higher are considered acceptable for research purposes.

Table 1 shows the Cronbach's alpha coefficient for each measurement scale used in the study. Results showed high internal consistency for all constructs, with Cronbach's alpha values ranging from 0.80 to 0.85. These results indicate that the items in each scale reliably measure the underlying construct and provide confidence in the validity of the measurement instrument.

Table 1: Sample Cronbach's Alpha Results for Measurement Scales

Construct	Cronbach's Alpha
High Performance work System (HPWS)	0.82
Burnout	0.85
Turnover Intention	0.80

The study's demographic characteristics, which include gender, age, marital status, and work experience, are analysed using descriptive analysis. The percentage of male participants is 72.7%, reflecting the fact that more men than women work in banks in Pakistan. And the percentage of female respondents is 27.3%.

The marital status of those surveyed indicated that a significant portion of them—75%—were married, while 25% were single. The sample's work experience varied; 41% of participants had between 11 and 20 years' experience, while 35% had less than ten years. and 24% who have worked for more than 20 years. This wide range of expertise offers a complex view of the workforce under study's professional history.

Utilising Statistical Software (SPSS), the gathered data was analysed. To determine the effect, bootstrap was applied, and a correlation was also run to show how the variables related to one another. Following analysis, the findings demonstrated support for the research model and the significance of the hypothesised correlations at  $p < .01$ .

It is evident from the stated hypothesis H1 that burnout has a negative and significant relationship with high performance work systems. Moreover, the beta coefficient ( $\beta_5$ ) is -0.40 with a p value of less than .05. This indicates that the hypothesis proposed in H1 is accepted and supported. Furthermore, the researchers' suggested range for  $\chi^2/df$  and the model fit indices values indicate that the model is fit. H1 is therefore approved.

It is evident from the data for the stated hypothesis H2 that employee turnover intention is positively and strongly correlated with burnout. Furthermore, the beta coefficient ( $\beta_5$ ) is .51, indicating that the H2 stated hypothesis is accepted with a p-value of less than .05. Furthermore,  $\chi^2/df$  and the model fit indices' values fall within the range recommended by the researchers, indicating that the model is fit. H2 is therefore approved.

Regarding the hypothesis H3, it is evident that a high-performing work environment has a negative and significant correlation with employees' inclination to leave. Moreover, the p-value for the beta coefficient ( $\beta_5$ ) is less than .05. This indicates that the hypothesis presented in H3 is supported. It is -0.33. Furthermore,  $\chi^2/df$  and the model fit indices' values fall within the range recommended by the researchers, indicating that the model is fit. H3 is therefore approved.

Table 2: Hypotheses summary H1 to H3

Variable relationships	Beta value	P-value	Decision/Remarks
$\beta_1$ (Burnout $\leftarrow$ HPWS)	-0.4	0.00	Supported
$\beta_1$ (Turnover Intention $\leftarrow$ Burnout)	0.51	0.00	Supported
$\beta_1$ (Turnover Intention $\leftarrow$ HPWS)	-0.33	0.00	Supported

### Analysis of Mediation

The table below shows the relationship, both direct and indirect, between a high-performance work system and employees' intention to leave, both with and without a mediator. The study's findings unequivocally show that there is partial mediation because the associations are significant both with and without brand marketing acting as a mediator. Additional tests were conducted in order to analyse the mediation relationship. For the aim of mediation analysis, Baron and Kenny's (1986) methodology was applied, drawing on the suggested relationships covered in H4. By extracting 5,000 bootstrap samples with 95 percent bias-corrected confidence intervals, the results were validated via bootstrapping (Preacher and Hayes, 2008) (Ng et al., 2014). This method is superior to previous strategies since it can test multiple mediations simultaneously (Ng et al., 2014).

Initially, H4 was examined for burnout as a mediator in the association between HPWS and employees' intention to leave. Employee turnover intention is significantly impacted by HPWS ( $\beta = .345, p = .001$ ), and the results are still significant when burnout is utilised as a mediator between HPWS and turnover intention ( $\beta = .114, p = .015$ ). Verifying that burnout is a partial mediator between HPWS and turnover intention, it can be observed that the indirect effect is equally substantial ( $\beta = .433, p = .001$ ). H4 is therefore only partially supported.

Table 3: Mediator model for Burnout

Variable	Total effects (H) $\beta$ (T)	Direct Effect (H') $\beta$ (T)	Indirect Effect (ab) $\beta$ (T)	Result	Mediation level
HPWS-B-TI	.345 (.00)	.114 (.01)	.433 (.00)	Significant	Partial

### Discussion and Interpretation of Results

As our analysis shows, the high performance work systems process is closely linked to the profit motive. Although positive perceptions of these processes are associated with increased turnover intentions, these findings support the notion of "task focus" in the organizational psychology literature. Researchers such as Mitchell et al. (2001) and Crossley et al. (2007) argue that employees who feel more engaged in their work through social interaction, belonging, and self-sacrifice are less likely to consider leaving. Therefore, an unexpected positive relationship

between high performance work systems processes and turnover intentions may indicate a mismatch between employee expectations and organizational reality. Recruitment methods should be carefully evaluated.

In contrast, the field of high performance work systems is closely related to the literature on employee retention. A study by Jiang et al. (2012) and Meir et al. (2012) highlighted the role of high performance work systems in increasing employee engagement and loyalty. By investing in employee skill development and career development, organizations not only create a sense of competence and effectiveness, but also foster deep commitment to the organization.

Furthermore, the importance of participation and decision-making in the formation of profit goals is consistent with research on organizational justice and employee voice. Studies by Cohen-Sharash and Spector (2001) and LePine and Van Dyne (2001) highlight the importance of employee participation in the decision-making process as a means of enhancing perceptions of organizational fairness and commitment. Our results highlight a negative relationship between decision-making participation and turnover intentions, with organizations that allow employees to participate in the decision-making process indicating that this is likely to persist.

### **Limitations and Future Research Areas**

While our study provides valuable insights into the relationship between High performance work systems and turnover intention in the banking sector of Pakistan, it is not without limitations. Firstly, the study's cross-sectional design limits our ability to establish causal relationships between variables. Longitudinal studies would provide a more robust understanding of the dynamic nature of employee turnover. Additionally, our reliance on self-reported data may introduce common method bias, potentially affecting the accuracy of our findings. Finally, the generalizability of our findings may be limited to the specific context of the banking sector in Pakistan, and caution should be exercised when applying them to other industries or geographical regions.

Building upon the findings of this study, future research could explore several avenues for further investigation. Longitudinal studies could help elucidate the temporal dynamics of High performance work systems and their impact on turnover intention over time. Moreover, qualitative research methods, such as interviews or focus groups, could provide deeper insights into the underlying mechanisms driving turnover intentions among employees. Additionally, comparative studies across different industries or countries could shed light on the contextual factors influencing turnover dynamics and the effectiveness of HR management strategies.

### **Practical and Theoretical Implications**

Our findings have several practical implications for HR practitioners and organizational leaders in the banking sector of Pakistan. By understanding the significant impact of High performance work systems on turnover intention, organizations can prioritize investments in employee development, performance management, incentives and rewards, and , to enhance employee retention and organizational effectiveness. Moreover, addressing burnout and promoting , can further mitigate turnover intentions and foster a positive work environment. By implementing targeted HR management strategies informed by our findings, organizations can cultivate a more engaged, committed, and resilient workforce.

From a theoretical perspective, our study contributes to the growing body of literature on HR management and turnover intention. By examining the relationships between various High performance work systems and turnover intention, as well as the mediating role of burnout, we provide empirical evidence that advances our understanding of the underlying mechanisms driving turnover dynamics. Our findings underscore the importance of considering both individual High performance work systems and their collective impact on turnover intention within organizational contexts. Moreover, our study highlights the significance of addressing employee well-being and stress management in retention efforts, adding to the theoretical discourse on occupational stress and turnover.

### **Recommendations and Conclusion**

Based on our findings, we present a set of recommendations aimed at organizations operating in the banking sector in Pakistan with the aim of improving employee retention and overall organizational effectiveness.

First, it is important for organizations to review and improve their HR processes. This includes high performance work systems processes, and turnout intention. By identifying areas for improvement, organizations can create a more profitable environment that fosters employee engagement and loyalty.

Continuous monitoring and evaluation of staffing processes is essential to ensure their effectiveness in reducing turnover targets. Organizations should solicit feedback from employees and stakeholders and adjust their HR strategies accordingly. Adopting a culture of continuous improvement and innovation allows organizations to stay ahead of the curve and drive organizational success in a competitive banking industry.

By implementing these recommendations, organizations in the banking sector in Pakistan can develop an active, dedicated and flexible workforce that will lead to organizational success and growth.

As a result of the study on the impact of High performance work systems on burnout objectives in the banking sector of Pakistan, some important conclusions have been reached based on the analysis and synthesis of the existing literature.

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## Impact of Fintech on The Financial Performance of Pakistani Banking Sector: A Comparative Study of Islamic and Conventional Banks

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### Abstract

*FinTech is a developing technology which primarily changed the way of banking. The association between banks and FinTech got the attention of many scholars. In this regard, the present research aimed to investigate the influence of financial technology on the Pakistani banking sector's financial performance including both Islamic and non-Islamic banks for tenure of 5 years comprising of 2018-2022. Four Islamic banks and all the conventional banks except micro finance banks were chosen as a sample for this study. The analysis of the present research is grounded on the independent variable Fintech (Internet banking, Mobile banking and ATM transactions) and the dependent variable financial performance (ROA, ROE and EPS) of both banking systems. The researcher collected quantitative data as per the quantifiable nature of the study from the yearly statements of the concerned banks and State Bank of Pakistan website. Linear model regression of panel data was used to derive the empirical outcomes from the analysis of financial technology and banks' fiscal performance. The outcomes of the research resulted that overall Pakistani banking sector's financial performance was insignificantly impacted by FinTech with reference to ROA and ROE. But individually fiscal performance of Islamic banks has been positively influenced by financial technology while insignificant impact on conventional banks' financial performance in reference with ROA and ROE. Moreover, the outcomes of the research further resulted that FinTech has positive significant impact on the financial performance of Pakistani banking sector as a whole with respect to EPS. Theoretically, the present study added latest information to the existing literature regarding Pakistani banking sector's performance in liaison with FinTech. Practically, the present study has dual implications. From customers' perspective the use of FinTech services creates easiness for clients to avail banking services irrespective of the time and place constraints. While from banks' perspective the use of FinTech services by customers promotes the agenda of green banking by reducing paperwork in the form of vouchers as well as improves operational efficiency.*

**Keywords:** FinTech, Financial Performance, Islamic Banking, Conventional Banking, Pakistani Banking Sector.

### Introduction

FinTech, refers to Financial Technology, is an expression that denotes the combination of technology and finance. "FinTech is technologically enabled financial innovation that could result in new business models, applications, processes, or products with an associated material effect on financial markets and institutions and the provision of financial services" (European Commission, 2018) cited in (Rupeika-apoga & Thalassinos, 2020). The innovation in technology leads banks to enter a modern age of digitization, which introduced them with a new tool known as FinTech (Monika et al., 2021). FinTech got recognition due to its wide range of applications as it provides a complete set of banking services to clients involving credit facilities, money transfer, payment of bills

and investment in stocks by using mobile phones or computers with ease and transparency 24/7. The advancement in financial services brought up by FinTech has shaped financing methods and expectations of the customers. The physical interaction of bankers and their customers have been declined with the use of innovative computerized mediums specifically during and post COVID-19 (Feyen et al., 2021). This movement towards the use of technology led customers to increased level of FinTech adoption in terms of internet banking. As a result, customers have changed the pattern of managing their accounts which pose a significant risk for banks to tackle the shift in customers' preferences (Hassan & Misrina, 2021).

The use of FinTech in banking services became common (Medyawati et al., 2021). With FinTech becoming a common tool in banking services, it enabled customers to have access to a diversified range of banking services with convenience and security (Abdillah, 2020). FinTech is a composition of financial services and technology that turned around classic mode of business into new-fashioned model. Earlier people used to make payments face to face which require them to carry a large sum of physical cash from one place to another, but now FinTech services enabled people to make payments via internet banking (Bank Indonesia, 2018) cited in (Siska, 2022). Financial technology has two dimensional aspects over performance of banks. Firstly, the widespread use of smartphones facilitates customers with easy access to banking services which leads to enlarge customer base of banks. Consequently, money is being injected into banks which enhance their liquidity position, deposit base and ultimately results in improving banks' profitability (Ky et al., 2019). Secondly, as per the highly regulated framework of banks, it is challenging to design diversified banking services in integration with technology as it may require banks to take additional measures to incorporate FinTech services into operations of banks. As a result, banks' performance might be negatively affected because provision of innovative services may cause banks to bear higher financial costs (Beccalli, 2007; Jalal-Karim & Hamdan, 2010; Thakor, 2020). Generally, every activity of everyday life is somehow associated with technology in this modern age of digitization. Similarly, banking operations are going through similar phase. To succeed in these changing circumstances, banks must enhance their technological soundness (Siska, 2022). There exists competitive rivalry for market penetration between conventional and non-conventional banks argued by (Apriyanti, 2018). Consequently, for gaining competitive edge, banks must become technologically equipped enough to meet changing customers' needs through development of innovative banking products and services.

Since, this study is conducted in Pakistani context where both banking systems are operating namely conventional and non-conventional banks. The whole Pakistani banking sector including Islamic and non-Islamic banks was taken as a population for the current study. Whereas, the selected sample of banks for this study consist of 4 Islamic banks namely Dubai Islamic Bank Limited, Bank Islami Pakistan Limited, Meezan Bank Limited and Al Baraka Bank Pakistan Limited while non-Islamic banks are taken as a whole except microfinance banks, whereas data was assembled for the past five years ranging from 2018- 2022. The current research evaluated the effect of innovative banking services on the financial performance of both conventional and non-conventional banks, where dependent variable was banks' financial performance while FinTech acted as an independent variable.

## **Problem Statement**

Earlier researches (El Chaarani & El Abiad, 2018; Ky et al., 2019) examined FinTech services by means of a single parameter, like ATMs, investment in computer software, mobile banking and Internet banking. Ky et al. (2019) measured the FinTech variables of 170 banks in East African Community from 2009 to 2015 by basing on the involvement of banks with mobile money via mobile network operators. The finding shows a strong positive relationship between FinTech and bank performance. The study is limited to only East African Community and is based on a single variable of mobile money. El Chaarani and El Abiad (2018) studied the effect of technological advancement, such as Internet banking, mobile banking, ATMs and investment in computer software on Lebanese banks performance from 2010 to 2017. The results showed positive association between FinTech and Lebanese banks performance. The study used a relatively small sample of 17 Lebanese banks and two variables for measuring banks performance including ROA and ROE.

Moreover, earlier research studies were more focused on the theoretical aspect while paid less consideration to the empirical aspect (Ali et al., 2019). Besides that, a recent research conducted in Pakistan which is focused on the variations in performance between conventional and non-conventional banks in the economic recession tenure

ranging from 2020-2023 (Bhatti et al., 2023), while did not consider the function of FinTech on the fiscal performance of both banking systems. By considering this fact, the researcher found the potential gap to conduct study on the impact of financial technology on the financial performance of Pakistani banking sector.

This study is among the emerging studies to be conducted as an empirical FinTech based study on the fiscal performance of Pakistani banking sector. Hence, the current research aimed to contribute towards the gap in the empirical literature related to the potential impact of FinTech on the fiscal performance of conventional banks and their counterparts in the context of Pakistan. The present study also contributed to the existing literature by examining the variations between Islamic and non-Islamic banks with respect to the influence of FinTech services on the financial performance of both banking systems.

## Literature Review

For the purpose of studying the effect of financial technology on banks' performance and competitiveness, Dwivedi et al. (2021) in United Arab Emirates polled 76 bankers (executives and professionals in the banking industry). According to Smart-PLS's results, FinTech improves banks' performance and competitiveness. In specifics, FinTech lowers the cost of financial transactions, boosts flexibility and profit, increases efficiency and fosters growth. Saksonova and Kuzmina Merlino (2017) found that FinTech solutions outperform traditional banking products in terms of ease, speed, safety and consumer satisfaction, based on data collected from 378 individuals in Latvia. FinTech development benefits both consumers and the financial industry by bringing advantages and opportunities. Al-Matari et al. (2022) looked into the effect of FinTech variables on the performance of 47 Saudi Arabian financial firms between 2014 and 2020 using the Global FinTech Adoption Index as a proxy. The research revealed that while financial technology has a positive significant impact on firms' financial performance.

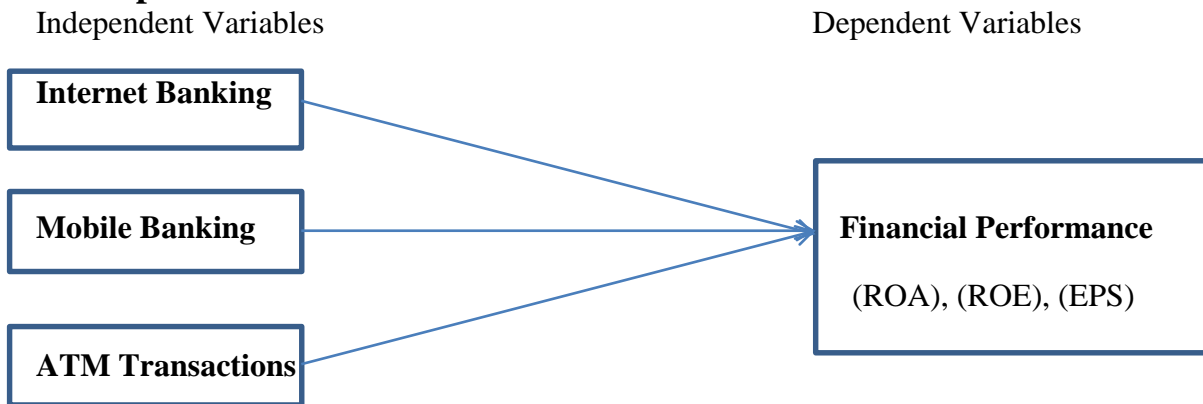
Ky et al. (2019) examined the influence of financial technology on banks' stability and profitability in the five East African Community member states (Tanzania, Uganda, Burundi, Rwanda, & Kenya). The World Bank, Global Financial Development index and Bureau Van Dijk provided the dataset of 170 institutions from 2009 to 2015. The researchers revealed a positive correlation between banks' financial performance and FinTech. The effect of FinTech on the fiscal performance of Indian banking sector has been analyzed by Bansal (2014). Eight ratios were selected for assessment of performance of the banks while he had chosen about 10 factors to compute the index. For determining the association between performance of banks and FinTech, he separated the time period into pre and post-e-banking periods using a regression technique. According to his findings, the bank's efficiency increased significantly in post-e-banking tenure as compare to the tenure of pre-e-banking. A study conducted in 2017 by Taiwo and Agwu (2017) examined the impact of digital banking on the efficiency of Nigerian banks. They came to the conclusion that there is a strong association between electronic banking and financial performance of banks. In a developing economy, the effect of technology adoption on banks' performance was examined by (Dabwor, Ezie, & Anyatonwu, 2017). Nigeria has been selected as the representative country. They have come to the conclusion that Internet banking transactions have influenced the banks' operational performance significantly. Ali (2018) attempted to determine the connection between banks' financial performance and internet banking. The research was carried out in Kenya. ROA and ROE were selected as the fiscal performance indicators of banks. The author discovered that the availability of electronic banking positively influenced the fiscal performance of Kenyan banks.

Varma and Nijjer (2022) employed the volume of transactions conducted through mobile banking in India as a proxy for bank FinTech variables, examining the effect of these transactions on banks' efficiency. Bureau van Dijk provided data on 167 banks for the time span of 2011-2019. The outcomes showed an unfavorable effect of FinTech on banks' productivity. Olalere et al. (2021) examined how FinTech affected banks' performance in Nigeria and Malaysia. According to the estimation results of the two-step GMM technique, which were based on data from 26 banks between 2009 and 2019, FinTech has an insignificant impact on Nigerian banks performance while significant impact in Malaysia. Almulla and Aljughaiman (2021) held a research to analyze the FinTech's effect on banks profitability in the Gulf Cooperation nations (Bahrain, Saudi Arabia and the UAE) between 2014 and 2019, on the basis of data taken from 40 listed banks. The numerical results proved that banks profitability is negatively influenced by FinTech.

## Theoretical Framework

The theoretical underpinning of this research is grounded on Consumer Theory and Technology Acceptance Model (TAM) Model. Consumer theory explains the behavior of people by stating that new innovative services which fulfill their needs are preferred by them over old fashioned services (Aaker & Keller, 1990). In addition to that, TAM Model was designed by Devis in 1989 which states that how various users adopt new technology. Moreover, users consider various factors before adopting new technology (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). TAM explains that two factors are mainly considered by users before adopting new technology which are perceived usefulness and perceived ease of use (Devis, 1989). The purpose of using TAM as a theoretical underpinning tool is having dual aspects. TAM can be a helpful tool to recognize how users embrace FinTech services, which as a result can influence performance of banks. FinTech services are evolving, offering innovative modes of availing banking services. TAM can be helpful for banks in recognizing the factors which can make their offerings appealing to consumers by using financial technology. FinTech services can enhance customer satisfaction by providing convenient access to banking services which is in line with TAM. TAM offers a platform for banks to design consumer centric services that can be convenient and user friendly for customers, which as a result can influence performance of banks.

## Conceptual Framework



## Hypotheses of the study

**H1:** FinTech has positive significant impact on the financial performance of Islamic banks.

**H2:** FinTech has positive significant impact on the financial performance of conventional banks.

**H3:** FinTech has more positive significant impact on the financial performance of Islamic banks as compare to conventional banks.

## Research Methodology

Descriptive research design is used in this study. This particular research design entails finding out the; who, what, where, when and how much (Cooper & Schindler, 2000). The model is considered appropriate, because the basic goal of the current research is to ascertain how financial technology influence Pakistani banking sector's financial performance. The goal of a descriptive research design is to gather information and present results at a single point in time. Secondary data sources were used in the research model including annual reports of concerned banks and State Bank of Pakistan website. This study is based on positivist approach as per the nature of the study, where results are deduced from the available secondary data of both banking systems.

Primarily, the present research is undertaken in the perspective of Pakistani banking sector including both conventional and non-conventional banks. The population of the present study comprised of all the commercial banks of Pakistan excluding microfinance banks. While, the current study's sample consists of four Islamic banks and twenty conventional banks for a time span of 5 years from 2018-2022. From Islamic banks four banks are taken as a sample, because there were only four full fledged Islamic banks operating in Pakistan until the end of 2022. The study is limited to five years because it was started in the mid of 2023, at that time the data of 2023 was not available on SBP website for the year 2023.



The study involves dependent and independent variables. Dependent variable of the present study is the banks' fiscal performance which is measured with reference to profitability ratios namely, ROA, ROE and EPS, while the independent variable is financial technology (Fintech) which is measured in terms of transactions conducted through internet banking, mobile banking and ATM. A technique of Linear Model panel data regression was undertaken for deduction of empirical results based on the available secondary data of the concerned banks. Panel data regression technique is appropriate as per the nature of the study and same technique was used by previous similar studies including a study of (Sangita Dutta Gupta et al., 2018) conducted in India. Panel data assumptions were assessed for derivation of results. It was suggested that random or fixed model can be used for derivation of results from the available secondary panel data. For this purpose, Hausman test was used for selection of random or fixed regression model. Based on Hausman test results, the data was assessed on random model of regression through e-views software.

## Data Analysis

This section presents the empirical outcomes generated based on the compiled data related to FinTech and performance of banks.

### FinTech effect on overall Fiscal Performance of Pakistani Banks with respect to ROA:

Table 1: FinTech effect on overall Pakistani Banks Performance

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	1.105361	3	0.7758

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMB	0.054285	0.171724	0.316120	0.7526
LIB	0.242837	0.212208	1.144336	0.2554
LATM	0.267192	0.228102	1.171369	0.2444
C	-6.730552	3.059517	-2.199874	0.0303

The empirical results show that banks' financial performance in terms of ROA are insignificantly influenced by FinTech as the overall value is 0.7758 which is superior from the value of significance level 0.005. Moreover, the individual results of mobile banking, internet banking and ATM transactions have insignificant impact on overall Pakistani banks financial performance with respect to ROA valuing at 0.7526, 0.2554 and 0.2444 respectively, which supersedes the value of significance level 0.005.

### FinTech effect on Financial Performance of Conventional Banks with respect to ROA:

Table 2: FinTech effect on Conventional Banks Performance

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	1.030299	3	0.7939

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMB	0.002353	0.003402	0.691635	0.4914
LATM	0.003227	0.002904	1.111249	0.2701
LIB	0.000943	0.002159	0.436881	0.6635
C	-0.078985	0.052738	-1.497690	0.1385

The empirical outcomes reflect insignificant impact of FinTech on financial performance of conventional banks in terms of ROA as the overall value is 0.7939 which supersedes the level of significance. Besides that, the individual results of mobile banking, internet banking and ATM transactions on conventional banks' performance in reference with ROA is also insignificant valuing at 0.4914, 0.6635 and 0.2701 respectively, which surpasses the level of significance.

**FinTech Effect on Financial Performance of Islamic Banks with reference to ROA:**

Table 3: FinTech effect on Islamic Banks Performance

Test Summary	Chi-Sq. Statistic	Chi-Sq.	d.f.	Prob.
Cross-section random	1539.42972		3	0.0000

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMB	0.003108	0.001092	2.846654	0.0059
LIB	-0.003538	0.001195	-2.961476	0.0043
LATM	0.004510	0.001224	3.683898	0.0005
C	-0.044998	0.015302	-2.940770	0.0046

The numerical findings reveal that financial performance of Islamic Banks are significantly influenced by FinTech with overall figure of 0.0000 which is lower than 0.005. In addition to that, the individual results of mobile banking, internet banking and ATM transactions have positive significant effect on Islamic banks financial performance with empirical findings of 0.005, 0.0043 and 0.0005 respectively, which are under the significance level of 0.005.

**FinTech effect on overall Fiscal Performance of Pakistani Banks with respect to ROE:**

Test Summary	Chi-Sq. Statistic	Chi-Sq.	d.f.	Prob.
Cross-section random	1.423289		3	0.7001

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMB	-5.068527	100.0147	-0.050678	0.9597
LIB	-117.1774	123.5930	-0.948091	0.3455
LATM	105.8329	132.8502	0.796633	0.4277
C	132.4350	1781.909	0.074322	0.9409

Table 4: FinTech effect on overall Pakistani Banks Performance

The numerical outcomes reveal insignificant effect of FinTech on overall Pakistani banks financial performance in terms of ROE valuing at 0.7001 which is greater from significance level of 0.005. Moreover, the individual results of mobile banking, internet banking and ATM transactions have also insignificant impact on overall banks' performance with respect to ROE valuing at 0.9597, 0.3455 and 0.4277 which exceeds the significance level of 0.005.

**FinTech effect on Financial Performance of Conventional Banks with respect to ROE:**

Table 5: FinTech effect on Conventional Banks Performance

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	557.312783	3	0.0000

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMB	0.705913	0.440270	1.603362	0.1138
LIB	0.334801	0.481767	0.694943	0.4896
LATM	4.195004	0.493670	8.497592	0.0000
C	-61.40785	6.170014	-9.952627	0.0000

The numerical findings reflect that the impact of financial technology on the performance of conventional banks in reference with ROE is insignificant valuing at 0.6362 which supersedes the significance level of 0.005. Moreover, the individual results of mobile banking, internet banking and ATM transactions also revealed insignificant effect on conventional banks’ financial performance with respect to ROE which is valued at 0.2860, 0.9510 and 0.3617.

**FinTech effect on Financial Performance of Islamic Banks with reference to ROE:**

Table 6: Impact of FinTech on Islamic Banks Performance

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2155.00228	3	0.0000

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMB	0.034875	0.003982	8.758326	0.0000
LIB	-0.036207	0.004357	-8.309561	0.0000
LATM	0.107167	0.004465	24.00220	0.0000
C	-1.206777	0.055803	-21.62564	0.0000

The numerical results disclosed that the impact of financial technology on fiscal performance of Islamic banks in reference with ROE is positively significant valuing at 0.0000 which falls under significance level of 0.005. Moreover, Islamic banks’ financial performance is significantly influenced by mobile banking, ATM transactions and internet banking in terms of ROE which are all valued at 0.0000 falling under significance level of 0.005.

**FinTech effect on overall Fiscal Performance of Pakistani Banks with respect to EPS**

Table 7: Impact of FinTech on overall Pakistani Banks Performance

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	8.774866	3	0.0324

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMB	2.230137	0.616874	3.615225	0.0005
LIB	-0.932338	0.520120	-1.792543	0.0762
LATM	2.276608	0.707645	3.217158	0.0018
C	-38.27886	9.154948	-4.181221	0.0001

The empirical findings reflect that the influence of mobile banking is significantly positive on overall Pakistani banking sector performance in reference with EPS valuing at 0.0005 which falls under significance level of 0.005. Similarly, transactions conducted through ATM have also positive significant impact on the overall Pakistani banks financial performance valuing at 0.0018. Conversely, internet banking insignificantly influenced the overall financial performance of Pakistani banks valuing at 0.0762.

**FinTech effect on the Fiscal Performance of Conventional Banks with reference to EPS:**

Table 8: Impact of FinTech on Conventional Banks Performance

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	9.619175	3	0.0221

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMB	2.579220	0.595108	4.334038	0.0000
LIB	-1.008468	0.504707	-1.998128	0.0485
LATM	1.913990	0.703447	2.720874	0.0077
C	-37.11223	8.846464	-4.195148	0.0001

The empirical results reflect that the effect of mobile banking on the fiscal performance of Pakistani conventional banks is positively significant in terms of EPS which is valued at 0.00000, falls under significance level of 0.005. In addition to that, the findings of internet banking show insignificant effect on the financial performance of Pakistani conventional banks valuing at 0.0485 which supersedes the significance level. Moreover, the impact of ATM transactions is also insignificant on the performance of conventional banks as its value is 0.0077 which is nearly exceeding the significance level.

**FinTech effect on the Fiscal Performance of Islamic Banks with reference to ROE:**

Table 9: Impact of FinTech on Islamic Banks Performance

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	557.312783	3	0.0000

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMB	0.705913	0.440270	1.603362	0.1138
LIB	0.334801	0.481767	0.694943	0.4896
LATM	4.195004	0.493670	8.497592	0.0000
C	-61.40785	6.170014	-9.952627	0.0000

The numerical findings show that FinTech has overall positive significant effect on Islamic banks fiscal performance of in terms of Earnings Per Share (EPS) valuing at 0.0000. Moreover, the results of mobile banking reflect insignificant impact on the financial performance of Islamic banks in respect with EPS valuing at 0.1138. Similarly, the effect of internet banking is also insignificant on the fiscal performance of Islamic banks with respect to EPS which is valued at 0.4896. Lastly, the results of ATM transactions reveal positive significant influence on the fiscal performance of Islamic banks in reference with EPS which is valued at 0.0000.

**Comparison of Islamic and Conventional Banks**

The principal motive of the present study was to analyze the impact of FinTech on the financial performance of Pakistani banking sector and to compare the effect of FinTech on both conventional and non-conventional banks performances. Based on the derived analysis, FinTech has insignificant impact on overall banks performance in reference with ROA and ROE, but in terms of ROE, mobile banking and ATM transactions have positive significant impact on overall banks performance while insignificant impact in terms of internet banking as proxies of FinTech. The results are based on the derived results presented in the tables.

Moreover, the derived results revealed that FinTech with respect to all the three selected proxies (ATM transactions, mobile banking and internet banking) insignificantly influenced the fiscal performance of conventional banks with respect to both ROA and ROE. While the empirical findings further revealed that FinTech with respect to all the three selected proxies (ATM transactions, mobile banking and internet banking) has positive significant impact on the fiscal performance of Islamic banks with reference to both ROA and ROE.

In addition to that, the numerical outcomes of FinTech have varying results concerning banks performance in reference with EPS. As in the case of conventional banks, the results of mobile banking are significant while internet banking and ATM transactions results are insignificant. In case of Islamic banks performance the results revealed significant impact in case of ATM transactions while insignificant impact in reference with mobile banking and internet banking.

**Conclusion**

The present study was primarily aimed to analyze the influence of financial technology on the financial performance of Islamic and conventional banks of Pakistan for tenure of five years comprising of 2018 to 2022. A sample of four Islamic banks and the whole conventional banks except microfinance banks was chosen for the present study. The analysis of the current study was based on the independent variable Fintech (Internet banking, Mobile banking and ATM transactions) and financial performance as dependent variable (ROA, ROE, & EPS) of both banking systems. The researcher collected quantitative data as per the quantifiable nature of the study

from the yearly statements of the concerned banks and SBP website. Linear model of panel data regression was adopted for the derivation of empirical outcomes from the analysis of FinTech and banks' financial performance.

This study was directed by the incredible progress of FinTech services in Pakistan and rest of the world. In this research, the researcher examined the correlation between financial technology and banks' performance and how this correlation could variate between Islamic and non-Islamic banks.

The empirical findings of the current research resulted that financial technology has insignificant effect on the fiscal performance of Pakistani banking sector as a whole inclusive of Islamic and non-Islamic banks in reference with ROA and ROE. Moreover, in terms of individual performance, FinTech has positive significant influence on the financial performance of Islamic banks while insignificant influence on the financial performance of conventional banks with reference to both ROA and ROE. Furthermore, the empirical outcomes resulted that FinTech has positive significant influence on the fiscal performance of both banking systems with reference to EPS.

The outcomes of the current research are in line with the researches of (Almulla & Aljughaiman, 2021) and (Al-smadi, 2016). These studies also showed that financial technology has insignificant influence on the fiscal performance of Gulf Cooperation Countries and Jordanians banking sectors specifically with reference to ROA and ROE.

### Limitations and Recommendations of the study

There is a general phenomenon that any research study has some limitations and with the passage of time updated studies fulfill those limitations. Same principle would be valid regarding this research. The present study was based on a short time period of five years (2018-2022) due to limited resources and time constraints. Moreover, in this study only regression was used for data assessment.

Future researches should examine whether there is a statistically significant variance in the performance of organizations that pursue FinTech services compared to those that do not, using a sample of banks that provide and do not provide FinTech services.

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# Role of Education, E-learning and Financial Development towards Environmental Sustainability

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## Abstract

*Due to globalization, the role of financial development, education and E-learning is increasing in the daily life of people, which significantly influences the environmental outcomes. But this association has attained little attention in Chinese context from scholars and environmental economists. This study tries to fulfil this vacuum by exploring the impact of financial development education and E-learning on Chinese environmental performance through the ARDL approach. The findings disclose that education and E-learning improve environmental performance in China. Based on these findings, it proposed that the Chinese government should promote E-learning and education in remote areas of China to improve environmental performance and the overall well-being of society.*

**Keywords:** Education, E-learning, CO2 emissions, ARDL, China.

## Introduction

Three of the world's most important socio-economic development components include health, education, and poverty (Hannum & Buchmann, 2005). The Millennium Development Goals (MDGs) of the United Nations (UN) in 2000 emphasized importance of health, education, and poverty as the main indicator of human development (Diaz-Sarachaga et al., 2018). This declaration demands the world community to take the initiative in the field of health, education, and poverty reduction so that the situation on these indicators improves over the next 15 years (Jones & Chant, 2009). In 2015, the UN general assembly issued an extension of these goals with the name Sustainable Development Goals (SDGs), which are 17 in number and must be implemented by the end of 2030. Like MDGs, the SDGs also focus on developing healthy lifestyles, reducing all types of poverty, and providing quality education for all (Liu et al., 2015).

Despite these directions by the UN, about 2.6 million children could not live only for a month after birth. According to (Afzal et al., 2021; Azam et al., 2021; Organization, 2016), out of these 2.6 million Children, about one million children die just after one day of birth. The UNICEF also sheds light on the reasons behind stillbirths, which represent the complications in the pregnancy and delivery procedures alongside infections in the children at the time of birth (X. Li et al., 2022). However, the difference in mortality rate in the countries depends on the different factors in the countries. For instance, these factors are much more favourable in a country like Japan, where just one out of 1000 children die within the first 28 days of birth; however, the scenario is worst in the context of Pakistan, where 46 out of 1000 children die at the time of birth. The socio-economic condition of a country is mainly responsible for the chances of an infant's existence (Yang et al., 2022; Ye et al., 2022). With every passing day, the gap between developing and developed economies is increasing in the context of attaining SDGs. If immediate actions are not taken, the situation will be out of control in the developing economies in the coming years, and they will slip further away from the targets of SDGs. The simple and widely accepted definition of the term 'health outcome' represents the factors that can affect the lifestyle of resident of an economy (Nutbeam, 2008).

Health outcome refers to health-related issues; chronic ailment and illness, psychosocial working, care expenses, longevity, life quality and mortality satisfaction with care (Dutta et al., 2020; Kasparian & Kovacs, 2022). The study of (Wen et al., 2006) provided the proper definition of health outcome by saying that health variation of an individual, group or the whole population is due to an interference. It considers all the aspects of services provided by the health sector, ranging from the cost of services, time involved incomplete recovery, hospital services, management of services, and the social recognition of the patient (Jiang et al., 2020). Many empirics in the field of health economics have used the abovementioned factors as crucial indicators of quality of life. Many researchers argue that the health outcome of the people is directly affected by environmental performance.



Information and communication technologies have completely transformed society by providing a facility to exchange and convey inexpensive and highly efficient information (Kouton et al., 2021). ICT has made e-learning possible, revolutionizing the environmental and education sectors. The role of e-learning is rising in the environmental sector, and the literature is growing. The literature argues that ICT can significantly solve various environmental issues (Usman, Ozturk, Hassan, et al., 2021). ICT provides guidelines that help reduce human activities' influence the environment. For instance, E-commerce helps reduce petroleum consumption by reducing transportation activities (Nogueira et al., 2022). In the case of ASEAN economies, (Lee & Brahmastre, 2014) reported a significant favourable relationship among ICT and CO<sub>2</sub> emissions. Thus, it is imperative to understand the transmission channels through which ICT influences environmental sustainability. The transmission mechanism between ICT and environmental sustainability can be categorized in three manners (Asongu et al., 2017; Higón et al., 2017). Firstly, ICT positively enhances environmental sustainability through the channel of technological advancement. ICT promotes E-learning that can significantly reduce transportation activities that lead to a substantial CO<sub>2</sub> emissions cutback. Lastly, ICT development improves social and economic performance, promotes environmental behaviour among people, and significantly improves environmental sustainability. ICT not improves environmental sustainability but can also be used to bring awareness among the people regarding the preventive measures to curb the spread of several diseases (Gao et al., 2022).

Many empirics study the link between education and environmental sustainability (Butt, Sajjad, & Awais, 2023), but whether the link is causal or not is debatable. We aim to update this area of research with the inclusion of e-learning alongside the traditional methods of education. Studies such as (Li & Ullah, 2022; Zafar et al., 2020) have analysed the theoretical and empirical relation concerning education and the environment in detail. Past literature has provided three explanations for the association between education and the environment. First, a higher level of schooling may lead to better environmental performance; secondly, higher environmental sustainability may improve the education standards; thirdly, time preference or any other omitted factor may impact both education and the environment. Consistent with these views, this study is an effort further to analyse the nexus between education, e-learning, and environmental sustainability. This study makes an empirical contribution to the literature by offering short and long-run results.

## Model and Methods

We aim to examine the effects of education and e-learning on environmental sustainability. It is widely recognized that all factors are important in improving environmental quality measures. By taking help from past studies such as (Higón et al., 2017; Usman, Ozturk, Hassan, et al., 2021), Eq. 1 indicates the constructed model:

$$CO_{2,t} = \delta_0 + \delta_1 Education_t + \delta_2 EL_t + \delta_3 GDP_t + \delta_4 FD_t + \delta_5 GE_t + \varepsilon_t \quad (1)$$

Where  $CO_{2,t}$  is carbon emissions that depend on educational attainment (Education), e-learning (EL), government expenditure (HE), financial development (FD), and GDP per capita (GDP). This research work simultaneously computes the short and long-run estimates by utilizing error correction transformed modelling i.e. Eq.2.

$$\Delta CO_{2,t} = \delta_0 + \sum_{k=1}^n \beta_{1k} \Delta CO_{2,t-k} + \sum_{k=0}^n \beta_{2k} \Delta Education_{t-k} + \sum_{k=1}^n \beta_{3k} \Delta EL_{t-k} + \sum_{k=0}^n \beta_{4k} \Delta GDP_{t-k} + \sum_{k=1}^n \beta_{5k} \Delta FD_{t-k} + \sum_{k=0}^n \beta_{6k} \Delta GE_{t-k} + \delta_1 CO_{2,t-1} + \delta_2 Education_{t-1} + \delta_3 EL_{t-1} + \delta_4 GDP_{t-1} + \delta_5 FD_{t-1} + \delta_6 GE_{t-1} + \lambda \cdot ECM_{t-1} + \varepsilon_t \quad (2)$$

The ECM measures the adjustment speed (for instance,  $\lambda$ ) from short-run to long-run dynamics of bounds testing method, renowned as the ARDL model (Pesaran et al., 2001). The conventional cointegration methods are available, but they have a few limitations. For instance, previous popular cointegration methods necessitate that variables must be integrated at I(1). Though the ARDL approach is free from integration limitations, the model deals with mixed orders of integration. This method provides simultaneously short and long-run results, while other cointegration methods can convey the long-term results. The " $\Delta$ " variables measures the short-run dynamics, while the long-run effects are measured through  $\delta_2 - \delta_6$  normalized on  $\delta_1$ . The F-test and ECM-test affirmed the long-run estimates. The conventional time series methods are inefficient in the case of the small number of observations except the ARDL which provides efficient results (Lei et al., 2021). Endogeneity and serial correlation issues can easily resolve in the ARDL method by incorporating short-run dynamics. The study

examines the nexus between education; PEdu (Primary Education), SEdu (secondary Education); TEdu (tertiary Education), E-learning, and environmental sustainability for Chinese economy spanning the 1995 to 2020 and collected World Bank databases and depicted in Table 1.

**Table 1: Data nature and description**

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Definitions
CO2	6.794	6.851	7.071	6.487	0.214	CO2 emissions (kt)
SEdu	4.356	4.372	4.748	3.919	0.262	School enrollment, secondary (% gross)
TEdu	2.944	3.025	4.068	1.479	0.819	School enrollment, tertiary (% gross)
PEdu	4.985	5.015	9.290	4.550	0.212	Average years of primary schooling, age 15+, total
EL	1.863	2.945	4.254	-5.307	2.758	Individuals using the Internet (% of the population)
GDP	8.352	8.414	9.247	7.326	0.632	GDP per capita (constant 2015 US\$)
FD	4.808	4.795	5.206	4.433	0.194	Domestic credit to private sector (% of GDP)
GE	15.42	15.53	17.13	13.19	1.088	Government final consumption expenditure (% of GDP)

### Results and discussion

By following econometric roadmap, it is compulsory to access the variables' stationarity before choosing the ARDL approach for empirical tasks. The prerequisite for the ARDL model is that none of the series should be second difference stationary and the PP and GF-GLS tests applied to check the unit root analysis and reported in Table 2; infer a set of a mixture order of integration. Hence, the ARDL approach explores the long-run and short-run impact of education and E-learning on environmental sustainability in China and reported in Table 3. As we are using three proxies for education variables, thus we have estimated three separate models in this study.

**Table 2: Unit root test**

Variables	PP		DF-GLS		Decision	
	I(0)	I(1)	I(0)	I(1)		
CO2	-0.624	-2.754*	-0.452	-2.061**	I(1)	I(1)
SEdu	-0.821	-3.012**	0.841	-1.987**	I(1)	I(1)
TEdu	-1.512	-2.688*	-0.345	-2.578***	I(1)	I(1)
PEdu	-5.564***		1.023	-1.644*	I(0)	I(1)
EL	-5.664***		-0.987	-1.687*	I(0)	I(1)
GDP	-1.458	-2.875*	-1.742*		I(1)	I(0)
FD	-0.632	-2.821*	0.175	-3.875***	I(1)	I(1)
GE	-1.021	-4.321***	-0.721	-4.921***	I(1)	I(1)

**Note:** \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1%, respectively.

Table 3: Carbon emissions outcomes from ARDL

Variable	Model (1)		Model (2)		Model (3)	
	Coef.	t-Stat	Coef.	t-Stat	Coef.	t-Stat
<b>Short-run</b>						
SEdu	-0.050	-0.879				
SEdu(-1)	-0.011	-0.924				
SEdu(-2)	-0.002**	-1.989				
TEdu			-0.023***	-4.114		
PEdu					-0.007	-0.473
PEdu (-1)					-0.016	-1.174
EL	-0.007	-0.727	-0.004***	-2.856	-0.005***	-3.150
EL(-1)	-0.005***	-4.820	-0.002***	-6.436		
GDP	0.002***	2.764	0.003***	3.254	-0.004*	-1.729
GDP(-1)	0.003**	2.179	0.002*	1.930		
GDP(-2)	0.004	1.492	0.003***	3.705		
GE	-0.006*	-1.693	-0.008	-1.346	-0.006	-1.255
GE(-1)	-0.002*	-1.765	-0.003*	-1.664	-0.003**	-2.369
FD	0.004	1.101	0.005	0.795	0.006	0.998
<b>Long-run</b>						
SEdu	-0.017*	-1.670				
TEdu			-0.013***	-5.029		
PEdu					-0.184***	-13.16
EL	-0.014	-0.878	-0.012*	-1.686	-0.015***	-11.26
GDP	0.051***	9.896	0.041***	6.989	0.017***	2.635
GE	-0.003*	-1.912	-0.006***	-3.337	-0.005**	-2.436
FD	0.021	0.243	0.012	0.808	0.014***	3.788
C	3.935***	4.794	3.950***	5.454	3.285***	8.655
<b>Diagnostics</b>						
F-test	20.32***		8.320***		5.698***	
ECM(-1)*	-0.208***	-5.400	-0.209***	-6.514	-0.402***	-6.297
LM	0.320		0.785		0.901	
RESET	0.891		0.157		0.452	
CUSUM	S		S		S	
CUSUM-sq	S		S		S	

**Note:** \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1%, respectively.

The education, secondary education, and tertiary education have an adverse statistically significant link with CO<sub>2</sub>, revealing that all three proxy education measures bring significant improvement in environmental sustainability in China; 1 percent escalation in secondary education, tertiary education, and education reduces CO<sub>2</sub> by 0.017 percent, 0.013 percent, and 0.184 percent, correspondingly, hence, a positive association between education and environmental sustainability (Nathaniel et al., 2021). These studies argue that education stimulates innovation that triggers improvements in productivity and ensures environmental quality. Education indirectly influences the environment through social, financial, and occupational channels (Yin et al., 2021).

The model 2 and model 3 are revealing that an increase in the internet usage contributes environmental performance improvements in the long run for Chinese economy. It indicates that 1 percent intensification in E-learning reduces CO<sub>2</sub> levels by 0.012 percent in model 2 and 0.015 percent in model 3 in the long run. Our findings report a positive impact of e-learning on environmental sustainability, as reinforced by the subsequent studies (Avom et al., 2020; Majeed, 2018). These studies claim that e-learning enhances knowledge about environmental issues and facilitates spreading information about clean energy use. With the e-learning facilities, people better interact with environmental care service providers to make decisions and advice about using energy products.

All three models are revealing that GDP per capita expansion inclines to boost significantly the long run Chinese CO<sub>2</sub> level. In long run, 1 percent upsurge in GDP per capita enhances CO<sub>2</sub> by 0.051 percent, 0.041 percent, and 0.017 percent in model 1 to 3, subsequently. The impact of government expenditures on environmental performance is significant and negative in all three models, revealing that increasing government expenditures improve environmental performance significantly in China. It displays that a rise in 1 percent government expenditures will diminish the long run CO<sub>2</sub> by 0.003, 0.006 and 0.005 percent in model 1 to 3, respectively. It is also confirming that financial development tends to deteriorate the long run Chinese environmental performance. In the short-run, the impact of secondary education and education on environmental performance is found to be statistically insignificant, while the impact of tertiary education on CO<sub>2</sub> is reported significant and negative in China. In model 2 and 3, the impact of E-learning on CO<sub>2</sub> is reported to be significant and negative in the short run. Hence, our findings confirm that E-learning plays a dominant role in improving environmental performance compared with education in the short run. The results of diagnostic tests validate the findings of all three ARDL models; F-stat, ECM term; long-run cointegration, LM test for no serial correlation, Ramsey RESET test for correct functional form, and CUSUM and CUSUM-sq tests for stability condition.

## Conclusion and Implications

There has been growing literature exploring environmental performance's social and economic determinants. Various researchers have investigated the linkages among the financial development, income, technological innovation and environmental sustainability. However, we failed to find any study examining the impact of education and E-learning on environmental performance. Thus, this study puts effort into filling this vacuum of literature by using the Chinese time-series data. The key concern of this research work is to explore the impact of education and E-learning on environmental performance. By employing the ARDL approach, it infers; all three proxies of education are revealing that education enhances environmental knowledge that ultimately improves the environmental performance both in the long and short-run. Secondly, E-learning is also displaying that internet use improves environmental outcomes in China in the long and short run. The impact of GDP per capita and financial development on CO<sub>2</sub> is significantly positive in the long run, while the impact of government expenditure on CO<sub>2</sub> is found to be significantly negative in the short-run and long run.

Based on these findings, our study put forward some important policy suggestions for education and the E-learning sector. This research highlights the significance of comprehensive measurements and conceptualization of the environment in Chinese public policy and educational research. It is suggested to improve the quality of education and ensure the level of equity that will help attain environmental knowledge that generates long-lasting environmental benefits. Embedding instructions related to environmental education into education curricula can generate benefits for the environmental sector. It is suggested to increase investment in E-learning, and the government should develop E-learning excellence centers in remote areas of China. This initiative will support collaboration, evaluation, implementation, development, and design of E-learning materials. The construction of E-learning centers will promote environmental performance in remote and less developed areas of China.

Despite these policy suggestions, our study contains several limitations. Our study captures the impact of education and E-learning on the aggregate economy of China. Due to data constraints, we couldn't explore this nexus for the disaggregated economy of China. Future studies should explore the same relationship for the provincial economies of China to provide more accurate policy suggestions for remote areas. The asymmetries among variables undermine the relationship. Thus, exploring the impact of positive and negative shocks among variables will be good. Future studies should explore the asymmetric impact of education and E-learning on environmental performance by using the NARDL approach.

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