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Sectoral Energy Consumption and Environmental Degradation in Pakistan: An Empirical Evidence from Correlated Component Regression

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Abstract

This study has investigated the sectoral energy consumption influences on CO2 emissions in Pakistan while analyzing data from 1992 to 2022. The correlated component regression method has been adopted in this research because it works effectively to address multicollinearity challenges, manage high-dimensional datasets with limited sample size and numerous independent variables and also produce reliable results. Moreover, as a relatively new methodological approach, the correlated component regression provides a novel contribution to analyzing complex data structures. Our findings show that oil consumption in five sectors including household, industrial, transport, power and government produce increased CO2 emissions which enhances environmental pollution. According to the estimated results, increasing oil consumption by 1 percent in the households, industries, transport, power, and government sectors leads to an increase in CO2 emissions by 0.010 percent, 0.025 percent, 0.118 percent, 0.010 percent and 0.016 percent, respectively. In contrast, oil consumption in the agricultural sector indicates a negative effect on CO2 emissions, implying a 0.024 percent decrease in environmental pollution following a 1 percent increase in agricultural oil consumption. Moreover, gas consumption in the household, commercial, fertilizer, power, industrial and transport sectors is found to have a positive relationship with CO2 emissions. A 1 percent increase in gas consumption in the household, commercial, fertilizer, power, industrial and transport (CNG) sectors leads to an increase in environmental pollution by 0.047 percent, 0.061 percent, 0.223 percent, 0.093 percent, 0.055 percent and 0.010 percent, respectively. Conversely, gas consumption in the cement sector demonstrates a negative influence on CO2 emissions, suggesting that environmental degradation decreases by 0.014 percent following a 1 percent increase in cement sector gas consumption. Additionally, coal consumption in the power and brick kiln sectors, both have positive effects on CO2 emissions, showing that a 1 percent increase in coal consumption in the power and brick kiln sectors leads to a 0.014 and 0.039 percent corresponding increase in CO2 emissions. Based on the study's findings following are the key recommendations. Energy-saving technologies should be promoted in high emissions-intensive industries and renewable energy-based technologies including solar and wind along with public and electric transportation should also be encouraged. The gas-using sectors need to adopt hydrogen and biogas as cleaner alternatives for their operations. The power and brick kiln sectors need to transition their coal usage with renewable power generation technologies while the fertilizer sector requires low-emissions-intensive solutions.

Keywords: Correlated component regression, CO2 emissions, Oil consumption, Gas consumption, Coal consumption, Sectoral analysis, Pakistan

JEL Classification: C19, Q40, Q50

Introduction

Climate change is regarded as one of the most significant and challenging global issues, acting as a threat multiplier that affects the most vulnerable populations and exacerbates existing inequalities. Climate change affects developing countries more than developed countries, where resources are inadequate to tackle climate-change issues. Pakistan, although contributing approximately 0.9% to global greenhouse gas emissions, is among the most negatively affected countries by climate change and air pollution. According to the long-run Climate Risk Index, Pakistan was identified as the 8th most adversely affected nation due to climate change from 2000 to 2019. During the period from 1999 to 2018, its position was even worse, placing it as the 5th most adversely affected country (Eckstein et al., 2021).

Energy has crucial importance both in the development and functioning of the global economy. Researchers such as Stern (1997), Cleveland et al. (2000) and Murphy and Hall (2011) have identified energy as an important factor of production. Being an indispensable component for agricultural production, industry, transportation, commerce and the home, demand for energy will increase as the global population grows and living standards improve through economic development. The increasing trend of mobility, urbanization and a more integrated world economy will exacerbate energy consumption and dependence. Historical evidence demonstrates that rising energy usage and mechanization have their own set of consequences for environmental sustainability, public

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health, safety standards, living conditions, and community well-being (Connors, 1998). Thus, climate change and global warming triggered by fossil fuels have been two global environmental challenges since the middle of the 20th century. From an economic perspective, the energy sector has been a significant source of environmental degradation triggered by energy usage and its transmission. The rising trend of CO_2 emissions has been a significant reason for environmental degradation.

In Pakistan, CO_2 emissions from energy consumption, including oil, gas and coal, have increased more than two times over the past twenty years. Coal is the highest growth achiever, showing more than five times an increase over the previous twenty years, followed by gas indicating a more than two-times rising trend and oil contributing approximately 50% more in CO_2 emissions as compared to the last twenty years (Butt et al., 2021).

Economic development holds crucial significance for all nations across the world including developing, developed and emerging economies. Furthermore, many development goals can be achieved with the help of sustainable economic growth. Tang et al. (2016) indicated that energy holds cornerstone importance in determining economic progress and achieving long-term development. Krueger and Grossman (1991) empirically examined and found that per capita GDP growth enhanced environmental pollution at low levels of income while it mitigated pollution at high levels of income. Stern (2004) argued that economic development, without technological or structural change, directly enhanced environmental pollution and numerous other environmental challenges. Yi et al. (2023) and Ramlogan and Nelson (2024) have emphasized that an increase in production or manufacturing-related activities leads to an acceleration in environmental pollution. Xue et al. (2021) concluded that environmental sustainability can be attained by enhancing economic development, reducing fossil fuels and discouraging foreign direct investment. Some researchers show that carbon taxes serve as a tool to reduce the harmful effects of global warming. For instance, Gaspar et al. (2019) demonstrate that climate change has now become a clear and current threat to the world economy. Its harmful effects can be controlled through establishing carbon taxation on coal burning and other fossil fuel emissions. These actions would encourage countries to transition to clean and environmentally conscious energy sources. The authors further suggested that a carbon price of $75 per ton of carbon emissions should be levied on large pollution-emitting countries to limit global warming to under 2°C by 2030.

Some other studies evaluated the effect of aggregated oil, gas, electricity and coal consumption on CO_2 emissions. For instance, Amer et al. (2024) demonstrated that energy use of oil, gas and coal together with population and economic growth have positive effects on CO_2 emissions. Ahmad et al. (2022) studied and concluded that an increase in coal, gas, oil and electricity consumption enhanced CO_2 emissions, while a decrease in these energy sources mitigated the environmental pollution in India, Pakistan and Bangladesh. Sharif et al. (2023) explored that coal and oil consumption directly affected carbon emissions, while gas consumption inversely impacted CO_2 emissions in the top eleven pollution-emitting countries. Shah et al. (2022) empirically analyzed and demonstrated that depreciation in exchange rate and surge in energy consumption enhanced the environmental pollution in Pakistan.

The escalation of CO_2 emissions and environmental damage in many countries has prompted academicians to determine various contributing factors, with a specific emphasis on the role of energy consumption. Various previous studies (Abbas et al., 2021; Ahmad et al., 2016; Aftab et al., 2021; Fatima et al., 2018; Hu et al., 2021; Khan et al., 2020; & Yavuz et al., 2023) have investigated aggregated and disaggregated energy consumption effects on carbon emissions. However, the literature review shows a lack of research focusing on sectoral energy consumption influence on CO_2 emissions in Pakistan. The sectoral analysis is important both for designing and implementing environment-concerning policies because it can help to identify which sectors increased CO_2 emissions and where resources are required to deal with CO_2 emissions for achieving environmental sustainability. The present research bridges this gap by exploring an in-depth analysis across various sectors of oil, gas and coal usage and their influences on CO_2 emissions in Pakistan. Following this research gap, this study has the following primary objectives:

i. To investigate the impact of sectoral energy consumption of oil, gas and coal on CO_2 emissions in Pakistan.
ii. To determine the relative contributions of various sectors in oil, gas and coal consumption to CO_2 emissions in Pakistan.

Specifically, this research uses disaggregated oil use in the household, industry, agriculture, transport, power, and other government sectors. Gas consumption is disaggregated into seven sub-sectors including household,

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commercial, cement, fertilizer, power, industrial, and transport sectors. Finally, coal consumption is evaluated specifically in the power and brick kilns sectors. This comprehensive analysis of energy consumption across various sectors and their influence on CO_2 emissions would help the policymakers in Pakistan to identify sectors with high emissions levels to prioritize resource allocation for environmental sustainability and economic development. To achieve the aforementioned objectives, this research adopts the correlated component regression (CCR) methodology because this technique provides more robust estimate results especially when the explanatory variables exhibit multicollinearity issues. Moreover, the CCR technique performs well when proceeding with high-dimensional datasets with small sample sizes and numerous independent variables as investigated in this research. Traditional regression methods produce inaccurate and indefinite coefficient values whenever the number of regressors matches or exceeds the sample size. However, the CCR model possesses alternative features that address this particular limitation. Additionally, this method is applied because it is a new methodological approach that brings innovative contributions to this study.

The remainder of the paper follows this structure in its subsequent sections. Section 2 includes a review of earlier studies, whereas data and methodology are described in Section 3. Section 4 delivers results and discussions and the conclusion of this paper is outlined in Section 5.

Literature Review

In this study, the literature review has been organized into two sub-sections: time series studies and cross-sectional studies.

Time Series Studies

Soytas et al. (2007) found a one-way causality from energy consumption to CO_2 emissions in the USA. These results were also confirmed by other researchers, including: Joo et al. (2015) for Chile, Mohiuddin et al. (2016) for Pakistan, Wang et al. (2016) for China, Yang and Zhao (2014) for India, and Zhang and Cheng (2009) for China. Similarly, Nain et al. (2017) found a causality from electricity consumption to CO_2 emissions by analyzing the data from 1971 to 2011 in India. In contrast, some other studies, such as Alam et al. (2011) for India, Hussain et al. (2012) for Pakistan, Lee and Yoo (2016) for Korea, Magazzino (2016) for Italy, and Mirza and Kanwal (2017) for Pakistan, found two-way causality between consumption of energy and emissions.

Gessesse and He (2020) concluded that energy consumption was directly linked to CO_2 emissions in China. Similarly, Chandia et al. (2018) demonstrated that energy consumption positively influenced carbon emissions while utilizing data from 1971 to 2016 in Pakistan. These results were also confirmed by some other studies, including: Khan et al. (2019) for Pakistan, Raggad (2020) for Saudi Arabia Shahbaz et al. (2013) for Indonesia, and Shahbaz et al. (2014) for Bangladesh. On the other hand, Abbas et al. (2021) confirmed that traditional energy consumption, transportation, ecological footprint and urbanization enhanced emissions, whereas renewable energy use reduced it. Belaid and Youssef (2017) explored that non-renewable use resulted in increased emissions while renewable energy consumption caused emissions reductions in Algeria.

Some previous studies also investigated the impact of disaggregated energy consumption on environmental pollution in different countries. In these studies, Khan et al. (2020) found that coal and oil consumption were positively associated with emissions in the case of Pakistan. Kanat et al. (2022) empirically concluded that oil, gas and coal consumption were positively related to CO_2 emissions in Russia. Ahmad et al. (2016) also found similar results by empirically investigating that aggregate energy, gas, oil, electricity and coal consumption were directly associated with emissions in India. Sahoo and Sahoo (2022) concluded that coal, gas and oil use were positively linked with CO_2 emissions. Majeed et al. (2021) empirically examined that a positive shock in the consumption of total energy, coal and electricity inhibited the environmental quality, while a positive change in oil and a negative change in gas consumption enhanced the environmental quality. Moreover, economic development increased pollution (Awais, Kashif, & Raza, 2020; Awais, Malik, Bhatti, & Hashmi, 2022; Awais, Shah, & Abidy, 2018), while capital formation decreased it. Rahman and Ahmad (2019) empirically examined and concluded that capital formation and consumption of coal and oil resulted in increased CO_2 emissions in Pakistan. In contrast, Alkhathlan and Javid (2013) empirically analyzed and concluded that consumption of total energy, oil and electricity were positively associated with CO_2 emissions, while gas consumption was inversely related to environmental pollution in Saudi Arabia.

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Cross-Sectional Studies

Gershon et al. (2024) empirically examined and concluded that energy use and real GDP exerted a positive influence on CO2 emissions, while FDI and population showed a negative influence for seventeen African countries. Osobajo et al. (2020) analyzed 70 nations to study the relationship between energy usage, population and capital formation along with their impact on emissions from 1994 to 2013. Their findings indicated that energy utilization, population and capital formation enhanced CO2 emissions. Mahapatra and Irfan (2021) explored the energy efficiency impact on emissions while utilizing data from 1990 to 2017 for 34 developing and 28 developed economies. A 1 percent increase in energy efficiency resulted in 1.19 emissions decrease in developing countries and 1.24 emissions decrease in developed countries according to their findings. Furthermore, a 1 percent decrease in energy efficiency enhances emissions by 1.06 percent and 0.37 percent for developing and developed countries, respectively. Alshehry and Belloumi (2023) indicated that both energy use and economic development increased environmental pollution in 17 countries. Ehigiamusoe (2020) explored the electricity generation and consumption influence on emissions in 25 African economies. Results suggested that consumption of electricity showed a positive influence on emissions, whereas electricity output from renewable sources was negatively linked with emissions. Moreover, gas, coal and oil-generated electricity indicated a detrimental influence on emissions, whereas the influence of hydro-generated electricity on emissions was negative. Mujtaba et al. (2022) authenticated that non-renewable consumption of energy and capital formation positively impacted CO2 emissions in 17 OECD nations. Behera and Dash (2017) empirically explored that energy use and FDI exerted a direct influence on CO2 emissions in seventeen Asian countries.

Table 1: Summary of Literature Review

Author	Methodology	Country	Data Period	Findings
Soytas et al. (2007)	TY	USA	1960-2004	EC Granger causes CO2 emissions.
Zhang and Cheng (2009)	TY	China	1960–2007	One-way causality from EC to emissions.
Yang and Zhao (2014)	Granger Causality	India	1970–2008	One-way causality from EC to carbon emissions and EG.
Joo et al. (2015)	Granger Causality, Cointegration and ECM	Chile	1965–2010	One-way causality from EC to CO2 emissions and EG.
Wang et al. (2016)	VECM and Granger Causality	China	1990–2012	One-way causality from EC to CO2 emissions and two-way causality between EG and EC.
Mohiuddin et al. (2016)	VECM	Pakistan	1971-2013	One-way causality from EC to CO2 emissions
Nain et al. (2017)	TY	India	1971-2011	Unidirectional causality from EC to GDP and CO2 emissions.
Alam et al. (2011)	TY	India	1971-2006	Bidirectional causality between EC and CO2 emissions.
Hussain et al. (2012)	Cointegration, VECM and Granger causality	Pakistan	1971-2006	Bidirectional causality between EC and CO2 emissions
Magazzino (2016)	TY	Italy	1970–2006.	Bidirectional causality between EC, EG and CO2 emissions.
Lee and Yoo (2016)	Cointegration and ECM	Korea	1971–2008.	Bidirectional causality between EC, EG and CO2 emissions.
Mirza and Kanwal (2017)	Cointegration, ARDL and Granger causality	Pakistan	1971-2009	Bidirectional causality between CO2 emissions, EC and EG.
Gessesse and He (2020)	ARDL	China	1971-2015	EC and GDP have positive effects on CO2 emissions.
Chandia et al. (2018)	OLS and VECM	Pakistan	1971-2016	EC and GDP positively impact CO2 emissions, two-way causality between CO2 emissions and EC.
Shahbaz et al. (2013)	ARDL and VECM Granger causality	Indonesia	1975-2011	EC and EG have positive impacts on CO2 emissions, Bidirectional causality between CO2 emissions, EC and EG
Shahbaz et al. (2014)	ARDL	Bangladesh	1975–2010	Electricity consumption positively impacted CO2 emissions.
Khan et al. (2019)	Dynamic ARDL	Pakistan	1971-2016	EC and FDI positively impacted CO2 emissions.

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Raggad (2020)	NARDL	Saudi Arabia	1971-2014	Positive change in EC enhances CO2 emissions
Abbas et al. (2021)	ARDL	Pakistan	1970-2018	EC has a positive effect on CO2 emissions.
Belaid and Youssef (2017)	ARDL	Algeria.	1980–2012	Electricity consumption and EG have positive impacts on CO2 emissions.
Khan et al. (2020)	ARDL	Pakistan	1965-2015.	EC and EG have a positive influence on CO2 emissions.
Kanat et al. (2022)	ARDL	Russia	1990-2016	Oil, gas and coal consumption positively impacted CO2 emissions.
Ahmad et al. (2016)	ARDL and VECM	India	971–2014.	Total EC, consumption of electricity, oil, gas and coal were positively associated with CO2 emissions.
Sahoo and Sahoo (2022)	ARDL and TY	India	1965-2018.	Consumption of coal, gas and oil and GDP have positive impacts on CO2 emissions.
Majeed et al. (2021)	NARDL	Pakistan	1971-2014	An increase in oil and a reduction in total energy, coal and electricity consumption increase ecological footprint.
Rahman and Ahmad (2019)	NARDL	Pakistan.	1980–2016	Consumption of coal and oil, GDP per capita and capital formation have a positive influence on CO2 emissions.
Alkhathlan and Javid (2013)	ARDL and VECM	Saudi Arabia	1980-2011	Total EC, oil, gas and electricity consumption have a positive influence on CO2 emissions.
Gershon et al. (2024)	Fixed and Random effects models	17 African Countries	2000-2017	EC and real GDP enhanced CO2 emissions while population growth and FDI reduced it.
Osobajo et al. (2020)	Pooled OLS and Fixed Effect Model	70 Countries	1994-2013	EC, population and capital formation have positive impacts on CO2 emissions.
Mahapatra and Irfan (2021)	Nonlinear Panel ARDL	62 Countries	1990-2017	The reduction in CO2 emissions relied on an increase in energy efficiency but a decrease caused more emissions.
Alshehry and Belloumi (2023)	Linear and Nonlinear Panel ARDL	17 MENA Countries	1990-2020	EC and GDP increased CO2 emissions
Ehigiamusoe (2020)	DOLS and FMOLS	25 African Countries	1980-2016	Electricity consumption and electricity generated from oil, gas and coal have positive impacts on CO2 emissions.
Mujtaba et al. (2022)	ARDL and NARDL	17 OECD Countries	1970-2016	EC and capital formation have harmful influences on the environment.
Behera and Dash (2017)	DOLS and FMOLS	17 SSEA Countries	1980–2012	Primary and fossil fuel EC and FDI positively impacted CO2 emissions.

Note: EC = Energy Consumption, EG = Economic Growth, TY = Toda and Yamamoto, VECM = Vector Error Correction Model, ECM= Error Correction Model, ARDL = Autoregressive Distributive Lag Approach, NARDL = Non-linear Autoregressive Distributive Lag Approach, DOLS = Dynamic OLS, FMOLS = Fully Modified OLS.

Data and Methodology

Data and Variables

This study analyzes data spanning from 1992 to 2022 while achieving its primary goal to understand how various sectors of oil, gas and coal consumption influence carbon dioxide (CO2) emissions in Pakistan. For this objective, this research is based on the following variables.

Dependent Variable

The analysis in the current research employs CO2 emissions as the environmental degradation proxy following earlier studies by: Alola and Kirikkaleli (2019), Apergis and Payne (2009), Lean and Smyth (2010), Razzaq et al. (2021) and Zafar et al. (2022).

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Independent Variables

i. Oil Consumption

Previous researchers such as: Adebayo et al. (2021), Kanat et al. (2022), Kartal (2022), and Lim et al. (2014), have already studied how aggregated oil consumption influences CO2 emissions in various countries. Unlike these studies, the current research analyzes oil consumption across household, industrial, agricultural, transport, power and other government sectors.

ii. Gas Consumption

Several research works including: Adebayo et al. (2021), Amer et al. (2024), Dong et al. (2018), Kanat et al. (2022), and Kartal (2022) studied the link between gas consumption and CO2 emissions at an aggregated level. A study of disaggregated gas consumption across seven sectors makes up the main focus of the present paper which examines household, commercial, cement, fertilizer, power, industrial and transport sectors.

iii. Coal consumption

Many previous researchers (Adebayo et al., 2021; Amer et al., 2024Cheng et al., 2021; Kanat et al., 2022; Kartal, 2022; Pata, 2018) have investigated the association between aggregated coal consumption and CO2 emissions. Departing from these studies, the present study considers coal consumption in the power and brick kiln sectors as separate explanatory variables.

Control Variables

The current research includes population along with foreign direct investment and gross fixed capital formation as control variables. When FDI increases local production rises therefore manufacturers consume additional resources leading to increased environmental damage. This relationship was confirmed by earlier studies conducted by: Adeel et al. (2024), Al-mulali (2012), Amoah et al. (2023), Bakhsh et al. (2017), Behera and Dash (2017), and Kim and Seok (2023). CO2 emissions also increase with population growth which requires industrial expansion, higher energy consumption, additional transportation activities, more deforestation and land-use transitions for housing or agricultural purposes. Higher gross fixed capital formation is referred to as more investments in physical assets like machines, buildings and infrastructures. All these activities stimulate economic growth thereby causing more CO2 emissions.

Data Source

Data concerning CO2 emissions is sourced from our world in Data, while population, gross fixed capital formation and foreign direct investment are searched from the WDI. Moreover, the data related to all sectors of oil, gas and coal consumption is taken from the Pakistan Economic Dashboard. Table 2 summarizes the data source and variables

Table 2: Description of Variables

Name of Variables	Abbreviation	Measurement Unit	Source
CO2 Emissions	lnCO2	Kilotons	Our World in Data
Total Population	lnPOP	Numbers	WDI
Gross Fixed Capital Formation	lnGFC	Constant Local Currency Unit	WDI
Foreign Direct Investment	lnFDI	Current US Dollars	WDI
Households Sector Oil Consumption	lnHOILC	Tons	Pakistan Economic Dashboard
Industrial Sector Oil Consumption	lnIOILC	Tons	Pakistan Economic Dashboard
Agriculture Sector Oil Consumption	lnAOILC	Tons	Pakistan Economic Dashboard
Transport Sector Oil Consumption	lnTOILC	Tons	Pakistan Economic Dashboard
Power Sector Oil Consumption	lnPOILC	Tons	Pakistan Economic Dashboard
Other Govt. Oil Consumption	lnOGOILC	Tons	Pakistan Economic Dashboard
Households Sector Gas Consumption	lnHGC	Million Cubic Feet	Pakistan Economic Dashboard

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Commercial Sector Gas Consumption	lnCGC	Million Cubic Feet	Pakistan Economic Dashboard
Cement Sector Gas Consumption	lnCEGC	Million Cubic Feet	Pakistan Economic Dashboard
Fertilizer Sector Gas Consumption	lnFGC	Million Cubic Feet	Pakistan Economic Dashboard
Power Sector Gas Consumption	lnPGC	Million Cubic Feet	Pakistan Economic Dashboard
industrial Sector Gas Consumption	lnIGC	Million Cubic Feet	Pakistan Economic Dashboard
Transport CNG Sector Gas Consumption	lnTCNGGC	Million Cubic Feet	Pakistan Economic Dashboard
Power Sector Coal Consumption	lnPCOALC	Thousand Metric Tons	Pakistan Economic Dashboard
Brick Kilns Sector Coal Consumption	lnBKCOALC	Thousand Metric Tons	Pakistan Economic Dashboard

Model Specification

The major objective of this study is to determine the sectoral consumption influence of oil, gas and coal on CO_2 emissions in Pakistan while adopting a correlated component regression approach. The influence of aggregated consumption of energy, including oil, gas and coal, has been examined in the earlier empirical studies. In this study, we will extend the analysis to the sectoral level and attempt to seek the sectoral influence of oil, gas and coal consumption on CO_2 emissions. This objective has been achieved by employing the STIRPAT model, abbreviated as Stochastic Impacts by Regression on Population, Affluence, and Technology. Previous studies, including the work by: Amer et al. (2024), Shaheen et al. (2022), Zmami and Ben-Salha (2020), and many other researchers have employed the STIRPAT model to determine the factors driving environmental degradation in different contexts. This study also utilizes the STIRPAT model to find out the sectoral influence of oil, gas and coal consumption on CO_2 emissions in Pakistan. This model can be presented as follows:

$$I = \beta_0 P^\alpha . A^\beta . T^\delta . \varepsilon \qquad (1)$$

I in this equation indicates environmental degradation which is measured by CO_2 emissions. The P is represented by the population size (POP) at a given point in time. As the population of a country grows, it leads to more deforestation and land clearing for commercial or agricultural purposes which requires more energy usage and hence causes greater environmental pollution. A is divided into two variables, including gross fixed capital formation (GFC) and foreign direct investment (FDI). Finally, T is decomposed into three crucial variables, such as oil consumption (OILC), natural gas consumption (GC) and coal consumption (COALC). By incorporating all aforementioned variables into equation (1), equation (2) is constructed as follows:

$$CO2 = \beta_0 POP^\alpha . GFC^{\beta 1} . FDI^{\beta 2} . OILC^{\delta 1} . GC^{\delta 2} . COALC^{\delta 3} . \varepsilon \qquad (2)$$

Finding the sectoral influence of oil, gas and coal consumption on CO_2 emissions is a fundamental purpose of this study. Therefore, the OILC is disaggregated into six components, including household sector oil consumption (HOILC), industrial sector oil consumption (IOILC), agriculture sector oil consumption (AOILC), transport sector oil consumption (TOILC), power sector oil consumption (POILC), and other government sector oil consumption (OGOILC). The GC has been divided into seven components, such as household sector gas consumption (HGC), commercial sector gas consumption (CGC), cement sector gas consumption (CEGC), fertilizer sector gas consumption (FGC), power sector gas consumption (PGC), industrial sector gas consumption (IGC) and transport sector (CNG) sector gas consumption (TCNGGC). Finally, power sector coal consumption (PCOALC) and brick kilns coal consumption (BKCOALC) are the two components of COALC. Incorporating the aforementioned fifteen energy consumption variables into equation (2), yields equation (3) as follows:

$$CO2 = \beta_0 . POP^\alpha . GFC^{\beta 1} . FDI^{\beta 2} . HOILC^{\delta 11} . IOILC^{\delta 12} . AOILC^{\delta 13} . TOILC^{\delta 14} . POILC^{\delta 15} . OGOILC^{\delta 16} .$$
$$HGC^{\delta 21} . CGC^{\delta 22} . CEGC^{\delta 23} . FGC^{\delta 24} . PGC^{\delta 25} . IGC^{\delta 26} . TCNGGC^{\delta 27} . PCOALC^{\delta 31} . BKCOALC^{\delta 32} . \varepsilon \qquad (3)$$

Taking the natural log on both sides of equation (3) yields equation (4) as follows:

$$lnCO2 = ln\beta_0 + \alpha lnPOP + \beta_1 lnGFC + \beta_2 lnFDI + \delta_{11} lnHOILC + \delta_{12} lnIOILC + \delta_{13} lnAOILC$$
$$+ \delta_{14} lnTOILC + \delta_{15} lnPOILC + \delta_{16} lnOGOILC + \delta_{21} lnHGC + \delta_{22} lnCGC + \delta_{23} lnCEGC + \delta_{24} lnFGC$$
$$+ \delta_{25} lnPGC + \delta_{26} lnIGC + \delta_{27} lnTCNGGC + \delta_{31} lnPCOALC + \delta_{32} lnBKCOALC + ln\varepsilon \qquad (4)$$

Equation (4) can be used to determine the sectoral influence of oil, gas and coal consumption on CO_2 emissions in Pakistan.

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Methodology

The correlated component regression (CCR) technique, provided by Magidson (2013), was applied in this research to address a high degree of multicollinearity in the dataset. Magidson (2013) indicated that the CCR methodology enhances the reliability of estimated coefficients even when the independent variables are multicollinear. Scale invariant is an important advantage of the CCR methodology over the traditional methodologies, implying that it provides identical results whether explanatory variables are based on unstandardized or standardized regressors. Traditional methods like PLS-R and penalized regression algorithms along with Ridge Regression, Lasso and Elastic Net are predictor scaling-dependent and yield different results when using unstandardized and standardized predictors. The CCR technique also performs effectively when analyzing datasets with numerous predictors along with limited sample observations such as this study which contains 18 predictors and only 31 sample values. Traditional regression methods produce inaccurate and indefinite coefficient values whenever the number of regressors matches or exceeds the sample size. However, the CCR model possesses alternative features that address this particular limitation. Additionally, this method is applied because it is a new methodological approach that brings innovative contributions to this study.

In earlier research work, Alkerwi et al. (2015) applied the CCR model to study how various demographic and socioeconomic factors affect diet quality. Moreover, in the previous economic literature, some other studies (Bullock, 2021; Naveed & Hina, 2023; Naveed, Maqsood, & Cheema, 2024; Naveed, Maqsood, Cheema, & Yousaf, 2024) have also applied the CCR technique. This methodology has also been applied in this study to examine the sectoral impact of oil, gas and coal consumption on CO2 emissions. The general framework of the CCR methodology is as follows:

In the first stage, we will fit the regression equations utilizing OLS for every regressor separately. This is indicated as follows:

$$ln\hat{Y} = \hat{\gamma}_g^{(1)} + \hat{\lambda}_g^{(1)} lnX_g \qquad (5)$$

In equation (5), *ln* indicates the natural logarithm, Y represents the dependent variable and the symbol Xg signifies explanatory variables in which g takes values like 1, 2,…P and $\hat{\gamma}_g^{(1)}$ and $\hat{\lambda}_g^{(1)}$ represent constant coefficient as well as regression coefficients for a specific independent variable g. The first correlated component variable, lnS_1, captures the impacts of prime predictors, which have a direct impact on the outcome variable. It is the weighted sum of all 1-predictor impacts, considering the slope coefficients obtained from equation (5) as weights. It is defined as follows:

$$lnS_1 = \sum_{g=1}^{P} \hat{\lambda}_g^{(1)} lnX_g \qquad (6)$$

Regressing a basic OLS of lnY on lnS_1 yields the predictions for the explained variable Y (in the form of a natural logarithm) in the 1-component CCR model:

$$ln\hat{Y} = \hat{\alpha}^{(1)} + \hat{\beta}_1^{(1)} lnS_1 \qquad (7)$$

The second correlated component variable, lnS_2, is derived by first employing the following regression equation for each predictor using simple OLS:

$$ln\hat{Y} = \hat{\gamma}_g^{(2)} + \hat{\lambda}_{1,g}^{(2)} lnS_1 + \hat{\lambda}_g^{(2)} lnX_g \qquad (8)$$

The second component, lnS_2, then becomes the weighted sum of all the 2-predictor impacts and is calculated as follows:

$$lnS_2 = \sum_{g=1}^{P} \hat{\lambda}_g^{(2)} lnX_g \qquad (9)$$

Regressing a basic OLS of lnY on lnS_1 and lnS_2 produces the predictions for the outcome variable Y (in the form of a natural logarithm) in the 2-component CCR model:

$$ln\hat{Y} = \hat{\alpha}^{(2)} + \hat{\beta}_1^{(2)} lnS_1 + \hat{\beta}_2^{(2)} lnS_2 \qquad (10)$$

Accordingly, the aforementioned procedure for obtaining the correlated component variables can be followed over again until the optimal number of component variables is reached. Generally, for any component variable K (where K< P), we will fit the following regression equation for each regressor utilizing the OLS:

$$ln\hat{Y} = \hat{\gamma}_g^{(K)} + \hat{\lambda}_{1,g}^{(K)} lnS_1 + \hat{\lambda}_{2,g}^{(K)} lnS_2 + \cdots + \hat{\lambda}_{K-1,g}^{(K)} lnS_{K-1} + \hat{\lambda}_g^{(K)} lnX_g \qquad (11)$$

Finally, the last component variable, lnS_k, is then found using equation (12):

$$lnS_k = \sum_{g=1}^{P} \hat{\lambda}_g^{(k)} lnX_g \qquad (12)$$

Regressing a simple OLS of lnY on lnS_1, lnS_2…, lnS_k yields the predictions for the explained variable Y in the k-component CCR model:

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$$ln\hat{Y} = \hat{\alpha}^{(K)} + \hat{\beta}_1^{(K)} lnS_1 + \hat{\beta}_2^{(K)} lnS_2 + \cdots + \hat{\beta}_k^{(K)} lnS_k \qquad (13)$$

To produce the values of regression coefficients, we can re-express the K-component CCR model by inserting equations (6), (9) and (12) into equation (13) as indicated in the following equation:

$$ln\hat{Y} = \hat{\alpha}^{(K)} + \hat{\beta}_1^{(K)} \left(\sum_{g=1}^P \hat{\lambda}_g^{(1)} lnX_g\right) + \hat{\beta}_2^{(K)} \left(\sum_{g=1}^P \hat{\lambda}_g^{(2)} lnX_g\right) + \cdots + \hat{\beta}_k^{(K)} \left(\sum_{g=1}^P \hat{\lambda}_g^{(k)} lnX_g\right) \qquad (14)$$

Algebraic manipulation and simplification of equation (14) yields equation (15):

$$ln\hat{Y} = \hat{\alpha}^{(K)} + \sum_{k=1}^k \hat{\beta}_k^{(K)} \left(\sum_{g=1}^P \hat{\lambda}_g^{(k)} lnX_g\right) = \hat{\alpha}^{(K)} + \sum_{g=1}^P \hat{\beta}_g \, lnX_g \qquad (15)$$

Thus, the estimated regression coefficient $\hat{\beta}_g$ is a weighted aggregate of the loadings. The regression coefficients of the K-component CCR model, as expressed in equation (13), serve as weights:

$$\hat{\beta}_g = \sum_{k=1}^P \hat{\beta}_k^K \hat{\lambda}_g^{(k)} \qquad (16)$$

By replacing lnCO2 with lnY in equation (15) and incorporating all relevant explanatory variables, we yield an equation equivalent to equation (4), which we are trying to estimate.

Equation (16) provides the estimates of unstandardized coefficients, whereas the standard errors of estimated coefficients can be estimated using the following formula:

$$SE(\hat{\beta}_g) = \sqrt{\sum_{k=1}^K \left(SE(\hat{\beta}_k^K)\right)^2 \left(\hat{\lambda}_g^k\right)^2} \qquad (17)$$

Where $\hat{\lambda}_g^k$ indicates the loadings on all correlated component variables and $SE(\hat{\beta}_k^K)$ denotes the coefficient's standard error for the K-component CCR model. The standardized regression coefficients in absolute values are employed to assess the relative significance of each explanatory variable concerning CO2 emissions. These coefficients are produced by applying the following formula:

$$\hat{\beta}_g^* = \left(\frac{\hat{\sigma}_g}{\hat{\sigma}_y}\right) \times \hat{\beta}_g \qquad (22)$$

Where $\hat{\beta}_g^*$ and $\hat{\beta}_g$ respectively denote the standardized and unstandardized coefficients of each of the regressors with g equaling 1, 2, 3…, P. Furthermore, $\hat{\sigma}_g$ and $\hat{\sigma}_y$ measure the dispersion as a standard deviation for each regressor and explained variable, respectively, with g indicating 1, 2, 3…, P.

The standardized coefficients represent which explanatory variable has a higher influence on the explained variable. In this research, the relative contribution of each explanatory variable to CO2 emissions is measured through standardized coefficients in absolute values which are then presented as percentages of their absolute sum.

Results and Discussion

Figure 1 indicates the behavior of CO2 emissions from 1992 to 2022 in Pakistan. Figure 2a and 2b shows oil consumption pattern in various sectors, while gas consumed in the fertilizer, power, industrial, transport, household, commercial and cement sectors is presented in Figure 3a and 3b. Finally, power and brick kilns coal consumption behavior is shown in Figure 4.

Figure 1: CO2 Emissions

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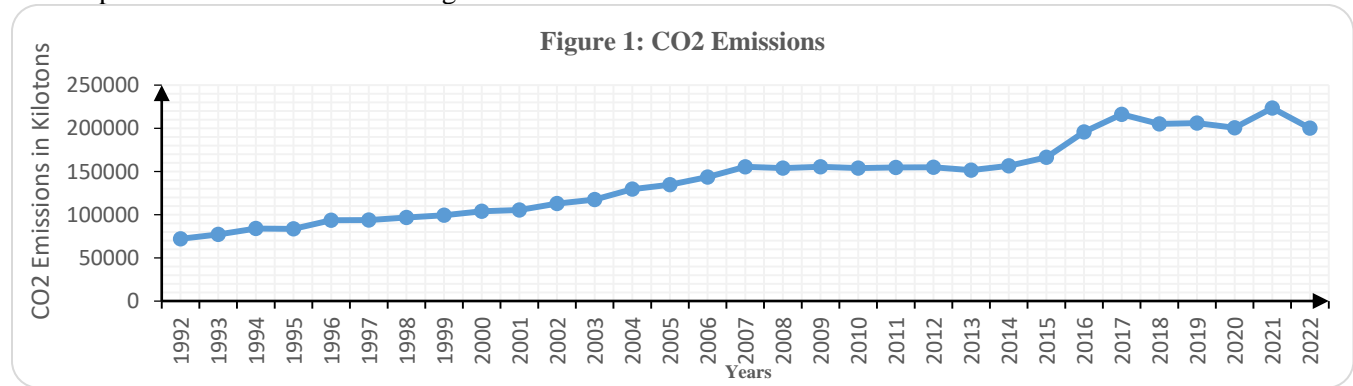Figure 2a: Industrial (IOILC), Transport (TOILC) and Power (POILC) Sector Oil Consumption in Tons
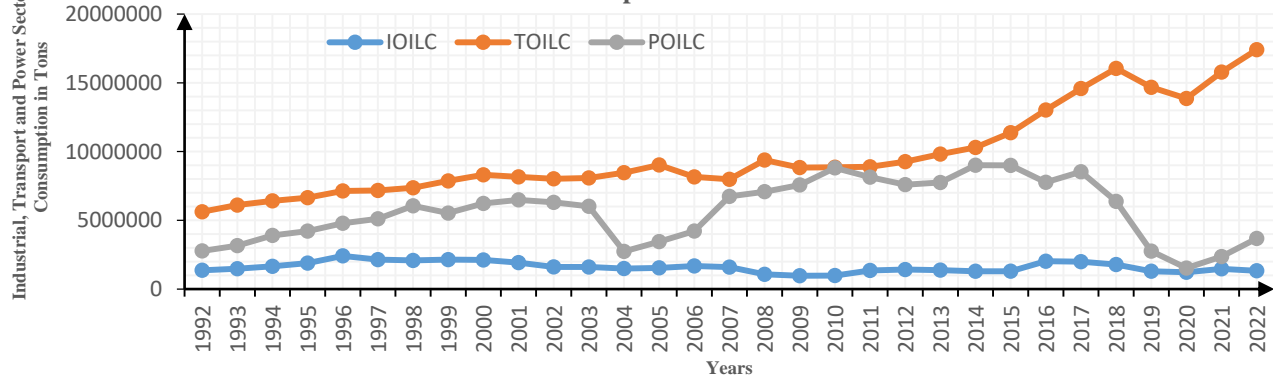
Figure 2b: Household (HOILC), Agriculture (AOILC) and Government (OGOILC) Sector Oil Concumption in Tons
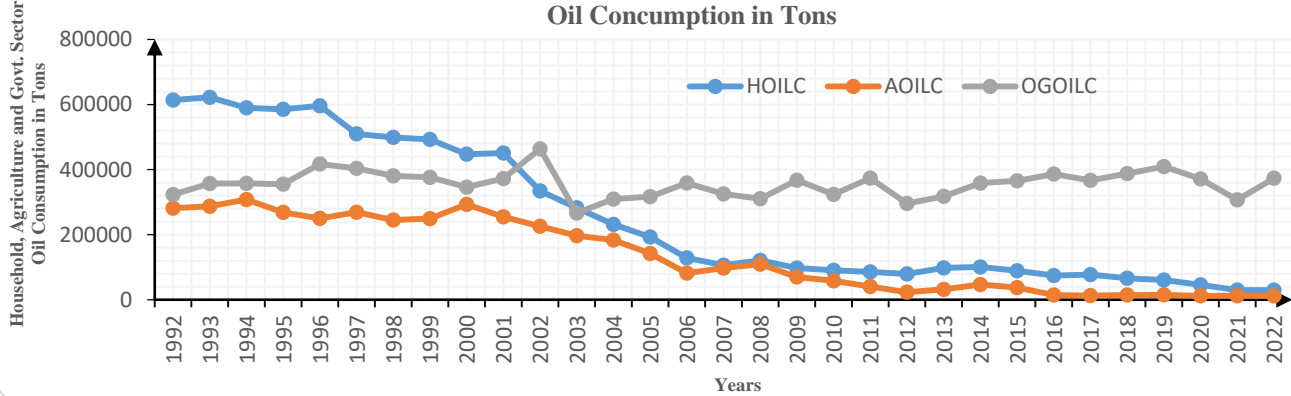
Figure 3a: Fertilizer (FGC), Power (PGC), Industrial (IGC) and Transport (TCNGGC) Sector Gas Consumption
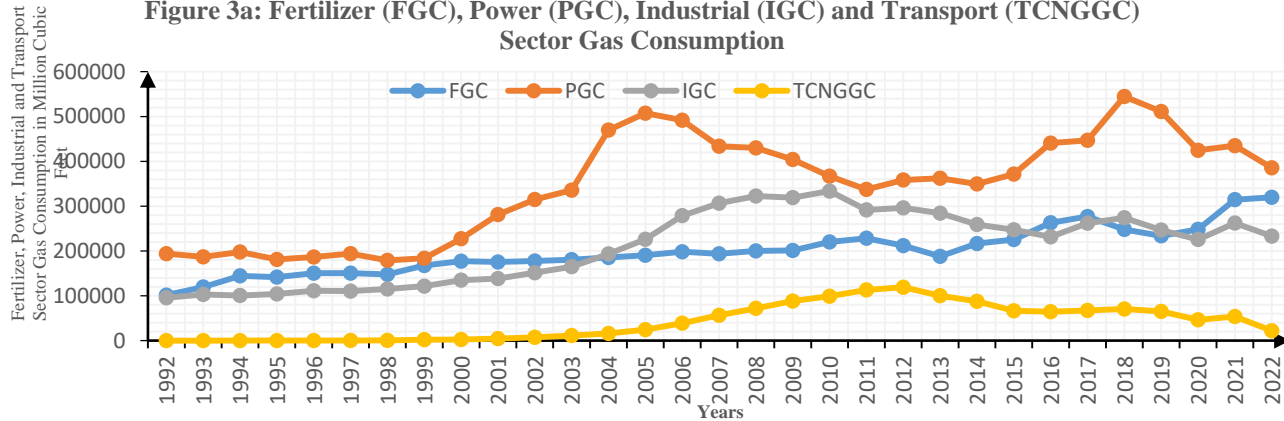
Figure 3b: Household (HGC), Commercial (CGC) and Cement (CEGC) Sector Gas Consumption

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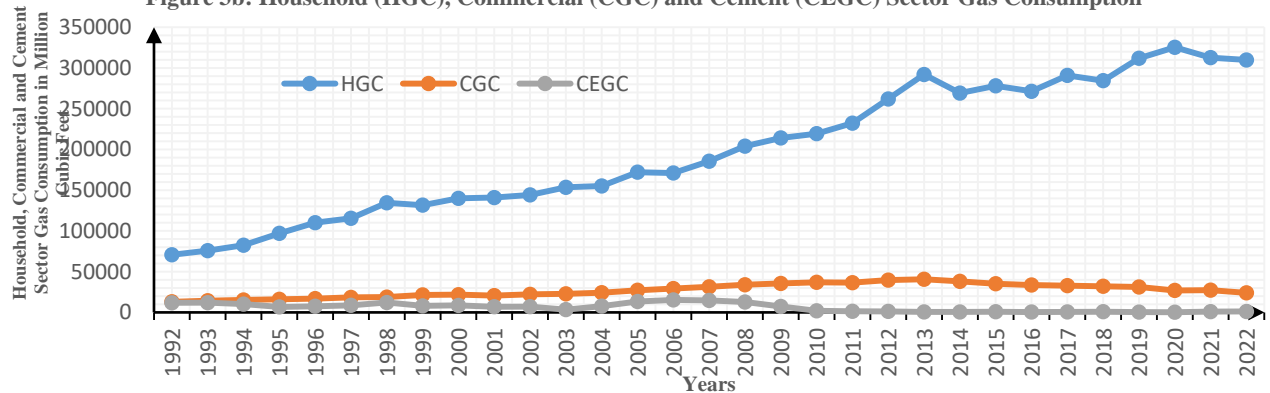
Figure 4: Power (PCOALC) and Brick Kilns (BKCOALC) Sector's Coal Consumption
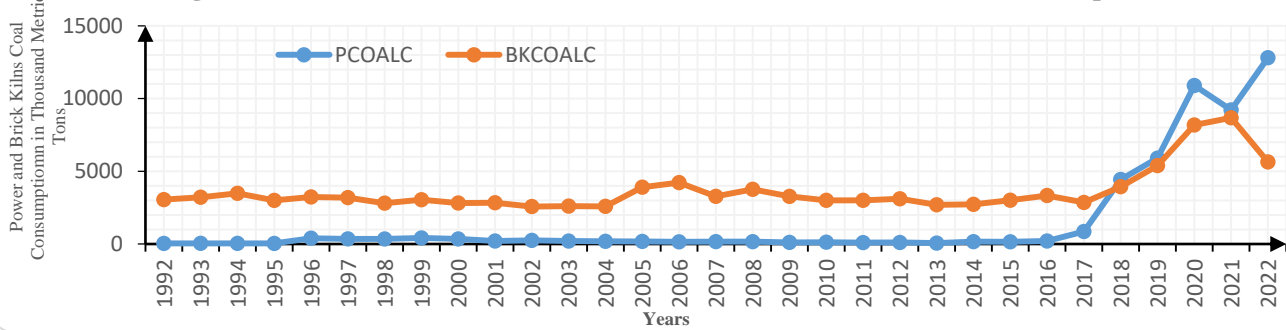
Summary statistics (Table 3) results indicate that the mean of carbon dioxide (CO_2) emissions, in the natural logarithm, is found to be 11.81 kilotons, with 12.32 and 11.18 kilotons as maximum and minimum values, respectively. The degree to which the CO_2 emission differs from the mean, as expressed by the standard deviation in the natural logarithm, is calculated to be 0.33 kilotons. Among the six gas consumption sectors, AOILC and OGOILC show the highest and lowest absolute dispersion, respectively. Similarly, in the seven gas consumption sectors, TCNGGC exhibits the highest absolute dispersion, while FGC has the lowest. Furthermore, among the two sectors of coal consumption, PCOAL and BKCOALC indicate the highest and lowest dispersion, respectively. Moreover, the summary statistics results reveal that the median for all variables excluding lnGFC, lnHOILC, lnTOILC, lnPCOALC, and lnBKCOALC is greater than the mean, indicating a negative skewness as demonstrated by negative skewness coefficients observed for lnCO2, lnPOP, lnFDI, lnIOILC, lnAOILC, lnPOILC, lnOGOILC, lnHGC, lnCGC, lnCEGC, lnFGC, lnPGC, lnIGC, and lnTCNGGC. The kurtosis values concerning all variables excluding lnOGOILC, lnFGC, lnPCOALC, and lnBKCOALC fall below 3, implying a platykurtic distribution, while the kurtosis values for lnOGOILC = 3.20, lnFGC = 3.06, lnPCOALC = 3.36, and lnBKCOALC = 5.77 indicate a leptokurtic distribution for these variables. The Jarque-Bera analysis shows that observed data for all variables excluding lnPCOALC and lnBKCOALC follow the normal distribution at the 95% confidence level, whereas the distributions of lnPCOALC and lnBKCOALC are non-normal.

Table 3: Summary Statistics

Variables	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jarque Bera	Prob.	Obs.
lnCO2	11.81	11.93	12.32	11.18	0.33	-0.23	1.92	1.77	0.41	31
lnPOP	18.99	19.02	19.28	18.62	0.20	-0.35	1.91	2.17	0.34	31
lnGFC	28.85	28.89	29.34	28.48	0.28	0.07	1.56	2.71	0.26	31
lnFDI	20.91	21.01	22.44	19.55	0.82	-0.02	2.09	1.07	0.58	31
lnHOILC	12.02	11.70	13.34	10.29	0.97	0.01	1.70	2.18	0.34	31
lnIOILC	14.26	14.25	14.70	13.78	0.23	-0.14	2.41	0.55	0.76	31
lnAOILC	11.25	11.48	12.64	9.38	1.22	-0.36	1.57	3.29	0.19	31
lnTOILC	16.05	15.99	16.67	15.54	0.30	0.58	2.42	2.20	0.33	31
lnPOILC	15.46	15.62	16.01	14.24	0.46	-0.80	2.83	3.31	0.19	31
lnOGOILC	12.78	12.79	13.05	12.49	0.11	-0.20	3.20	0.26	0.88	31
lnHGC	12.11	12.13	12.69	11.17	0.45	-0.46	2.15	2.05	0.36	31
lnCGC	10.16	10.21	10.61	9.48	0.33	-0.45	2.07	2.14	0.34	31
lnCEGC	8.07	8.85	9.64	5.58	1.33	-0.41	1.58	3.50	0.17	31
lnFGC	12.17	12.17	12.68	11.53	0.26	-0.24	3.06	0.31	0.86	31
lnPGC	12.69	12.80	13.21	12.10	0.37	-0.50	1.78	3.25	0.20	31
lnIGC	12.18	12.35	12.72	11.47	0.42	-0.43	1.61	3.47	0.18	31
lnTCNGGC	9.10	10.57	11.69	3.22	2.80	-1.01	2.57	5.54	0.06	31
lnPCOALC	5.69	5.22	9.46	3.68	1.64	1.14	3.36	6.93	0.03	31
lnBKCOALC	8.14	8.04	9.07	7.85	0.30	1.84	5.77	27.48	0.00	31

The correlation coefficients in Table 4 indicate that some explanatory variables are positively associated, while some are negatively related to each other. Moreover, correlation coefficients between some variables have absolute values less than 0.80, while the values between several explanatory variables are extremely high and exceed 0.80 (Green values in Table 4) in absolute value. The high (0.80 or above) value of simple pairwise correlations among predictors indicates the presence of severe multicollinearity as highlighted by Willis and

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Perlack (1978).

Table 4: Correlation matrix

Predictors	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
lnPOP 1	1																	
lnGFC 2	0.92	1																
lnFDI 3	0.70	0.82	1															
lnHOILC 4	-0.97	-0.94	-0.74	1														
lnIOILC 5	-0.44	-0.42	-0.42	0.53	1													
lnAOILC 6	-0.93	-0.92	-0.61	0.94	0.35	1												
lnTOILC 7	0.91	0.88	0.55	-0.88	-0.21	-0.92	1											
lnPOILC 8	0.14	0.06	0.13	-0.04	0.03	-0.01	-0.04	1										
lnOGOILC 9	-0.07	-0.03	-0.06	0.12	0.34	-0.01	0.09	0.03	1									
lnHGC 10	0.99	0.89	0.68	-0.94	-0.39	-0.91	0.89	0.20	-0.05	1								
lnCGC 11	0.85	0.75	0.73	-0.79	-0.48	-0.71	0.60	0.49	-0.18	0.87	1							
lnCEGC 12	-0.80	-0.69	-0.32	0.74	0.26	0.87	-0.80	-0.06	-0.08	-0.81	-0.59	1						
lnFGC 13	0.95	0.87	0.65	-0.92	-0.27	-0.88	0.93	0.12	0.00	0.93	0.74	-0.72	1					
lnPGC 14	0.84	0.85	0.80	-0.82	-0.47	-0.72	0.72	0.04	-0.21	0.80	0.78	-0.48	0.77	1				
lnIGC 15	0.87	0.84	0.84	-0.87	-0.60	-0.74	0.64	0.32	-0.26	0.86	0.95	-0.51	0.78	0.88	1			
lnTCNGGC 16	0.91	0.79	0.74	-0.85	-0.47	-0.73	0.70	0.35	-0.18	0.91	0.96	-0.58	0.83	0.87	0.95	1		
lnPCOALC 17	0.60	0.58	0.28	-0.58	0.02	-0.62	0.80	-0.40	0.25	0.58	0.17	-0.52	0.67	0.40	0.25	0.35	1	
lnBKCOALC 18	0.47	0.55	0.38	-0.58	-0.25	-0.57	0.60	-0.66	0.03	0.43	0.09	-0.37	0.51	0.37	0.26	0.22	0.75	1

The variance inflation factor (VIF) and the condition index (CI) are also applied to assess the multicollinearity. According to the VIF criterion, there is severe multicollinearity between the predictors if the VIF value is greater than10 (Kennedy, 2008; Kyriazos & Poga, 2023). In Table 5, all the VIF values excluding lnIOILC and lnOGOILC exceed 10, implying a harmful multicollinearity in the data. According to the CI method, multicollinearity is severe if the CI value is 15 or greater (Midi et al., 2010). In our findings, the CI has a maximum value of 217.84, which is larger than 15, indicating severe multicollinearity. Severe multicollinearity among explanatory variables produces unstable and statistically insignificant coefficient estimates (Paetzold, 1992). As a result, we need to use an econometric approach that is suitable for collinear datasets. Severely multicollinear dataset analysis benefits from the CCR method which produces reliable and precise coefficient estimates (Magidson, 2013). Therefore, this study adopts the CCR methodology for analyzing the sectoral contributions of oil, gas, and coal usage on CO2 emissions in Pakistan.

Table 5: Variance Inflation Factor and Condition Index

Predictors	Variance Inflation Factor (VIF)			Condition Index (C.I)	
	R_i^2	$1 - R_i^2$	VIF	Eigen Values	C.I
lnPOP	0.9996	0.0004	2754.8209	11.4843	1.0000
lnGFC	0.9897	0.0103	96.6651	2.5856	2.1075
lnFDI	0.9426	0.0574	17.4149	1.5101	2.7577
lnHOILC	0.9984	0.0016	619.5787	0.7983	3.7929
lnIOILC	0.8891	0.1109	9.0180	0.6253	4.2856
lnAOILC	0.9942	0.0058	171.9690	0.3106	6.0804
lnTOILC	0.9946	0.0054	185.5632	0.2496	6.7836
lnPOILC	0.9409	0.0591	16.9268	0.1693	8.2370
lnOGOILC	0.7473	0.2527	3.9569	0.0979	10.8324
lnHGC	0.9982	0.0018	564.6527	0.0692	12.8835
lnCGC	0.9952	0.0048	207.0393	0.0429	16.3642
lnCEGC	0.9792	0.0208	48.0354	0.0246	21.6153
lnFGC	0.9759	0.0241	41.5749	0.0147	27.9061
lnPGC	0.9821	0.0179	55.7351	0.0068	41.1260
lnIGC	0.9951	0.0049	204.4154	0.0049	48.6509
lnTCNGGC	0.9970	0.0030	333.5557	0.0035	57.5042
lnPCOALC	0.9725	0.0275	36.3994	0.0023	70.1007
lnBKCOALC	0.9131	0.0869	11.5023	0.0002	217.8432

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Table 6 shows each predictor's loading upon four correlated component variables. All predictors excluding POILC and OGOILC exhibit significant loadings upon the first component variable, while the second component variable has only six significant loadings, such as the loading of HOILC, IOLC, TOILC, FGC, IGC and PCOALC. On the other hand, the third component variable has eight significant loadings, including IOILC, TOILC, CGC, PGC, IGC, TCNGGC, PCOALC and BKCOALC.

Table 6: Loadings on Correlated Component Variables

Predictors	lnS1	lnS2	lnS3	lnS4
lnPOP	1.6409*	-0.1040	-0.1696	-0.0767
lnGFC	1.1330*	0.1187	0.0365	0.0192
lnFDI	0.3082*	0.0019	0.0160	-0.0029
lnHOILC	-0.3278*	0.0713***	0.0414	-0.0270
lnIOILC	-0.5459**	0.1338*	0.0818***	-0.0024
lnAOILC	-0.2530*	-0.0089	0.0156	-0.0135
lnTOILC	1.0104*	0.1463*	-0.1998**	-0.0184
lnPOILC	0.0741	-0.0003	0.0193	-0.0063
lnOGOILC	-0.1362	0.0857	-0.0494	-0.0529
lnHGC	0.7034*	-0.0268	-0.0293	-0.0273
lnCGC	0.8321*	-0.0680	0.0795***	-0.0471
lnCEGC	-0.1861*	0.0024	0.0100	-0.0007
lnFGC	1.2085*	0.2248*	0.0687	0.0193
lnPGC	0.7721*	0.0249	0.0615***	0.0163
lnIGC	0.6765*	-0.0752***	0.1364*	-0.0329
lnTCNGGC	0.1050*	-0.0044	0.0124**	-0.0009
lnPCOALC	0.1261*	0.0108***	-0.0133***	-0.0019
lnBKCOALC	0.5580*	-0.0042	-0.0511**	-0.0119

*, ** and *** indicate that the loadings are significant at the 1%, 5% and 10% significance level, respectively.

Since each predictor shows insignificant loadings upon the fourth component variable, we omit the fourth component and proceed with the first three components. The identification of three components also follows the ascertain by Magidson (2010) that the CCR technique performs well with two, three, or four components. In addition to components, we have incorporated all explanatory variables to evaluate the sectoral impact of oil, gas, and coal utilization on CO2 emissions.

Table 7: Correlated Component Regression Model with K = 3

Component Variable	Un-Standardized Coefficients	Std. Error	T-Statistic	P-Value	Standardized Coefficients	Shares (%)
lnS1	0.091*	0.002	60.826	< 0.000	1.040	83.788
lnS2	0.444*	0.068	6.567	< 0.000	0.130	10.451
lnS3	0.194*	0.055	3.550	< 0.010	0.072	5.761

*, ** and *** indicate that the coefficients are significant at the 1%, 5% and 10% significance level, respectively.

Table 7 indicates the estimated results concerning the correlated component regression model with three component variables. Our findings reveal that all component variable's coefficients are positive having a significant influence on the explained variable. The component variable, S1, captures the prime variable's (direct) effect, accounting for 83.788 percent of the total contribution. However, the second and third component variables S_2 and S_2 measure the suppressor variable's (indirect) effect. These two components comprise 10.451 and 5.761 percent of total shares. It is worth noting that the prime variables have a dominant share in determining the explained variable.

Table 8: Regression Results Based on the CCR Model

Predictors	Unstandardized Coefficients	Standard Error	T-Statistic	Prob.value	Significance	Standardized Coefficients	Contribution (%)
lnPOP	0.071	0.012	5.967	< 0.001	*	0.042	3.41
lnGFC	0.163	0.008	19.347	< 0.001	*	0.138	11.06
lnFDI	0.032	0.001	32.164	< 0.001	*	0.080	6.41
lnHOILC	0.010	0.005	1.815	< 0.100	***	0.028	2.29

lnIOILC	0.025	0.010	2.504	< 0.050	**	0.018	1.44
lnAOILC	-0.024	0.001	-21.635	< 0.001	*	-0.088	7.10
lnTOILC	0.118	0.015	8.008	< 0.001	*	0.108	8.68
lnPOILC	0.010	0.001	9.773	< 0.001	*	0.014	1.16
lnOGOILC	0.016	0.006	2.504	< 0.050	**	0.006	0.45
lnHGC	0.047	0.003	17.695	< 0.001	*	0.064	5.14
lnCGC	0.061	0.006	9.504	< 0.001	*	0.060	4.86
lnCEGC	-0.014	0.001	-22.104	< 0.001	*	-0.056	4.53
lnFGC	0.223	0.016	14.190	< 0.001	*	0.176	14.15
lnPGC	0.093	0.004	23.784	< 0.001	*	0.106	8.48
lnIGC	0.055	0.009	6.052	< 0.001	*	0.070	5.66
lnTCNGGC	0.010	0.001	13.257	< 0.001	*	0.085	6.83
lnPCOALC	0.014	0.001	13.089	< 0.001	*	0.068	5.47
lnBKCOALC	0.039	0.003	13.392	< 0.001	*	0.036	2.89
CONSTANT	-3.528	0.693	-5.088	< 0.001	*		

*, ** and *** indicate that the coefficients are significant at the 1%, 5% and 10% significance level.

After determining the two turning parameters including three components and eighteen explanatory variables, we go ahead and estimate the parameters of our concerned equation using the CCR model. The estimated regression results based on the CCR model are reported in Table 8. According to findings, population, capital formation and FDI have positive impacts on CO_2 emissions. These results confirm that a 1 percent increase in population, capital formation and foreign direct investment enhance environmental pollution by 0.071, 0.163 and 0.032 percent, respectively. Oil consumption in the household sector (HOILC) has a positive impact on CO_2 emissions, implying that environmental degradation rises with an increase in HOILC. More precisely, a 0.010 percent increase in CO_2 emissions is associated with a 1 percent increase in HOILC. Oil consumption in the industrial sector (IOLC) also positively affects CO_2 emissions. A 1 percent increase in IOILC leads to a 0.025 percent increase in CO_2 emissions, indicating that environmental degradation increases with an increase in IOILC. The rise in agricultural sector oil use (AOILC) demonstrates a negative influence on CO_2 emissions by generating a 0.024 percent decrement for every 1 percent increase in AOILC. This confirms that an increase in AOILC mitigates environmental pollution, while its decrease significantly damages the environmental quality. Oil consumption in the transport sector (TOILC) has a positive impact on CO_2 emissions. According to the results, a 1 percent rise in TOILC leads to a 0.118 percent rise in CO_2 emissions, suggesting that a positive change in TOILC increases pollution, while its negative change reduces pollution. Oil consumption in the power sector (POILC) also positively affects CO_2 emissions. According to findings, a 0.010 percent increase in CO_2 emissions is associated with a 1 percent increase in POILC, implying that environmental pollution increases due to an increase in POILC. Finally, oil consumption in the government sector (OGOILC) positively contributes to carbon emissions, suggesting a 0.016 percent increase in CO_2 emissions due to a 1 percent rise in OGOILC.

Our results confirm that gas consumption in the household sector (HGC) has a positive effect on CO_2 emissions, indicating that a 0.047 percent increase in CO_2 emissions is associated with a 1 percent rise in HGC. Gas consumption in the commercial sector (CGC) also has a positive impact on CO_2 emissions. A 1 percent increase in CGC leads to a 0.061 percent increase in CO_2 emissions, showing that environmental degradation is associated with the increase in CGC. In contrast, gas consumption in the cement sector (CEG) has a negative effect on CO_2 emissions, indicating a 0.014 percent decrease in CO_2 emissions in response to a 1 percent increase in CEGC. This confirms that a higher CEGC mitigates environmental pollution, while its decline significantly damages the environmental quality. Gas consumption in the fertilizer sector (FGC) has a positive impact on CO_2 emissions. According to empirical results, a 1 percent rise in FGC leads to a 0.223 percent rise in CO_2 emissions. This confirms that a higher FGC increases pollution, while its reduction mitigates pollution. Similarly, gas consumption in the power sector has a positive influence on CO_2 emissions. More precisely, a 0.093 percent increase in CO_2 emissions is associated with a 1 percent rise in PGC. This implies that a higher PGC leads to higher environmental pollution, whereas its deterioration mitigates pollution. Gas consumption in the industrial sector (IGC) positively contributes to carbon emissions. According to estimated results, a 1 percent increase in IGC leads to a 0.055 percent increase in CO_2 emissions. Finally, gas consumed in the transport sector (TCNGGC) has also a positive impact on CO_2 emissions, showing that a 0.010 percent increase in CO_2 emissions is

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associated with a 1 percent increase in TCNGGC. This confirms that environmental degradation in Pakistan is associated with higher gas consumption in TCNGGC.

Coal consumption in the power sector (PCOALC) has a positive influence on CO_2 emissions. According to the results, a 1 percent positive rise in PCOALC leads to a 0.014 percent increase in CO_2 emissions, implying that a higher PCOALC enhances environmental pollution. Similarly, coal consumption in the brick kilns sector (BKCOALC) also positively impacts CO_2 emissions, showing a 0.039 percent increase in CO_2 emissions following a 1 percent increase in BKCOALC. According to our results, positive change in BKCOALC increases environmental pollution, while negative change mitigates pollution.

Empirical findings concerning each predictor's relative importance are also calculated. According to our findings, among the comprised explanatory variables, gas consumption in the fertilizer sector had the highest contribution at 14.151 percent, followed by gross fixed capital formation (11.059%), transport sector oil consumption (8.682%), power sector gas consumption (8.481%), agriculture sector oil consumption (7.103%), transport sector gas consumption (6.827%), foreign direct investment (6.409%), industrial sector gas consumption (5.657%), power sector coal consumption (5.473%), household sector gas consumption (5.145%), commercial sector gas consumption (4.857%), cement sector gas consumption (4.528%), population (3.408%), brick kilns coal consumption (2.895%), household sector oil consumption (2.289%), industrial sector oil consumption (1.436%), power sector oil consumption (1.157%) and other government sector oil consumption (0.445%).

Table 9: Diagnostic Tests for the CCR Model

Name of Test	Critical value	Calculated value of Test Statistic	P-value
Normality Test (Jarque Bera)	$\chi^2_{0.05(2)} = 5.99$	1.06	0.59
Serial Correlation LM Test	$\chi^2_{0.05(1)} = 3.84$	1.15	0.28
ARCH Test	$\chi^2_{0.05(1)} = 3.84$	0.65	0.42
Ramsey Reset Test	$F_{0.05(1,26)} = 4.22$	2.68	0.11

Various diagnostic tests are used to confirm the validity and stability of the CCR model and the estimated results of these tests are presented in Table 9. We have checked the assumption of normally distributed residuals using the Jarque-Bera test. The residuals of the CCR model satisfy the normal distribution requirement according to our findings. The LM test has been applied to investigate the autocorrelation. The findings concerning the LM test show the absence of autocorrelation, implying that disturbances in one time period do not correlate with disturbances of another period. The problem of heteroscedasticity has been analyzed with the help of the ARCH test. This test confirms the absence of heteroscedasticity, indicating that all observations of the disturbances are drawn from the distribution having equal variability. The Ramsey Reset test has also been used to analyze the specification and misspecification concerning the CCR model. Based on the results of this test, it is possible to claim that the CCR model is correctly specified.

Figure 5 shows the cumulative sum (CUSUM) and squares cumulative sum (CUSUMSQ) of residuals to identify the parameter's stability and consistency of the CCR model. Both CUSUM and CUSUMSQ confirm structural stability since their graphs remain within 95% confidence level straight lines.

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Figure 5: The CUSUM and the CUSUMSQ
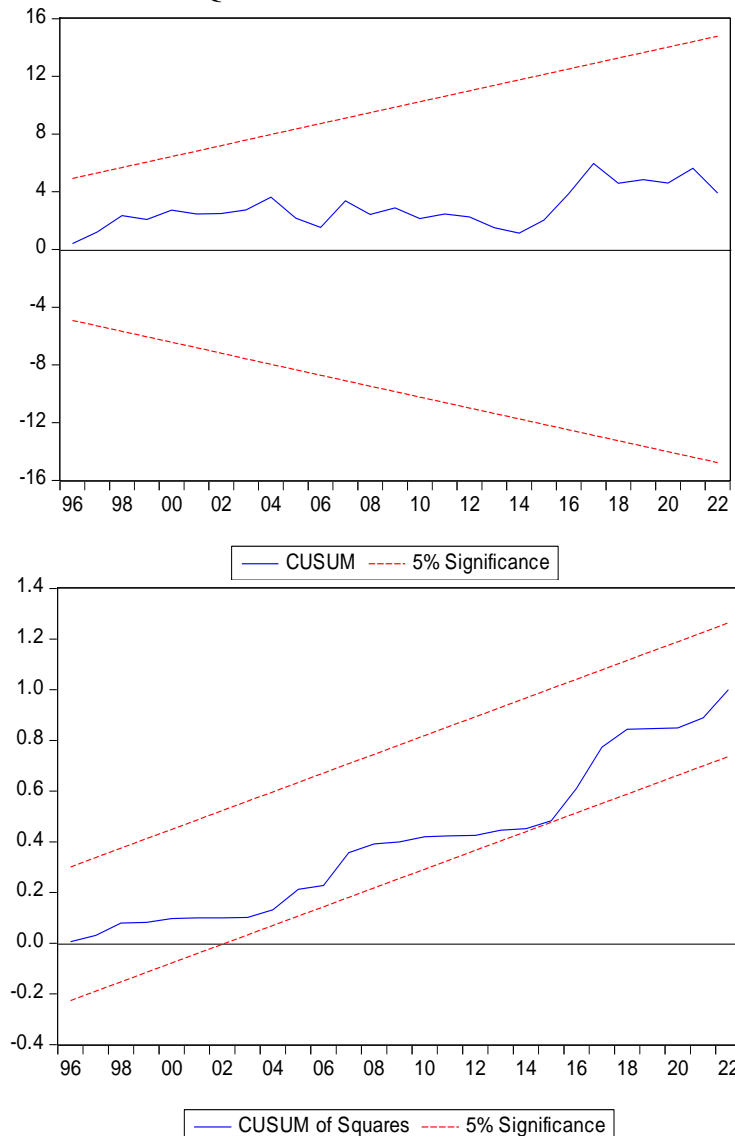
Conclusion and Policy Recommendations

The basic objective of this study is to examine the sectoral impact of energy consumption on CO2 emissions in Pakistan. This research has analyzed data from 1992 to 2022 while adopting the correlated component regression methodology. According to our findings, a 1 percent increase in oil consumption across households, industries, transport, power and government sectors leads to an increase in CO2 emission by 0.010 percent, 0.025 percent, 0.118 percent, 0.010 percent and 0.016 percent, respectively. This indicates that an increase in oil consumption in these sectors leads to a corresponding increase in environmental pollution. In contrast, a 1 percent increase in agricultural oil use produces a 0.024 percent reduction in environmental pollution consistent with a negative impact on CO2 emissions. Furthermore, gas consumption in the household, commercial, fertilizer, power, industrial and transport sectors is found to have a positive impact on CO2 emissions. A 1 percent increase in gas consumption in the household, commercial, fertilizer, power, industrial and transport (CNG) sectors leads to an increase in environmental pollution by 0.047 percent, 0.061 percent, 0.223 percent, 0.093 percent, 0.055 percent and 0.010 percent, respectively. Conversely, gas consumption in the cement sector demonstrates a negative influence on CO2 emissions, showing that environmental degradation decreases by 0.014 percent following a 1 percent increase in cement sector gas consumption. Coal consumption in both the power and brick kiln sectors has a positive effect on CO2 emissions, showing a 1 percent increase in coal consumption in the power and brick kiln sectors leads to an increase in environmental pollution by 0.014 and 0.039 percent, respectively. Finally, population, capital formation and foreign direct investment also positively impact CO2 emissions, indicating that a 1 percent increase in population, capital formation and foreign direct investment leads to an increase in

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environmental pollution by 0.071, 0.163 and 0.032 percent, respectively. Our results concerning the relative contributions indicate that among the variables, fertilizer sector gas consumption contributed 14.151 percent to CO_2 emissions, followed by capital formation (11.059%), transport sector oil consumption (8.682%), power sector gas consumption (8.481%), agriculture sector oil consumption (7.103%), transport sector gas consumption (6.827%), foreign direct investment (6.409%), industrial sector gas consumption (5.657%), power sector coal consumption (5.473%), household sector gas consumption (5.145%), commercial sector gas consumption (4.857%), cement sector gas consumption (4.528%), population (3.408%), brick kilns coal consumption (2.895%), household sector oil consumption (2.289%), industrial sector oil consumption (1.436%), power sector oil consumption (1.157%) and government sector oil consumption (0.445%).

Based on our findings, the following policy recommendations can be made to tackle the sector-specific effect of energy consumption on CO_2 emissions in Pakistan. First, energy efficiency measures should be adopted in high emissions-intensive sectors, including transport, household, industrial, power, and government, to decrease oil consumption. People can achieve this through green technologies along with promoting other energy sources, like solar, wind, and electric vehicles. For gas-consuming sectors, including fertilizer, power, transport (CNG), industrial, household and commercial should shift towards less emissions-intensive sources, including hydrogen and biogas. Emissions from coal utilization in the power and brick kilns sectors can be best addressed by kicking out coal and transitioning its usage either toward green energy sources or less emissions-intensive technologies. Investment in renewable energy technologies such as wind-based, solar panel-based and hydropower-based technologies is an urgent need to achieve environmental sustainability. The government needs to create financial assistance through subsidies and tax cuts for residential and industrial users who choose renewable energy technologies. Since the fertilizer sector has the largest share of carbon emissions, the focus of policies should encourage low carbon-intensive technologies in fertilizer production and promote the utilization of organic alternatives. In the transport sector, the concept of public transportation should be promoted. Electric vehicle adoption should be supported by establishing motivational schemes for electric vehicle usage and necessary infrastructure development. This research delivers useful guidelines that also allow other developing countries to establish sector-specific policies and renewable energy transformations that reduce CO_2 emissions effectively. These nations can achieve sustainable growth promotion and address climate change issues through the implementation of these strategies.

Adopting the proposed policies could bring important economic and social advantages for Pakistan. Moving towards renewable energy options including solar power and wind energy together with hydropower can reduce its reliance on imported fossil fuels which strongly improves national energy security and saves foreign exchange.

This shift to renewable energy can generate employment possibilities in the renewable technology systems which boost economic growth and further develop new technologies. Some social benefits can also be achieved with reduced CO_2 emissions through cleaner energy infrastructures and green technologies that improve public health and provide better air quality as well as reduce healthcare costs and enhance life quality. Furthermore, adopting electric vehicles together with public transportation services can minimize traffic congestion and noise pollution which further leads to higher quality of living standards.

Despite the important sectoral analysis, the current study has the following limitations. First, it may include potential omitted variables bias due to its exclusion of important CO_2 emissions determinants such as gross domestic product as well as renewable energy use and technological innovation. Second, the investigated model considers linear relationships while ignoring dynamic feedback effects within the data. In future research, better-estimated results can be achieved by incorporating these omitted variables and employing nonlinear estimation methods. Additionally, the results would gain more reliability through increased sample size along with the use of dynamic models for panel data analysis.

Disclaimer: The opinions expressed in this paper belong only to the author while not representing institutional standpoints.

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Determining the effect of Financial and Non-Financial Compensation on Employee Motivation and Commitment in Higher Education Institutes, Jamshoro

Determining the effect of Financial and Non-Financial Compensation on Employee Motivation and Commitment in Higher Education Institutes, Jamshoro

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Abstract

The main objective of this research is to measure the effect of financial and non-financial incentives on employee motivation and commitment in higher education institutes. Primary data was collected from employees of three large public sector universities located at Jamshoro city. Using survey research method, survey questionnaire is used to collect primary data. After data analysis it is interpreted that observed data is statistically valid and reliable. Discriminant validity analysis confirms no any specific item or construct is highly correlated with the measure of other, means all items are statistically different from one another. Standardized Root Mean Square Residual and Normed Fit Index analysis confirm significance of financial and non-financial incentives with motivation and commitment and Variance Inflation Factor analysis reveal no multicollinearity issues with predictors. Positive Beta and P values indicate all four alternate hypotheses are accepted. It is concluded that employees in higher education institutes are given fair and equitable compensatory benefits which not only motivate them but enhance commitment to work with employer. The findings of this research are valuable insight for top management of higher education institutes to devise compensation policy for employees. Future researchers may conduct this research in private educational institutes of country as well as comparative analysis between financial and non-financial incentives is also needed to achieve more diversified findings in compensation management.

Keywords: Financial incentives, Non-financial incentives, Employee motivation, Employee commitment, Higher education institutes

Introduction

One of the contemporary issues faced by corporations in developing and under developed countries is ensuring their employees are motivated enough to achieve set goals and objectives of the enterprise. Misfortunately, personal goals of employees are different from those of corporation goals. Efforts of skilled human capital must be appreciated to achieve desired goals of the corporation therefore motivation is essential. It is need of an hour to set policies in a way which must be aligned with appreciating right efforts of employees so that competent workforce will stay loyal with the corporation and properly engaged in achieving long term goals of the corporation (Ayandele & Etim, 2020). Employees remain integral part of the corporation so they decide the fate of the corporation for which motivation is suggested (Daniel, 2019). It is necessary for sustainable growth and development of the corporation that employees must be willing to work with employer. Among other factors for motivating employees, incentives is one of the determining factors which rewards each employee based on his contributed efforts.

Highly motivated employees and better rates of retaining lead to greater organizational performances. Employees pay more attention and put effort in assigned jobs which is conditional to fulfilling inner needs and motives. The physical and mental efforts invested by each employee in a particular organization depends on his level of motivation. Motivation can be extrinsic means employee receive financial or tangible incentives and intrinsic involve appreciation or encouragement (Watkins & Fusch, 2022). The organizations which demotivate employees will certainly have adverse effects (Chukwu, 2021). Lack of motivation results low productivity and lower profits. The Bureau of labor statistics (2015) in Nigeria revealed that voluntary turnover rate in small scale enterprises increased from 27% to 33% which is due to lack of attention paid by businessmen to their employees, this

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turnover also led downturn in earned profits. The main reason highlighted was lack of fair compensation strategy which create challenges for smooth functioning of the businesses (McManus & Mosca, 2015).

Any discrimination or inequity in disbursing rewards can create stress, frustration and embarrassment among employees as discussed by (Armstrong, 2012) because these benefits not only fulfill personal and family needs of an employee but also show his value and dignity with the corporation. Research findings reveal that most of the executives' high job turnover is due to pay discriminations. This inequity leads to affect performance, team work and commitment of employees to continue working with same employer (Lucas, 2016). Financial incentives directly affect corporate performance by helping them achieve goals and objectives because the reward structure serve as means of attracting and retaining talented employees who will surely perform better (Armstrong, 2012).

The non-financial incentives such as career growth and development, work appreciation and proper communication with employees increase employee loyalty in telecom sector of Libya. This hypothetical structure supported by theoretical background, i-e Equity theory and Expectancy theory. Adequate provision of non-financial incentives empowers employees to communicate information and receive job recognition which properly engage them in the corporation. This support increases their commitment to work with the corporation and improve organizational performance (Abdussalam et al., 2021).

Higher education institutes receive budget cuts in the last two decades which create a challenge for the management to compensate employees and motivate them to stay loyal. In parallel to this, Higher Education Commission has been directing the educational institutes to improve quality education and promote research culture by having highly qualified faculty. To achieve this objective, employees need to be motivated so they will stay committed with employer (Agasisti, 2017). Top Management of the Higher education institutes revised fee structure of students as only option left to retain highly qualified faculty as well as continuously engaged with federal and provincial governments to reconsider budget cuts for seamless conduct of academic activities (Ilyas et al., 2024). Based on contemporary situation it is pertinent to know the current state of employees' motivation and commitment in higher education institutes.

The main objective of this research is to study the relationship of financial compensation with job motivation and commitment of employees. Faculty members and administrative staff in higher education institutes voice their concern for attractive compensation because hyper-inflation and economic downturn in the country coupled with increasing income tax liabilities financially destabilized earning class to bear rising cost of living (Ali, 2014). It is momentous to know current compensation levels and their marginal effects on motivation and commitment of employees.

Second objective is to measure the effect of non-financial compensation on motivation and commitment of employees. Like financial incentives, employees also need recognition, work for achievement and growth. Appreciating employees for better work done, nature of work itself and growth prospect not only engage employees but motivates them to stay loyal with employer (Dessler, 2020). Considering this fact, it is important to know the adequate provision of non-financial incentives and their effect on motivation and commitment of employees.

Based on detailed review of literature and current studies, it is evident that no any research is undertaken in recent years to measure the effect of financial and non-financial compensation in public sector universities of Sindh in particular. This paper attempts to fill gap in literature which is certainly needed to be researched during fragile economic situation of higher education institutes in Sindh province. Furthermore, in a globalized economy, highly qualified faculty and admin staff has open door opportunities to resettle their careers and leave parent institutes therefore current state of their motivation and commitment is essential to be measured and known too.

Literature Review

Financial Incentives and Employee Motivation

Many research studies attempted to know the relation between financial incentives and employee motivation (Awais, Kashif, & Raza, 2020), in this context (Fischer et al., 2019; Shibli & Chatterjee, 2020) found the positive relationship between change in reward and employee motivation. (Nyandema & Were, 2014) discussed that many organizations did not increase financial rewards which result low motivation level among employees. Likewise, Lombardi et al. (2020) studied that extrinsic rewards do not similarly affect all employees, the way higher income employees motivated was different than lower income employees. Ekhayemhe and Oguzie (2018) studied

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significant relationship between financial incentives and employee motivation and concluded that relation between financial incentives and employee motivation is universal.

Prasetya and Kato (2011) researched that organizations should not only offer market based competitive pay to employees but along with this, some intrinsic rewards must be given to motivate employees. Robescu and Lancu (2016) discussed that offering adequate and fair tangible incentives to all employees is much difficult because the expectation level of employees varies due to multiple demographic and cultural differences among employees.

Considering above discussion, H1 is developed as;

Financial incentives are positively associated with employee motivation in higher education institutes.

Financial Incentives and Employee Commitment

Organizations offer tangible incentives to employees excite their commitment and sustainability with the corporation (Kilimo et al., 2016). Firms or corporations which have market based competitive monetary incentives in their compensation structure receive increased commitment level of their employees as well as improved organizational performance (Shalini, 2020). Organizations which offer tangible incentives like shares, cash bonus and profit sharing, have seen increased commitment of employees with the corporation (Awino & Kipsang, 2020). Employees do expect their contributed efforts must be rewarded by tangible incentives, it motivates employees to stay long with the same corporation and do not switch to any other organization (Hadžiahmetović & Dinc, 2017).

In contemporary business environment it is challenging to retain competent workforce therefore organizations change their compensation policy from conventional rewards to performance-based incentives. Main factors of performance-based rewards include Job knowledge, competencies and technical skills are prerequisite for performance-based incentives (Yun et al., 2007). Firms which adopt performance-based incentives in their compensation policy are benefited with large pool of committed employees (Jhonson et al., 2010; Milkovish & Newman, 2008).

Many research studies empirically found that financial incentives have positive and significant effect on motivation and commitment of employees. In this context (Kriesman, 2002; Kurdi et al., 2020; Urbancova & Vnouckova, 2018) empirically determined positive and significant relationship between financial incentives and employees' commitment, furthermore these incentives reduce turnover intention and enhance employee devotion. As the needs and wants of employees are fulfilled with tangible incentives offered by employees, it increases level of commitment with the corporation (Jeni et al., 2020). Tangible gains received by employees bridge the gap in their rational needs and desires which result them to stay committed with their corporation (Teo et al., 2020).

Considering above discussion H2 is developed as;

Financial incentives influence employees' commitment in higher education institutes.

Non-Financial Incentives and Employee Motivation

Many research studies undertaken on intangible incentives and employee motivation (Awais, Kiani, Thas Thaker, Raza, & Qaim, 2021; Yaqub, Awais, Aslam, Mohsin, & Rehman, 2022) found that intangible rewards as main predictor of motivating employees. In this connection (Nyandema & Were, 2014) interpreted that opportunities for career growth and development, coaching and mentoring augment motivation and satisfaction of employees. They also observed that conducive work environment is one of the main intangible rewards that stimulate positive work behavior. Kurdi et al. (2020) found positive relationship between work appreciation and recognition with employee motivation. Non-Financial incentives like growth opportunities and other non-financial incentives motivate employees (Teo et al., 2020).

Supervisor's attitude with employees and empowerment are other two intangible incentives which are empirically tested to have positive effect on employees' motivation. It develops trust of employees as management supports them and give them freedom in way to achieve their assigned tasks (Bari et al., 2019). Another study found that five non-financial rewards i-e training, performance recognition, opportunities for career growth and development, effective communication and job security were empirically tested, results found that except training and performance recognition all other non-financial incentives motivate employees at their workplace (Cheema & Mirza, 2013). Another study conducted in measuring the effect of non-financial incentives on employee's motivation in developed and developing countries which conclude that non-financial incentives positively

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motivate employees in developed countries however these incentives are less important in motivating employees in developing countries like Pakistan (Yousaf et al., 2014). Tausif (2012) found positive and significant relationship between non-financial incentives and employees' motivation in education sector of Pakistan. The study further discussed that non-financial incentives enhance motivation level of employees in all age groups, it is higher for senior employees and lower for fresh employees.

Considering above discussion, H3 is developed as;

Non-Financial rewards are positively associated with employees' motivation in higher education institutes.

Non-Financial Incentives and Employee Commitment

The situation in which employees do not receive rewards in proportion to their contributed efforts result increased job dissatisfaction. This dissatisfaction led to further weaken the commitment of employees in continuing work with same corporation. Keeping all other factors constant, the major failure of top management is unbalancing the disbursement of tangible and intangible incentives (Yousaf et al., 2014). Perception about financial and non-financial rewards varies from one employee to other, few employees prefer extrinsic over intrinsic rewards while others have vice versa choice. Therefore, it is main responsibility of top management to determine preference of each employee in receiving rewards which motivate all employees simultaneously based on rational decision (Meyer et al., 2004). Research findings reveal that most employees prefer financial incentives like cash however others argue that performance can be further improved with recognition and appreciation (Ghosh et al., 2016). In view of diverse opinion of employees, firms can have a justified mix of tangible and intangible incentives in compensation management which may result increased commitment of employees in comparison to firms which have unjust and irrational disbursement of both types of rewards (Meyer & Nujjo, 2012). Proper and justified reward structure manage employees effectively can lead corporations to achieve sustainable growth. Firms need to develop connection between talented workforce and commitment (Lok & Crawford, 2004). Higher motivation level of committed employees develops their emotional attachment with the corporation (Heavey et al., 2011).

Malhotra and Singh (2007) studied that non-financial rewards significantly affect employees' commitment than financial rewards. Firms need to execute perpetual appreciation of employees in their corporate culture which will increase motivation and make them highly committed (Altindis, 2011; Bibi, Butt, & Awais, 2024). Employees seem to be more concerted in achieving organizational goals in which are linked to social rewards given to them. The more accurate and timely disbursement of social rewards enhance their motivation and emotional attachment with the corporation. These rewards increase affective commitment of employees with employer (Chipunza & Berry, 2010). As firm give intangible incentives to employees, like holidays, employees believe that management does care about them and it adds to wellbeing of employees which enhance their motivation and commitment (Chiang & Birtch, 2012). Once employees know that firm values their certain behavior, they become motivated enough to adopt that behavior permanently at workplace (Luthan et al., 2006).

Researchers found that comparing two firms in which one offers tangible incentives and other offer intangible incentives, employees prefer firm offering intangible rewards (Ajila & Abiola, 2004). As managers become committed with their corporation, they reward their employees in just and rational manner (Kokubun, 2017). Studies found that firms which praise, recognize and morally support employees they become successful in receiving firm commitment of employees as the psychological needs of employees are fulfilled.

Considering above discussion H4 is developed as;

Non-Financial Incentives are positively associated with employees' commitment.

Employee Motivation

Motivation is a driving force of performance and it mediates the relationship between incentives and commitment. A motivated employee put his best efforts to improve firm performance (Dessler et al., 2015). Motivated employees hope for his efforts to be rewarded in the form of both financial and non-financial incentives which need to be line up with performance (Baron et al., 1992). Motivation is defined as a process by which an individual is engaged in ongoing activity to achieve desired outcomes. Nickson (2013) further elaborated that HR practices motivate employees to properly engage in his work and perform best which led to job satisfaction. Motivation is inner driving forces which make employees perform with interest, willingness and desire to achieve assigned goals and objectives in an effective manner.

Highly skilled and motivated employees perform difficult tasks with their best contributed efforts which lead to

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improve organizational performance. Motivation is positively correlated with performance because motivated employees achieve their assigned tasks more effectively than demotivated employees. Human resources are pivoting element for organizations therefore motivating employees is utmost important for giving a competitive edge to the firm (Datta et al., 2005). Various research studies found positive and significant relationship between employees' motivation and commitment (Newman & Shaikh, 2012).

The Incentive Theory of Motivation

The incentive theory of motivation asserts that people are motivated by extrinsic rewards whether positive or negative. This theory worked as operant conditioning where employees perform either for incentives or avoid punishment. External rewards motivate people to work despite unpleasant working environment i-e chores, restrictive tasks or other factors. These rewards also motivate people to avoid bad habits like smoking or alcoholism because these addictions can negatively affect the lives of people. Incentives can be positive or negative, positive rewards receive by employees once task is finished or completed, for instance, receiving commission for achieving or exceeding assigned targets. Negative incentives are related to violation of some legal acts, like over-speeding imposes financial penalty on employees (Cherry, 2020).

Not all incentives work in same way as you plan, social and psychological factors keep changing overtime. For instance, any medical emergency or major disease in his family drive him to work or do something at workplace which can solve his contemporary problem. Likewise, an employee looking for financing his children higher education might be less motivated with annual bonus because his desire for action finds solution of his chronic problem (Cherry, 2020).

Frederick Herzberg Two Factor Theory

This theory asserts that intrinsic factors motivate employees more than extrinsic or hygiene factors. Intrinsic factors like Achievement, Recognition, work itself and advancement satisfy higher level needs of employees however Extrinsic factors like Salary, working conditions, supervisor attitude satisfy lower-level needs. Managers do this by making jobs of employees more challenging so that recognition and feedback give internal satisfaction to employees. In organizational psychology, it is discussed that intrinsic motivation comes from people within therefore it gives more pleasure as compare to extrinsic which comes from any external factor like manager decides to reward you based on contribution. The research findings of Herzberg clearly narrate that providing extrinsic rewards only is riskier for the managers to motivate employees and get work done from them instead motivating or intrinsic factors to be provided by which employees feel pleasure in completing challenging tasks and receiving feedback and recognition in the end (Dessler, 2020).

Conceptual Framework
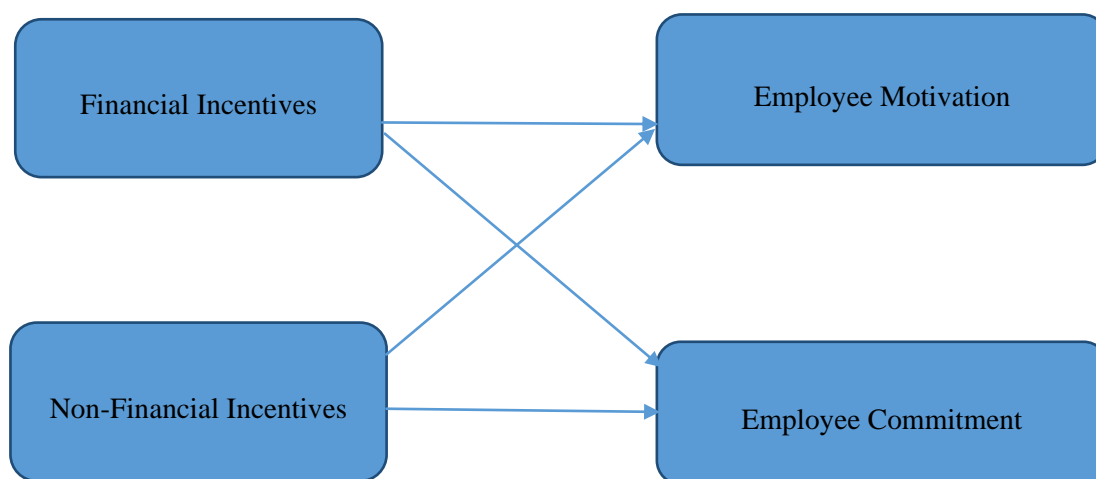
Research Methodology

Nature of Research

This research is quantitative in nature. Bryman (2015) discussed that quantitative research is one in which researcher uses numerical data to analyze the relationship between predictors and explained variables. This research investigates the relationship between financial and non-financial incentives on employee motivation and

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commitment of teachers at higher education institutes.

Population and Sample

Using convenience sampling method employees of top three public sector universities situated in Jamshoro city i-e University of Sindh Jamshoro campus, Liaquat University of Medical and Health Sciences, Jamshoro and Mehran University of Engineering and Technology Jamshoro are selected. Two hundred questionnaires were distributed among faculty members and admin employees of three selected universities. Out of these, 180 questionnaires were correctly filled and returned. Using simple random sampling method, one hundred questionnaires were distributed among faculty members and one hundred to admin employees. Out of one hundred faculty, 66% were males and 40% were females, their job positions were Lecturers, Assistant Professors, Associate Professors and Professors from three public sector universities. Remaining one hundred questionnaires to admin employees were; Assistants, Superintendents, computer programmers, and Accountants. Out of them, 70% were males and 30% females.

The summary of above discussion is tabulated below:

Table1: Survey questionnaire distribution table

Demographic Factors	Sindh Univ	MUET Univ	LUMHS Univ
Gender			
Male	60	40	32
Female	40	16	12
Total **(200)**			
Designiation (Faculty)			
Lecturer	20	10	05
Assistant Professor	15	10	10
Associate Professor	10	05	05
Professor	04	03	03
Designation (Admin)			
Assistants	15	05	05
Superintendents	08	10	10
Computer programmers	17	10	05
Accountants	05	05	05
Total (200)			

Scale and Measurement

This study includes five points Likert scale, i-e 1. Strongly disagree, 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree. Items of each variable included in the closed ended. Five constructs of financial incentives were adopted from Pregnolato (2010), Five constructs of non-financial incentives from Bustamam et al. (2014), Six Constructs of Employee Motivation from Musinguzi et al. (2018), and eight constructs of Employee Commitment from Mayer et al. (1993). This research aimed to collect primary data through closed ended questionnaire.

Closed ended questionnaire used to collect primary data in which multiple choice questions are given on a questionnaire to all respondents involved in the research as target respondents. Survey research is a type of research in which closed ended questionnaire is used to collect quantitative data (Bryman, 2015).

Data collection and Analysis tools

Data was collected through survey questionnaire distributed among respondents of three public sector universities. Two software tools were used to analyze the data, Statistical Packages for Social Sciences (SPSS) and Smart PLS-3. Data analysis tools used in the study are, construct validity and reliability, Discriminant validity analysis using Fornell Larcker Criterion, Model Fitness using Standardized Root Mean Square Residual and Normed Fit Index and Variance Inflation Factor for multicollinearity analysis.

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Data Analysis

Structural Equation Model 1 of Financial and Non-Financial Incentives with Employee Motivation

Pic 1
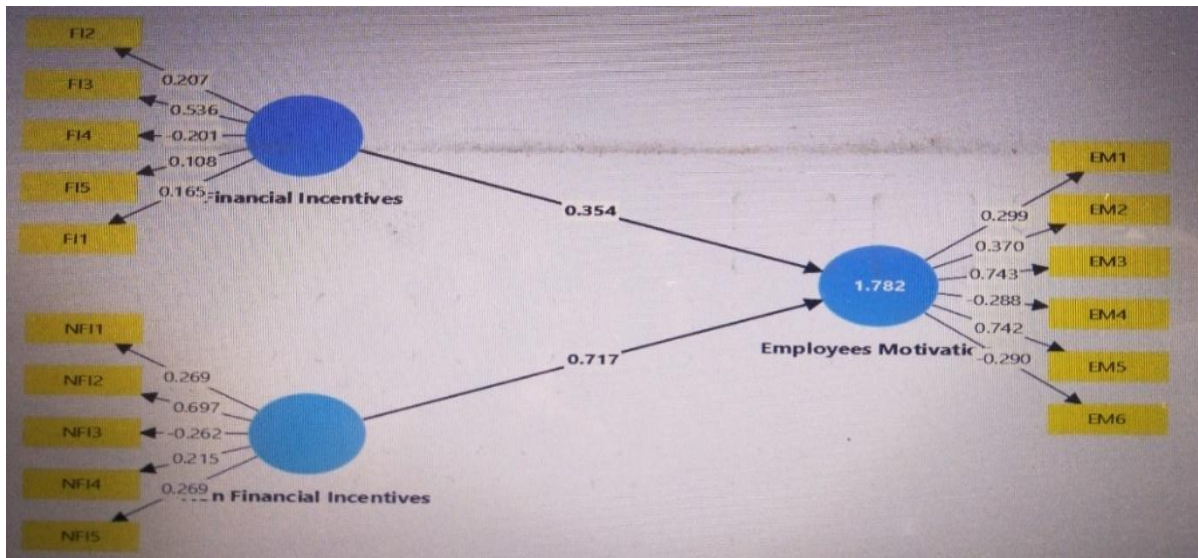
Structural Equation Model 2 of Financial and Non-Financial Incentives with Employee Commitment

Pic 2
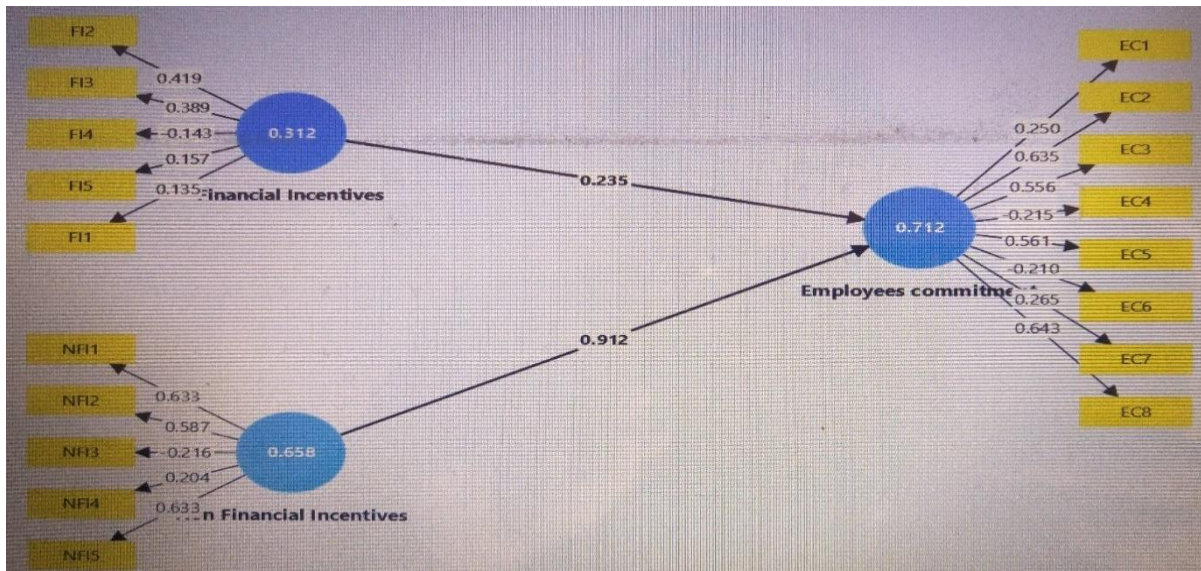
Table-2: Construct Validity and Reliability Analysis

Variables	Cronbach Alpha	Composite Reliability	Average Variance Extracted
Financial Incentives	0.744	0.851	0.689
Non-Financial Incentives	0.757	0.897	0.776
Employee Motivation	0.812	0.871	0.640
Employee Commitment	0.861	0.880	0.644

Table 2 shows validity and reliability analysis of explanatory and explained variables. Data is empirically valid if its AVE value is >0.50 (Bryman, 2015). Financial Incentives AVE is 0.689>0.50, Non-Financial Incentives AVE is 0.757>0.50. Employee Motivation AVE is 0.640>0.50 and Employee commitment AVE is 0.644>0.50. All

results show constructs are highly correlated with their respective variables, therefore data is said to be significantly valid.

Reliability analysis shows internal consistency among constructs of variables. Data is said to be reliable if its internal consistency among items of each variable is >0.70 (Bryman, 2015). In above table, all four variables' composite reliability value is >0.70 means internal consistency of all constructs is good and data is reliable.

Table 3: Discriminant Validity Analysis using Fornell Larcker criterion

Constructs	FI	NFI	EMPM	EMPC
FI	0.805			
NFI	0.644	0.786		
EMPM	0.579	0.677	0.818	
EMPC	0.610	0.692	0.655	0.785

Discriminant validity shows each construct average variance supposed to be greater than variances of other constructs in respective rows and columns. Then it can be empirical confirmation about each construct which is statistically different from other constructs included in the study (Hamid et al., 2017). Results show the average variance of Financial Incentives is 0.805 which is greater than other variances of constructs in the respective row and column. Likewise, Non-Financial Incentives average variance is 0.786 greater than variances of other constructs, Employees Motivation value is 0.818 and Employees Performance value is 0.785. All constructs are statistically different which confirms discriminant validity in the data.

Table 4: Model Fitness Standardized Root Mean Square Residual (SRMS), Normed Fit Index and R Squared using SEM Analysis (Model 1)

Fit Summary	Saturated Model	Estimated Model
Standardized Root Mean Square Residual (SRMR)	0.077	0.077
Normed Fit Index	0.928	0.928
R Squared:	0.771	

Standardized Root Mean Square Residual is the difference between observed correlation and model implied correlation matrix. Its acceptable value is <0.10 or 0.08 (Stone, 2021). In above table, the SRMR value is 0.078<0.08 it means the observed model is best fit. If Normed Fit Index (NFI) value is >0.90 model is considered to be best fit (Bentler & Bonnet, 1980). In above table the NFI value is 0.928>0.90 means the model is best fit. R square is supposed to measure percentage change in dependent variable explained by predictors. If R Square value is above 0.50 means moderate effect is observed on dependent variable if it is greater than 0.70, means it has significant effect on dependent variable (Bryman, 2015). In above table, the R squared value is 0.771 which means 77% change in employee motivation is due to Extrinsic and Intrinsic Rewards given to them.

Table 5: Model Fitness Standardized Root Mean Square Residual (SRMS), Normed Fit Index and R Squared using SEM Analysis (Model 2)

Fit Summary	Saturated Model	Estimated Model
Standardized Root Mean Square Residual (SRMR)	0.070	0.070
Normed Fit Index	0.931	0.931
R Squared:	0.712	

In above table the SRMR value is 0.070 <0.08, NFI value is 0.931>0.90 interpreted that observed model is best fit. The R squared value is 0.712 means 71% change in employee commitment is strong influence of predictors on dependent variable. It further interprets that 71% change in employee commitment is explained by financial and non-financial incentives offered to employees in higher education institutes.

Table 6: Variance Inflation Factor (Multicollinearity Analysis)

Predictors	Values of Correlation
Financial Incentives	1.777
Non-Financial Incentives	2.220

Variance Inflation Factor attempts to measure collinearity among predictors in the research model. High collinearity creates problem in the research model as both predictors change together so it will be difficult to know each predictor's effect on dependent variable. If the VIF value is <5.0 then its correlation is weak and

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model is statistically significant (Murray et al., 2012). In above table, first predictor i.e. Financial Incentives value is 1.77<5.0, second predictor i-e non-financial incentives value is 2.220<5.0. Both predictors do not have any issue of multicollinearity therefore model is statistically significant.

Discussion

Table 7: Hypotheses Accepted/Rejected Results

Hypotheses	Beta	T Statistics	P-Values	Accepted/Rejected
Fin Inc - > Emp Motiv (H1)	0.361	13.713	0.000	Accepted
Fin Inc - > Emp Commit (H2)	0.210	5.878	0.000	Accepted
Non-Financial Inc - > Emp Motiv (H3)	0.410	12.821	0.000	Accepted
Non-Financial Inc - >Emp Commit (H4)	0.354	10.048	0.000	Accepted

H1: Financial Incentives are positively associated with employee motivation with the Beta value 0.361 that is positive, T statistics is 13.71>2.0, and P value is 0.000<0.05 indicates that Financial Incentives enhance motivation level of employees. Ekhayemhe and Oguzie (2018) results endorsed that financial incentives have positive and significant effect on employees' motivation. H2: Financial Incentives and employee commitment with Beta 0.210 that is positive, T statistics 5.878>2.0 and P Value 0.000<0.05 is accepted. Shalini (2020) research findings also reveal that market based competitive monetary benefits enhance their commitment level and improves organizational performance. H3: Non-Financial Rewards are positively associated with employee motivation with Beta value 0.410 which is positive, T statistics 12.821>2.0, P value 0.000<0.05 indicates that employees are motivated enough in response to Non-Financial Incentives given to them. (Kurdi et al., 2020) research findings also endorsed that work appreciation and recognition (non-financial incentives) are positively associated with employee's motivation. Teo et al. (2020) also endorsed that non-financial incentives have positive and significant association with employees' motivation.

H4: Non-Financial Incentives with Employees Commitment Beta value 0.354 that is positive, T statistics 10.048>2.0, and P-value 0.000<0.05 indicates that Non-Financial Incentives have positive and significant effect on employee commitment in higher education institutes. Ghosh et al. (2016) findings reveal that employees prefer cash as financial incentive but show commitment more with non-financial incentives, i-e recognition and appreciation.

Conclusion

The study concluded that financial and non-financial compensation positively associated with employees' motivation and commitment in higher education institutes. Main objective of this research was to study financial and non-financial incentives and their association with employees' motivation and commitment. Survey questionnaire was distributed among two hundred employees of three selected universities. Faculty members and administrative staff of selected public sector universities are motivated enough with grant of financial benefits, i-e salary, promotion and non-financial benefits like job recognition, achievement and growth as well as their commitment level was also increased. Careful data analysis of main variables; i-e financial incentives with reliability value, i-e >0.80, AVE >0.60, Positive Beta and T values >12.0 indicate its statistical significance. Non-Financial Incentives also show significant results, i-e reliability>0.85, AVE >0.75, Positive Beta and T value > 5.0 indicate the importance of these incentives too. Both extrinsic and intrinsic rewards not only motivate employees but reduce turnover rate and increase their commitment to work with higher education institutes.

Future Research

This study can only include three largest public sector universities of Jamshoro city. Both financial and non-financial incentives influence on employee commitment and motivation can also be studied in other corporate sectors of the country too. Future researchers can study impact of these incentives on employees working in private educational institutes of the country too. Comparative analysis between extrinsic and intrinsic rewards will also be a valuable addition in future research because in many studies one group of employees prefer extrinsic over intrinsic rewards and other employees' perception is vice versa.

Practical Implication

The findings of this research study are valuable insight for higher education institutes to motivate employees and increase their commitment level with the employer. In response to motivating employees and increasing their level of commitment, performance will also be improved and it will also enhance goodwill of educational

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institutes in the society and country at large. As satisfying employees is also one of the prerequisites for fulfilling corporate social responsibilities. Therefore, awarding attractive tangible and adequate intangible rewards to employees in just and judicious way will create a better working environment for all stakeholders of higher education institutes. Top management of these higher education institutes must devise stability compensation strategy for continuing grant of financial and non-financial incentives to employees for sustainable growth and development.

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Impact of Perceived Generational Conflict on Workplace Stress with Moderating Role of Social Support in Educational Institutions: A Case of Twin Cities

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Abstract

In today's diverse workplace, multiple generations often work side by side that can sometimes lead to perceived conflicts between younger employees particularly Generation Z and their older colleagues. This study explores how these generational conflicts are perceived by Generation Z employees by focusing on their impact on stress levels in the workplace. Additionally, it examines whether social support from peers and supervisors can help to reduce this stress. To analyze these relationships, data was gathered from Generation Z employees working under older generations at various universities in the Islamabad and Rawalpindi regions. The study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) using the SMART PLS software to test the proposed hypotheses. The results revealed a significant but moderate positive link between perceived generational conflict and increased workplace stress among Generation Z employees. However, the presence of social support was found to play a crucial role in moderating this effect. This research contributes to existing literature by emphasizing the value of social support in easing workplace stress caused by intergenerational conflicts. These findings suggest that fostering a supportive work environment can help organizations to mitigate stress and enhance overall performance for their younger workforce.

Keywords: Perceived generational conflict, Workplace stress, Social support, Generation Z

Introduction

The modern workplace has become a vibrant mix of multiple generations where each bringing their unique values, work ethics, and communication styles to the table. This intergenerational diversity can foster innovation and creativity, but it also presents challenges, particularly when it comes to aligning expectations and work approaches (Abbasi et al., 2024). Generation Z, the youngest cohort to enter the workforce, often finds itself working under the guidance of older generations. This generational gap can create misunderstandings and friction particularly in areas like communication preferences, work styles, feedback mechanisms, and expectations for work-life balance (Agustin et al., 2023). In past, various studies have been conducted to understand the generational conflicts among various generations (Silent Generation, Generation X and Generation Y) (Appelbaum et al., 2022), however, this study is particularly about Generation Z who have distinct characteristics and working values (Barhate & Dirani, 2022) and are working under the older generations. This generation may have perception of generational conflict that may affect their productivity at workplace. These perceived generational conflicts are not merely about differences in age rather they reflect deeper disparities in outlook shaped by the societal contexts in which each generation was raised (Rafiki & Hartijasti, 2022). For Generation Z employees in Pakistan, who are still in the early stages of their professional journey, these conflicts can be a significant source of workplace stress (Zhang & Wiebe, 2022). The stress stems from the pressure to adapt the established norms and practices that may not align with their own values or preferred ways of working (Ahmad et al., 2022). As a result, Generation Z employees may experience feelings of frustration, reduced job satisfaction, and even burnout if these conflicts are not effectively managed.

Despite the growing focus on workplace diversity, there is a noticeable gap in research when it comes to understanding the specific generational tensions experienced by Generation Z particularly in the context of developing countries like Pakistan. The existing literature on generational conflict has been conducted in Western settings (Guo et al., 2022), leaving a gap in our understanding of how these dynamics play out in Pakistani organizations especially for Generation Z who are entering to the workplace as entry level manager with distinct characteristics and values. These days, workplace stress is a significant issue for entry-level managers in educational institutions. These managers face various challenges that contribute to heightened stress levels. Stress

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can stem from workload, role ambiguity, interpersonal conflicts, and performance pressures. These factors are especially prominent in educational settings, where managing both administrative tasks and interpersonal dynamics is crucial (Abdullah et al., 2023). To get benefit from this generation at workplace, it is important to understand how they perceive the generational conflict and how it can be mitigated to keep them motivated and productive. This study aims to fill this gap by examining how perceived generational conflicts contribute to workplace stress among Generation Z employees and exploring the moderating role of social support. Hence, this research has two distinct objectives: (a). To examine the impact of perceived generational conflict on workplace stress among Generation Z employees in educational institutions in twin cities (Islamabad & Rawalpindi). (b). To investigate the moderating effect of social support on the relationship between generational conflict and workplace stress.

Literature Review

Perceived Generational Conflict

Perceived generational conflict is a concept that captures the tensions, misunderstandings, and friction arising from differences in attitudes, behaviors, and work preferences among employees belonging to different age cohorts (Özan et al., 2024). This conflict often emerges in workplaces where multiple generations interact, influenced by distinct socio-economic contexts, technological advancements, and cultural shifts (Guo et al., 2022). These generational disparities can create challenges in fostering a cohesive and collaborative work environment, particularly in organizations that rely heavily on teamwork and cross-functional collaboration (Sattar et al., 2023). One of the most evident areas of generational conflict is communication style (Grieve, 2020). Generation Z, often described as digital natives, is highly comfortable with instant messaging, social media, and other quick, technology-driven communication methods (Agustin et al., 2023). They tend to favor open, informal, and immediate communication channels, expecting rapid responses and feedback (Bashir et al., 2021). In contrast, older generations such as Generation Y (Millennials) and Generation X are more accustomed to structured and formal communication methods, such as emails or scheduled meetings, which younger employees may perceive as slower and less efficient (Sattar et al., 2023).

These differences in preferred communication styles can lead to misunderstandings, frustration, and strained relationships among employees. Generational differences also manifest in decision-making approaches. Generation Z employees generally value inclusivity, transparency, and a participative approach to decision-making (Barhate & Dirani, 2022). They expect their opinions to be heard and thrive in flat organizational structures that promote open dialogue (Bogueva & Marinova, 2022). On the other hand, older generations may prefer a more hierarchical approach, where decision-making authority is concentrated among senior leaders (Zhang & Wiebe, 2022). This divergence in decision-making preferences often leads to feelings of exclusion or undervaluation among younger employees, further contributing to perceived generational conflict.

Perceived generational conflict is increasingly prevalent in educational institutions, where multiple generations of employees (including faculty, administrative staff, and managers) must work together in dynamic, team-oriented environments. Educational settings are unique as these settings are often hierarchical but require collaborative decision-making and communication, making generational differences more pronounced (Silva & Carvalho, 2021). Generational conflict can arise from differences in communication styles, and work preferences, all of which can impact institutional culture, teamwork, and overall performance (Gopinath, 2020). The implications of generational conflict are significant for organizational outcomes. Conflict can negatively impact employee engagement, reduce productivity, and increase turnover intentions (Rudolph et al., 2021). Addressing perceived generational conflict through effective communication strategies and fostering an inclusive work environment is critical for improving collaboration and reducing workplace tensions across age cohorts.

Workplace Stress

Workplace stress refers to the mental, emotional, and physical strain caused by job-related demands that exceed an individual's capacity to cope. It is a widespread phenomenon across various sectors, driven by factors such as excessive workloads, unclear job expectations, lack of control over work tasks, and interpersonal conflicts (Ahmad et al., 2022). Stress in the workplace can lead to significant negative outcomes, including burnout, decreased job satisfaction, reduced productivity, and mental health challenges (Abdullah et al., 2023). Organizations that fail to address workplace stress often experience high employee turnover and decreased overall organizational performance (Arora & Mahapatra, 2022). One of the primary causes of workplace stress is role

ambiguity, which occurs when employees are uncertain about their responsibilities or expected performance standards. Employees placed in ambiguous roles often experience anxiety and frustration, which can negatively impact their decision-making abilities and overall job performance (Arnetz et al., 2020). Additionally, workplace stress can be exacerbated by limited resources and organizational changes, especially when employees feel unsupported in adapting to new work demands (Cao et al., 2021). Interpersonal relationships at work also contribute to workplace stress. Conflict with supervisors, colleagues, or subordinates can lead to feelings of exclusion or disrespect, further increasing stress levels. High levels of interpersonal tension in the workplace often result in job dissatisfaction, disengagement, and lower team cohesion (Byun et al., 2022; Estes, Awais, & Sher, 017; Nawaz & Awais, 2018). Similarly, workplace stress can be intensified by inadequate feedback or a lack of recognition for an employee's efforts, leading to feelings of undervaluation and demotivation (Sharma & Tripathi, 2023).

In educational institutions, workplace stress is particularly prevalent due to the dynamic and multifaceted nature of the environment. Entry-level managers and educators are often subject to heavy workloads, tight deadlines, and frequent disruptions. They may experience stress due to unclear job expectations, administrative challenges, and the need to manage relationships with faculty, students, and senior management simultaneously (Abdullah et al., 2023). Additionally, rapid policy changes and limited resources can create a stressful work environment for educational employees, leading to burnout and reduced job satisfaction (Chen et al., 2021). High-pressure performance evaluations and administrative demands further compound workplace stress in educational institutions. Workplace stress is a complex issue that affects employee well-being and organizational outcomes across industries (Tan et al., 2020). Organizations that implement stress-reduction strategies are more likely to improve employee engagement and overall performance (Wright et al., 2023).

Social Support

Social support plays a crucial role in the well-being of individuals, particularly in the workplace (Cao et al., 2021). It is broadly defined as the perception or experience of being cared for, valued, and having assistance available from others (Santiago et al., 2023). This support can come from various sources, including colleagues, supervisors, family members, and friends (Xiao et al., 2020). Social support encompasses emotional, informational, and instrumental dimensions, each contributing to reducing stress, improving mental health, and enhancing overall performance (Dhakate et al., 2022).

Emotional support refers to expressions of empathy, care, concern, and encouragement from others (Santiago et al., 2023). It can involve listening to someone's problems, providing reassurance, or simply being present during difficult times. In the workplace, emotional support from colleagues and supervisors fosters a sense of belonging and reduces feelings of isolation. Employees who feel valued are more likely to experience increased morale and motivation (Xiao et al., 2020).

Informational support involves providing advice, guidance, or useful information that helps individuals solve problems or make decisions (Santiago et al., 2023). This type of support is particularly valuable in work settings, where employees may face challenges related to job tasks, career development, and organizational changes (Foy et al., 2019). Access to reliable information from trusted sources alleviates stress by reducing uncertainty and enhancing one's ability to cope with job demands (Dhakate et al., 2022).

Instrumental support, also known as tangible support, involves offering practical help or resources to meet a person's immediate needs (Cao et al., 2021). In the workplace, this might include assistance with workload, providing necessary tools or resources, or offering flexibility in work schedules (Santiago et al., 2023).By reducing the immediate demands placed on an employee, instrumental support enables better management of responsibilities (Xiao et al., 2020).

In educational institutions, social support plays a critical role in mitigating workplace stress and promoting a positive work environment. Entry-level managers, teachers, and staff often benefit from emotional and informational support to navigate complex administrative tasks, classroom challenges, and shifting institutional priorities (Zambrana et al., 2021). Informational support is particularly valuable in addressing curriculum changes, student issues, and policy adjustments, while instrumental support, such as workload sharing and schedule flexibility, helps to reduce burnout. Institutions that foster a supportive culture can enhance employee well-being, increase job satisfaction, and ultimately improve overall educational outcomes (Killgore et al., 2020).

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Theoretical Foundation

The Generational Cohort Theory was developed by sociologists Karl Mannheim (1952) serves as a foundation for understanding how different generations develop distinct attitudes, values, and behaviors (Buskirk-Cohen et al., 2016). According to this theory, individuals born during a specific time period are influenced by the major events, societal changes, and technological advancements of their formative years that leads them to form a "cohort identity" that differentiates them from other generations (Egerová et al., 2021). The Generation Z is born approximately between 1997 and 2012, has grown up in a digital age marked by the rise of social media, economic uncertainty, and a globally connected world (Zhang & Wiebe, 2022). This digital-native cohort is characterized by their preference for instant communication, flexibility, diversity, and a strong inclination towards work-life balance (Barhate & Dirani, 2022). The Generational Cohort Theory thus provides a theoretical lens through which to examine how these generational differences can lead to perceived conflicts in the workplace.

Linking Theory with Research Model

The Generational Cohort Theory underpins the research model by explaining how the unique experiences and characteristics of Generation Z influence their expectations and behaviors in the workplace. According to the theory, the shared experiences of Generation Z such as growing up in a rapidly changing technological landscape, have shaped their preferences for a flexible, dynamic, and feedback-rich work environment. When these expectations clash with the work styles of older generations who may prioritize structure and hierarchy, it can lead to perceived generational conflict.

Perceived Generational Conflict Leading to Workplace Stress

Perceived generational conflict arises when employees from different generational cohorts experience difficulties in communication, work expectations, and leadership styles (Grieve, 2020). According to Generational Cohort Theory, individuals develop shared values, attitudes, and work preferences based on the socio-economic and cultural events they experience during their formative years. When these generational values clash in the workplace, it can lead to intergenerational tensions, affecting employee well-being and performance (Bashir et al., 2021). Workplace mismatches in leadership, feedback mechanisms, and communication styles have been found to be major contributors to workplace stress (Zhang & Wiebe, 2022). Previous Studies suggested that Generation Z employees, who are digital natives and accustomed to instant feedback, open communication, and flexibility, may struggle under the hierarchical, formal, and structured work approaches of older generations (Agustin et al., 2023). These misalignments can create stressors such as role ambiguity, lack of autonomy, and feelings of exclusion (Cao et al., 2021). A study by Byun et al. (2022) found that younger employees experiencing intergenerational conflict reported higher stress levels and lower performance, primarily due to misaligned expectations and a lack of effective communication.

One critical area of conflict between Generation Z employees and older supervisors is the feedback mechanism (Bratu et al., 2023). Generation Z employees prefer frequent, constructive, and digital-based feedback, whereas older generations may adhere to formal, periodic performance reviews (Bogueva & Marinova, 2022). A mismatch in feedback expectations has been linked to higher levels of workplace stress and reduced job engagement (Sharma & Tripathi, 2023). When younger employees perceive that their contributions are undervalued due to delayed or insufficient feedback, they may experience workplace stress, anxiety, and disengagement (Chen et al., 2021). Leadership style also plays a crucial role in generational conflict and workplace stress (Ali et al., 2020). Transactional and hierarchical leadership styles, which are more common among Generation X and Baby Boomer supervisors, may conflict with the participative and collaborative leadership expectations of Generation Z employees. This misalignment can lead to feelings of alienation, increased role conflict, and workplace stress (Guo et al., 2022). Workplace stress is the most relevant variable as it directly captures the strain caused by perceived generational conflict (Chen et al., 2021), unlike broader workplace stressors. Generational differences in work styles, communication, and decision-making create interpersonal tensions that contribute to stress through workload pressure, conflicts, and job insecurity (Dhakate et al., 2022). Focusing on workplace stress ensures a precise analysis of how generational conflict affects employees' well-being and productivity (Zhang & Wiebe, 2022).

Building on the Generational Cohort Theory, this study hypothesizes that perceived generational conflict is a significant predictor of workplace stress for Generation Z employees. The theory suggests that when Generation Z feels that their communication styles, work ethics, or feedback expectations are not aligned with those of their older supervisors, it creates a stressful work environment (Egerová et al., 2021). This conflict can be particularly

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stressful for younger employees who are still adapting to the professional world that may lead to feelings of frustration, anxiety, and disengagement (Rafiki & Hartijasti, 2022). For example, if a Generation Z employee prefers instant feedback but receives infrequent, formal reviews from their older generation supervisor, they may feel undervalued and demotivated. Such mismatches can contribute to elevated levels of workplace stress, as they navigate the challenge of aligning their work styles with the expectations of their supervisors. Hence, the researcher proposed that:

H1: Perceived generational conflict is positively related to workplace stress among Generation Z employees.

The Moderating Role of Social Support

Social support plays a critical role in buffering workplace stress, particularly in environments where generational differences create interpersonal tensions (Cao et al., 2021). Santiago et al. (2023) suggested that social support can mitigate the adverse effects of workplace stressors by providing emotional, informational, and instrumental resources that help employees cope more effectively. Generation Cohort Theory also highlights the importance of social contexts in shaping workplace experiences, emphasizing that intergenerational support can facilitate adaptation and stress management. Studies have consistently found that employees with strong social support networks experience lower workplace stress (Chen et al., 2021) and higher performance (Abdullah et al., 2023). This is particularly relevant for Generation Z employees, who are still adapting to professional environments and may struggle with intergenerational communication barriers (Agustin et al., 2023).

Social support can help to mitigate the negative effects of generational conflicts and stress (Santiago et al., 2023). Research indicates that supervisors who acknowledge generational differences and adapt their leadership styles to foster a more inclusive environment, their younger employees feel less stress at workplace (Byun et al., 2022). A collaborative and team-oriented work culture allows employees to exchange experiences, seek advice, and gain reassurance, thereby alleviating workplace stress (Arora & Mahapatra, 2022). Frequent, constructive feedback from supportive mentors can reduce uncertainty, improve job performance, and lower stress levels among younger employees (Bogueva & Marinova, 2022). Xiao et al. (2020) suggested that informational and emotional support directly buffered the effects of workplace stressors, including generational differences in leadership styles.

The model further posits that social support can moderate the relationship between perceived generational conflict and workplace stress. Social support can mitigate the negative effects of stressors by providing employees with resources to cope more effectively (Abbasi et al., 2024). When Generation Z employees receive support from their peers or supervisors, it can help alleviate the stress caused by generational misunderstandings (Santiago et al., 2023). For instance, a supportive supervisor who acknowledges generational differences and provides tailored feedback can create a more inclusive and understanding work environment. Social support can also enhance resilience by making Generation Z employees feel valued and understood, reducing the perceived impact of generational conflicts (Cao et al., 2021). This aligns with the Generational Cohort Theory's emphasis on the influence of social contexts in shaping attitudes and behaviors. A supportive work culture can bridge generational gaps, enabling employees to focus on their strengths rather than the conflicts that arise from their differences. Therefore, the researcher posits that:

H2: Social support moderates the relationship between perceived generational conflict and workplace stress of Generation Z in such that when social support is high, the workplace stress is low and when social support is low, the workplace stress is high

Development of Conceptual Model

Perceived generational conflict, rooted in Generational Cohort Theory, arises from differences in attitudes, communication styles, and work preferences across generations (Guo et al., 2022). The Generation Z employees prefer the rapid feedback and open dialogue while older generations gave importance to more formal and hierarchical approaches (Zhang & Wiebe, 2022). These differences can lead to misunderstandings, friction, and feelings of exclusion or undervaluation, contributing to heightened workplace stress (Arora & Mahapatra, 2022). This stress may lead to reduced collaboration and productivity (Byun et al., 2022). However, social support; comprising emotional (empathy and encouragement), informational (guidance and advice), and instrumental (practical assistance) dimensions can moderate this relationship (Santiago et al., 2023). Social Support buffer the stress by fostering empathy, clarifying expectations, and easing work demands (Cao et al., 2021). Social support helps mitigate the negative effects of generational conflict on workplace stress, promoting a more inclusive and

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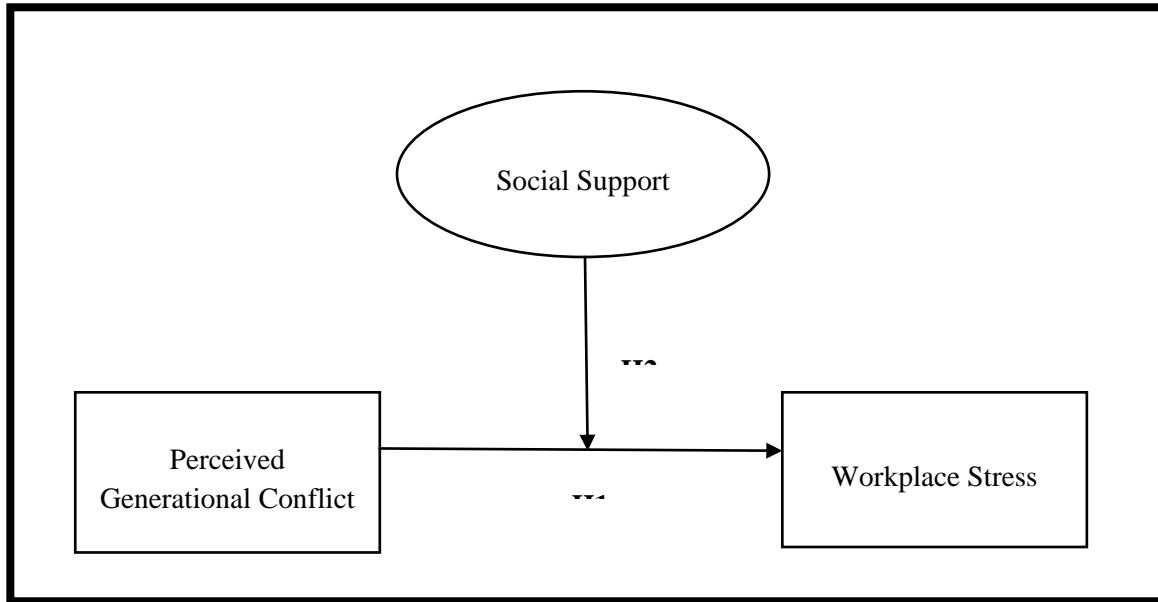cohesive work environment (Xiao et al., 2020).

Figure 1: Research Model of the Study

Research Methodology

This research adopts a quantitative approach to examine the perceived generational conflict, workplace stress, and the moderating role of social support among Generation Z employees working in higher education Institutions. Pakistan Bureau of Statistics (2023) reported that according to 7th Population and Housing Census – First Digital Census of Pakistan, Generation Z makes up 52% of the total population of the country. However, for the purpose of this study, the focus was narrowed down to individuals of Generation Z who are employed in universities as entry level manager because these institutions have a clearly defined hierarchical structure. The rationale for choosing this age range is to target those who have recently transitioned into full-time professional roles and are likely to encounter generational dynamics in the workplace. A purposive sampling technique was employed to select participants with the aim of gathering data from universities located in the Islamabad and Rawalpindi regions. To ensure the data was both valid and reliable, the researcher approached the registrar offices of various universities to identify departments with a significant presence of Generation Z employees. This strategic engagement with university administration helped in pinpointing departments and offices where younger employees were more prevalent, thereby increasing the relevance and authenticity of the responses.

According to sample-to-item ratio (Memon et al., 2020), 20:1 ratio was applied to the current study and 340 sample size was selected from universities located in Islamabad and Rawalpindi region. A total of 33 universities, both public and private, were identified as potential data sources for the study. A structured questionnaire was designed and distributed to Generation Z employees working as entry-level managers in these institutions. However, only 24 universities provided responses to the survey. Out of the 230 questionnaires distributed, 200 responses were found to be complete and accurate, making them suitable for analysis. The reduced response rate can be attributed to several factors. First, only 24 universities had Generation Z employees working as entry-level managers which limited the eligible participant pool. Additionally, many public sector universities were unable to participate in the research because they had not yet recruited Generation Z employees. These limitations significantly influenced the final sample size and response rate for the study. The overall response rate was approximately 87%, which is considered quite satisfactory for survey-based research. To develop a comprehensive and reliable questionnaire, the researcher adapted several well-established measurement instruments. To confirm the validity of the adapted questionnaire, a model fit analysis was conducted using SMARTPLS. The Standardized Root Mean Square Residual (SRMR) value was 0.06, while the Normal Fit Index (NFI) was 0.107. Both values fell within the acceptable range, indicating the overall validity of the adapted questionnaire. Additionally, the Average Variance Extracted (AVE), which assesses convergent validity, the Composite Reliability (CR), which measures the internal consistency of the items, and the Heterotrait-Monotrait Ratio (HTMT), which evaluates discriminant validity, were all within the acceptable thresholds. These findings further confirmed the validity of the adapted questionnaire. The scale for measuring perceived generational

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conflict was a 5-item scale adapted from the work of Hochwarter and colleagues (Hochwarter et al., 2009). For assessing workplace stress, an 8-item scale was used, originally developed by The Marlin Company in collaboration with the American Institute of Stress (Sharma & Tripathi, 2023). Social support was measured using a 4-item scale adapted from the work of Peeters and his colleagues, which captures the extent of emotional, informational, and practical support employees perceive from their supervisors and colleagues (Santiago et al., 2023). The structured questionnaire included a combination of Likert scale items, where participants were asked to rate their level of agreement with various statements, ranging from 1 (strongly disagree) to 5 (strongly agree). This approach was used to quantitatively capture the subjective perceptions of generational conflict, workplace stress, and social support, thus providing a robust framework for subsequent statistical analysis.

Data collection was conducted over a period of two months, allowing sufficient time for follow-ups and reminders to increase response rates. The collected data was then cleaned and checked for any inconsistencies or missing values, ensuring that only complete responses were included in the final dataset. The sample size of 200 was deemed adequate for conducting Partial Least Squares Structural Equation Modeling (PLS-SEM), which was the chosen method for analyzing the hypothesized relationships between the variables.

The study involved 200 participants from Pakistani universities, which operate within a hierarchical organizational structure. All participants were members of Generation Z, aged between 23 and 28 years, and included 135 males (67.5%) and 65 females (32.5%), ensuring gender representation. The participants were early-career professionals, with work experience ranging from 1 to 2.5 years. Specifically, 76 participants (38%) had 1 year of experience, 34 (17.5%) had 1.5 years, 85 (42.5%) had 2 years, and 4 (2%) had 2.5 years. This distribution reflects the participants' early stage of professional development, offering valuable insights into the experiences and perspectives of Generation Z in the workplace. The information about the type of universities from which data has been collected is given in Table 1:

Table 1: University Type to Collect the Responses

Sr. #	University Type	Number of Universities
1.	Public Sector Universities	14
2.	Private Sector Universities	10
	Total	**24**

In this study, the administrative staff from both public and private universities was surveyed to assess the perceived generational conflict and workplace stress. Despite institutional differences, the nature of administrative work remains fundamentally similar across both sectors which justifies the treatment of their responses as a single group. Administrative staff in both types of universities perform comparable functions, including academic administration, human resource management, finance, budgeting, and facility operations. Further, combining responses leads to an adequate sample size that improves the reliability and generalizability of findings. Since administrative work in public and private universities shares core functions, therefore, researcher treated their responses as a single type.

Results and Analysis

The data were analyzed using SmartPLS, a software widely employed for Partial Least Squares Structural Equation Modeling (PLS-SEM). This method was chosen for its ability to handle complex models as well as it accommodates small to medium sample sizes and work efficiently with non-normal data distributions. The analysis was conducted in two main stages: the evaluation of the measurement model and the assessment of the structural model. Although SmartPLS is a non-parametric tool that does not require strict assumptions like normality, ensuring data quality is still essential for accurate and reliable results. To achieve this, the researcher carefully checked for missing values and addressed them by excluding incomplete responses. Additionally, potential outliers were identified and evaluated. These steps ensured that the dataset was complete, consistent, and suitable for structural equation modeling, enhancing the robustness and validity of the findings of the study.

Evaluation of Measurement Model

The **measurement model** evaluation focuses on testing the reliability and validity of the constructs. Reliability is assessed through composite reliability (CR) and Cronbach's alpha to ensure internal consistency, with acceptable thresholds set at 0.7 or higher. Validity is evaluated in three parts: the loadings of all indicators should exceed the value 0.65 then convergent validity by using Average Variance Extracted (AVE) values exceeding 0.5, and

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discriminant validity is assessed through the Fornell-Larcker criterion and HTMT (Hetrotrait-Monotrait Ratio) which ensured that constructs were distinct from each other.

The analysis of results demonstrates the reliability and validity of the constructs used in the study. Composite reliability (CR) values for all constructs exceed the acceptable threshold of 0.7, indicating strong internal consistency. Specifically, Perceived Generational Conflict (PGC) has a CR of 0.766. Similarly, Cronbach's alpha values for PGC, WS, and SS further confirm the reliability of the constructs, as they are above the minimum recommended value of 0.7. Convergent validity is assessed using the Average Variance Extracted (AVE). All constructs exhibit AVE values above the standard threshold of 0.5. This indicates that a substantial portion of the variance in each construct is explained by its indicators.

Table 2: Evaluation of Measurement Model

Constructs	CR	Cronbach's Alpha	AVE
Perceived Generational Conflict	0.766	0.788	0.546
Workplace Stress	0.744	0.737	0.596
Social Support	0.852	0.761	0.742

Outer loadings are performed in **structural equation modeling (SEM)** to evaluate the relationship between observed indicators (items) and their associated latent constructs (factors). They are part of the **measurement model assessment** and help determine the reliability and validity of the constructs being measured. The results of outer loadings are reported in Table 3 below:

Table 2: Outer Loadings

Constructs	Indicator	Outer Loadings	Remarks
Perceived Generational Conflict (PGC)	PGC_1	0.50	Removed (low loading)
	PGC_2	0.88	Retained (excellent)
	PGC_3	0.65	Retained (as value was >.47)
	PGC_4	0.78	Retained (acceptable)
	PGC_5	0.72	Retained (acceptable)
Workplace Stress (WS)	WS_1	0.60	Retained (as value was >.47) with acceptable AVE)
	WS_2	0.74	Retained (acceptable)
	WS_3	0.86	Retained (excellent)
	WS_4	0.72	Retained (acceptable)
	WS_5	0.77	Retained (acceptable)
	WS_6	0.59	Retained (as value is >.47 with acceptable AVE)
	WS_7	0.81	Retained (acceptable)
	WS_8	0.85	Retained (excellent)
Social Support (SS)	SS_1	0.90	Retained (excellent)
	SS_2	0.81	Retained (acceptable)
	SS_3	0.72	Retained (acceptable)
	SS_4	0.85	Retained (excellent)

The diagonal values in Table 4 below, represent the square root of the AVE, which are higher than the inter-construct correlations, supporting discriminant validity based on the Fornell-Larcker criterion. These findings suggest that while generational conflict moderately influences workplace stress, it inversely relates to social support. Additionally, workplace stress and social support appear largely independent in this context.

Table 4: Fornell-Larcker Criteria

Constructs	PGC	WS	SS
Perceived Generational Conflict (PGC)	0.739	-	-
Workplace Stress (WS)	0.172	0.772	-
Social Support (SS)	-0.127	-0.046	0.862

HTMT is considered a more robust and reliable method for assessing discriminant validity in PLS-SEM compared

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to the Fornell-Larcker method. HTMT calculates the ratio of correlations between items across constructs (heterotrait correlations) to correlations between items within the same construct (monotrait correlations). Its acceptable threshold is <0.85. The results of HTMT Ratio indicates that discriminant validity is established among the constructs and same is represented in Table 5:

Table 5: HTMT Ratio

Constructs	PGC	WS	SS
Perceived Generational Conflict (PGC)	-	0.62	0.31
Workplace Stress (WS)	0.62	-	0.15
Social Support (SS)	0.31	0.15	-

Assessment of Structural Model

The **structural model** evaluation involved examining path coefficients to test the hypothesized relationships between constructs. The assessment of structural model is represented in Table 6:

Table 6: Assessment of Structural Model

Predictor	R	R^2	P	B	T
PCG:WS (Dependent Variable)	0.03	0.025	0.011	0.068	2.549
Interaction Effect (PCG*SS)	-	-	0.852	0.081	0.187

N= 200; PGC= Perceived Generational Conflict; WS= Workplace Stress; SS= Social Support

The structural model results provide insights into the impact of **Perceived Generational Conflict (PGC)** on **Workplace Stress (WS)** and the moderating role of **Social Support (SS).** The analysis revealed that PGC has a **small but statistically significant effect** on WS, with an R^2 value of 0.025 that indicates that PGC accounts for only 2.5% of the variance in WS. These findings suggested that PGC contributes to workplace stress, the effect is relatively weak compared to other potential factors influencing stress levels. The path coefficient (B = 0.068) further confirms that as perceived generational conflict increases, workplace stress also rises but slightly. This relationship is statistically significant, with a p-value of 0.011 and a T-value of 2.549, exceeding the critical threshold for significance.

However, the results do not support the hypothesized moderating role of social support in this relationship. The interaction effect (PGC × SS) yields a high p-value (0.852), indicating no statistical significance. Although the path coefficient for the interaction term is 0.081, it is not meaningful in this context due to the lack of significance. This indicates that while social support is often considered a buffer against workplace stress, it does not appear to influence how perceived generational conflict impacts workplace stress in this sample.

Overall, the findings suggested that while generational conflict slightly contributes to stress at work, social support does not play a moderating role in mitigating this relationship. This highlights the need for further exploration of other factors that might buffer or intensify the effects of generational conflict on workplace stress.

Discussion

The findings of this study offered important implications, both theoretical and practical, for understanding the dynamics of Perceived Generational Conflict (PGC) of Generation Z about older generations and its relationship with Workplace Stress (WS), as well as the moderating role of Social Support (SS). By integrating these constructs into a structural model, the study provided novel insights into generational dynamics in workplace settings.

The findings of the study advance the understanding of the role of Perceived Generational Conflict as a stressor in organizational settings. Although PGC was found to have a statistically significant impact on WS, the relatively small effect size (R^2 = 0.025) highlights the nuanced nature of this relationship and suggested that PGC alone is not a dominant predictor of stress among the employees of Generation Z. This finding extends existing theories on workplace stress by emphasizing generational conflict as a contributing factor. Second, the study adds to the literature on social support by revealing its limited moderating role in mitigating workplace stress caused by generational conflict among the employees of Generation Z. While prior research often highlighted the buffering effects of social support in stressful contexts. This study showed that its effectiveness may depend on the type or source of the stressor. The buffering role of social support was not proven in the current study, which may be

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attributed to several factors. Social support typically consists of three types: instrumental, emotional, and informational support (Cao et al., 2021). However, in the case of Generation Z employees, these support mechanisms may not have effectively mitigated the stress caused by generational conflict. Firstly, instrumental support, which includes assistance with tasks and resources, may not have addressed the emotional strain experienced by Generation Z employees due to generational differences. While task-related help can improve efficiency, it does not necessarily alleviate workplace tensions stemming from communication gaps, differing work ethics, or leadership styles (Santiago et al., 2023). Secondly, emotional support, such as encouragement from peers, may have provided temporary relief but failed to resolve the fundamental workplace challenges that contribute to stress. While reassurance and empathy are valuable, they do not change the structural and cultural barriers that cause generational conflict (Grieve, 2020). Thirdly, informational support, which includes feedback and guidance, may not have been effective for Generation Z employees. This generation thrives in participatory and collaborative environments, yet traditional hierarchical structures may have limited the effectiveness of feedback mechanisms (Bashir et al., 2021). If feedback was infrequent, formal, or top-down, it likely did not meet the expectations of Generation Z employees, who prefer instant and constructive engagement.

Additionally, social support in the workplace is a two-way process (Xiao et al., 2020), where Generation Z both receives and provides support to older generations. However, if this intergenerational exchange is weak particularly in hierarchical organizations (Guo et al., 2022), then the buffering role of social support is compromised. In the current study, data was collected from organizations with rigid hierarchical structures, where Generation Z employees may not have received the level of support they expected. The lack of open communication, participatory decision-making, and mutual exchange may have further diminished the moderating effect of social support on workplace stress. This theoretical nuance calls for further research to explore the contextual and situational factors influencing the role of social support in intergenerational workplace settings.

The findings emphasized the importance of addressing generational conflict in the workplace to minimize stress and improve well-being of Generation Z employees to tackle the increased turnover rate in the organizations. While the direct impact of PGC on WS was relatively small, the statistical significance of this relationship suggested that organizations cannot ignore the friction arising from intergenerational differences among the employees of Generation Z and older generations. To address this, organizations can implement targeted conflict resolution strategies, such as generational awareness training, cross-generational mentoring programs, and open communication channels that foster understanding and reduce misunderstandings among different age groups (Zhang & Wiebe, 2022). Moreover, the study highlighted that Social Support alone may not be sufficient to alleviate stress of Generation Z employees stemming from generational conflict (Cao et al., 2021). This suggested that organizations need to tailor support mechanisms to the specific challenges employees face by ensuring that the quality and relevance of support should be aligned with their stressors. Practical interventions could include customized wellness programs, team-building activities, and the promotion of a culture of mutual respect and collaboration (Liu et al., 2021).

The findings highlight critical implications for policymakers and organizational leaders in managing workplace stress stemming from perceived generational conflict among Generation Z employees. Policies fostering inclusive leadership and adaptive management styles are essential to reduce workplace stress by addressing generational differences effectively (Rudolph et al., 2021). Leaders should prioritize creating supportive work environments that value diverse perspectives, implement flexible work arrangements, and develop tailored feedback mechanisms to meet the specific needs of Generation Z. These strategies can help alleviate stress, improve performance, and enhance overall workplace harmony (Ali et al., 2020).

Contribution of the Study

This study contributes to both theoretical and practical understandings of workplace dynamics by exploring the relationship between generational conflict and workplace stress, with social support examined as a potential moderator. Theoretically, the study extends the application of Generational Cohort Theory by highlighting how generational differences in communication styles, work expectations, and decision-making can contribute to workplace stress. While the results confirm a moderate relationship between perceived generational conflict and workplace stress that also indicate that social support does not significantly moderate this relationship. These finding challenges existing assumptions about the buffering role of social support in mitigating stress, suggesting that its effectiveness may vary depending on the nature or intensity of workplace conflicts. Secondly, the Generation Z is quite different from older generations. The social support, they are receiving at their workplace is not directly matching to their characteristics. These findings highlight the gaps in existing body of knowledge that

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Generation Z employees' expectations at workplace are different from its older generations. Practically, the results underscore the need for organizations to proactively address generational differences through training, open dialogue, and tailored conflict-resolution strategies, rather than relying solely on social support systems. These insights can help educational institutions and other organizations design more targeted interventions to promote employee well-being and collaboration across generational divides.

Limitations of the Study

While this study provides valuable insights, it also has some limitations. First, the sample size of study was 200 respondents of Generation Z. Although this sample size is sufficient for basic structural equation modeling but limits the generalizability of the findings to broader populations. A larger sample size across diverse organizational contexts and industries could provide a more comprehensive understanding of how perceived generational conflict of Generation Z employees about older generations affects workplace stress. Additionally, the data was collected from a single geographical region, which may not fully capture the organizational, or industry-specific variations that influence the studied relationships. Future research could address this limitation by including a more diverse and representative sample to enhance the external validity of the findings. Second, the study was cross-sectional in design that restricted the evaluation of long-term effectiveness of social support as a moderating factor. Generational conflict and its effects on stress may evolve over time due to changes in organizational dynamics, leadership styles, or employee experiences. A longitudinal research design would enable a deeper exploration of the temporal aspects of these relationships that may offer a more dynamic perspective on how social support mechanisms and generational conflict interact over time.

Conclusion

In summary, this study contributes to the growing body of knowledge on workplace stress by integrating the unique construct of perceived generational conflict of Generation Z. The study helps to understand the impact of perceived generational conflict on workplace stress and also determines the role of social support in moderating the relationship between perceived generational conflict and workplace stress. To conduct this study, the data was collected from higher educational institutions located in Islamabad and Rawalpindi. The participants were the entry level manager from Generation Z. The data was collected through questionnaire and the quantitative analysis of data was performed by using the SmartPLS tool. The results indicate that although generational conflict is a small but significant contributor to workplace stress among Generation Z employees. The findings challenge the assumption that social support universally buffers its impact. Practically, these insights call for a proactive and context-specific approach to managing generational differences in organizations. Future research should explore alternative moderators such as emotional intelligence and organizational culture. Moreover, expanding the research to include different industries and generational cohorts could offer deeper insights into variations in stress management across diverse workplace settings.

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Appendix

List of Universities (for Data Collection)	
Public Sector	**Private Sector**
Air University, Islamabad	Abasyn University, Islamabad
Allama Iqbal Open University, Islamabad	CUST, Islamabad
Arid Agriculture University, Rawalpindi	CASE, Islamabad
Bahria University, Islamabad	Foundation University, Islamabad
HAS, Islamabad	Ibadat University, Islamabad

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International Islamic University, Islamabad	Iqra University, Islamabad
National Skills University, Islamabad	MY University, Islamabad
NDU, Islamabad	Preston University, Islamabad
NUML, Islamabad	Riphah International University, Islamabad
NUMS, Rawalpindi	Shifa Tameer-e-Millat University, Islamabad
NUTECH, Islamabad	
NUST, Islamabad	
Rawalpindi Women University, Rawalpindi	
Rawalpindi Medical University, Rawalpindi	

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Mediating Effect of Green Innovation and Knowledge Sharing on the Relationship between Green Entrepreneurial Orientation and Environment Performance

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Abstract

The purpose of this research is to examine the mediating effect of green innovation (GI) and knowledge sharing (KS) on the relationship between green entrepreneurial orientation (GEO) and environment performance (EP) with special reference to in context of industrial firms in Pakistan which is one of the contextual gaps of the study. This study used a quantitative approach due to its ability to produce large and standardized data sets. The data was collected using structured questionnaires on 216 respondents drawn from different industrial firms. To examine the mediation effects, the Process Hayes (2012) was used whereby the data was analyzed using SPSS. The findings obtained show that GEO has a positive impact on EP in the organization. The results obtained demonstrate that GI and KS mediate the impact of GEO on EP, which means that the positive effects of GEO emerge through the strengthening of green innovation and knowledge sharing. These results also reveal positive statistical relationships between GEO, GI, KS, and EP that may support the mediation shown in the proposed model. Managers are advised to enhance a comprehensive green entrepreneurial culture, which involves the establishment of sustainable organizational objectives and targets, dedication of resources to green innovation and diffusion of available knowledge. Such actions can improve environmental performance and full establish companies as leaders, especially in sustainable development. It is an original contribution to the literature aimed at explaining how precisely process GEO affects evaluation EP with the help of theoretical constructs GI and KS. It offers an explicit account of how companies' active green initiatives can be a catalyst for superior environmental conditions.

Keywords: Green entrepreneurial orientation, Environmental performance, Green innovation, Knowledge sharing, Industrial firms, Mediation analysis

Introduction

The industrial sector in Pakistan is one of the most important sectors in the economy contributing roughly 20 percent of the Gross Domestic Product (GDP) and employing a sizeable part of the working population. It encompasses major industries like textiles, cement, steel, chemicals, and pharmaceuticals (Economic Survey of Pakistan, 2025). However, in addition to these, the sector is also burdened with chronic issues such as energy deficit, aging equipment, and environmental policy issues which affect sustainability performance of the sector. Pakistani industrial sector's companies use a lot of energy and mostly rely on fossil fuels. Degradation of the environment and greenhouse gas emissions are caused by this reliance on non-renewable energy sources. Nonetheless, there is a growing movement to use renewable energy sources and energy-efficient technologies (Ullah et al., 2024). To lessen their carbon footprint, some textile companies, for example, have put in solar

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panels and adopted energy-saving techniques. Technology and innovation are essential for improving economic sustainability. Businesses can increase productivity, cut expenses, and lessen their environmental effect by implementing advanced manufacturing technologies (Malik & Ullah, 2024; Maqbool et al., 2024). Businesses in Pakistan are investing in automation, digitization, and research and development as a result of the increased focus on technological innovation. For instance, some textile producers use cutting-edge equipment to streamline workflows, cut waste, and enhance product quality.

Over the recent past, the aspect of business sustainability as well as the theme of environmental conservation has been adopted globally. This change is due to, first, environmental concerns, a second, the increasing number of regulations regarding environmental sustainability, and third, customer demand and expectation towards sustainable products and services (Gao & Bansal, 2013). Therefore, it is now being championed that sustainability has to be directly linked to organization's business strategies and value propositions. Sustainable development with regards to the industrial sector is concerned with the reduction of the negative effect on the environment by using resources more efficiently, minimizing waste, and controlling pollution (Ahmad & Ullah, 2023). The environmental aspect of sustainability in Pakistan has received attention for the first time because of the high level of pollution and the rapid depletion of resources due to industrial activities.

One such approach is Green Entrepreneurial Orientation (GEO) that depicts behavioral scope that proactively search for environmental opportunities and pursue them in order to attain competitive advantages through initiative, innovation and risk taking (Lumpkin & Dess, 1996). The theory of GREENEO is defined as the extent that firms rely on sustainable environmental activities as a result of undertaking entrepreneurial activities. It measures to what degree a firm is environmentally active and committed; with an innovation activity that focuses on detecting methods of large acceptance, the introduction of environmentally compatible technologies and even the derivation of new ecological products and services (Kuckertz & Wagner, 2010). Indeed, the study of the influence of GEO on environmental performance has emerged as a salient literature since organizations with SR initially exhibit better environmental performance since their entrepreneurially-driven endeavors are aligned with sustainability objectives (Song & Yu, 2021).

As the concept of environmental responsibility has evolved to include not only minimizing the negative impact of organizations' activities on the environment but also increasing organizations' efficiency in their usage of natural resources, environmental performance became identified as a fundamental measure of sustainable business performance, or Schepp's 'Sustainability Quadrant' (Jiang et al., 2022). Therefore, superior environmental performers not only provide compliance with the rules and legislation but also offer competitive advantage besides expending less by changing the brand image to fit the market, because consumers are demanding more environmentally friendly products in the current era (Jiang & Chai, 2020). But it is not clear how the existing arrangements for GEO directly affect the environmental performance of organizations. This study has proposed that green innovation and knowledge sharing mediate the GEO and environmental Performance. Green innovation may be defined as new ideas, technologies, practices and methods that continuously seek to minimize the effects of humans on the environment (Chen et al., 2006).

According to Cortese et al. (2017), firms that have a higher GEO are likely to incorporate more green innovation activity, thereby improving their overall environmental performance, according to (Li et al., 2021). Furthermore, the sharing of knowledge, which is the exchange of information or know-how within an organization, is vital to support the learning of the organizations and create new knowledge (Nonaka & Takeuchi, 1995). From this perspective, green-oriented firms can gain greater overalls knowledge use from different sectors to enhance the creation and application of green solutions (Wang et al., 2022). Since GEO is carried out through green innovation, knowledge sharing, and environmental performance, grasping the dynamics of those variables is essential for theoretical development and real-world implementation. This research therefore seeks to highlight these relationships so as to offer useful recommendations for managers as well as policymakers; especially those interested in improving their firms' sustainability initiatives. Specifically, this research aims to answer the questions that how GEO affects environmental performance? Furthermore, what is the part played by green innovation and knowledge sharing in this context?

To respond to these questions, this research infers a quantitative research method that uses survey data from the industrial firms of Pakistan. Therefore, the study intentions to extend knowledge and understanding of GEO's influence on sustainable entrepreneurship and environment management by identifying underlying processes through which it enhances environmental performance. Furthermore, the findings provide applied values to identify the necessary guidance for firms who seek to include sustainability into their entrepreneurial frameworks

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and activities. The gap in this research is that while previous studies have established that green entrepreneurial orientation (GEO) affects environmental performance (EP), few comprehensions is available about how these tributary variables; furthermore, green innovation (GI) and knowledge sharing (KS) mediates the association between GEO and EP. Many prior investigations have not addressed these mediating pathways in an effective way especially across varying industrial lines. This study intends to address this research question by offering empirical findings concerning these mechanisms, thereby improving the theoretical and applied understanding of sustainable business models. The contextual gap is also incorporated in this study that this research is carried out in Pakistan which is noticed very rare in previous research.

Literature Review

Underpinning Theory

Dynamic Capabilities Theory has been developed by David Teece and other authors in 1997 based on the Resource-Based View, but with the focus put on certain capabilities of a firm to build up, integrate, and reconfigure internal and external resources and competencies effective in the conditions of environmental dynamism. This focuses on strategic management in response to environmental lenses and opportunities to leverage on them. Green breakthrough and sustaining mechanisms proposed by the Dynamic Capabilities Theory argue that organizations with a higher degree of green entrepreneurial orientation are in a better place to leverage opportunities in the environment, and thereby improve their environmental outcomes. When it comes to ensuring that environmentally sustainable and responsible activities take place, green entrepreneurial orientation supports the building of innovative capabilities that are required for developing environmentally sustainable products, processes, and technologies. This theory involves knowledge sharing processes through which best practices and new innovations in the green concept are disseminated for implementation throughout the organization.

This paper uses Dynamic Capabilities Theory to examine the interplay between Green Entrepreneurial Orientation and Environmental Performance. The theory under consideration proposed that dynamic capabilities, namely, Green Innovation and Knowledge Sharing, play a moderator role moderating this relationship by enabling the firms to manage the challenging environment and apply knowledge efficiently and innovatively in matching opportunities and threats. In this respect, elucidating these mediating roles should help flesh out the process by which green strategies equate to enhanced environmental results.

Green Entrepreneurial Orientation and Environmental Performance

Green Entrepreneurial Orientation (GEO) is the inclined and purposeful strategic actions toward innovation with the risk-taking character of the firms to explore opportunities in Green Environment to get nearer to competitors (Covin & Slevin, 1991; Lumpkin & Dess, 1996). Companies have started to recognize that GEO is a vital determinant of environmental performance in a firm, which entails the minimization of synergistic negative environmental effects and enhancing the ecological productivity ratio (Sharma & Vredenburg, 1998). Studies have indicated that GEO is positively associated with environmental performance. For example, Kuckertz and Wagner (2010) showed that by identifying the level of green EO, green practices/technologies would be implemented via organizational arrangements with the aim of increasing the level of environmental performance. For instance, Zhang et al. (2018) concluded that GEO helps in improving the environmental performance since it ensures that the firms advance in sustainable activities and practices. Considering the above findings, meaningful indication could be towards the fact that firms with higher GEO are better placed to augment the probability of achieving optimum environmental performance when they align the entrepreneurial operations with environmental sustainability goals and policies.

H_1: Green Entrepreneurial Orientation (GEO) has a positive and significant impact on Environmental Performance

Green Entrepreneurial Orientation and Green Innovation

It is possible to refer to green innovation as the process of coming up with and putting into practice new products, customer solutions, practices or plans which lead to enhancement of the key performance indicators, creation of higher customer value and causing minimal harm to the natural environment (Chen, 2008). It is hypothesized that extending EO with the dimension of green entrepreneurial orientation can help organizations implement green innovation strategies. Previous literature has established that GEO has a way of positively impacting green innovation. A study by Li et al. (2019) demonstrated that firms that made a greater geo climate commitment

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report higher levels of green innovation including creation of environment friendly products and processes. In the same vein, Chen et Al. (2006) pointed out that GEO puts pressure on firms to spend on Green R & D/innovation to achieve environmentally benign states. The green entrepreneurial orientation is critical to underlining the prospect of green innovation because these studies found that firms with GEO are inclined more to innovate in manners that contribute to environmental sustainability.

H₂: Green Entrepreneurial Orientation (GEO) has a positive and significant impact on Green Innovation

Green Entrepreneurial Orientation and Knowledge Sharing

Knowledge sharing is the sharing of experience, ideas or information, formal and informal, which is transferred between personnel in organizations to support learning and create added value (Nonaka & Takeuchi, 1995). Climate juxtaposes green entrepreneurial orientation to emphasize that the latter improves knowledge sharing, especially when it concerns environmental sustainability. Literature further supports that GEO fosters the availability of knowledge sharing in archival records. Lin and Ho (2011), revealed that it is possible to increase knowledge sharing in firms with the help of GEO where firms were cultivating a culture to share knowledge on environmental practices and new ideas. This is because the green-oriented firms are aware of the fact that knowledge sharing and collaborative learning is important for the dissemination of information and knowledge on environmental subjects as a way of promoting sustainable development. Moreover, Song et al. (2018) showed that GEO assists in the flow of green knowledge within employees which is very important when implementing green applications. Hypothesis 2: Green entrepreneurial firms that support knowledge sharing have an improved ability to undertake environmental innovation and performance. These findings suggest that green entrepreneurial firms have a greater propensity to engage in knowledge sharing, which in turn leads to a higher capability to undertake environmental innovation and perform better.

H₃: Green Entrepreneurial Orientation (GEO) has a positive and significant impact on Knowledge Sharing (KS)

Green Innovation and Environmental Performance

Green innovation mainly defines environmental impacts as the ability of directly cutting down on the environmental cost of the actions continuous within an organization and or encouraging sustainable practices. There are also main categories of innovation: product innovations to enhance the environmental performance of products; process innovations to improve processes that may harm the environment; and organizational innovations, aligned with environmental goals (Kemp & Pearson, 2007). As it can be seen from Table 2, various green innovation initiatives have been also found by several other similar researches to enhance environmental performance significantly. For instance, (Dangelico & Pujari, 2010) confirmed that there are multiple benefits associated with the greening of a firm's product portfolio, and some of them include emission reductions and waste savings. Likewise, Chen et al. (2006) supported the argument that green process innovations include applications of energy efficient manufacturing technology which improve the green performance through reduction of resource uses and environmental degradation. These studies also re-emphasize the importance of green innovation in the enhancement of sustainability and sensitize the firms to innovate in their operations in order to obtain higher standards of sustainability.

H₄: Green innovation (GI) has a positive and significant impact on Environment Performance (EP)

Knowledge Sharing and Environmental Performance

Improve environmental performance is another key reason that advocate knowledge sharing because it supports the sharing of environmental best practices and innovations that improve the fortunes of the organizations. Promising knowledge transfer allows organizations to capitalize on more extensive and higher order of manpower experience for the implementation of best practices in environmental management (Nonaka & Takeuchi, 1995). The literature has supported the view that KSH has significant correlation with the environmental performance. For example, studies by Choi and Lee (2003) have shown that those organizations which seek to engage their employees in knowledge sharing are well placed to implement sustainable principles in their businesses with the resulting added plus of enhanced environmental performance. Also, Lee and Kim (2015) try to demonstrate that knowledge sharing leads to an even better chance of firms in developing green innovation and having a better overall environmental performance among other firms.

H₅: Knowledge Sharing has a positive and significant impact on Environmental Performance

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Mediating Role of Green Innovation between Green Entrepreneurial Orientation and Environmental Performance

Green Entrepreneurial Orientation (GEO) refers to a set of behaviors by firms that involves proactivity, innovation and risk-taking inclined toward creating innovation and searching for opportunities in the environment as a way of attaining competitive advantage (Covin & Slevin, 1991; Lumpkin & Dess, 1996). GEO is evidence of a firm's intent to institute environmental factors into its strategic perspective and processes. Such orientation is important on the green innovation, this being defined as activities leading to the creation of one or a combination of products, processes, or practices that can make a huge impression on the degree of harm on the environment (Chen et al., 2006). For many years, evidence has indicated that GEO has a direct impact on green innovation. For instance, Kuckertz and Wagner (2010) highlighted that firms having this great external organizational factor are likely to pursue green innovative activities such as designing new green products and the use of environmentally friendly processes. Such firms are interested in green R&D investment and are also eager to find effective ways to reduce negative externalities on the environment (Li et al., 2021). Innovation in green business is especially important in enhancing the environmental performance, defined as the minimization of negative impacts on the environment while promoting ecological efficacy (Sharma & Vredenburg, 1998). There is credible literature evidence from various empirical papers suggesting the mediating effect of green innovation on the GEO-environmental performance relationship. For instance, Jiao, Wei, and Cui, in their study titled: 'Exploring the medal of green organizational innovation on the relationship between GEO and environmental performance', established that green innovation plays a significant role in moderating this relationship. Based on the study, they have established that firms with a strong GEO pursue eco-innovation, which positively affects the firms' EP. Zhang et al. (2020) also agreed with the notion of green product and process innovation which enhance environmental performance through emission and waste minimization. These studies indicate that green innovation was one of the ways through which GEO was expected to help organizations attain superior environmental performance. Therefore, the association of GEO with environmental performance is not a direct one but will depend on the level of green innovation. An organization with a high degree of green entrepreneurial orientation will adopt and create green income streams that in the process of improving the green ideas, they will improve their environmental efficiency.

H₆: Green Innovation mediates the relationship between Green Entrepreneurial Orientation (GEO) and Environmental Performance

Mediating role of Knowledge Sharing between Green Entrepreneurial Orientation (GEO) and Environmental Performance

The process of transmitting and acquiring information, as well as skills and experience throughout an organization is called knowledge sharing, allowing for constant learning in an organization (Nonaka & Takeuchi, 1995). It is mandatory to be the key for creating a culture where ordinary employees should be encouraged to participate in an organization to come up with effective sustainable solutions. According to this study, green entrepreneurial orientation is expected to have a positive influence on knowledge sharing, incremental as well as radical, especially with reference to environmental sustainability. Surprisingly, prior literature demonstrates that GEO has a significant and positive correlation with the knowledge sharing level. Lin and Ho (2021) also established that the implementation of a strong GEO leads to firms having an environment that encourages knowledge sharing on environmental issues and practices as well as the development of innovations in the same areas. This is because the green-oriented firms understand the importance of knowledge sharing in a learning organization and dissemination of environmentally related information for enhancing sustainability enterprise system. The mere fact is that knowledge sharing enhances environmental performance because it makes the adoption of green innovations and sustainable practices successful. For example, Lee and Kim (2021) also concluded that knowledge sharing increases the capacity for firms to implement green innovations in their production processes and thus benefit the environment. In a similar study Choi and Lee (2020) opine that firms with knowledge sharing capability are prepared to introduce sustainability actions that result in enhanced environment quality. When a firm has a healthy GEO, this provides an environment where knowledge can be easily disseminated and shared, thus improving the capacity with which firms can put into practice green developments and concerns. This in a way translates to improved environmental achievements. Through knowledge sharing, green entrepreneurial firms are thus in a better able to optimize on their accumulated knowledge to design and implement for several schemes and solutions that will be environmentally friendly to the business in peril hence increasing the green entrepreneurial sustainability.

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H_7: *Knowledge Sharing mediates between Green Entrepreneurial Orientation (GEO) and Environmental Performance*
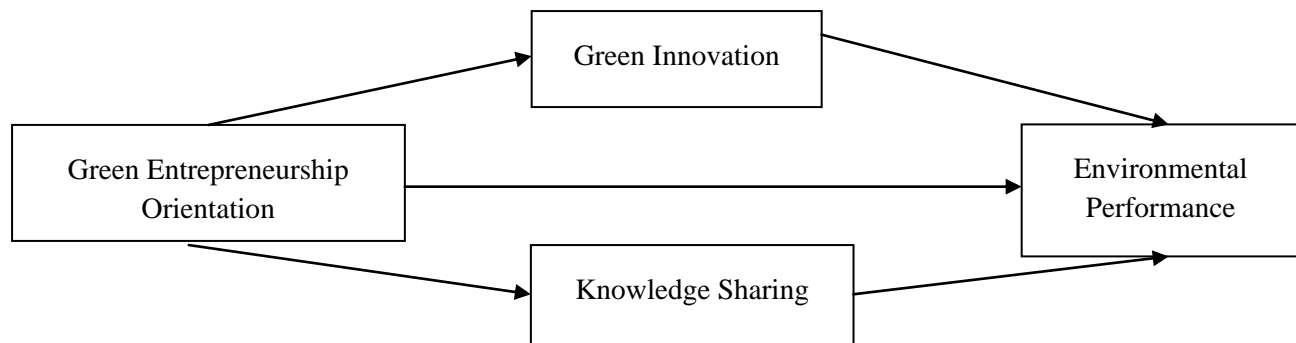

Figure 1, Theoretical Framework

Research Methods

Data Collection and Sample

The objective of this research is to analyze the role that the various green initiative and practices play in enhancing the impact of green proactive strategies for organizational improvement of environmental performance and to establish how green innovation and knowledge sharing further support this. This was done through the acquisition and analysis of data using a research design that was quantitative in nature. Data obtained from the questionnaires were analyzed using Process Hayes (2012) method to analyze the data get from questionnaires.

Study Design

The purpose of this research is to analyze the relationship between Green Entrepreneurial Orientation (GEO) and Environmental Performance (EP) in organizations and the mediating roles of green innovativeness and knowledge sharing. From several industrial firms, data was gathered and analyzed in line with a quantitative research design.

Sampling Method

To actualize the above strategy, the authors employed snowball sampling with an aim to getting higher rate of response from the participants. This method is particularly helpful in targeting given populations in industrial sectors of society and is ideal for exploratory purposes. The first wave of participants was asked to invite other people from their workplaces and/ or other related networks to participate in the study and the referrers had to continue making referrals till the required number of sample size was reached. The target population included the employees of, industrial firms as these firms must concerns the environmental issues in their manufacturing process. The questionnaire was presented online in the form of a web-site and email, and the use of social business web-site LinkedIn was made. The survey was divided into two parts: Demographic questions and research variables are different in that the former are questions or items included in the questionnaire that addresses basic information about the respondents while the latter are the props used in the survey that measures attributes and characteristics of the respondents. The first section collected information on participants' gender, age, educational qualification, job position, industry type, and years of experience in their current role. The second section that is study variables, this section included items to measure the constructs of Green Entrepreneurial Orientation, Green Innovation, Knowledge Sharing, and Environmental Performance. Each construct was measured using established scales adapted from existing literature and modified for the industrial context.

Sample Size

The final sample comprised 216 respondents from different industrial firms. These firms were selected to ensure diversity across various sectors, including manufacturing, energy, and technology.

Data Analysis

The data were analyzed using SPSS (Statistical Package for the Social Sciences), and the Process Hayes (2012) method was employed to test the mediation effects. The analysis involved the following two steps, Descriptive Statistics and Reliability and Validity: Basic descriptive statistics were calculated to summarize the characteristics of the sample and the main variables (e.g., means, standard deviations, and frequencies) In Reliability and

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Validity**,** Cronbach's Alpha was used to assess the internal consistency reliability of each scale. However, from the descriptive statistics Table 1 summarizes that total number of sample size was 216 and the majority of the respondents in our study were females 55.6% and males (44.4%) who are young lies in the age group of 20-25 years (32.4%) and 26-30 years (26.4%), and rest belong to other age groups, holding a Bachelor's and Master's degree (37.0%) and (36.6%) with having experience of (2-5 years) and (6-10 years) and most of the industrial employees who have knowledge about Green Entrepreneurial Orientation (84.3%). To ensure the reliability and validity of the measurement scales, Cronbach's Alpha was calculated for each construct. All constructs demonstrated good internal consistency, with Cronbach's Alpha values exceeding the acceptable threshold of 0.70.

Table 1 *Demographic Analysis: Descriptive Frequencies*

Variable	Categories	Frequency	Percentages
Gender	Male	96	44.4
	Female	120	55.6
Qualification	Matric	5	2.3
	Intermediate	26	12.0
	Bachelors	80	37.0
	Masters	79	36.6
	PhD	26	12.0
Age	20 - 25 years	70	32.4
	26 - 30 years	57	26.4
	31 - 35 years	23	10.6
	36 - 40 years	37	17.1
	40 and above	29	13.4
Tenure of Employees	Less Than 1 year	52	24.1
	2-5 years	77	35.6
	6-10 years	52	24.1
	15 and above	35	16.2
Scale	Junior Level	54	25.0
	Middle Level	90	41.7
	Senior Level	72	33.3
Knowledge of GEO	Yes	182	84.3
	No	34	57

Study Measures

To determine the impact of Green Entrepreneurial Orientation (GEO) on Environmental Performance (EP), we have collected data of four variables. The measurement scales (shown in Appendix 1) used in this research has also been validated in previous studies. First, we measured Green Entrepreneurial Orientation on 6 items scale adopted from previous study Jiao et al. (2021). Then we have measured Environmental Performance on 4 items scale developed by Clarkson et al. (2008). Third variable is Green Innovation which contains 3 items scale developed by Chen et al. (2006) and fourth one is Knowledge Sharing which contains 5 items scale developed by Bock and Kim (2002). The questionnaire was measured on five- point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). By using this scale, respondents were asked to rate their level of agreement or strong disagreement with a set of statements on a particular topic.

Descriptive statistics of the variables are shown in Table 2, including the mean values of Green Entrepreneurial Orientation, Environmental Performance, Green Innovation and Knowledge Sharing. The table shows that Green Entrepreneurial Orientation had relatively low mean values compared to all other constructs at 2.8650. A lower mean for GEO suggests that the adoption of green entrepreneurial practices within the sampled industrial firms is relatively limited. Companies may not be prioritizing or implementing proactive green strategies as much as they could. The lower mean indicates that while there is some level of green entrepreneurial orientation, the commitment and proactive efforts toward environmental sustainability are not as strong or widespread among the firms surveyed. The relatively low mean might reflect barriers to the adoption of green entrepreneurial practices, such as lack of resources, insufficient knowledge or expertise, regulatory challenges, or perceived costs associated with implementing such practices.

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Table 2 *Descriptive Statistics of Variables*

Study Variables	Mean	Std. Deviation
GEO	2.8650	.92211
EP	4.1632	.70576
GI	4.1331	.87234
KS	4.1065	.89357

n=216, GEO=Green Entrepreneurial Orientation, EP=Environmental Performance, GI=Green Innovation, KS=Knowledge Sharing

Data Analysis and Results

Reliability Analysis

Reliability refers to the extent of homogeneous of constructs being utilized in the study. Hence it can be concluded that Cronbach's alpha coefficient is the most suitable and reliable model among all to calculate the reliability and internal consistency of constructs. Depending on the result of the alpha (α) value a construct is said to be more reliable, where alpha (α) > 0. 70 (Hair et al., 2013) ≤ Mechanical Turk whose overall average is 73. Therefore, since reliability means the stability or the consistency of the items, it was estimated using Cronbach's alpha (α). The findings of Green Entrepreneurial Orientation and Environmental Performance with 6 items scale was found to be very reliable with an alpha co-efficient of .794 and the 4 items Environmental Performance scale was also found to be highly reliable with an alpha co-efficient of 0.867 and possesses high internal consistency. Likewise, Green Innovation with 4 item scale achieved alpha coefficient of .844, Knowledge Sharing with 5 item scale achieved alpha coefficient of .869. Reliability results are presented in the table below:

Table3 *Reliability Statistics*

Constructs	No. of Items	Alpha α
GEO	6	.794
EP	4	.867
GI	4	.844
KS	5	.869

n=216, GEO=Green Entrepreneurial Orientation, EP=Environmental Performance, GI=Green Innovation, KS=Knowledge Sharing

Correlation Analysis

Table 4 Correlation Analysis

Variables	Mean	Std. Dev	EP	GEO	GI	KS
EP	4.1632	.70576	.867 *(4)*			
GEO	2.8650	.92211	.185**	.794 *(6)*		
GI	4.1331	.87234	.658**	.315**	.844 *(3)*	
KS	4.1065	.89357	.751**	.260**	.747**	.869 *(4)*

**. Correlation is significant at the 0.01 level (2-tailed), n=216, GEO=Green Entrepreneurial Orientation, EP=Environmental Performance, GI=Green Innovation, KS=Knowledge Sharing
- EP (Environmental Performance): Cronbach's Alpha = .867
- GEO (Green Entrepreneurial Orientation): Cronbach's Alpha = .794
- GI (Green Innovation): Cronbach's Alpha = .844
- KS (Knowledge Sharing): Cronbach's Alpha = .869

These Cronbach's Alpha values indicate good internal consistency reliability for each construct. Values above 0.7 are generally considered acceptable, and values above 0.8 are considered good. Thus, the reliability of the scales used to measure these constructs is satisfactory.

The correlation between EP and GEO is .185**, which is positive and statistically significant. This indicates a weak but significant positive relationship between Green Entrepreneurial. The correlation between EP and GI is

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.658**, which is strong and statistically significant. This indicates a strong positive relationship between Green Innovation and Environmental Performance. As GI increases, EP also significantly increases.

The correlation between EP and KS is .751**, which is strong and statistically significant. This indicates a strong positive relationship between Knowledge Sharing and Environmental Performance. As KS increases, EP significantly increases.

There are significant positive relationships between all the main variables in the study. Green Innovation (GI) and Knowledge Sharing (KS) are strongly correlated with Environmental Performance (EP), suggesting that these two variables play a crucial role in enhancing environmental outcomes. Green Entrepreneurial Orientation (GEO) has a weaker correlation with Environmental Performance compared to GI and KS, but it is still significant. This may imply that while GEO is important, its impact on EP is somewhat mediated by other factors like GI and KS. The strong correlation between GI and KS suggests that firms that are innovative in green practices also tend to share knowledge effectively, which further enhances their environmental performance. The reliability analysis shows that the measurement scales used for the constructs are reliable, ensuring that the data collected are consistent and dependable.

Table 5 *Model Summary*

R	R-sq	MSE	F	df1	df2	p
.7514	.5646	.3737	138.0917	2.0000	213.0000	
Model						
	coeff	**se**	**t**	**p**	**LLCI**	**ULCI**
constant	1.0088	.2318	4.3514	.0000	.5518	1.4658
GEO	-.0145	.0612	-.2376	.8124	-.1351	.1060
KS	.7783	.0483	16.1088	.0000	.6830	.8735

n=216, GEO=Green Entrepreneurial Orientation, EP=Environmental Performance, GI=Green Innovation, KS=Knowledge Sharing.

The regression analysis results indicate a strong and statistically significant model. The predictors explain a substantial portion (56.46%) of the variance in the dependent variable (Environmental Performance). The high R value and low p-value further support the model's effectiveness in predicting the dependent variable. The significant F-statistic indicates that the model provides a better fit than an intercept-only model, validating the importance of the independent variables included in the analysis.

Table 6 *Direct Relationship Hypothesis*

Variable Relationships	coeff	se	T	p	LLCI	ULCI
GEO---EP	.2413	.0878	2.7493	.0065	.0683	.4143
GEO---GI	.3888	.0802	4.8470	.0000	.2307	.5469
GEO---KS	.3288	.0836	3.9333	.0001	.1640	.4935
GI----EP	.7034	.0574	12.2442	.0000	.5902	.8166
KS----EP	.7783	.0483	16.1088	.0000	.6830	.8735

n=216, GEO=Green Entrepreneurial Orientation, EP=Environmental Performance, GI=Green Innovation, KS=Knowledge Sharing

The table presents the results of the direct relationships between the variables in our study. Here's a detailed interpretation of the coefficients, standard errors, t-values, p-values, and confidence intervals. There is a positive and significant direct effect of Green Entrepreneurial Orientation on Environmental Performance. The coefficient (.2413) indicates that for every unit increase in GEO, EP increases by .2413 units. The relationship is statistically significant ($p < .01$), suggesting that GEO has a significant impact on EP.

There is a strong positive and significant direct effect of Green Entrepreneurial Orientation on Green Innovation. The coefficient (.3888) suggests that for every unit increase in GEO, GI increases by .3888 units. The relationship is highly significant ($p < .001$).

There is a positive and significant direct effect of Green Entrepreneurial Orientation on Knowledge Sharing. The coefficient (.3288) indicates that for every unit increase in GEO, KS increases by .3288 units. The relationship is statistically significant ($p < .001$).

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Table 7

Mediation Analysis Summary

Relationship	Total Effect	Direct Effect	Indirect Effect	Coefficient Interval		t- Statistics	Conclusion
GEO---KS---EP	.2413 (.0065)	-.0145 (.8124)	.2559	**Lower Bound**	**Upper Bound**	3.973	**Partial Mediation**
				.1285	.3856		
GEO---GI---EP	.2413 (.0065)	-0.0321 (.6514)	.2735	.1558	.3967	4.455	**Full Mediation**

n=216, GEO=Green Entrepreneurial Orientation, EP=Environmental Performance, GI=Green Innovation, KS=Knowledge Sharing

The table presents the mediation analysis results, focusing on the relationships between Green Entrepreneurial Orientation (GEO), Knowledge Sharing (KS), Green Innovation (GI), and Environmental Performance (EP). The table highlights the total effect, direct effect, indirect effect, coefficient interval, t-statistics and the mediation.

Total Effect: The combined direct and indirect effect of the independent variable (GEO) on the dependent variable (EP). 0.2413 (p = .0065). There is a significant total effect of GEO on EP

Direct Effect: The effect of the independent variable (GEO) on the dependent variable (EP) when controlling for the mediator (KS or GI). 0. .0145 (p = .8124). The direct effect of GEO on EP, controlling for KS, is not significant.

Indirect Effect: The effect of the independent variable (GEO) on the dependent variable (EP) through the mediator (KS or GI). 0.2559. The direct effect of GEO on EP, controlling for KS, is not significant.

Since the direct effect in the absence of mediator was insignificant and the indirect effect is significant, KS partially mediates the relationship between GEO and EP. This implies that GEO affects EP partially through its influence on KS. The pathway GEO → KS → EP shows partial mediation, meaning that the impact of GEO on EP is partially channeled through KS. On the first hypothesis, the total mediation test shows that enhancing knowledge sharing was a more robust mediating model, with a higher mediation index of .485, and a significant indirect effect of .324, while having a non-significant direct effect, .102, demonstrates that knowledge sharing is a crucial mechanism through which green entrepreneurial orientation increases environmental performance. In the same manner, the link between GEO and EP, mediated by GI demonstrates full mediation in the following way, GEO → GI → EP Thus, green innovation is another significant key through which the extent of GEO is related to that of EP. While the total effect of regulations on pro-environmental outcomes is found to be considerably large, the direct effect of regulations is considerably small and not statistically significant, which underlines the significance of promoting green innovation. These findings provide support for both the KM and green innovation as the two main moderators that can bridge the relationship between GEO and EP among green ventures. To improve on environmental performance, firms should ensure that green EOI is developed, implemented, and maintained since EOI influences knowledge sharing and green innovation in organizations.

Discussion

This study aimed towards establishing the effects of Green Entrepreneurial Orientation (GEO) on the environmental performance and redressing the mediating role of Green Innovation (GI) and Knowledge Sharing (KS). From the results of this study, it is noted that GEO has a direct positive impact on the EP, GI and the KS respectively, while the GI and KS in part have a positive impact on the EP. These observations reflect the assumptions put forward in this hypothesis and offer certain insights into the processes by which GEO affects environmental results. These findings imply that the overall hypothesis of research is true in a way that GEO has a positive and significant direct relationship with EP (coefficient =. 2413, p <. 01). From the argument advanced above, it can be inferred that companies that give priority to green entrepreneurship have a higher chance of attaining better environmental outcomes. This relationship is evidence of the fact that mainline environmental strategies serve as central drivers to the attainment of improved sustainability performance. In terms of mean value also, the case is slightly low in GEO (2.8650) and it indicates that the integration of green entrepreneurial practices is equally beneficial but firms are in developmental stage to develop such orientation only. This has shown that there is further potential for increasing the application and practicing GEO amongst the industrial sector. The findings reveal that; GI strongly moderates the influence of GEO on EP; coefficient =. 7034, p <. 001.

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Indeed, there is a positive relationship between GI and EP confirmed by the correlation coefficient of r =. 658, t = 12.109, p <. 001 indicating that innovation was critical in the enhancement of environmental performance. It is thus possible to identify the firms that overhaul their innovation capabilities to enable green processes, products and technologies for sustainability. This finding has close similarity with the dynamic capability and Resource-Based View (RBV) theory that underlines innovative capability as one of the strategic resources that multinational companies can use to enhance competitive advantage and superior performance. The average GI mean value also supports these findings as it has a value of 4.1331which shows that many firms are already practicing green innovation activities that have a positive impact in the environment.

KS also plays the role of a mediator in GEO-EP relation; it turns out that the impact of GEO on EP is significantly modified by KS (coefficient =. 7783, p <. 001). The coefficients for KS and EP were individually positive and influencing, and a positive and strong relationship between KS and EP was further confirmed with a correlation coefficient of r =. 751 at p <. 001. In another case, when the personnel and departments exchange information about the best practices, technologies, and approaches to environment management at the company, everybody in the organization is likely to experience a positive change. The result of this research finding accords with the KBV theory, since the theory proposes knowledge as the vital organizational asset. The mean value for KS was relatively high at 4.1065, depicts that the firms in the study have the right knowledge sharing practices in place that have the potential to improve their environmental performance.

Table 8 *Summary of Results*

Relationship	Beta-value	T-value	P-value	Conclusion
GEO---EP	.2413	2.7493	0.0065	Accepted
GEO---GI	.3888	4.8470	0.0000	Accepted
GEO---KS	.3288	3.9333	0.0001	Accepted
GI---EP	.7034	12.2442	0.0000	Accepted
KS---EP	.7783	16.1088	0.0000	Accepted
GEO---KS---EP	.2559	3.973	0.0065	Accepted (Partial Mediation)
GEO---GI---EP	.2735	4.455	0.8124	Accepted (Full Mediation)

n=216, GEO=Green Entrepreneurial Orientation, EP=Environmental Performance, GI=Green Innovation, KS=Knowledge Sharing

Practical Implications

This research proves that improving GEO significantly improve EP and wants to emphasize on the significance of the formation of GEO in industrial firms. Ensuring sustainable management strategies are part of organizational reputation, decision making frameworks and business models should be a goal in sustainability management. This can be done through offering training and development activities that relate to environmental stewardship, and through offering incentives where employees use their efforts for environmentally-sustainable initiatives. A successful integration of sustainability into the firm's mission and objectives hence paves way for company changes since it brings overall improvements to environmental issues. Furthermore, the study also discussed and provided the suggestion that green innovation and knowledge sharing are the mediating variables between GEO and EP. To support strategy, managers should use research and development to encourage green innovations in the organization and embrace new technologies along with techniques that minimize the harms on the environment. Creating an environment of openness and sharing of information on best practices to implement as well as ideas on how to solve new and emerging problems will be incorporated. Key ways of sharing green initiatives that might be of immense assistance in capturing and passing on knowledge include adoption of knowledge management systems and open communication. In this case, by concentrating on these areas, firms can improve the quality of their sustainability strategies and approaches to environmental problems and, therefore, can become examples of sustainable business activities and innovative solutions for such issues.

Managerial Implications

This study's outcomes affirm that in the context of this study, green entrepreneurial orientation enhances environmental performance through green innovation and knowledge sharing. For managers, this means that it is requisite that a wide culture of environmental entrepreneurship within their organizations. This can be done through ensuring that sustainability objectives form part of the company's strategic plan, offering incentives to employees with concerns for the environment, and availing resources in the fighting of ecological campaigns.

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Managers should also establish programs for the purpose of encouraging the workforce to be involve in the green activities of the firm so as to contribute to the sustainability of the firm; this should be done through implementing incentive systems to reward the workforce for contributing to the green schemes of the firm.

Furthermore, it brings out the aspect of green innovation and knowledge transfer in GEO implementation and its impact in enhancing organization environmental performance. We recommend this to be a primary focus of the managers, as part of their research and development, so as to develop sustainable solutions. It involves the use of advanced environmentally friendly technologies, enhancing existing practices to respond to environmental conservation, and cultivating innovation on environmental conservation. In addition, ensuring that the knowledge sharing infrastructure, or the capability, is strong is also a necessity. Managers should also encourage the use of best practice and idea databases or repositories as a means to pass these ideas around the company. Another key factor is timely and efficient sharing of knowledge by organizing the regular meetings or workshops along with training sessions and use of a digital platform to protect knowledge as a form of capital that will improve the overall effect of green activities.

Thus, the consideration of these considerations of managerial action would not only enhance the effectiveness of a firm in the management of the environmental impacts, but make the firm to stand out from the other firms in the market since most consumers prefer to deal with firms who have adopted sustainable business practices. All these will consist and contribute to the achievement of lasting sustainable organizational success as well as societal welfare in the running and managing of business.

Empirical Implications

This research establishes that green entrepreneurial orientation affects environmental performance in a significant manner. Consequently, by identifying and explaining the links between GEO and EP strands, the study strengthens the knowledge base. This empirical validation becomes significant for the creation of more specific green entrepreneurial strategies inside given industrial sectors. Thus, making this work, which quantifies the relationships between the introduced GEO, GI, KS, and EP variables, useful for industrial firms that seek to improve the sustainability of their organizations. The empirical data can be regarded as benchmark for organizations to compare their present operations and set the goal where they must be by certain point in time. Human resource managers can also use these insights to make some changes in the policies and practices by which they seek to support their firms' green entrepreneurship. First of all, the empirical results of the study provide the necessary guidelines for the formation of national and organizational policies. Such information is valuable because it refers to green entrepreneurial initiatives, points to added value being attained when enhanced by dominant factors such as innovation and knowledge sharing, and creates insights for prompting suitable policies and rewards. This may involve financial support for the green innovation projects, knowledge management and training initiatives, and structures that promote best practice environmental relations. This research helps to minimize the existing gap in the literature by assessing the mediating role of GI and KS in the specified relationship of GEO-EP within industrial firms. The paper offers insight into the issues of sustainable business practices and paves the way for future investigation. These results can be further extended by the scholars who can try to identify other mediators or moderators or can attempt to replicate the study in other contexts or industries

Theoretical Implications

This research extends the existing dynamic capabilities theory to reveal that green entrepreneurial orientation as a dynamic capability helps improve a firm's EP. Consequently, the research shows that GEO assists firms to address the environmental issues through practical and creative changes hence expanding the DCT theory by introducing green and sustainable business practices. The analysis shows how GEO affects EP through the mediation of GI and KS. Consequently, it is recommended that these elements should be taken as core concepts for the strategic management theories in order to enable then to enhance the idea of sustainable competitive advantage. By demonstrating how GI and KS explain this relationship, the study offers a more elaborate understanding of how firms' green EO and performance are related and how they can be connected. In sum, this study outlines a complex of ideas that can be a basis for further work on EO, innovation, knowledge sharing and firms' environmental performance. It invites scholars to consider other possible mediators or moderators and it grants the opportunity to test this model in different contexts or industries, thus improving the theoretical concepts to do with green entrepreneurship and sustainability.

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Conclusion

Industrial firms which include manufacturing, technological and energy firms are the main source of economic uplift. As the environmental issues are increasing day by day, therefore these firms should focus on green entrepreneurial orientation, green innovation, and green knowledge sharing for environmental performance. Therefore, it is worth admitting that the GEO has a positive impact on EP, nevertheless, not directly, but by promoting the green innovation and stimulating knowledge sharing within organizations. It shows that the firms, which are into green entrepreneurial practices, can get improved results on the environmental front by encouraging new ideas and ideas which could change the existing paradigms on green issues and by ensuring dissemination of knowledge on sustainability. The results highlight their future research agenda stressing on the importance of the green entrepreneurial culture in managers and strong support for sustaining innovation and effective knowledge management. Through research and clearly demonstrated solutions such as spending in green technologies and willingness to cooperate, organizations' environmental impact can be greatly enhanced. This research adds value to the existing body of knowledge by expounding the how process of GEO in terms of the sequential processes that gives rise to quantifiable environmental improvements, hence offering a clear and profound insight. In aggregate, this research indicates that GEO has to be properly incorporated into organizational processes, since it is a crucial tool for decision making. It has been established that stakeholders who foster green entrepreneurship, innovation, and knowledge transfer are more capable of improving the environmental quality and are therefore operating in tandem with sustainable development objectives. These ideas provide useful advice to managerial personnel who wanted to spearhead their organizations toward a more sustainable and an environmentally friendly organization.

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Consumer Brand Identification and Purchase Intention: Mediating Role of Customer Brand Engagement and Moderating Role of Self-Esteem in the Fashion Apparel Industry

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Abstract

This study emphasizes the role of customer brand identification in predicting customer brand engagement using social exchange theory. The study investigates the connection between customer brand engagement and purchase intention. Furthermore, the research investigates the mediatory role that customer brand engagement plays in the relationship between consumer brand identification and purchase intention. The moderating function of self-esteem between customer brand engagement and purchase intention also examined. This research used an online questionnaire and a convenience sampling technique to obtain valid data from 392 respondents who were either Pakistani fashion apparel users or those who intended to purchase fashion apparel brands. The structural equation modeling with partial least squares was employed to conduct the investigations. Social exchange theory was employed in this research. Consumer brand identification predicts customer brand engagement. Additionally, customer brand engagement has a favorable impact on purchase intention. Additionally, the relationship between consumer brand identification and purchase intention is partially mediated by customer brand engagement. Self-esteem moderates the relationship between customer brand engagement and purchase intention. The outcomes of this study suggest fashion apparel marketers explore the significance of CBE in the formation of purchase intention. This article is one of the few published manuscripts that belong to the Pakistani fashion apparel marketing sector. The results shed fresh insight on the causes of customer brand engagement and gave empirical evidence for customer brand engagement's partial mediating influence. Additionally, the study contributes to the literature on purchase intention by establishing the favorable influence of customer brand engagement on purchase intention.

Keywords: Consumer brand identification, Customer brand engagement, Self-esteem, Purchase intention

Introduction

As markets become more saturated and globalized, brands must develop innovative strategies to maintain their relevance to consumers. In 2022, the fashion industry generated over US$1.5 trillion in revenue; this figure is anticipated to exceed US$1.7 trillion in 2023 (Zeugner-Roth et al., 2025). South Asian countries such as Pakistan, Bangladesh, and India are becoming textile production hubs, producing roughly 60% of the apparel now consumed by humans (Razzaq et al., 2018). In the past, fashion was considered the game of the wealthy, but recently, it has become accessible to everyone. Therefore, the global fashion industry's income has significantly increased over the last ten years, mostly in the apparel sector (Chauhan et al., 2023).

Fashion apparel is experiencing a surge in popularity and acceptance among consumers in Pakistan. In addition to increased acceptance, the fashion industry is experiencing heightened competition as businesses endeavor to secure a competitive edge (Sandhu & Shabbir, 2023). Fashion studies have garnered considerable academic

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attention (Handa & Khare, 2013). Fashion may be the creative medium through which customers express themselves by adhering to the most recent trends or embracing unique styles (Johnstone & Lindh, 2022). A fashion item is widely accepted as visually attractive and socially acceptable at the time (Entwistle, 2015). People may pay more attention when purchasing "suitable" clothing brands since clothes expose one's personality, communicate one's status, and identify the individual wearing them (Islam & Rahman, 2016). Fashion apparel has always been an intriguing subject of consumer behavior research (Talaat, 2022).

Humans have exhibited a natural urge to improve their outer appearance in front of society ever since the beginning of human society. Individuals engage in consumption behaviors with the intention of cultivating favorable social impressions and seeking good assessments from others (Naz, Awais, & Shafiq, 2018; Orehek et al., 2020). Fashion may be the creative medium through which customers express themselves by adhering to the most recent trends or embracing unique styles (Johnstone & Lindh, 2022). Individuals employ "appearance management" products, including apparel, to enhance their physical appearance and express their personal taste in fashion (Sarkar & Sarkar, 2022). In Pakistan, the fashion sector is a significant component of the economy. Many emerging Indigenous brands, including Gul Ahmed, HSY studio, Junaid Jamshed, and Khaadi, target diverse niche markets in the country (Atta et al., 2024).

Customer engagement has been on the Marketing Science Institute's Tier I research priorities list since 2010 (Roy Bhattacharjee et al., 2023). Customer brand engagement is receiving an increasing amount of scholarly attention (Kumar & Kaushik, 2022). Despite the emerging abundance of research on CBE, the dynamics of the concept in emerging markets are still insufficiently understood (Wahid & Gunarto, 2022). Although academic publications have discussed consumer engagement as early as 2006, 2010 marked the beginning of the concept's sudden surge in popularity (Lim et al., 2022). The significance of customer engagement as a study area has increased in several business fields, including marketing, service management, and communication management (Shawky et al., 2020). Despite the increasing curiosity in customer brand engagement, there is a less empirical research in this area (NasarAmini Jeloudarlou et al., 2021). Several academicians advocate further investigating the drivers that influence customer engagement due to its critical importance from a strategic standpoint (Kosiba et al., 2020). One important gap in the research on CBE is the lack of empirical studies that look at possible moderators that affect the relationship between the causes and effects of CBE (Read et al., 2019). This gap in the research is especially important because finding moderators could help us learn more about how CBE drivers and outcomes work in different contexts.

The main problem is that CBE has not received enough attention from the non-Western world (Aziz & Ahmed, 2023). Previous CBE research has mostly occurred in Western cultures (Dwivedi et al., 2021). Specifically, it is argued that models established in Western contexts are inconsistent or give different findings in non-Western contexts (Harrigan et al., 2017; Leckie et al., 2016). In light of this, the current study conducted research in a developing country, such as Pakistan, in order to address the problem that was present in the CBE literature in the context of the fashion clothing business.

Regarding the CBE, in recent years, there has been growing recognition in academia of the significance of engagement and the connections that generate engagement between customers and companies (Gutiérrez-Rodríguez et al., 2024). According to the 2021 Global Customer Engagement Review, businesses that have a high CBE also enjoy decreased expenses associated with customer acquisition and enhanced customer lifetime value. Both of these factors are vital for the long-term success of a company. Furthermore, more than half of the companies that scored highly on the Customer Engagement Index exceeded their sales estimates for the year 2020, which is evidence of the competitive advantage that CBE offers to organizations (So et al., 2021). According to research by Gallup, fully engaged consumers generate 23% more revenue, profit, and wallet share than average customers. Actively disengaged customers spend 13% less than average customers on the same measures (Tourchian et al., 2022). Customer engagement is essential for businesses to predict and satisfy customer needs effectively, ultimately improving organizational performance (Sharma & Sharma, 2024). As a result, enhancing CBE has emerged as a key marketing goal (Gao & Shao, 2024). Scholars contend that the consumer identification process significantly impacts individual consumer behavior (Loureiro et al., 2024). Consumer behavior is a complex and varied field of study, wherein researchers continually examine the multiple factors influencing consumer decision-making (Kinawy, 2024). Brand identification may positively influence customer engagement, since those customers who strongly identify with a brand are more inclined to interact actively rather than remain passive customers (Shahid et al., 2025). Marketers and consumer behavior researchers must identify the key factors that accelerate and enhance consumer purchase intentions despite the availability of

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competing brands (Nikhashemi & Delgado-Ballester, 2022).

As a key indicator for measuring the connection between consumers and companies, one of the ultimate aims of businesses is to determine how to trigger CBE and maximize its beneficial impacts (Chen et al., 2021). Several studies have recognized CBE as a significant mediating variable (Agyei et al., 2020; Kaur et al., 2020a; Omar et al., 2021). Individuals' engagement in self-comparison and their perception of the information obtained from such comparisons are significantly influenced by differences between people (Bi & Zhang, 2022). In relation to social comparison processes, self-esteem, in particular, attracts the interest of academicians (Wang, Wang, Gaskin, & Hawk, 2017). Self-esteem is used as moderating variable in many studies (Burnasheva & Suh, 2020; Van Tran et al., 2022). In the present study self-esteem used as moderating variable.

Research Objectives

1. To examine the effect of CBI on CBE.
2. To evaluate the impact of CBE on purchase intention.
3. To investigate the mediating effect of CBE between CBI and PI.
4. To determine the moderation effect of self-esteem between CBE and PI.

This study significantly contributes to the marketing literature by rectifying the aforementioned deficiencies. This study enhances the present literature on marketing in several aspects. The study's results are a valuable addition to the CBE, which has substantial unexplored potential but has not yet garnered sufficient attention. Furthermore, this present investigation enhances the already established corpus of research on fashion clothing brands by investigating the fundamental correlations among CBI, CBE, SE, and their effects on fashion apparel brand's purchase intention. This study's findings contribute to our comprehension of the social exchange theory in relation to the purchase intentions of consumers for fashion apparel from companies.

Literature Review

Social Exchange Theory

The present research investigation is based on social exchange theory (SET), which mainly addresses transactional (social & economic) value, reciprocity, and social interactions (Kakakhel & Khalil, 2022). According to SET, individuals engage in social interactions only on the basis of their evaluations of the tangible and intangible costs and rewards associated with the relationship (Gligor & Bozkurt, 2022; Harrigan et al., 2018). Customers are supposed to exhibit favorable attitudes, emotions, and behaviors toward an object (e.g., brand/products) after obtaining advantages from the brand/firm (Rosado-Pinto & Loureiro, 2020). When exchanging resources with others, individuals strive to optimize their benefits and minimize their expenses (Jahan & Kim, 2021). This paper explores, from the perspective of SET, the links between the constructs of consumer brand identification, CBE, self-esteem and purchase intention (Blau, 1964). The significance of reciprocity in human relationships is underscored by the SET (Khalil et al., 2021). Several CBE research studies have used SET as their theoretical foundation (Gomes et al., 2025; Parray et al., 2023; Rasty & Filieri, 2023; Sallaku & Vigolo, 2022).

Consumer Brand Identification

Brands have evolved into esteemed societal entities that people may use to construct their own identity (Pedeliento & Kavaratzis, 2019). Individuals overlap their own image with the brand image in order to convey and strengthen their personal identity (Lee & Hsieh, 2021). The co-creation of CBI occurs via the interaction between brand identity and consumer identity, as they converge to form a cohesive representation of the customer's self-concept in relation to the entity offering the product or service. Consumers enhance their affiliation with a brand via consumer-brand identification, which is a result of brand identity (So et al., 2013). Moreover, the research suggests that customers make purchases not just for the practical advantages offered by products or services but also for the existential meaning they provide to their lives and the self-affirming impact they offer (Addie et al., 2019; Awais, Malik, & Khan, 2023). Customer identification leads to positive behavior. Identification positively correlates with content creation, engagement, and willingness to pay (Romero & Ruiz-Equihua, 2020).

Customer Brand Engagement

Numerous scholars have expressed substantial interest in the subject of engagement. For example, the notions of engagement have been studied in a number of studies pertaining to political science, educational psychology,

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sociology, organizational behavior, and, more recently, marketing (Awais, Kashif, & Raza, 2020; Hinson et al., 2019). Engagement is a subject that is of considerable significance to both academicians and marketers (Wang et al., 2022). There has been a great deal of discussion on the definition of engagement in a number of different settings. In the realm of business, two parties enter into a formal agreement known as an engagement. In the context of marketing, engagement is the degree to which consumers engage with a specific company, as evidenced by their actions and interactions (Salem, 2021). In the past decade, customer engagement has garnered a growing amount of scholarly attention (Monferrer et al., 2019; Roy et al., 2018). Customer engagement is increasingly recognized for positively impacting consumer behavior (Awais, Rehman, & Kiyani, 2020; Awais, Sulehri, Dar, Mohsin, Rehman, & Estes, 2021; Junaid et al., 2019). The role of customer brand engagement (CBE) in fostering intentions to utilize a brand is often described as "brand usage intentions"(Harrigan et al., 2018).

Self-esteem

The concept of self-esteem may be characterized as a fundamental psychological need for individuals. Consequently, persons with low self-esteem often have a considerable inclination to participate in activities that may elevate their self-esteem (Giovannini et al., 2015). Self-esteem (SE) is the personal assessment of one's own worth and encompasses an individual's self-perception (Rosenberg, 1965; Wang et al., 2017). In the disciplines of marketing psychology and consumer behavior, self-esteem is also a well-known term (Dittmar et al., 2007; Yurchisin & Johnson, 2004). Self-esteem can be described as an attribute of personality that exerts a powerful influence on how people behave and can also induce a variety of consumer behaviors (Pyszczynski et al., 2004).

Purchase Intention

Purchase intention refers to the level of interest and consideration a buyer has while deciding to purchase a certain brand (Kamalul Ariffin et al., 2018). Purchase intention is influenced by the interplay between the customer's desires, attitudes, and perceptions towards the product or brand, and it pertains to the probability of a person engaging in a certain product purchase (Beneke et al., 2016). PI is an attitude variable that is used in the process of determining the future contribution that purchasers will make to a brand (Kim & Ko, 2012). Purchase intention is the most accepted predictor of consumer behavior (Verma, 2021).

Hypothesis Development

CBI And Customer Brand Engagement

Customers' identification results in good behavior. For instance, identification correlates positively with content creation, engagement, and the propensity to pay (Romero & Ruiz-Equihua, 2020). Theoretical models have proposed that CBI positively impacts CBE (Rather et al., 2018a). An earlier research has demonstrated that CBI has a beneficial effect on CBE (Agyei et al., 2021). Research has demonstrated that customers are more inclined to interact with a brand when they identify it, such as by dedicating time to learning about it (Kaur et al., 2020b). Prior empirical research has shown that brand identification increases consumer engagement (Badenes-Rocha et al., 2019). The results of this paper suggest that consumers' identification with a certain fashion apparel brand might influence their level of engagement with that brand. The discussion above can be used to form the following hypothesis.

H₁: Consumer brand identification positively affects CBE.

CBE and Purchase Intention

When people engage with a product and brand on a regular basis, they are more probable to buy that product or brand in the future (Joshi & Srivastava, 2019). CBE has a positive effect on PI (Algharabat, 2018). Theoretical frameworks in customer engagement highlight the significance of attachment, loyalty, and trust as key outcomes that influence purchase intention (Clement Addo et al., 2021). An earlier research has investigated the influence of CBE on favorable consumer outcomes, including purchase intention, consumer-based brand equity, and word of mouth (Zha et al., 2023). A prior study identified a favorable correlation between CBE and PI (Zeqiri et al., 2025). Research examining the relationship between CBE and PI is limited (Joshi & Srivastava, 2019). The discussion above can be used to construct the following hypothesis.

H₂: CBE positively influences PI

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Mediating Function of CBE

Engaged consumers are more likely to like the target brand than non-engaged consumers (Hollebeek, 2011). This results in a more favorable evaluation of the main brand and a stronger personal connection with it (Harrigan et al., 2018), it consequently strengthens purchase intention (Harmeling et al., 2017). Customer brand engagement has been used as a mediator in many previous studies (Gao & Huang, 2021; Kwon et al., 2021). Based on previous studies, it has been shown that CBE plays a mediating function in the connection between social identification and PI (Prentice et al., 2019). Moreover, customer engagement has been recognized as a mediator in the correlation between customer experience and behavioral intention (Gomes et al., 2025). In this research, the following hypotheses were made by keeping in mind how important brand trust and CBE are as links between different variables.

H₃: CBE mediates the connection between CBI and purchase intention.

Moderating Function of Self-Esteem

Prior investigations have established that self-esteem acts as a moderating factor with respect to specific psychological variables (Lee et al., 2020). Extensive research has shown that self-esteem significantly impacts an individual's behavior and serves as a driving force behind various consumer behaviors (Giovannini et al., 2015). In addition, a significant moderating influence of moderator self-esteem is found between customer engagement and PI (Lee et al., 2020). The discussion above can be used to construct the following hypothesis.

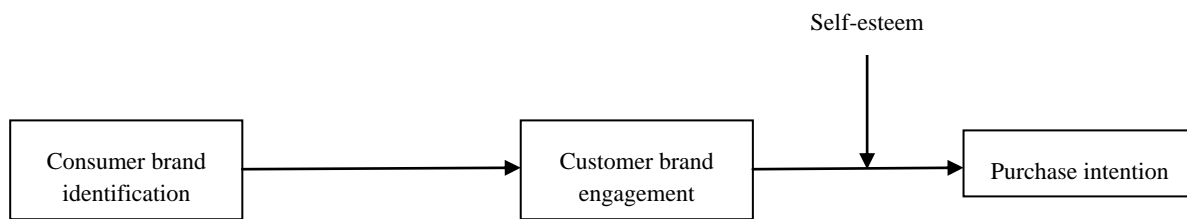*H₄: Self-esteem moderates the connection between CBE and PI.*

Figure 1: Theoretical Framework

Methodology

Research Design

A research design provides the aims of a study and provides researchers with a strategic approach to follow (Antony & Banuelas, 2002). Research design is fundamentally classified into quantitative and qualitative methods. Nonetheless, the research design may vary with its attributes, frequency of interactions, sample type, and reference period (Saunders et al., 2009). This study employs a quantitative methodology.

Population and Sampling

This section defines the study's population and the sampling methodology used to select the sample. A sample is a subset of the population selected for research purposes (Bryman & Bell, 2011). The research population comprises consumers of fashion clothing brands in Pakistan. Many sampling techniques may be used to get a sample that accurately reflects the whole population, classified as either probability sampling methods or non-probability sampling methods (Creswell, 2009). Many researchers employ the convenience sampling technique, which proves advantageous for accurately predicting consumer behavior and swiftly gathering information (Gao & Shao, 2024; Safeer & Le, 2023). This research used a non-probability sample method due to the absence of a population frame for fashion clothing businesses and a lack of databases or other sources containing consumer contact information for fashion apparel firms. Non-probability convenience sampling is often used in emerging engagement research, making it an ideal strategy for this study (France, Merrilees, & Miller, 2016; Rather et al., 2019).

Survey Design Approach

This paper examines the connections between CBI and PI, with an emphasis on the mediating function of CBE and the moderation function of self-esteem. To achieve this objective, a survey approach was employed for data

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collection. The design includes the techniques used to gather participant data (Cuneen & Tobar, 2017). Researchers use surveys to collect data on individuals to describe, contrast, or explain their behavior, attitudes, and knowledge. A survey is a data collection approach in which individuals, known as respondents, are invited to answer questions (Monette et al., 2013).

Data Collection Method

Data was collected from the fashion apparel brand users in Pakistan. Participation was voluntary, and informed consent was obtained from participants. The sample encompassed a total of 392 usable respondents from consumers. The respondents were selected using the convenience sampling technique. An online survey method was employed to access the fashion apparel consumers. Online surveys are regarded as a credible method for gathering data on the perception, attitude, and behavioral intentions of respondents (Evans & Mathur, 2005). The researcher sent questionnaires to a larger number of respondents via email and WhatsApp. In the last two years, WhatsApp has dominated the worldwide instant messenger industry (Quoquab et al., 2021). A total of 500 questionnaires were distributed. Following data screening for completion and validity checks, 430 questionnaires were deemed usable for further analysis. After additional data cleaning, the final sample size for analysis consisted of 392 usable responses.

Instrument Development and Measures

This section details the operationalization of key variables employed in the study. A 5-point Likert scale was employed for all measures, with a range of 1 ("strongly disagree") to 5 ("strongly agree").

Consumer Brand Identification (CBI)

CBI was assessed using an adopted 4-item scale developed by (So et al., 2013). A sample item included: "When someone criticizes this fashion apparel brand, it feels like a personal insult". This instrument captures consumers' psychological connection with the brand.

Customer Brand Engagement (CBE)

A 4-item scale adopted from (Hollebeek et al., 2014) measured CBE. An example item is: "I feel good when I use this fashion apparel brand". This scale gauges the extent to which employees identify with the brand and feel a sense of connection with it.

Self-Esteem (SE)

An established 3-item scale (Richardson et al., 2009) was utilized to measure self-esteem. An example item is: "I take a positive attitude toward myself". This scale captured the extent to which consumers associate the brand with positive attributes they value in themselves.

Purchase Intention (PI)

A 5-item scale developed by (Lee et al., 2008) and (Son et al., 2013) was employed to measure purchase intention. A sample item included: "I intend to buy fashion apparel brand constantly." This scale assesses how far a consumer is willing the buy particular apparel from a brand.

Data Analysis Tools

There are numerous justifications for employing PLS-SEM in this investigation. The data analysis and the evaluation of the research hypotheses were both conducted using the PLS-SEM technique. PLS-SEM has been extensively employed in marketing research as a result of its capacity to assess the correlations between many predictive factors. PLS utilizes the least squares regression method, which can be modified to concurrently examine the relationships between more variables with a higher degree of precision than covariance-based techniques such as multiple regression and LISREL. Additionally, PLS enables the integration of moderating factors Into A Study Model (Kumar & Nayak, 2018).

Results and Data Analysis

Sample Description

In this survey, 392 respondents participated, as indicated by the data. The statistical data for the sample indicated that 52.3% of the respondents were male, while 47.7% were female. The majority of respondents (38.5%) belong to the age category of 20–25. M.Phil. or PhD candidates comprised the majority of responses (54.8%).

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Additionally, the majority of respondents (60.7%) were unmarried. Among respondents, the majority (49.2%) reported a monthly salary of less than 20,000 rupees.

Measurement Model Assessment

The measuring model emphasizes the establishment of the reliability and validity of the constructs used in the investigation. This ensures that the measures accurately capture the intended concepts. The structural model examines the hypothesized causal relationships between the constructs. It determines the significance and strength of these relationships. The data analysis began with the evaluation of the measurement model. The measurement model was evaluated for two kinds of validity: convergent validity and discriminant validity. Experts advise that the values of Cronbach's alpha (CA) and composite reliability (CR) should exceed 0.70 and remain below 0.95 (Hair & Alamer, 2022). The composite reliability and Cronbach's alpha values surpassed the 0.70 threshold, indicating construct reliability. Convergent validity was established by identifying the threshold value of the average variance extracted (AVE). Convergent validity is established when the AVE surpasses 0.50 (Henseler & Guerreiro, 2020). The AVE values above 0.50 indicate sufficient convergent validity. In addition, multicollinearity may be evaluated by the variance inflation factor (VIF). The expert said that a VIF score below five indicates the absence of multicollinearity among the latent constructs. The authors noted that the VIF value in this study is below the recommended threshold, affirming the model's robustness (Shehzad et al., 2022).

Discriminant validity refers to a case in which two unrelated factors should not be statistically related (Rehman et al., 2019). Legate et al. (2023) indicated that discriminant validity among all constructs is confirmed when the heterotrait–monotrait (HTMT) values fall below the suggested threshold of 0.90. The HTMT (Heterotrait-Monotrait Ratio) criterion in Table 2 was used to check the discriminant validity of this study and confirmed that the constructs were different. All HTMT values fell below 0.90. Thus, discriminant validity is achieved.

Structural Model Assessment

The evaluation of the structural model came after the evaluation of the measurement model. The evaluation of the structural model included the examination of hypothesized linkages. The evaluation of the structural model includes the inclusion of coefficients of variables (β), t, R^2, f^2, and Q^2. The inner model evaluation validated all hypotheses except for one.

Table 1: Measurement model assessment

Constructs	items	Outer loadings	Cronbach's Alpha	Composite reliability	AVE
Customer brand engagement	CBE1	0.785	0.812	0.878	0.643
	CBE2	0.856			
	CBE3	0.857			
	CBE4	0.700			
Consumer brand identification	CBI1	0.706	0.766	0.849	0.585
	CBI2	0.750			
	CBI3	0.800			
	CBI4	0.799			
Purchase intention	PI1	0.815	0.877	0.910	0.671
	PI2	0.783			
	PI3	0.799			
	PI4	0.849			
	PI5	0.846			
Self-esteem	SE1	0.793	0.760	0.862	0.676
	SE2	0.864			
	SE3	0.809			

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Table 2: Discriminant Validity (HTMT)

	CBE	CBI	PI	SE
CBE				
CBI	0.564			
PI	0.703	0.360		
SE	0.378	0.153	0.523	

Structural Model Evaluation

Hypothesis 1 (H1) received strong support ($\beta = 0.454$, $p < 0.05$). Consumer brand identification exhibited a significant positive relationship with CBE. Hypothesis 2 (H2) was also confirmed ($\beta = 0.545$, $p < 0.05$), as customer brand engagement positively predicted purchase intention. The mediating function of CBE was validated. Hypotheses 3 ($\beta = 0.247$, $p < 0.05$), received significant support. CBI effects on purchase Intention were mediated by CBE. This research finds support for the moderating effect of self-esteem. The analysis revealed a significant positive coefficient ($\beta = 0.129$, $p < 0.05$), indicating that self-esteem moderates the connection between CBE and PI. In simpler terms, the impact of customer brand engagement on PI is indeed stronger for consumers with lower self-esteem compared to those with higher self-esteem.

Consumer Brand Identification displayed a direct and significant influence on purchase intention, with the mediation of CBE and moderation of self-esteem as detailed in Table 3 with beta coefficients.

Table 3: Structural Model: Path Co-efficient and Hypotheses

Hypotheses	Paths	Original Sample (O)	T Statistics	P Values	Decision	F Square
H1	CBI -> CBE	0.454	10.410	0.000	Supported	0.259
H2	CBE -> PI	0.545	10.152	0.000	Supported	0.485
H3	CBI -> CBE -> PI	0.247	6.472	0.000	Supported	
H4	Moderating Effect 1 -> PI	0.129	2.868	0.004	Supported	0.053

Table 4: R Square, Adjusted R Square and Q Square Values

	R^2	Adjusted R square	Q^2
CBE	0.206	0.204	0.121
PI	0.455	0.451	0.274

The current study evaluated model fit using two common criteria: Standardized Root Mean Square Residual (SRMR) and R-squared (R^2). Unlike Covariance-Based SEM (CB-SEM) which focuses on overall model fit, PLS-SEM emphasizes the explanatory power of the structural model (Aibinu & Al-Lawati, 2010). Therefore, relying solely on a single fit measure can be misleading. For instance, a model with a low R^2, indicating a low explanatory power, might still possess good fit based on other criteria. In this study, an SRMR (0.06) value below 0.10 was considered indicative of a good fit.

The CBI explained 20.6% of the variance observed in CBE. Furthermore, CBE accounted for 45.5% of the variance in purchase intention. The adjusted R-squared (R^2) values for CBE and PI are 0.204 and 0.451, respectively. The f^2 value indicates the extent to which an exogenous variable influences an endogenous variable (Götz et al., 2010). The f^2 value encompasses various classifications: small ($f^2 = 0.02$), medium ($f^2 = 0.15$), and higher influence ($f^2 = 0.35$), as suggested by Cohen (1988). Table 3 demonstrates that the influence of CBI on CBE has a medium effect. The impact of CBE on PI has a higher effect. The moderating effect has a lower impact on purchase intention. Furthermore, we evaluated predictive relevance through the Q^2 statistic. A Q^2 value exceeding zero signifies that the model demonstrates predictive relevance; on the other hand, a Q^2 value below zero indicates that the model does not possess predictive relevance (Ali, Kim, & Ryu, 2016). Positive and significant Q^2 values (reported in Table 4) suggest the model has strong relevance, meaning it can predict the endogenous variables with reasonable accuracy.
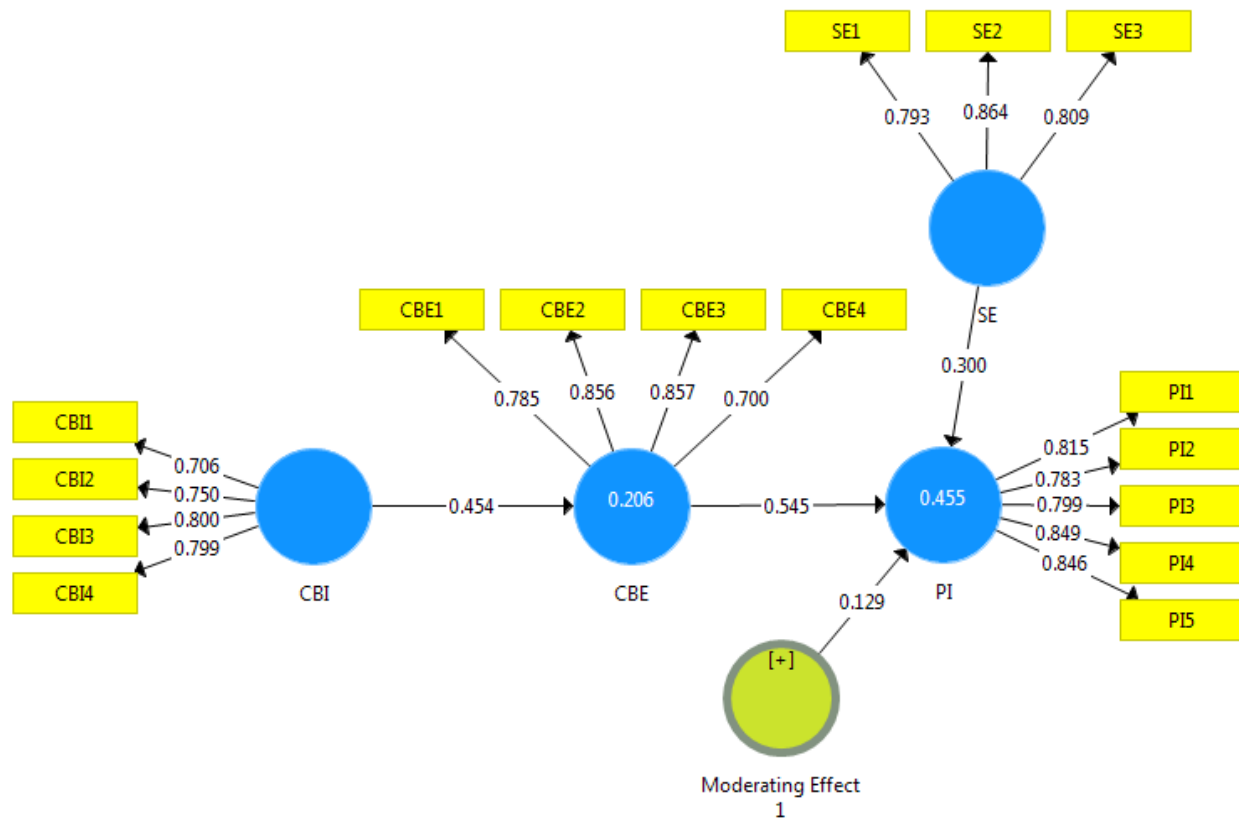
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Figure 2. Structural Model

Discussion

The empirical evidence presented in this study supports the influence of CBI on CBE. The paper makes a vital addition to the existing body of literature, which is a significant accomplishment. In addition, CBE influence on PI within the fashion clothing business was explored in this research. The findings are closely congruent with the hypothesized connections made in the earlier research. The findings of this paper's empirical investigations provide considerable evidence supporting almost all of the hypotheses that were stated.

This study found that in the fashion clothing industry, consumer brand identification affects CBE. Previous research corroborates this conclusion (Shahid et al., 2025). Furthermore, the findings confirm the influence of CBE in enhancing purchase intention. Previous studies support this finding (Patel et al., 2024; Shah et al., 2024; Zeqiri et al., 2025). This result indicated that more customer brand engagement results in purchase intention. Also, this paper found that there is partial mediating function of CBE between CBI and PI. Prior research support this outcome (Aziz & Ahmed, 2023). This result implies that promoting CBE might strengthen the influence of CBI on PI of fashion apparel brands. Additionally, the potential moderator's self-esteem is examined in light of the fact that it may exert a significant moderating effect. The aforementioned finding is corroborated by prior scholarly investigation (Lee et al., 2020).

The relevance of these findings is that the prior study has not fully elucidated the roles and significance of CBI, CBE, and SE concerning the purchase intention of fashion apparel firms. Consequently, the current findings contribute uniquely to the comprehension of buy intention within the fashion clothes sector by presenting novel insights into the interplay of CBI, CBE, and SE in shaping purchase intention. In a developing economy, scholars conducted empirical studies and contributed to the literature on customer engagement. Although emerging nations have substantial development opportunities for multinational corporations (Islam et al., 2018), there is a paucity of CBE research conducted in these areas (Hollebeek et al., 2022). This study addresses the issue by conducting research within a developing nation.

This research employs the social exchange theory to analyze the impact of CBI and CBE as significant determinants of purchase intention in the fashion apparel sector. Despite the growing corpus of marketing literature about customer brand engagement, further empirical investigations are warranted to explore its

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antecedents and consequences. This article makes a substantial contribution to the existing corpus of literature on CBE. This paper offers a comprehensive investigation of CBE within the fashion apparel industry. These results are all essential for giving organizations a competitive edge.

Conclusion

One of the primary objectives of this study is to conduct a thorough analysis of the pertinent literature to demonstrate the factors that shape purchase intentions. This article aimed to examine the effect of CBI on CBE. The researchers also aimed to evaluate the impact of CBE on purchase intention. Furthermore, this paper aims to examine the mediating effect of CBE between CBI and PI in the context of fashion apparel brands, thereby contributing empirical knowledge to this field. The paper also examines the moderation effect between CBE and PI. This study employed a quantitative technique. An online survey was conducted for this study. Previous research on consumer behavior employed the same approach as this poll. Participants were selected via a convenience sampling method. This sampling strategy aligns with other studies investigating consumer behavior in the fashion industry using the same approach. This research used a convenience sampling technique to obtain valid data from 392 respondents who were either Pakistani fashion apparel users or those who intended to purchase fashion apparel brands. The analysis of data and testing of study hypotheses were performed utilizing SPSS and Smart PLS. The findings indicate that CBI has a beneficial effect on CBE. This study also indicated that CBE favorably influences PI. The findings confirm that CBE partially mediates the connection between CBI and PI. The study identified the moderating effect of self-esteem on the relationship between CBE and PI. This study would give several insights for examining this embryonic notion and its implications for CBE in further depth. This research examines the determinants and consequences of CBE in the fashion apparel industry. This article enhances the understanding of CBE within the fashion clothing sector. Additionally, this research proposes that future research should shift its attention to emerging nations, a context that has been largely overlooked by previous research but which will have significant implications for policymakers and practitioners.

Theoretical Implications

This paper presents a novel opportunity to examine the use of CBE in fashion apparel businesses in developing markets. The paper further expanded upon social exchange theory in order to establish and verify the connections between CBE and its resulting effects. The results of this investigation provide a valuable contribution to the current corpus of knowledge in several respects. The study of customer engagement within the field of marketing is currently in its infancy (Shah, 2019). By examining CBE in the fashion apparel sector, this research contributes significantly to the current scholarly literature in the field. This research's theoretical implications enhance the existing literature on CBI, CBE, SE, and PI. The results offer a theoretical framework for future research, thereby deepening our comprehension of the intricate interplay between these constructs. Using SET, this research created a unique framework for CBI, CBE, SE, and PI in the context of fashion apparel, with a particular emphasis on the mediating role of CBE.

It adds to the literature by studying the largely unexplored antecedents and consequences of CBE and by providing a more specific knowledge of CBE in the fashion apparel sector. This paper examined the mediating function of CBE between CBI and PI. The function of self-esteem as a moderator was also examined. The paper is significant because it fills a gap in earlier studies. This article contributes to the extant literature by investigating CBE within the domain of the fashion apparel industries. As a result, the study satisfies the growing need for context-specific investigation of the concept (Kumar et al., 2019; Roy et al., 2018). This research enhances the current literature on engagement through an empirical analysis in the setting of a developing economy.

There has been little CBE research undertaken on growing markets (Hollebeek, 2018; Roy et al., 2018). Few CBE investigations have been conducted in such emerging regions. Multiple unaddressed research calls for including moderating variables (Junaid et al., 2020). By investigating the potential moderating influence of self-esteem, the current study seeks to fill a gap in the literature. In addition, the growing corpus of literature on customer management highlights the essential importance of CBE within the framework of customer-brand relationships. This paper enhances the current understanding by conducting research on CBE, specifically within the fashion apparel industry. This research addresses the need for contextually relevant studies on this subject (Kumar et al., 2019; Roy et al., 2018). In an emerging economy, researchers did empirical research and contributed to the engagement literature. While developing countries have significant growth possibilities for multinational firms (Islam et al., 2018), CBE research in emerging markets has been limited (Hollebeek et al., 2022). This research

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addresses it by conducting research in a developing country. This study enhances the marketing literature on engagement and purchase intention by doing empirical research in a developing nation.

Practical Implications

This paper has significant implications for fashion apparel brands, as it may contribute to the creation of superior customer engagement. The study findings may provide potential benefits to organizations, specifically in terms of management implications. This is especially relevant for brand and customer relationship managers, who are responsible for devising customer relationship strategies aimed at establishing a sustainable competitive advantage. This study seeks to enhance our understanding of CBI, CBE, self-esteem, and purchase intention in relation to fashion apparel brands. These findings can help in developing more targeted plans and tactics. The fit between the identity of a fashion brand and the identity of a customer has significant implications since it will improve the sales of fashion apparel brands. Due to the considerable influence this relationship has on a company's revenue, it is significant for marketers to comprehend the connections between customers and their fashion brands. In the contemporary era, managers cannot afford to disregard engagement; otherwise, their businesses would fail in the survival of the fittest (Obilo et al., 2021). With the ever-increasing competition and expansion of the fashion clothing sector, it is now essential for managers to find out how to engage and keep customers. Therefore, marketers should work on enhancing CBE, which would undoubtedly improve customers' intention to buy fashion apparel brands.

Limitations and Future Directions

Although this research contributes to the current corpus of knowledge on CBE, it does have a number of deficiencies that underscore the necessity of further investigation. This study was limited to Pakistan's fashion sector. Consumer behavior might vary from industry to industry. Further studies might aim to reproduce the findings of this study across many industries, including domains such as sports, electronics, and tourism. Further study endeavors may be conducted to examine the various impacts that the valence of CBE may exert on individuals who make purchases. Even though this study looked at the link between CBI, CBE, self-esteem, and purchase intention, future research could look at a number of other related constructs. As a result, researchers are urged to include additional variables with potential moderating or mediating effects, including brand attachment, customer satisfaction, brand love, brand experience, and co-creation, in their models. Further investigation in future studies might potentially provide benefits by exploring the moderating impact of demographic variables on the interactions within the model. In conclusion, future studies should expand the outcome variable to include other customer loyalty behaviors. Although there are certain limitations, the current study provides enough intellectual stimulation and will promote more investigation into the field of consumer brand engagement.

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Abstract

Given its widespread popularity among younger demographics, social media has become a prime platform for businesses to reach and engage their target audiences online. One effective strategy is to collaborate with social media influencers (SMIs), who can authentically promote products and services to their followers. Studies show SMIs can really influence people's choices. This study investigates how social media influencers' posts influence their followers' purchasing decisions and willingness to recommend brands. A survey-based methodology is used in this study, where data is gathered from a sample of 500 active social media users. The collected data is further analyzed using structural equation modeling (SEM) with SPSS and AMOS. The novelty of this study lies in testing the simultaneous impact of information credibility, informativeness, and entertainment value on social media users' intention to purchase and spread positive word-of-mouth. Our findings have practical implications for content creators and digital marketers.

Keywords: Social media influencer, Influencer marketing, Social networking sites, sWOM, Purchase intention

Introduction

Social networking sites (SNS) are online platforms where subscribers can create personal "profiles" and communicate with one another through messaging and commenting on a variety of topics (Wang, Jackson, Gaskin, & Wang, 2014). Furthermore, they can post their status updates, "friend" or "follow" other users, participate in discussions or groups, and share multimedia content. Popular social networking sites include TikTok, Twitter, Facebook, LinkedIn, Instagram, and Snapchat. These platforms have become integral parts of modern communication, allowing people to stay connected, share experiences, and build both personal and professional relationships in the digital space.

SNS are specifically popular among the teens as one of the recent survey conducted by Pew Research Center (Anderson, Faverio, & Gottfried, 2023) reveals that teenagers in the U.S. are highly active on these sites. Some even describe their engagement with social media as "almost constant." This survey conducted in September-October 2023, included 1,453 adolescents aged 13 to 17, explored social media habits, internet usage, and device ownership of teenagers in U.S. YouTube remains the most popular platform among teens, with approximately nine out of ten indicating its use. Additionally, TikTok (63%), Snapchat (60%), and Instagram (59%) were reported as the most popular platforms among teenagers aged 13 to 17. For older teens between 15 and 17, the usage rates are even greater, with around 70% indicating they are on these platforms. The extensive use of social networking sites (SNS) by the younger generation is leading to numerous cultural shifts, with online shopping standing out as one of the most significant. Retail marketers utilize internet advertising to connect with online shoppers and there is an increasing trend among them to employ influencer marketing techniques to boost their online sales.

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In today's digital landscape, retail brands are utilizing social media influencers (SMIs) to endorse their products. By featuring these products in influencer content, brands hope to expand their consumer base and increase purchases (Lou & Yuan, 2019). SMIs strategically develop online relationships to expand their influence and often seek financial compensation for their social media activities (Fowler & Thomas, 2023). They are different from celebrities you see on TV or in magazines as they are regular people who became famous online by sharing content with their followers. They often have expertise in specific areas such as wellness, fashion, beauty, culinary arts, lifestyle, or travel. Twitter research shows consumers place equal trust in social media influencers and personal friends (Swant, 2016). Summing up we can say that the SMIs have become a powerful force in shaping public opinion, especially among younger generations. Their ability to connect with their audience on a more personal level and their authenticity often make them more relatable than traditional celebrities.

To reach new audiences and build trust, influencer marketing is now a key weapon in a retailer's digital arsenal. Many marketing experts see it as a potent tool for driving increased profits. It was projected for 2023 that around 78.6% of U.S. marketers in companies with over 100 employees would utilize influencers for their marketing efforts (Shepherd, 2024). According to Ki and Kim (2019) content produced by SMIs was 6.9 times more impactful than content created in a studio setting. The influencer marketing industry has experienced explosive growth, surging from a modest $1.7 billion in 2016 to a staggering $21.1 billion by 2023, representing a more than threefold expansion since 2019 (Dencheva, 2023). Influencer marketing is delivering results! A majority of companies report success and plan to invest even more next year, with 68% budgeting for increased influencer collaborations. As a result, forecasts suggest that the worldwide influencer marketing industry will exceed USD 370 million by 2027 (Zhang & Choi, 2022). Influencers can directly influence purchase decisions by recommending products or services to their followers. There is growing evidence (as mentioned above) that campaigns featuring influencers often have higher conversion rates compared to traditional advertising. Influencers can generate income through brand partnerships, affiliate marketing, sponsored content, and merchandise sales.

Influencer marketing has its downsides, often overlooked by experts. Some influencers endorse unhealthy products, as seen in a study of two popular YouTube influencers where over 90% of their videos promoted unhealthy food and drinks (Coates et al., 2019). Additionally, influencers flaunting luxurious lifestyles can spark envy among followers, leading to negative emotional outcomes (Chae, 2018; Jin & Ryu, 2019). Frequent upward comparisons with influencers have been linked to heightened envy levels and overall well-being concerns (Chae, 2018). Furthermore, influencers in nutrition and exercise tend to promote unrealistic body images, prioritizing aesthetics over well-being (Pilgrim & Bohnet-Joschko, 2019). Exposure to such standards can negatively impact mental health, causing feelings of envy, stress, and even self-harm (Valkenburg, 2022). Influencer marketing can be a powerful tool for brands, but it's important to consider the potential downsides such as lack of authenticity, ethical concerns, and measurement challenges.

While Social Media Influencers (SMIs) can significantly expand a brand's reach and engagement, identifying the right influencers to maximize revenue and profit remains a challenge. This study aims to add to existing SMI literature by identifying the specific characteristics of SMIs that could be helpful in designing successful marketing campaigns.

Literature Review and Hypotheses Development

Review of literature in influencer marketing indicate that different researchers have explored the impact of credibility of SMIs generated content on consumers' intention to purchase (Sokolova & Kefi, 2020) and their intention to spread word of mouth on SNS (Dhun & Dangi, 2023; Saleem & Ellahi, 2017). One of the relevant theories to address this impact of SMIs is the persuasion theory that explains how people can change their attitudes or behaviors. The Elaboration Likelihood Model (ELM) outlines two persuasion routes: central and peripheral. The central route involves careful consideration of information, while the peripheral route relies on surface-level cues like source attractiveness (Masuda, Lee & Han, 2022). Studies suggest that social media followers form positive impressions of influencers based on minimal cues (Bacev-Giles & Haji, 2017). This can influence their purchase intentions, as followers are more likely to buy from influencers they perceive as trustworthy.

The majority of influencer marketing research has sought to identify the specific roles SMIs play in influencing consumer decisions (Ki & Kim, 2019; Lin et al., 2018). Studies have largely focused on two key roles: opinion leaders and tastemakers. As opinion leaders, SMIs can sway consumer attitudes (De Veirman et al., 2017; Shareef

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et al., 2019), while as tastemakers, they can shape consumer preferences for products (Martensen et al., 2018; Mcquarrie et al., 2012). Influencers cultivate a sense of intimacy with their followers, forming what's known as a "trans-parasocial" bond (Lou, 2022). This type of relationship is characterized by increased interaction, mutual engagement, and co-creation compared to the traditional one-sided connection viewers have with media figures. By sharing glimpses of their personal lives and actively engaging with followers through comments and responses, influencers aim to gain intimacy and connectedness. Given this closeness, dedicated followers often perceive influencers more as friends than mere content creators. Consequently, they tend to view influencer endorsements with a favorable bias, trusting the genuine intentions behind sponsored content (Lou, 2022). Influencers serve as influential voices, guiding their audience on the latest trends, products, and brands. Due to their specialized expertise in specific areas, they are seen as credible and reliable sources of advice, enhancing the effectiveness and acceptance of sponsored content (Lou & Yuan, 2019).

Credibility of Content Created by SMIs

The impact of source credibility on message persuasiveness has been a longstanding area of research. Pioneering studies by Hovland and Weiss (1951) and Giffin (1967) laid the groundwork for this field which was further enhanced by McGuire (1985). The source credibility was defined as a combination of expertise and trustworthiness by Hovland et al. (1953). Expertise refers to how skilled or qualified the source is on the topic, based on their knowledge and experience (McCroskey, 1966). Giffin (1967) describes trustworthiness in terms of audience perception of honesty, sincerity and reliability of the source. Advancing the concept, McGuire (1985) proposed adding attractiveness as another factor related to source credibility and defined it as how likable or good-looking the audience consider the source to be. Furthermore, Ohanian (1990) added expertise, besides trustworthiness and credibility, to describe source reliability.

Several researchers have explored the phenomenon that how credible sources can influence consumers' perception and their purchase decisions (e.g., Dwivedi, Johnson and McDonald (2015); Lee & Koo (2015)). Our study leverages the proven four-factor model of source credibility (expertise, trustworthiness, similarity and attractiveness) to advance understanding within the rapidly evolving landscape of influencer marketing. The same model is used by Munnukka, Uusitalo and Toivonen (2016) in which similarity is defined as the degree to which audience can associate itself to an influencer both in background and beliefs. Xiao, Wang and Chan-Olmsted (2018) have used four constructs to measure the credibility of SMI created content namely: expertise, perceived resemblance, trustworthiness and attractiveness. We have also used the same constructs and hypothesize the following:

H1: The credibility of information is positively influenced by the SMI's level of expertise.

H2: The credibility of information is positively influenced by the SMI's trustworthiness.

H3: The credibility of information is positively influenced by the SMI's likability.

H4: The credibility of information is positively influenced by the SMI's perceived resemblance (Homophily).

Purchase Intention

Purchase intention refers to a consumer's conscious choice to seek out and buy a specific product (Spears & Singh, 2004). De Magistris and Gracia (2008) proposed that purchase intentions, reflecting a consumer's inclination to buy a specific product, typically precede actual purchasing behavior. Both advertisers and academics commonly employ purchase intentions as a metric to gauge consumers' perceptions of products (Spears & Singh, 2004). Prior studies have indicated that the consumers' purchase intention is positively affected by the credibility of SMI, hence we propose the following hypothesis:

H5: The credibility of information in SMI-generated content positively influences consumer purchasing decisions.

Social Media Word of Mouth (sWOM)

Brands want people to talk positively about them online (called sWOM) because consumers trust recommendations from others on social media. sWOM is considered as a critical aspect of a product or service, since it empowers consumers to access and assess feedback or reviews from fellow customers or peers efficiently and swiftly, thereby facilitating informed purchase decisions at a reduced cost (Chung & Kim, 2015). Consumers have considerable trust in sWOM due to the fact that such endorsements originate from friends or peers rather than the brand itself. For companies, sWOM can serve as a valuable asset, aiding them in generating leads for

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their brand (Leung et al., 2022). Furthermore, Phan, Rivas, and Bat (2019) established that social word-of-mouth (sWOM) has become a reliable and relevant resource for consumers making online purchases.

sWOM is basically online buzz about a brand. sWOM includes commenting, liking and sharing content related to a specific brand. Furthermore, consumers can chat online, post their reviews and share their experience related to any brand, product or service. This online interaction is a matter of interest for the advertisers, since it can help them gauge the effectiveness of their marketing campaigns (Saleem & Ellahi, 2017). According to Casaló, Flavián and Ibáñez-Sánchez (2020), sWOM can also mean the likelihood of someone to interact with a brand or an influencers' page. Boerman (2020) has indicated that this interaction can be referred as "sWOM participation" or "online behavioral intention"

There is a strong relationship between online WOM and trust when it comes to brands. Presently, in cyberspace people trust influencers (Boerman, Willemsen and Van Der Aa, 2017), since they are like online celebrities. One of the objectives of this study is to look into different aspects related to influencers' credibility that could persuade their followers to spread a positive sWOM about a brand. If an influencer is considered expert of a product or a topic, followers are more likely to listen to him and follow him online (Turcotte, York, Irving, Scholl, & Pingree, 2015). Generally, people talk positive about brands when they consider the influencers' reviews and opinions to be honest (Naz, Awais, & Shafiq, 2018; Saleem & Ellahi, 2017). Moreover, it is also observed that people pay more attention to the content to which they can relate to (Ismagilova, Rana, Slade & Dwivedi, 2021), because of the feeling that influencer is similar to them (homophily). There are other studies that suggest that when people trust someone's recommendations, it has a stronger impact on their decisions (O'Reilly, MacMillan, Mumuni, & Lancendorfer, 2016). The more this perception of credibility of an influencer is the more likely it is that people spread a positive sWOM about the brands they recommend. As a result, the study proposes that:

H6: Information credibility of SMI's generated content has a positive impact on consumers' intention to spread a positive sWOM.

Informative Value of SMI's created Content

Social media plays a vital role as a platform where individuals seek information, either actively by browsing or passively through surveillance, meeting their need for competence (Dunne, Lawlor, & Rowley, 2010; Karapanos, Teixeira, & Gouveia, 2016). In particular, Ki and Kim (2019) found that social media influencers (SMIs) significantly impact consumers' product selections and purchase decisions. Hagger, Koch, and Chatzisarantis (2015) suggest that exposure to informative SMI content can boost individuals' confidence in their choices. In another study, Lou and Yuan (2019) demonstrated that while entertainment value plays a role, it is the informative nature of influencer content that significantly boosts follower trust in sponsored products. Therefore, we suggest that an SMI who consistently produces and shares valuable content will be able to exert more influence on their follower's intentions to purchase or share a positive word of mouth.

H7: There is a positive impact of informative value of SMI created content on consumers' purchase intentions.

H8: There is a positive impact of informative value of SMI created content on consumers' intention to spread a positive sWOM.

Entertainment Value

Media psychologists (Conway & Rubin, 1991; Rubin & Perse, 1987) have long identified entertainment and learning as key reasons for traditional media use. Similarly, adolescents are likely motivated to consume influencer-generated content on social media for both entertainment and informational purposes. Given that influencers primarily serve as content creators, the attributes of their content (such as its informative and entertainment value) play crucial roles in fostering connections with their followers (Lou & Yuan, 2019). Studies show that influencer content works best when it's both informative and entertaining. This helps them build relationships with their followers.

H9: The entertainment quality of content produced by SMIs will positively influence the consumers' desire to make a purchase.

H10: The entertainment quality of content produced by SMIs will persuade consumers to spread a positive sWOM.

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While different researchers have studied the impact of informative value of SMIs generated content, there is dearth of studies covering the informative value, entertainment value and information credibility on purchase intentions as well as positive WOM on SNS (sWOM). To bridge this gap in literature, we have included all these factors in our research model as shown in figure 1.
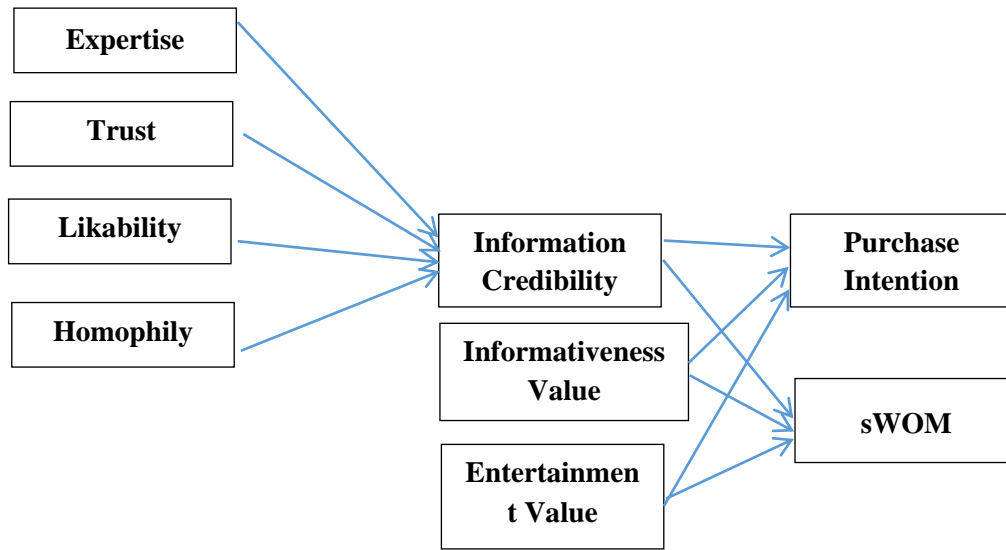

Figure 1: Proposed Research Model and Hypotheses

Instrument and Measures

Table 1 outlines the constructs (along with their source) that are used in our survey for data collection:

Table 1: Constructs Used in Questionnaire and their Sources

Constructs	Source
Expertise	Ohani an (1990)
Likeability	Reysen (2W5)
Trustworthiness	Ohani an (1990)
Information Credibility	Xio et al. (2018)
Informative Value	Voss, Spangenberg & Grohmann (2W3)
Entertainment Value	Voss et al. (2003)
Homophily	McCroskey et al. (1975)
Intention to spread sWOM	Dhun & Dangi (2023), Ki & Kim (2019)
Purchase intention	Ki & Kim (2019)

Sampling & Data Collection

Questionnaire developed for this study (as shown in table 1) was pretested involving 50 individuals with diverse backgrounds and language skills who were also using social media applications frequently. These respondents were the representatives of the sample consisting of adult males and females from the urban population working in different organizations in Islamabad/Rawalpindi region. We conducted this pilot study to make sure the questions were clear and effective. The information we gathered in pilot study wasn't used in the final analysis.

Procedure

Due to the practical considerations of this research, a non-probability sampling technique, specifically convenience sampling, was adopted. This method, commonly utilized in SMI research (Alwafi et al., 2022; Chekima et al., 2020; Freberg et al., 2011), involves selecting participants based on their availability and willingness to participate, rather than random selection (Dörnyei, 2007). The respondents were not required to share their personal or work details or where they work. We explained what the survey was about and why their answers were important. Moreover, the respondents were guaranteed anonymity throughout the entire study. Although survey approach and quantitative analysis is ideal in context of this study, they do have certain limitations as well. They may provide limited depth, be influenced by social desirability bias, suffer from

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sampling bias, rely on self-reported data, and only establish correlations rather than causation.

The survey was conducted over a four-month period, from December 2023 to March 2024. To ensure participant eligibility, only active social media users who frequently utilized platforms like Facebook, Twitter, and TikTok were recruited. A screening question was included at the beginning of the survey to verify this. Collected responses were meticulously entered into SPSS, with double-entry used to minimize errors. Missing data were addressed through appropriate imputation techniques or case deletion as needed. Outliers were identified and removed to maintain data integrity. Ultimately, 500 complete responses were included in the subsequent analysis.

Results and Findings

For data analysis we have selected Structural Equation Modeling (SEM) - a powerful statistical technique that allows to test hypothesized relationships, assess model fit, control for latent variables, and examine mediation and moderation effects. By using a causal approach and SEM, this research will provide a rigorous and innovative methodology for establishing causality and contributing to the advancement of research in this context.

The data was analyzed using SPSS and AMOS software. The factor loadings for each construct, as well as their respective reliabilities, are shown in Table 2. To assess the potential impact of common method bias on our sample data, we conducted Harman's Single Factor Test. The results indicated that a single factor explained 45.6% of the variance, which is below the commonly accepted threshold of 50%. Based on this finding, we conclude that common method bias is not a significant concern in our data.

Table 2: Factor Loading and Constructs Reliability

Construct	Items	Statements	Factor loading	Cronbach alpha	CR	AVE
Expertise		I feel this SMI is…				
	E1	Not an expert/an expert	0.954			
	E2	Inexperienced/experienced	0.981			
	E3	Unknowledgeable/knowledgeable	0.966			
	E4	Unskilled/skilled	0.962	0.982	0.982	0.933
Trustworthiness		I feel this SMI is…				
	T1	Insincere/sincere	0.941			
	T2	Dishonest/honest	0.94			
	T3	Undependable/dependable	0.959			
	T4	Unreliable/reliable	0.976	0.975	0.976	0.91
Likeability		I feel this SMI is…				
	L1	Unfriendly/friendly	0.904			
	L2	Unlikeable/likeable	0.908			
	L3	Not warm/warm	0.912			
	L4	Not approachable/approachable	0.929	0.952	0.953	0.934
Homophily		I feel this SMI is…				
	H1	Doesn't think like me/thinks like me	0.98			
	H2	Doesn't behave like me/behaves like me	0.941			
	H3	Different from me/similar to me	0.95			
	H4	Unlike me/like me	0.983	0.981	0.981	0.927
Information Credibility	IC1	I believe posts/updates of this SMI provide believable information	0.98			
	IC2	These posts/updates provide reliable information	0.941			
	IC3	These posts/updates provide trustworthy information	0.95			
	IC4	These posts/updates provide accurate information	0.983			
	IC5	These posts/updates provide dependable information	0948	0.98	0.978	0.9

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Informativeness Value		I believe this SMI's social media posts are:				
	IV1	Unhelpful/Helpful	0.986			
	IV2	Unnecessary/Necessary	0.991			
	IV3	Ineffective/Effective	0.99			
	IV4	Impractical/Practical	0.971			
	IV5	Not functional/Functional	0.994	0.994	0.994	0.973
Entertainment Value		I believe this SMI's social media posts are:				
	EV1	Not delightful/Delightful	0.986			
	EV2	Unenjoyable/Enjoyable	0.991			
	EV3	Not fun/Fun	0.99			
	EV4	Not thrilling/Thrilling	0.971			
	EV5	Dull/Exciting	0.994	0.994	0.994	0.973
Intention to spread sWOM	sWOM1	I'd like to share the posts of this SMI on social media.	0.974			
	sWOM2	I'll like and commend on the social media post of this SMI.	0.938			
	sWOM3	I am willing to promote this SMI's recommended brand/product on social media.	0.938			
	sWOM4	I am willing to promote the brand this SMI endorses by sharing their posts.	0.975	0.977	0.977	0.915
Purchase Intention	PI1	I'm likely to purchase a product endorsed by this SMI in the future.	0.9			
	PI2	I might use services this SMI recommends.	0.882			
	PI3	I might try out brands endorsed by this SMI.	0.916			
	PI4	I frequently consider buying products promoted by this SMI.	0.896	0.943	0.944	0.807

In order to establish the validity of constructs used in our model, we conducted exploratory factor analysis (EFA) using SPSS. A principal component analysis with varimax rotation was employed. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.948, indicating that the sample was suitable for factor analysis. Bartlett's test of sphericity was significant ($p < .001$), suggesting that the correlation matrix was not an identity matrix. The rotated component matrix indicates the 9 constructs as shown in table 3:

Table 3: EFA

Rotated Component Matrix

	1	2	3	4	5	6	7	8	9
				Component					
Expl				0.846					
Exp2				0.85					
Exp3				0.85					
Exp4				0.844					
Tl									0.808
T2									0.794
T3									0.795
T4									0.788
L1					0.865				
L2					0.848				
L3					0.842				
L4					0.848				
H1								0.822	
H2								0.811	
H3								0.803	

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H4					0.816
ICl	0.851				
IC2	0.833				
IC3	0.853				
IC4	0.837				
IC5	0.854				
IVI		0.818			
IV2		0.865			
IV3		0.845			
IV4		o. 834			
IV5		0.861			
EVI	0.958				
EV2	0.971				
EV3	0.968				
EV4	0.965				
EV5	0.973				
sWOM1			0.86		
sWOM2			0.82		
sWOM3			0.852		
sWOM4			0.856		
PI1				0.845	
PI2				0.832	
PI3				0.795	
PI4				0.848	

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

A Rotation converged in 7 iterations.

After conducting EFA, structural equation modelling was performed using AMOS. Measurement model and fit statistics are shown in table 4:

Table 4: Measurement Model and Fit Statistics

Goodness of Fit Indicator	Observed Value	Benchmark Value	Reference
Chi-square (CMIN/DF)	2.285	< 0.3	Hu and Bentler (1999)
Goodness-of-fit index (GFI)	0.869	> 0.08	Baumgartner & Homburg (1996)
Standardized Root Mean Square Residual (SRMR)	0.046	< 0.08	Hu and Bentler (1999)
Root Mean Square Error of Approximation (RMSEA)	0.051	< 0.06	Hu and Bentler (1999); Jackson, Gillapsy, and Purc-Stephenson (2009)
Tucker-Lewis Index (TLI)	0.972	> 0.90	Bentler and Bonett (1980); Hair et al. (2006)
Comparative Fit Index (CFI)	0.975	> 0.90	Hu and Bentler (1999); Hair et al. (2006)
Incremental Fit Index (IFI)	0.975	> 0.90	Hu and Bentler (1999)

As indicated in Table 4, all the model fit values exceed the minimum threshold values which indicate the fitness of research model. The results of hypotheses testing are shown in table 5.

Table 5: Hypotheses Testing Results

Paths	Standardized coefficient / Regression Weight	t value / C.R.	P value	Result
H1: Expertise → Information Credibility	0.125	2.791	**	Supported
H2: Trust → Information Credibility	0.461	10.237	***	Supported
H3: Likability → Information Credibility	0.097	2.287	*	Supported
H4: Homophily → Information Credibility	0.173	3.74	***	Supported
H5: Information Credibility → Purchase Intention	0.312	7.507	***	Supported
H6: Information Credibility → sWOM	0.161	4.116	***	Supported
H7: Informativeness → Purchase Intention	0.465	10.571	***	Supported
H8: Informativeness → sWOM	0.473	11.425	***	Supported
H9: Entertainment value → Purchase Intention	-0.057	-1.478	NS	Not Supported
H10: Entertainment Value → sWOM	0.199	5.376	***	Supported

***p ≤ .001, *p ≤ .05, NS, Not Significant.
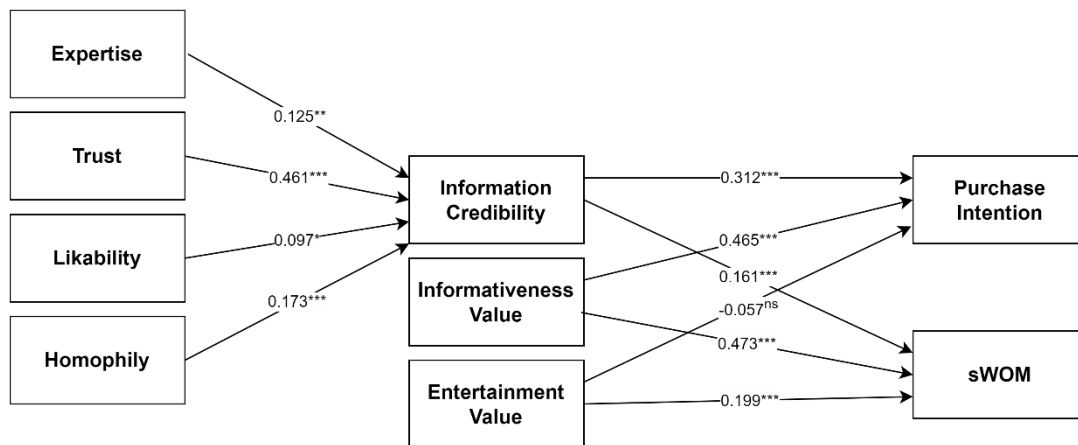
Figure 2: Structural Model

Note: *p < .05; **p < .01; ***p < .001

The outcomes of hypotheses testing reveal significant associations with the perceived credibility of information in following cases: Expertise (β = .125, t value = 2.791; p < .001), trust (β = .461, t value = 10.237; p < .001), and homophily (β = .173, t value = 3.740; p < .001). However, likability exhibits a weaker association with perceived credibility of information. Consequently, hypotheses 1, 2, and 4 are confirmed by the data, whereas hypothesis 3 is not. Information credibility shows a robust correlation with both the intention to purchase (β = .312, t value = 7.507; p < .001) and the spread of sWOM (β = .161, t value = 4.116; p < .001), confirming hypotheses 5 and 6. Similarly, Informativeness value exhibits a strong relationship with the intention to purchase (β = .465, t value = 10.571; p < .001) and the spread of sWOM (β = 0.473, t value = 11.425; p < .001), supporting hypotheses 7 and 8. However, the link between entertainment value and the intention to purchase is not significant, leading to the rejection of hypothesis 9. Conversely, the connection between entertainment value and the intention to spread sWOM (β = 0.199, t value = 5.376; p < .001) is significant, affirming hypothesis 10.

Discussion of Results and Conclusions

This research examines how the credibility, informativeness, and entertainment of social media influencer (SMI) content influence consumer purchase intent and positive word-of-mouth (WOM). As Hovland and Weiss (1951) emphasized, credibility is a cornerstone of persuasive communication. There are other studies, like: Giffin (1967)

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and McGuire (1985), that focus on investigating this relationship between source's credibility and the target's perceptions. The studies of Dwivedi et al. (2015) and Lee and Koo (2015) investigated the relationship between source credibility and consumer endorsements.

The results indicate a positive correlation between information credibility and consumers' propensity to purchase and recommend products. These findings align with previous research by Greer (2003) and Wang, Walther, Pingree, and Hawkins (2008), which established a strong link between perceived information credibility and consumer attitudes. A close association between attitudes and behavioral intentions was reported in several other studies (Ajzen & Fishbein, 1977). A positive correlation between information credibility and consumers' intention to spread a positive sWOM is in line with findings of several other studies on this topic such as Chu and Kim (2011); Dhun and Dangi (2023); and Saleem and Ellahi (2017).

The results of this study affirm that people are more likely to buy the brands recommended by the influencers creating an informative content as highlighted by other researchers as well (Lou & Yuan, 2019). In social media world people get information about products and services from the posts, comments and reviews of others (Karapanos, Teixeira, & Gouveia, 2016; Urista, Dong, & Day, 2009). Moreover, people follow influencers and trust their advice when they consider their social media content to be informative (Ki et al., 2020). Influencers are reported to be a big source of information in cyber space for people looking to buy something (Ki & Kim, 2019). This information can have a strong impact on their decisions to purchase if they consider the content to have high informative value (Hagger et al., 2015).

Followers attach special value to the informative content shared by the influencers, since they can share it with others giving reference of the influencer. The informative content can broaden their perspective and introduce them to new ideas. Any influencer who is capable to deliver informative content in an effective manner can help the followers to see them as someone they want to be: their ideal self. This content helps the followers to satisfy their "competence need" - a term commonly found in psychology literature (Deci & Ryan, 2000).

Our findings reveal that entertaining influencer content encourages followers to share positive word-of-mouth. This aligns with research suggesting that people seek connections with likable individuals (Reis, Collins, & Berscheid, 2000). This tendency extends to online interactions (Reinecke, Vorderer, & Knop, 2014; Tamborini et al., 2011). While celebrities are typically associated with fashion and style, SMIs are often characterized by humor and friendliness, making them more accessible to their followers (Nazerali, 2017). As of January 2024, GloZell Green has amassed over 4.5 million followers while Lilly Singh has over 2.6 million followers on YouTube, primarily owing to their entertaining content. Interestingly, even though some influencer posts are entertaining, it didn't seem to affect how likely their followers were to buy something. This suggests that social media users might trust influencers more for accurate information than just fun content. Consumers prioritize informative content over entertainment when building trust with influencers and making purchase decisions (Lou & Yuan, 2019).

Theoretical Contribution

This study helps us understand influencer marketing better by looking at how trustworthy, informative, and entertaining influencers are all linked to how likely people are to buy what they recommend and talk positively about them online. We examine how existing ideas about influence, originally developed for face-to-face interactions, can be applied to the online world. These ideas include how believable someone seems (source credibility) and how they convince others (persuasion theory). This analysis delves into the extent to which these theories shed light on the influential dynamics between an online content creator, who is an ordinary person rather than a celebrity, and his followers. In doing so, our work extends the existing literature on the generational effects in social media interactions (Chu & Kim, 2011; Sokolova & Kefi, 2020), emphasizing their relevance in influencer and social media marketing.

Practical Contribution

The outcomes of this study can be advantageous for social media content creators who wield influence over their followers. To secure brand partnerships, influencers should demonstrate their knowledge in their field by consistently posting pertinent content. To build trust, influencers must share accurate and reliable information, while fostering a sense of connection requires frequent engagement and relatable content. Furthermore, social media content creators can benefit from the findings to enhance their persuasive strategies when creating content and collaborating with brands. People are more likely to buy products recommended by influencers they trust who

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share informative content. This is especially true when the influencer seems like a genuine person who cares about their audience and really knows their stuff.

For brands aiming to establish affiliate partnerships with influencers, the study's insights are valuable in recognizing persuasive and para-social interaction skills. Understanding the persuasive cues used by influencers helps brands strike a delicate balance between creativity and control.

Limitations of the Study

The limitations of this study may stem from the hypothetico-deductive research design employed. We utilized a survey-based method, adapting literature-defined items to gauge psychometric variables associated with a multifaceted and evolving psycho-sociological phenomenon. To delve deeper into emergent insights, future investigations might employ qualitative or mixed research designs. Future studies could benefit from employing various theoretical frameworks (such as theory of reasoned action, theory of planned behavior and theory of goal-directed behavior) to gain a deeper understanding of their impact on individuals' attitudes, beliefs, and behaviors. Taking a closer look at the actual content influencers create (content analysis) could help us understand what makes it persuasive. Additionally, studying how people react to influencer content in the comments section might reveal valuable insights. Furthermore, our focus was not specific to any particular Social Networking Service (SNS), leaving room for subsequent studies to concentrate on distinct SNS platforms and ascertain the relevance of these constructs.

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Examining Knowledge Hiding and Abusive Supervision: Mediating Role of Job Strain and Moderating Effects of Prosocial Motivation

Examining Knowledge Hiding and Abusive Supervision: Mediating Role of Job Strain and Moderating Effects of Prosocial Motivation

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Abstract

The major aim of this research is to examine how employees' action of knowledge hiding is impacted by abusive supervision. The current study also investigates the roles of job strain as a mediator between abusive supervision and knowledge hiding. Prosocial motivation is taken as a moderator between job strain and knowledge hiding. Data were collected from the managers and middle-line employees of the banking industry in major cities of Pakistan. Data was collected with the help of an adopted questionnaire at three-time lags. Researchers collected 280 responses by employing purposive sampling. Multiple regression technique was used for the sake of data analysis. This study acclaimed that when employees work under high task pressure environment and observe their bosses as abusive; they got stressed and faced job strain, which positively affects their KH behavior. However, employees with high level of prosocial motivation are capable of managing such strain and are not likely to engage in knowledge hiding behavior because, being prosaically motivated, they want to assist others..The outcomes indicated that abusive supervision has significant positive relation with knowledge hiding, mediation of job strain between abusive supervision and knowledge hiding was also proved by results, and moderation of prosocial motivation was also significantly proved. The research model was supported by transactional theory of stress. Organizations should implement abusive behaviors control programs that prioritize ethically effective communication, and emotional intelligence to mitigate instance of abusive supervision. It is important for managers to makeup the workload in reducing stress which can in turn lead to knowledge hiding behaviors.

Keywords: Abusive supervision, Knowledge hiding, Job strain, Pro-social motivation, Transactional theory of stress

Introduction

The banking sector is most demanding and intense pressure environment, facing challenges of high competition and volatility (Jena & Meena, 2022). Unfortunately, these elements can foster abusive supervision, resulting in bad outcomes for both people and companies (Balducci et al., 2021). Businesses must enhance their information-making and information-holding structure in order to get achievable advantages.Knowledge sharing at work promotes creativity, innovation, and overall organizational success (Rubbab et al., 2022). According to Lu and Zhou (2025) People hold onto their knowledge for social and political advantages as well. However, despite the fact that companies and other organizations invest considerable efforts to build the processes of knowledge transfer into the work places, there are situations when knowledge is not transferred because workers are not willing to do so. Previous studies found that 76% Canadian and 60% US workers involved in knowledge hiding (Zhang & Min, 2022) However, Tierney and Tepper (2007) reported that "the mass of research on leadership has mostly focused more on its positive aspects and there is need to conduct research on destructive side," which means that, unethical leader behavior (negative leadership) can be damaging for the subordinates (Almeida et al., 2022). Therefore, this study focuses on abusive supervision (negative leadership) because the literature on abusive

supervision and KH behaviors requests more exploration. Abusive supervision is "employees' perceptions of the extent to which their supervisors engage in the sustained display of hostile verbal and non-verbal behaviors, excluding physical contact (Arshad et al., 2025). During the past 15 to 20 years, researchers have examined in great depth the detrimental sequel of administrators' arrogances and behaviours, such as bodily aggressiveness, mental abuse or malevolence, and bullying (Lyubykh et al., 2022). Studies indicate that abusive supervision is more common in the banking industry than in other sectors. This tendency is influenced by elements such as heavy workloads, strict target dates, and workplace stress. According to (Khan et al., 2020) the most important factor predicting fatigue in banking workers was harsh monitoring.(Agarwal & Avey, 2020), found that staffs who fronted more offensive supervision from their supervisors were less gratified with their effort, felt not so much obligated to their association, and had advanced outlooks for their performance. The majority of research has examined the effects of abusive behaviour and hierarchical factors associated with abusive supervision; however, relatively few studies have examined the traits of abusive boss behaviour that may be the cause of their abusive behaviour. There is a clear correlation between abusive command and detrimental mental outcomes, such as decreased self-belief and ineffectiveness (Anand & Dalmasso, 2020; Estes, Awais, & Sher, 2017). In a similar vein, (Ashforth, 1997; Tipper, 2000) identified distinguishing characteristics such as shifting objectives, increased levels of enthusiastic fatigue, managerial commitment, and decreased degrees of job contentment. These relationships help workers develop the affectivity and mindfulness necessary to deal with unreasonable and unjustifiable situations, which might impact their abilities and confidence (Jha & Jha, 2015; Lyubykh et al., 2022)

According to the traditional definition of stress provided by (Ganster & Rosen, 2013), stress arises when a person believes that they are unable to meet the ultimatum of an outside condition (Cohen et al., 2024; Ganster & Rosen, 2013). According to the World Health Organization, occupational pressure is a global issue that affects both companies and countries (Agarwal & Avey, 2020). Twenty percent of a company's payroll goes toward addressing issues related to stress (Naru & Rehman, 2020). It has been shown that employees who report high levels of strain incur nearly fifty percent more in fitness-care expenses than other employees (Goetzel et al., 2023). Prosocial inspiration is a crucial indicator of information concealment, as numerous research has recently demonstrated (Černe, 2014; Černe et al., 2015). However, little is known about the affiliation between helping inspiration and information concealment (Ganster & Rosen, 2013; Grant, 2007). Understanding the outcomes and yields of this interaction is crucial. Prosocial drive should have a major role in predicting knowledge concealing because it protects and promotes the prosperity of others (Batson, 1987). According to (Batson, 2010; Evans et al., 2015) it alludes to a desire to assist others. Researchers are discussing the concepts of prosocial motivation as put forth by (Grant, 2007) and going into detail on how crucial prosocial motivation is in helping employees with the stress of their jobs, which arises from abusive leadership. Workers with strong prosocial motivation are better able to manage stress and conceal less information.

Regardless of the emphasis placed on knowledge management systems within organizations, employees' knowledge hiding behaviors obstruct organizational learning, collaboration, and innovation, especially in high-pressure environments such as banking. While abusive supervision has been recognized as a major psychological precursor to numerous adverse employee reactions, its particular contribution to knowledge hiding behavior, especially concerning the psychological factors that mediate and moderate this effect, remains unclear. Most of the work on abusive supervision has focused on its general effects, meaning that there is a gap in understanding the processes that link abusive supervision to knowledge hiding, including how individual differences like prosocial motivation may either dampen or amplify these effects. Due to its rigid hierarchical structures and its emphasis on internal knowledge sharing, the performance-driven culture of the banking industry serves as a primary example where these dynamics are particularly salient. Although knowledge hiding and abusive supervision have been individually studied in depth, the intersection of these two constructs remains underexplored. Further research is needed to bridge this gap and provide a more nuanced understanding of how these variables interact. In order to close this gap, the current study uses the Transactional Theory of Stress and Coping (Lazarus & Folkman, 1984) to define abusive supervision as a stressor within the workplace. It looks at the impact of this stressor on employee behavior via job strain (mediator), and examines the role of prosocial motivation (moderator) in shaping the strength of this impact. The study seeks to strengthen the theoretical understanding of knowledge hiding as well as provide evidence-based insights for the organizational policies aimed at reducing the incidence of abusive supervision and knowledge hiding in the organization.

Literature Review

Underpinning Theory

The Transactional Theory of Stress, proposed by Lazarus and Folkman in 1984, suggests that stress is a result of an individual evaluating a given situation as surpassing their coping resources. This involves two pivotal stages: in primary appraisal, individuals decide whether the situation is harmful or poses a potential threat, and in secondary appraisal, they evaluate how effectively they can deal with the situation using existing resources. For the purposes of this research, abusive supervision is viewed as the stressor (IV). Employees perceive such supervisory behaviors as attacks on their psychological safety, which initiates the primary appraisal process. This emotional and cognitive strain results in the perception of threat, which prompts knowledge hiding as a means of self-defense (DV).

Job strain (mediator) describes the experience of this stressor's impact more psychologically. Abusive supervision increases strain by inducing feelings of powerlessness, reduced personal agency, and emotional burnout. These strain symptoms distract employees' effort from constructive organizational activities like knowledge sharing to knowledge hiding as a coping strategy or self-preservation. However, responses are not uniform across all individuals. The secondary appraisal process includes looking into coping resources like prosocial motivation (moderator) the intention to help and support others. Employees with high prosocial motivation are more likely to reframe the situation or invoke some altruistic internalized rationale to counterbalance the effects of abusive supervision, thereby increasing the likelihood of not engaging in knowledge hiding. Thus, prosocial motivation acts as a buffer permitting employees to maintain cooperative behaviors even when faced with supervisory stress. This model synthesizes the Transactional Theory of Stress by locating abusive supervision as the stressor, job strain as the behavioral outcome mechanism through which stress influences behavior, and prosocial motivation as a personal coping resource that moderates the relationship. This is especially applicable in the high-stakes banking industry where rigid hierarchies and relentless competitive pressure provide greater opportunities for abusive supervision, requiring a strong positive coping response and motivating tendencies to sustain knowledge sharing.

Abusive Supervision and Knowledge Hiding

According to Wang and Noe (2010), the term "knowledge" refers to a combination of experiencing framework, values, contextual information, and records. Essentially, this is characterized in this observational understanding as the data, ideas, and consequently the expertise applicable to the specified work finished by colleagues. In agreement with (Khoreva & Wechtler, 2020; Sabri, Saghir, & Awais, 2024), information concealing is the deliberate attempt to withhold information that someone has requested. It occurs once a worker gets an appeal for clarification but purposefully withholds or obscures the information (Černe, 2014). due to errors, mishaps, or ignorance, as well as situations in which they essentially did not request knowledge. Three dimensions of KH have been proposed by literature: playing dumb, evasive, and rationalized (Bari et al., 2020; Mahmud et al., 2021; Rubbab et al., 2022) playing dumb (where an individual pretends, they lack relevant information); evasive hiding (where staff members attempt to conceal data while simultaneously stating that records will be available); and rationalized concealment (where staff members offer an accurate clarification for why facts will not be available) (Wu et al., 2024)). However, because these actions impede organizational achievement, research has recently concentrated on figuring out what causes KH (Anand & Dalmasso, 2020; Rubbab et al., 2022; Wang et al., 2021).

According to Xiao and Cooke (2019), there may be a connection between the motivations for maintaining information confidentiality and organizational policies, reward systems, leadership style, organizational structure, and cultural elements. A person's decision to reveal or withhold information is influenced by the interpersonal relationships they have built and the behaviours of people they encounter at work. According to (Anand & Dalmasso, 2020), there is a dearth of existing literature on the experience of employees engaging in information concealing behaviour that is affected by dysfunctional leadership. In light of this, we contend that one of the contextual elements influencing employees' tendency to conceal knowledge is offensive administration. (Khan et al., 2020) defined it as "the degree to which their boss involves in antagonistic vocal and non-vocal activities, except physical contact." This type of supervisory harassment may cause the victimized employee to become defensive, leading them to conceal. We use the transactional model of stress and coping (Hobfoll et al., 2018) as our conceptual framework to support the aforementioned premise. We want to know how employees' propensity to withhold important information from the company is influenced by the aggressive behaviour of their managers.

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Increasing number of studies show the impact of abusive supervision at workplace; namely, costs to businesses and their employees (Khan et al., 2020). Jha and Jha (2015) indicated that organizations which practice and support submissive supervision level risk experiencing worsening of organizational performance, employees' turnover and the level of job satisfaction among workers. Until now, a lot of research has focused on the ways to mitigate the emotional effects of abusive supervision without striving to prevent them; or to put it another way, managing the situation in a reactive manner rather than proactive (Bari et al., 2020; Rubbab et al., 2024; Tepper et al., 2008). Duffy (2016) argues that abusive supervisors display unfavorable and aggressive behaviors, therefore, they are pessimistic. Anand and Dalmasso (2020); Lyubykh et al. (2022); and Wu et al. (2024); also explain that such leaders reduce voice behavior, job happiness and number/quality of information sharing. Ahmad et al. (2021a) argue that leaders also hold the ability to change the attitudes and behaviors of those reporting to them for worse or better. Thus, in situations where personnel are unveil to abusive supervision at workplace, they do not typically resist; rather, they tend to engage in avoidance coping mechanisms (Khan et al., 2020) to self-protect with regards to resource loss (Whitman et al. , 2014). With regard to the impact of stressors at work, people try to prevent or minimize the loss or the risk of loss carrying out activities to protect the resources that are important for them (Islam et al., 2023; Wu et al., 2024). Those who suffer abusive supervision or any other poor supervisory conduct at the workplace experience stress that reduces their personal resources. In this respect, they strive to preserve their KH personal resources by performing KH behaviors as a way of coping. While supporting these claims and the literature mentioned above, this analysis proposes.

H1: Abusive Supervision has significant positively effect on knowledge hiding

Abusive Supervision and Job Strain

Job pressure is expected to be high at all times (McCarthy et al., 2019) and may have severe effects on employees and businesses, such as decreased job satisfaction , improved fatigue from excitement. Because of the demands of their procedures and prolonged periods of severe pressure, managers are especially vulnerable (Brett & Stroh, 2003). According to Naru and Rehman (2020), stress is experienced if a person feels that the demands of a given context are beyond his or her capacity in handling them (Harris & Kacmar, 2005; Naru & Rehman, 2020). Workplace stress has been recognized by the World Health Organization as a widespread epidemic that is affecting organizations and countries globally (Agarwal & Avey, 2020). About 20% of total income of the companies is spent in addressing the issues related to stress (Naru & Rehman, 2020). The wellness associated expenses of the workforces who reported higher strain level have been noted to be up to 50 percent higher than those of other employees (Goetzel et al., 2023). Indeed, it has been found that a huge percentage of the working population suffers from different types of job pressure (Agarwal & Avey, 2020). Chi and Liang (2013) has pointed out that employment-related aggression from managers has the potential of causing long-lasting stress, burnout, and declines in workplace satisfaction. Workers who experience abuse by their supervisors are likely to act uncooperative and secretive by withholding information and ideas, thereby limiting creativity (Khoreva & Wechtler, 2020). The aggressive form of supervision may reduce the employees' motivation, increase the rates of absenteeism and turnovers, affecting the organizational performance (Mahmud et al., 2021). Apart from depression, as was demonstrated by (Harris & Kacmar, 2005; Mackey et al., 2015) abusive supervision is also positively associated with various indicators of mental strain, such as burnout identified by (Lyubykh et al., 2022), depression and somatic complaints. Hobfoll et al., (2018); Khan et al. (2020); and Zhu et al. (2017) affirm that abusive supervision is positively associated with work stress.

H2: Abusive Supervision has significant positive effect on Job Strain.

Job Strain and Knowledge Hiding

McCarthy et al. (2019) established that pressure from the work environment is expected by characters to learn fine points of how to self-apply stress abstractions, which in turn results in pressure responses. Based on the findings and the victorious hypotheses, it is feasible to use the value-based approach of pressure of (Obbarius et al., 2021), and turn pressure to the management focus pressure as an individual decision. Workplace anxiety is therefore defined by concerns voiced in circles by observers with a view of benchmarking the tangible and psychological responses of the workforce. Occupation stress enhances the degree of pressure, or pressure that hinders an individual from handling process concerns. According to Lazarus, such inclination arises when people realize that they are unable to manage the demands of the undertaking or with the threats to success. Several factors influence movement pressure such as courtesy at the place of business and unmannerly behavior of coworkers, and results into a higher level of man or lady depressive mood, turnover expectation, low morale phase, observed

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embarrassment and negatively affects participative leadership. In a paper by (Klima, 2014) the authors noted that abuse at the place of work contributes to one's perceived weight. The growing body of literature has established that job strain results in knowledge hiding in organizations. As much as there are few studies done showing correlation between job strain and knowledge hiding, this study will seek to establish it. Past studies have provided rather conclusive evidence and have shown that job strain leads to decreased levels of work performance among employees. Intense amounts of social control are viewed as a protective mechanism against pressures and stresses, including situations when social abuse and the threatening environment influence fatigue (Baruch-Feldman et al., 2002; Driscoll et al., 1994; Kickul & Posig, 2001). Stressed people have low levels of emotional coping capacity due to constant pressure and negative emotions. Concealing it might be done by those who are physically and emotionally worn out in order to protect what little knowledge they still have and reduce their workload.

H3: Job Strain has significant positive effect on knowledge hiding.

Mediation of Job Strain between Abusive Supervision and Knowledge Hiding

As previously mentioned, we acknowledge that workplace exclusion places more procedural pressure on those who have a stronger sense of commitment to their profession since these representatives feel a connection to their work or enjoy financial benefits and are obligated to maintain this procedure. However, those factors could be considered essential to improve alienation and information hiding affiliation. Taking everything into account, it is critical to identify the extensive effects of working environment pressure across all kinds of concealing information (sly, betting imbecilic, think). Finally, we argue that the effects of harsh administration on family member conflict are somewhat mitigated by fictitious feelings and tiredness constructions. Because we know that various approaches (outside the scope of this investigation) can be effective, researchers recommend halfway intercession rather than complete involvement. Our theory is based on the stress model proposed by (Obbarius et al., 2021). It explains how abusive supervisory behavior contributes to knowledge concealing and how job pressures act as a mediating factor in the connection between aggressive administration and knowledge concealment.

H4: Job Strain mediates the relationship between abusive supervision and knowledge hiding.

Moderating Role of Prosocial Motivation

In professional environments where individual dependencies and commitments are apparent, prosocial inspiration is a particularly relevant topic. Workers with increasingly basic levels of prosocial inspiration will undoubtedly respond positively to requests for assistance and be able to sort through partners' needs (Grant & Sumanth, 2009). Prior research has found that prosocial motivation is linked to three types of consequences on any given occasion: proactive practices, other noteworthy outcomes of laborers (such as execution), and proper citizenship conducts and prosocial rehearsals. We develop our framework on the basis of stress model proposed by (McCarthy et al., 2019). We explain how knowledge concealment increases as a result of abusive supervision from supervisors, and how job strains and PM (prosocial motivation) play a mediating role in the context of abusive supervision and knowledge hiding. When prosocial motivation is high, the relationship between job strain and knowledge hiding weakens.

Additionally, we discover the motivating interactions between agent outcomes, namely turnover objectives, turnover, and task performance, and boss observed strain. These findings demonstrate work-basis functioning generally (Sen et al., 2024) and are crucial for individuals as well as organizations. Thirdly, we perform a similar process and consider the surrounding conditions where supervisors will definitely give clear weight to ace social behaviors around labor power. In particular, we recall the extent to which directors' apparent sentiments toward their audience referred to as understood supporter models affect the amount of information they convey during expert social adjustment rehearsals. Review therefore relaxes earlier work with the understanding that, in certain circumstances, primary impression of stress may also yield beneficial outcomes. Because of their professional requirements, administrators are particularly vulnerable and frequently labor under extreme pressure for extended periods of time (Brett & Stroh, 2003). Our framework builds upon (Obbarius et al., 2021) stress model, explaining how knowledge concealment escalates as a result of supervisor abuse and how job strains act as a moderating factor in the context of harsh leadership and information concealment. When prosocial motivation is high, the relationship between job strain and knowledge hiding becomes weaker.

H5: Prosocial Motivation moderates the relationship between Job Strain and Knowledge Hiding.
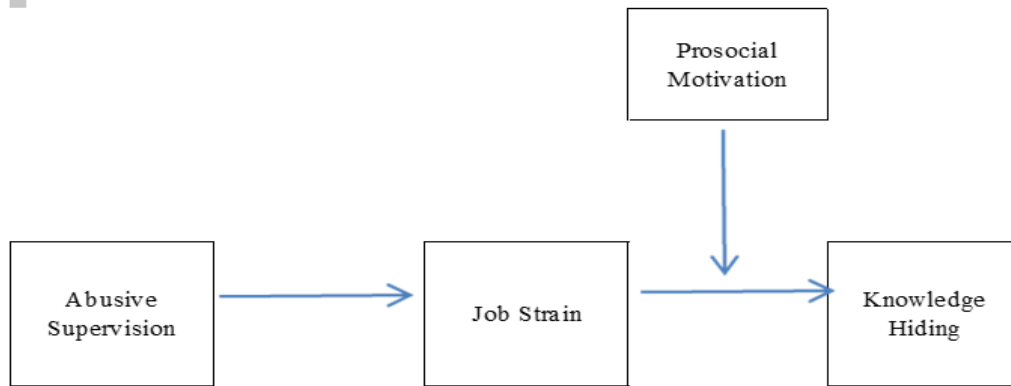
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Figure 1. Conceptual Model

Research Design

Population and Sampling Design

Middle-level employees from ABL, HBL, Faysal Bank, Askari Bank, Summit Bank, and JS Bank were surveyed through a structured, time-lagged survey to collect primary data for this study. The employees covered in this survey were located in twin cities of Pakistan, Islamabad and Rawalpindi. The study utilized purposive sampling, a subtype of non-probability sampling. This approach was used deliberately to ensure that respondents selected had sufficient knowledge and experience to provide insights into the dynamics of abusive supervision, job strain, prosocial motivation, and knowledge hiding. Purposive sampling is particularly useful in behavioral and organizational studies where the focus is on a specific population who are most likely to experience the phenomena being studied (Etikan, Musa, & Alkassim, 2016). In this research, middle-level employees were the focus because these individuals are often the most important intermediaries between top-level management and frontline employees, making them more vulnerable to supervisory behaviors and crucial to knowledge sharing (Palinkas et al., 2015). This position provides them with a blend of hierarchical and peer interaction pressures that are relevant to the study's variables.

Data gathering occurred in three phases to reduce common method bias (Podsakoff et al., 2003). During the first phase, measurements for the independent variable, abusive supervision, and the mediator, job strain, were collected. In the second phase, data for the moderator, prosocial motivation, was collected. Finally, in the third phase, participants completed the questionnaire for the dependent variable, knowledge hiding. This time-lagged approach improves the internal validity of the study and enables capture of mediation and moderation effects with greater precision, enhancing the accuracy of temporal assessments (MacKinnon et al., 2007). Sample size in this study was finalized as per recommendations by Hair et al. (2019), who advised a minimum of 10 participants per estimated parameter in structural equation modeling (SEM), and other scholars (Kline, 2015) who provided a range of 200-300 as optimal for SEM studies. Accordingly, purposively sampled mid-level employees serve to ensure robust statistical power and generalizability within the scope of the study.

Measuring Instruments

The constructs were measured using standard scales for the survey (Appendix 1). The responses on all scales were assessed using five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Abusive supervision was measured using Tepper Bennet (2000). Knowledge hiding (KH) was assessed using scale proposed by Connelly et al. (2012). Grant's (2008) prosocial motivation scale was used to measure prosocial motivation. It included four items. job strain was measured by scale that was developed Fuller et al. (2003). It also included four items.

Results

Demographics Characteristics

This study included four different demographic groups. The table below provides an explanation of each

demographic variable's summary. They were also accounted for in the regression analysis.

Table 4.1: Demographic characteristics of the participants

Characteristics	Frequency	(%)
Gender		
Male	173	61.8
Female	107	38.2
Age		
26 to 33 years	131	46.8
34 to 41years	93	33.2
42 to 49 years	34	12.1
50 and above	22	7.9
Education		
Intermediate	121	43.2
Bachelors	91	32.5
Masters	51	18.2
MPhil/PhD and others	17	6.1
Experience		
1 to 5 years	119	42.5
6 to 10 years	78	27.9
11 to 15 years	38	13.6
15 and above173	45	16.1

Scales Reliabilities and Correlation Analysis

Reliability analysis is conducted in order to determine internal consistency of the scale. The results are mentioned in following table.

Table 4.2: Reliabilities and Correlation

Variables	Cronbach's Alpha	M	SD	1	2	3	4
1.AbusiveSupervision	.809	56.68	6.81	1			
2.Knowledge Hiding	.843	45.74	6.68	.509**	1		
3. Job Strain	.787	13.64	3.53	.391**	.125 *	1	
4.ProsocialMotivation	.844	14.08	2.75	.448**	.390**	.228**	1

N=280, **p<0.01.

All of the model's variable and instrument reliability were included in the reliability analysis result. The Cronbach alpha reliability of the abusive supervision scale was 0.809, that of knowledge concealment at 0.843, job strain at 0.787, and prosocial motivation at 0.844. The correlation results between the variables examined in the current research, including prosocial motivation (PM), job strain (JS), knowledge hiding (KH), and abusive supervision (AS), are displayed in the above table. Knowledge concealment and abusive supervision had a substantial positive correlation (.509**). Prosocial motivation was at.448** and job pressure was at.391**. There exists a positive correlation between job strain and both knowledge concealing (.125*) and prosocial motivation (.228**). Prosocial drive and knowledge concealing have a substantial positive correlation (.390**). According to the proposed model, all variables have positive correlations with one another at 0.01 levels.

Regression Analysis

Table 4.4: Regression table

Hypothesis	Regression weights	Beta Coefficient	R square	F	P-Value
H1	AS →KH	0.624	0.259	97.243	0.000

| H2 | AS ⟶ JS | 0.735 | 0.153 | 50.293 | 0.000 |
| H3 | JS ⟶ KH | 0.082 | 0.160 | 4.433 | 0.03 |

The regression analysis results show that abusive supervision carries significant impact on knowledge hiding. The dependent variable knowledge hiding was regressed on predictor variable abusive supervision to test the H1. Similarly, the impact of AS was verified on JS to test H2 As significantly predict JS with, F (50.293), p below 0.000which shows that AS creates significant impact on JS with beta (0.735), R-square (0.153) which predicts 15.3% change in JS. The impact of JS on KH was also performed to test H3, JS significantly predict KH with, F (4.433), p below 0.03 which shows that JS creates significant impact on KH with beta (0.082). Moreover, R square (0.160) which predicts 16% change in KH.

Mediation Analysis

Table 4.4: Mediation Table

Hypotheses	Relationships	β	SE	T	P
H1	A S ➔ K H	0.624	0.048	7.07	0.000
H2	A S ➔ J S	0.531	0.039	5.587	0.000
H3	J S ➔ K H	0.457	0.076	3.868	0.019
H4	A S ➔ J S ➔ KH	0.381	0.049	5.548	0.000

The mediation analysis results applying the Baron and Kenny technique are displayed in the above table. First phase involves step-by-step mediation to assess the direct impact of abusive supervision (IV). The findings show a significant association where p<.000 at a beta value of.624. The influence of abusive supervision is examined in the second stage, where it is found to have a substantial link with the mediating variable job strain (beta value of.531 at p<.000). In the third phase, the impact of job strain (M) was examined on the dependent variable, knowledge concealment, and the results showed a non-significant beta value of.457 at p<.019. The final step's controlling mediator results demonstrate that, with a p value of.0000, the influence of abusive supervision is still considerable. This finding indicates that the association between abusive supervision and knowledge concealment is significantly mediated by job strain.

Moderation Analysis

The findings of the multiple moderation regression analysis are displayed in the above table. The impact of demographic factors was discussed in the first stage. The effects of harsh supervision, job strain, and prosocial motivation were regressed in the second step. The results of the regression analysis indicate a substantial relationship between knowledge concealing and prosocial motivation. The findings indicate that there is a considerable shift in R2 in the third stage following the integration of interaction terms such prosocial motivation and job strain*. Regression analysis results show that prosocial motivation significantly moderates the relationship between knowledge hiding and job strain. These findings support the hypothesis that prosocial motivation moderates the relationship between JS and KH in a way that makes the relationship between JS and KH weaker as prosocial motivation increases.

Table 4.5: Moderation Analysis

Predictors	Knowledge hiding		
	β	R^2	ΔR^2
Step 1			
Control Variables		.00	
Step 2			
AS	.66***		
JS	.30***		
PM	.30***	.15	.15**
Step 3			
JS*PM	.13***	.25	.09***s

*p<.05 ** p<.01, *** p<.001,

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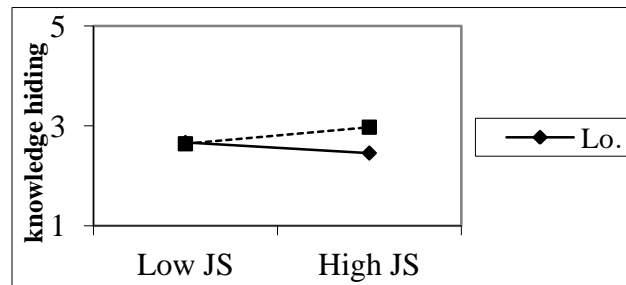
Figure: Moderation Graph

Discussion

Knowledge is a key component of organizational effectiveness and gaining a competitive edge in the competitive and dynamic corporate climate of today (Wang & Noe, 2010). This study examines how people's behaviours related to concealing knowledge are affected by abusive supervision, using the stress theory developed by (Lazarus & Folkman, 1984). This study also examined how prosocial motivation, acting as a moderator, bridges the gap between job strain and knowledge hiding.

The results of the regression analysis verify H1, that abusive supervision has a direct influence on knowledge concealment. The findings also show a favourable correlation between knowledge concealing and abusive supervision. The impact is supported by (Grant, 2007) theory of social learning. According to this theory, each person learns from their surroundings and experiences through behaviours, perceptions, and interactions with others. When individual segments are likely to hunt for authentic solutions and make genuine decisions at work, social collective learning replicates the authenticities from beginning to end. Although they are aware of how to manipulate situations and have demonstrated their dedication to the organization and hard work, their supervisors are primarily concerned with their authority and position, and they constantly strive to stand out. According to (Aryee et al., 2007), abusive behaviour is defined as behaviour that is detrimental to individuals and to the organization as a whole.

The regression result of H2 also clearly indicates the relationship between job strain and harsh supervision. Notably, the abusive monitoring raised stress for the worker and therefore is detrimental. Zimmerman and Darnold (2009) put forward an expectancy theory, which supports these domino effects. In accordance with this theory, performance is the product of several factors such as expectations towards the particular behaviour and the consequences that the performer is likely to endure because of the behaviour in question. Employees are stressed or depressed at work when there is abusive control for the following reasons: Kickul and Posig (2001) stated that abusive supervision is the ill-behaviours and negative treatment of superior toward the subordinate, and subordinate's negative attitude and immoral acts often result in anxiety, emotional stress, and depression for the subordinates. From the paper by Agarwal and Avey (2020), it is clear that abusive supervision equals job pressure; if a leader is abusive, employee gets ruined and stressed; if the employees do not find the working environment conducive, they will not perform the actions implication knowledge properly and; if the business environment is inadequate, this therefore implies that the level of job strain is high.

To considering the fact that manpower is the most important factor of competitive advantage, an improved working environment for employees ensures increased staff productivity. Another reason for granting good working conditions for employees is to equip them to deal with global challenges. As per the regression analysis results, job strain brings about effects with information hiding, which supports the hypothesis H3 that job strain has a positive connection with knowledge hiding. These findings are in support of Reactance theory that was developed by Jack Brehm in 1966. Other past studies have also revealed that when people working in organizational environment felt that their power is being undermined than they became annoyed (Bartunek et al., 2008; Xiao & Cooke, 2019). Culture is another factor that also contributes to the system of knowledge management where it has got an important role to play. Tight and loose cultures Gelfand et al (2012) was the first who try to classify cultures by the degree of adherence to the set standards. Whenever people are grouped together in form of teams, cultural norms, ethics and cultural differences impact organizational behaviour. As (Cox et al., 1991) said it. It established confidence in people for the purpose of coming up with prompt decisions (Afifi & Weiner, 2004). In order to improve the levels of trust, support and confidence in management employees try to control and actively spread knowledge. Another appreciated way of knowledge sharing is to bring more confidence, trust and the loyalty of the employee to the association (Ahmad et al., 2021; McCarthy et al., 2019;

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McCrory et al., 2013)

In the present context the findings say that the employees are abused for their hostile conducts and the employees get tired and get bored and develop stress, this stress ultimately cause knowledge hiding; In the present organizational working conditions the banking sector employees are facing immense pressure to achieve the targets that are assigned to them, that is why the employees are accustomed to perform their official duties under pressure and this pressure or strain cause knowledge hiding (Pradhan & Jena, 2018). Furthermore, in the context of the organization's banking sector, making policies for the rights of employees somehow empowers the employees by providing them self-confidence about the organizations performance so that they try to avoid any misconduct and unethical ways. In connection to this, organizations should retain knowledge in the organization via knowledge system since it is a major weapon to counteract its rivals and gain sustainable competitive edge.

Based on regression breakdown results, abusive supervision has an impact on job strain and job strain has a positive impact on knowledge hiding where hypothesis proves that positive relationship among job strain and knowledge hiding (H4) therefore is accepted. Podsakoff et al. (2007), transactional theory of stress relates with the current findings by mentioning that coping actions are directly tied to the mental state of stress. Prior literature reveals that most who focus on work related stress in employees are primarily interested with how it impacts employees (Ganster & Rosen, 2013). The moderation of job strain between abusive supervision and knowledge hiding was test in regression analysis with Preacher and Hayes method. By analyzing the outcomes of regression evaluation, it is potential to conclude that job strain forms a connection between abusive supervision and information concealment in accordance with the findings, the abusing behavior of a supervisor generates stress among the employees and that stress leads the employees to information concealing. With such findings, we were consequently capable of inferring that job strain mediates between abusive supervision and knowledge hiding. The exacting nature of leaders puts stress in the employee, stress reduces morale, interest and productivity and that stress makes the employees to conceal knowledge because the middle line employees of the banking sector organizations are already stressed due to targets pressure and that stress affect the performance but that strain results into Information secrecy because information is power in the existing trade world Organization should ensure and develop culture to acquire and maintain knowledge in order to address these issues and achieve the set organizational objectives.

The regression results suggest that prosocial motivation moderates the connection between job strain and information concealment (H5). The recent outcomes are supported by Hobfoll et al. (2018), Conservation of Resources (COR) theory, which was introduced in 1989 to expand the prevailing anxiety research. COR theory, sometimes known as stress theory, elaborates on how people are constantly compelled to maintain current resources while also pursuing new means. According to this idea, people experience stress for a variety of reasons, including the fear of losing resources, actual loss, and failure to attain additional resources. People attempt to maintain these resources in order to obtain authority, and they engage in bad behaviours such as knowledge concealment. There are also more circumstances that lead people to conceal knowledge, such as harsh behaviour by their supervisor. Abusive supervision occurs when an individual believes that their supervisor is engaging in offensive and immoral behaviour. To address the issues that employees confront as a result of abusive employer behaviour and to minimize anxiety or tension, the COR theory stated that supportive network is a powerful instrument for combating tension and bringing individuals out of such tight environments. PM is the desire to benefit everybody else or drive an effort to fix other people's problems (Hall et al., 2007). Prosaically motivated personnel are constantly willing to help others (Grant, 2007). Employees with high prosocial drive are constantly willing to assist others and can deal under stressful conditions. Earlier studies have demonstrated that PM is strongly negatively linked with knowledge concealment (Wu et al., 2024).

The current investigation concentrates on the aspects why workforce of banking sector organisations violate knowledge at workplace, in what way the AS creates pressure and that pressure escort to knowledge hiding and also highlights the significance of ''helping motivation'', and similarly describes how ''highly prosaically motivated people ready to help others and also have capabilities of competing pressure'' reduces the effect of AS on KH. To improve worker competence and productivity while also creating a positive working environment, firms should develop a mechanism for reporting any misconduct or wrongdoings and giving security to their employees (Schyns & Schilling, 2013). To tackle global problems, firms should design their own methods for creating and maintaining knowledge, as knowledge is a key source of competitive advantage.

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Implications

Practical Implication

This work adds significant value in the literature of KH. First, we add to the KH by analyzing the spectacles that underpin individuals' knowledge-hiding traits. According to Černe (2014), KH is an unproductive behavior that hinders creativity and creates a cycle of distrust among coworkers who refuse to share knowledge. On the basis of this conception, Previous literary text has investigated the backgrounds of information concealment as a retort to hostile behavior from their subordinate or the impression of information ownership (Bari et al., 2020; Wu et al., 2024). However, less research has looked into KH as a surviving behavior. To address the gap, we conceptualize KH as a preventive coping technique for subordinates facing a potential harm to themselves or their jobs. Firstly, Organizations should build a culture of psychological safety where employees feel comfortable sharing knowledge without fear of exploitation or negative consequences. Implement recognition and reward systems to encourage employees to share knowledge as a valuable resource for organizational growth. Secondly, Management should Implement monitoring mechanisms e.g., employee feedback systems to identify and address abusive supervisory practices early. In high-pressure environments like banking, where stress is prevalent, prosocial motivation can act as a protective factor. Banks should: Promote team-building activities to enhance interpersonal relationships. Encourage a shared sense of purpose to motivate employees to prioritize collective goals over individual stress responses. Encourage Open Communication: Establish trust-based communication channels to counteract knowledge hiding, which may arise from strained relationships caused by abusive supervision. Fostering Empathy and Collaboration: Conduct training that promotes prosocial behaviors, such as teamwork and mutual respect, which can mitigate the impact of job strain on knowledge hiding.

Theoretical Implications

First, the present work examines the moderating role of PM in the JS and the KH relationship. PM can be defined as an action whereby an individual attends to and seeks the welfare of the other members in the society rather than caring for him. Prosocial motivation ensures that the person is ever willing and ready to help the other and thus worker with high prosocial motivation is able to comprehend the feelings of the other workers in the organizations, and are also able to recognize factors such as stress and emotional strain that may hinder worker's performance. Employees' prosocial motivation helps them manage the factors that decrease creativity and any form of the organization as a whole.

In the current study, the private sector firms especially the banking firms have to establish efficient management systems where a code of ethics is properly formulated and implemented to deter any misdeed or unlawful actions within the firm. This is important for enhancing the performance of the employee in the banking industry because the banking sector has central role to the monetary progress of a country. Another emerging theme of this research study is passion toward commitment to abusive supervision that results in job pressure. Each of the abusive supervisory behaviours contribute to the nature of the workplace; thus, the employee undergoes mental stress and cannot perform the given responsibilities and complete the intended tasks.

Such behaviours promote negativity in organisation and reduce productivity, performance and employee self-efficacy while at work. In line with the principle of knowledge protection, this experiment shows that. In other words, how those abusive behaviours cause stress among the employees and finally, how they veil knowledge. This paper has implications to the theory of knowledge hiding by demonstrating that there are other reasons why employees hide information besides abuse; knowledge workers and spend much time with knowledge, and they say it is their own instrument of authority and therefore, they have the reasons to protect it. Last but not the least, this research links a function of job pressure with moderation of prosocial motivation in relation to abusive supervision and knowledge concealment. It is the duty of a Muslim which tell us that we should be just in everything we do and wherever we do it. Besides, it is our duty, as Muslims, to stop any hostile and illegal deals and behaviours to evade misbehaviour and provide healthy environment for everyone and without prejudice.

Limitations and Future Directions

In spite of its theoretical and practical significance, this work has certain restrictions. For starters, during data collecting, the researcher failed to include other relevant factors such as household troubles, economic issues, and fitness concerns. Researchers could investigate additional aspects in order to better widen the scope of the concept. Second, this study examined the theory for practical outcomes using restricted data and a specific sector. Additionally, researchers will primarily gather responses from other private sectors, such as the telecom sector,

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for the reason that private sector organizations set high goalmouths for their workers, and staffs must work harder to meet these goals, that's why private organization workers are facing additional stress. Third, the current study more strengthens the generalization of findings from the particular geographic area such as Pakistani banking industry. Due to distinct cultural differences, data could be collected from questionnaire that was developed on western setting. Fourth, the current study research examines abusive supervision as a single antecedent of knowledge hiding.

In future research studies, there will be an investigation of other similarities between abusive supervision and knowledge concealment, and the interaction of abusive supervision with job demands and resources. Future studies will focus on other moderators in relation to job stress and knowledge concealing. Thus, despite the identified limitations, the present study has benefits for the development of the literature on knowledge concealment, its connection with abusive supervision, and for the utilization of the Lazarus and Folkman stress theories. Analysing the data, it is still possible to identify that even when setting procedures and making numerous efforts to regulate information flow between employees, administrative aggressive measures can actually let the workers down and increase pressure at the workplace. On the other hand, prosocial incentive as a moderator can be measure used to minimise the impacts of abusive supervision such as job strain. This paper also establishes that having prosocial motivation assists in managing stress and reduces knowledge concealing. Future research will involve exploring other moderators in relation to job stress and knowledge concealing.

Conclusion

This study created a mediating moderated model to investigate the motivations behind information concealment behaviour. Results demonstrate that one of the main sources of workplace stress that encourages this kind of behaviour is abusive supervision. Additionally, we looked at the border circumstances that make people more inclined to withhold information that is asked. As foreseen, the outcomes demonstrate that toxic leadership has a favourable influence on an individual's perception of job pressure, but this relationship declines for those with high prosocial drive. Additionally, because individuals experience a great deal of stress at work, companies may be more vulnerable to the detrimental impacts of hostile supervision. Additionally, this study offers a number of avenues for managers and researchers to focus more on knowledge hiding behaviour related with people attitudes regarding their organization.

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Farmers' Perceptions Regarding the use of Digital Marketing
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Abstract

The foremost objective of the study is to explore the perception of the farmers regarding the application of Digital Marketing Solutions by the Bureau of Agriculture Information Khyber Pakhtunkhwa, for the dissemination of information from agriculture experts to the farmers across the province. These Digital solutions are virtual call center, Masking SMS (Agri-Info) and Robo calls. The study was qualitative, cross sectional and inductive. The source of the data has been primary and detail interviews were conducted at convenience from the registered farmers and agriculture officers working at call center and different districts of Khyber Pakhtunkhwa. The population of the study were agriculture officers working as call center agents and those registered farmers who are frequently calling on the virtual helpline (0348-111-70-70), receiving regular SMS that are broadcasted with (Agri Info) masking and Robo calls having different contents related to agriculture. After the implementation of Digital Marketing Solutions (virtual call center, Csms and Robo calls) all the barricades like communication, geographical and lingual have been over-throned as major outcomes. Previously, it was perceived by the farmers that the bureau of agriculture information department is only facilitating large-scale and influential farmers. With the introduction of such digital marketing solutions the perceptions of the farmers changed in a positive manner. As every farmer can call on the helpline number for their queries and complaints. This was the first time in Khyber Pakhtunkhwa that research has been conducted on the mentioned digital marketing solutions. So, the novelty factor of this research has its place in terms of uniqueness and examining different perspectives of digital marketing solutions. Such Marketing Solutions have a brighter scope in terms of empowering farmers. Other Government departments can also utilize such digital solutions to address public issues, concerns, queries and complaints.

Keywords: Digital solutions, Agriculture information, ICT, Virtual call center, SMS (Agri-Info), Robo call

Introduction

We are living in a Digital world where the dynamics of marketing changes radically. Digital marketing Plays an integral role in connecting customers with goods and services they want to acquire. The modern world of digital marketing is all about pertinence, engagement and relationship. Digital marketing is a strategic approach to promote goods and services across a range of digital media. Beyond basic connectivity and online marketing, digital marketing also leverages mobile technology, social media, search engines optimization, and a range of other digital channels. Digital marketing enables two-way communication, that helps the brands to interact with the customers on regular intervals. The customers can share their on-ground experiences, so the brands can work on the products and services to meet the customer expectations. Such activities increase customer loyalty. Digital marketing has given upsurge to influencer marketing, where customers are influenced by the views and

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experiences shared by others (Nuseir et al., 2023). Digital marketing uniquely utilizes the internet to establish one-to-one connection between sellers and buyers, facilitating personalized interactions and continuous customer support. Digital marketing holds immense significance in developing countries like Pakistan, enabling them to leapfrog traditional barriers and achieve rapid economic development. Although still in its developmental phase, digital marketing in Pakistan is primed for a remarkable takeoff. With all the projections, even the most pessimistic indicating a substantial boom. The growth of digital marketing in Asia is anticipated to be driven by three key factors: affordable computer costs, a growing base of internet users, and a highly competitive market for internet services (Lee et al., 2022). Digital marketing has made it simple for the customers to access necessary information related to goods and services, compare products, and make informed decisions. Digital marketing has raised customer expectations for seamless, efficient, and personalized experiences. Business owners must attract customers to a specific digital doorstep, such as a website or landing page, mobile applications, social media pages etc. where they can access comprehensive information about the products or services and take rational decisions (Almaazmi et al., 2020). The role of Digital marketing has been significant in all the sectors of the economy, not only private sector but Government sectors have also utilized multiple digital tools to facilitate public for the betterment of the society. If we analyze the agriculture sector in Pakistan. It has contributed a lot in Pakistan economy as Pakistan is an agrarian society. The profession of agriculture has been a cornerstone of human civilization from its inception, experiencing a range of developmental stages and diversification in techniques and crops. Contemporary technologies had a profound impact on agriculture, greatly enriching the profession with advanced tools, techniques and precision farming methods (Mandal & Alam, 2020). The agriculture sector is a vital engine of the economy, contributing significantly to a nation's GDP, overall employment and economic well-being. Pakistan's economy relies heavily on the agriculture sector, which generates 22.35 percent of the country's GDP (Bureau of Statistics of Pakistan, July 2022) and Agriculture is a significant sector in Pakistan's economy providing employment opportunities for 37.4 percent of the labor force and serving as a source of income and livelihood for approximately 62 percent of the population both directly and indirectly. (Economic Survey of Pakistan). These statistics unequivocally demonstrate that the agriculture sector is the linchpin of Pakistan's economy, playing a vital role in the country's economic stability and growth. Beyond its direct contribution to the economy, agriculture also supports the industrial sector by providing critical raw materials and labor, thereby playing a vital role in the country's overall economic development. A farmer supervises and directs the activities of agricultural establishments, including farms, greenhouses, nurseries and other production facilities. In order to ensure efficient and productive operations. Farmers engage in various activities, including planting, cultivating and harvesting crops as well as managing livestock, supervising farm workers and performing post-harvest tasks depending on the specific types of farms. Farmers are the key players in the agriculture sector's productivity and the only way to enhance productivity is by adopting modern technology which requires the collective effort of farmers and other stakeholders (Kumar & Sinha, 2021). The agricultural extension services in Pakistan have adopted multiple approaches to share knowledge with farmers, but these efforts have not been successful in achieving the desired goals of improving agricultural productivity and development. Several constraints have hindered the effectiveness of agricultural extension programs in Pakistan, including the lack of incentives for extension staff, inadequate planning and policy support, limited human resources, and a lack of robust communication systems, resulting in a significant gap in knowledge sharing and technology transfer to farmers (Malik & Khan, 2020). To enhance agricultural productivity modern techniques and digital marketing tools can be employed to facilitate access to information, promote knowledge sharing and support farmers in adopting best practices, leading to improved yields and sustainable agriculture. The dissemination of information to rural areas has undergone a significant transformation from relying solely on traditional media like radio and TV to harnessing the power of modern communication tools like the internet and mobile phones. Modern agriculture nowadays is primarily dependent on digital marketing solutions due to geographical spread of farmers, increase in operational cost and limited staff members in the relevant departments. The agriculture information department serves as a crucial bridge connecting the generators of knowledge with the end-users, enabling the transfer of relevant information and technologies to farmers and other stakeholders (Hafeez et al., 2018). As technology advances, all aspects of our society are undergoing transformation, and the agriculture industry with its various stages and processes, is no exception i.e., Crop Cultivation, water management, Fertilizer Application, Fertigation, Pest management, Harvesting, post-Harvest Handling, transportation of Food/Food products, Packaging, food prevention, Food processing, Food quality management, Food safety, Food storage and Food marketing. Accurate and timely information is essential for the farmers and all stakeholders involved in the various stages of agriculture including planting, growing, harvesting and marketing. By providing timely information, farmers will be able to enhance their productivity in a highly

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effective and efficient manner (Awan, Ahmed, & Hashim, 2019). Pakistan Telecommunication Authority (PTA) has demonstrated exceptional regulatory oversight, guiding the development of Pakistan's telecommunications industry along a path of robust growth and stability in urban and rural areas. Digital marketing solutions provide a platform for agriculture information department staff members to share knowledge and improved technologies with end-users. Ultimately leading to improved livelihoods and agricultural productivity (Malik & Khan, 2020). Modern communicational gadgets enabled farmers to obtain rationalized, reliable, relevant and appropriate information. ICTs are facilitating farmers to ensure their access to suitable and lucrative markets for their produce. The primary goal of this research was to investigate the effectiveness of different modern communication and digital tools in providing farmers with necessary information.

Farmers require accurate, timely, and cost-effective information to manage field challenges prudently. Digital platforms must bridge the knowledge gap between agriculture experts and farmers, enabling effective and efficient interaction.

Research Questions

1.   How the Digital Marketing Solutions optimized by the Bureau of Agriculture Information are perceived by the farmers in addressing their queries related to agriculture?

2.   What are the areas of opportunities that needed to be resolved by the Bureau of Agriculture Information Department to facilitate farmers with these digital solutions?

Research Objectives

1.   To examine the farmer's perception in the context of the utilization of Digital Marketing Solutions by Bureau of Agriculture Information Khyber Pakhtunkhwa.

2.   To explore multiple channels to improve these existing digital solutions along with improvisation.

Problem Statement

Numerous studies have been conducted regarding the farmers' perceptions about the utility and effectiveness of ICT tools, providing valuable insights into their needs and preferences. In which internet, mobile phones, websites, TV and radio have been utilized by Bureau of Agriculture Information Department for the Dissemination of information. Despite this fact farmers usually perceived that the department is only assisting large-scale and prominent farmers. The reason behind such perception was limited staff members with the department, geographical spread of the farmers across the province and limited financial resources. In this research the latest digital marketing solutions has been discussed such as virtual call center, Masking SMS (Corporate SMS) and Robo calls. This has been the first time in Khyber Pakhtunkhwa that research has been executed on the mentioned digital marketing solutions. So, the novelty factor of this research has its place in terms of uniqueness and examining different perspectives of digital marketing solutions.

Significance of Study

The research has assisted the Bureau of Agriculture Information Department with the knowledge and feedback to evaluate the existing digital marketing solutions. It has also helped to identify areas that need further improvement and establish data-driven decisions to improve its services in order to better serve the farmers. The research outcomes empowered the Department to optimize its existing resources, identify new opportunities and develop effective strategies to address the challenges faced by farmers, leading to improved service delivery and farmer support. Ultimately, the research has assisted the Bureau of Agriculture Department for formulating future strategies related to agricultural education, dissemination of updated information and the capacity building of both farmers and agriculture staff leading to enhanced skill development and improved service delivery. The study has also provided insights into the farmers' experiences and perceptions of digital marketing solutions, highlighting the advantages and benefits they have gained from utilizing these digital solutions. The successful implementation of digital solutions in the Agriculture Information Department can serve as a model for other government departments, such as Livestock, Health, Education, WSSP, Excise & Taxation and NADRA to adopt and utilize similar approaches for optimal outreach and impact (Aljumah et al., 2021).

Theoretical Framework

The theoretical context of the research is related to Uses & Gratification theory. Uses & Gratification theory was

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established by (Katz et al., 1973). It explains how individuals use various channels to fulfill specific needs and how this concept evolves over the period of time to influence businesses, groups and society. Initially, this theory focused on traditional media, but its principles are now being applied to diverse forms of modern media. This theory helps to understand how audiences engage with specific media channels and how to encourage target audiences to adopt emerging channels.

Literature Review

Digitalization is an emerging phenomenon that has given rise to a new paradigm where relevance, interaction and relationship are essential components. Relevance is the foundation upon which effective marketing have immense dependency, enabling the organization to connect with the target audience and generate meaningful interactions with the customers. In this phase knowing the customer is an important factor, as relevance can guide what the customer requires. This is very important phase of the process as knowing the customer psyche, usage patterns and other multiple attributes can play a vital role for the successful customer retention. It is followed by interaction, which is all about connecting with customers, ensuring two-way communication. That increases customer retention, builds trust and loyalty. Followed by feedback that initiates the prospects of improvements and personified the brand through personalized experiences. All the phases have a common factor of engaging the customer at all levels. Such stance will help the executor to ensure quality customer retention and upscaling the business from time to time (Nuseir et al., 2023). Relationship with customers plays a vital role through which marketers reach out customers from the phase of acquisition to retention. To build a strong relationship the organization has to develop trust, communicate consistently, identifying the customer needs, stay connected, offer multiple incentives from time to time, take feedback, hire dedicated customer service teams and address the issues promptly. Through effective relationships the scale of business can be increased by doing up selling and presenting new services and products to the customer. With an active relationship the company can win the trust of the customers. Hence, it can be useful to increase the volume of the business vertical in an effective manner. Digital marketing ensures two-way communication, that facilitates the brands to interact with the customers on regular intervals. The customers can share their on-ground experiences, so the brands can analyze the products and services they are offering to enhance the customer experience. Such activities can increase customer loyalty. Digital marketing has given upsurge to influencer marketing where customers are influenced by the views and experiences shared by others. Digital marketing has made it simple for customers to access necessary information related to goods and services, compare products, and make informed decisions. Digital marketing has raised customer expectations for seamless, efficient and personalized experiences. Businesses must guide customers to a dedicated online space offering a wealth of information about their products or services (Al Kurdi, Alshurideh, & Salloum, 2021). By investing in internet infrastructure and installing signal boosters to enhance TV and radio coverage, the government can significantly improve access to ICT facilities in rural regions. Promoting digital inclusion and bridging the gap in information access is very important in contemporary environment. Extension agents should empower farmers by educating them how to utilize modern ICT tools to access current agricultural information. With a special emphasis on educating young and middle-aged farmers regarding the utilities of information and communication services and encouraging them to leverage ICT tools for agricultural development. The Bureau of agriculture information department has a vital role in generating and broadcasting programs that foster agricultural development, leveraging various ICT technologies to rapidly disseminate current information and knowledge to stakeholders, thereby enhancing agricultural productivity and innovation (Kumar & Sinha, 2021). Modern agriculture nowadays is enormously dependent on Information and Communication Technology. Bureau of agriculture information department is the primary institutional domain that help in the dissemination and exchange of the agricultural information that can be highly beneficial to the farmers and end users. The Bureau of Agriculture Department has a significant role of broadcasting the necessary information from the agricultural experts to the farmers in an effective and efficient manner (Hafeez, Shamsuddin, Nazeer, & Saeed, 2021). The Ministry of Agriculture is responsible to execute extension services nation-wide in Pakistan. Agriculture extension services have contributed a crucial role in boosting crop yields, while the private sector has also contributed significantly to agricultural growth by promoting technology transfer at the grassroots level. Both sectors are working together to share knowledge and expertise with farmers. Agricultural extension is a well-established platform for sharing information and data that can benefit farmers. However, in many developing countries, agricultural extension efforts have struggled to effectively reach farmers with modern technologies and innovations (Malik & Khan, 2020). At the same time such digital solutions utilized by the agriculture department has helped the farmers in the best possible manner. The agriculture sector plays a vital role in supporting the industrial sector by supplying raw materials and labor. Farmers manage various agricultural operations including

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greenhouses, farms, nurseries and are responsible for tasks such as planting, cultivating, harvesting and overseeing livestock and labor. As the backbone of the agriculture sector farmers drive productivity. However, to enhance productivity farmers and other stakeholders must adopt modern technologies and innovative methods with collaboration (Kumar & Sinha, 2021).

Provincial agriculture information department employ various methods to disseminate knowledge to farmers, aiming to boost agricultural productivity. However, these efforts have fallen short of achieving desired results.

The key reasons for such limited impact include:

- *Lack of incentives for agriculture officers/inspectors.* As agriculture officers and inspectors are the front-line force of the department at ground level. So, the lack of fringe benefits is effecting the efficiency of the staff members.

- *Inadequate agricultural planning and policies.* It is very important to emphasize upon the policies and regulations that need to be implemented for increase in agriculture productivity.

- *Insufficient number of Agriculture staff members.* The number of staff members is not up to the mark, as the geographic dynamics are very challenging. So, there is a dire need to increase the staff members in order to ensure maximum penetration in the field.

- *Ineffective communication systems.* It is very important to ensure the effective communication at all levels within the organization and farmers on regular intervals.

These challenges hinder the effectiveness of agricultural extension services, ultimately affecting agricultural growth (Hashim, Ahmed, & Awan, 2021). However, the productivity of the agriculture sector can be enhanced through the application of modern methods and approaches to information through ICT. Previously, the major digital streams utilized for the propagation of information to farmers were Radio and TV. While currently modern ICT mechanisms like internet and mobile phones are utilized for information dissemination.

According to Aldosari, Muddassir, and Noor (2021) the study aimed to understand how farmers in Khyber Pakhtunkhwa, Pakistan perceive electronic media and how their demographic characteristics relate to their use of radio and TV for information. A random sample of 183 farmers were selected and data was analyzed using descriptive statistics and Chi-square tests. The results showed that most farmers (97.4% and 94.5%) believe that mobile phones and the internet are important sources of agricultural information, with only a small percentage (1.6% and 5.5%) strongly disagreeing. This suggests that farmers in the region value electronic media as a means of accessing agricultural information.

Furthermore, the study found a significant link between the respondents' level of education and their use of information obtained through radio. However, there was no notable connection between the respondents' farming knowledge and their application of information from TV and radio. The findings suggest that extension staff should encourage and support farmers in using electronic media (such as TV, radio, mobile, internet and helplines) to access innovative information on agricultural growth methods (Aldosari, Shunaifi, & Ullah, 2021). Khyber Pakhtunkhwa primarily relies on the agriculture sector, where the rural area population is approximately 80 percent and agriculture is considered their primary source of income. In Pakistan's GDP, the agriculture sector has got very significant position as its contribution in GDP is approximately 22 percent, with 40 percent in the employment of the labor force. Nevertheless, 31 percent of the provincial population remains to be food apprehensive with high rate of undernourishment (Agr. Policy, 2015-2025). Sugarcane cultivation is primarily focused in two regions of the province: the Northern belt, comprising Peshawar, Charsadda, Swabi, Mardan, Nowshera, Malakand and Khyber. The Southern belt consists of Bannu, Tank and DI Khan. This crop employs a large workforce in planting, harvesting and post-harvest processing as well as in promoting the crops. The province produces 56 million tons of sugarcane, which supplies to seven sugar mills. (Abbas, Shehbaz & Siqqiqui, 2021). Mandal and Alam (2020) has strongly advocated that the agricultural sector in Khyber Pakhtunkhwa lags in terms of outcomes, despite having access to advanced ICT facilities and infrastructure. Farmers continue to rely on traditional sources like radio, TV and printed materials. They also recognize the potential of modern technologies like mobile phones, internet and advanced radio and TV programs to improve agricultural innovations and productivity. The survey also revealed a widespread positive sentiment among respondents regarding the future of ICT in agricultural extension services, with expectations of enhanced access to information and communication technology once technical obstacles are surmounted. The Department of Agriculture Information uses telecommunications tools to share modern agricultural information from experts to

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farmers at the grassroots level, aiming to boost productivity.

These tools include:

- A virtual Call Center that can be managed remotely.

- Sending bulk SMS messages in Urdu to farmers with relevant agricultural information

- Robo Calls in local languages (Urdu, Pashto, Saraiki, etc.) that provide critical information and advice on domains like:

   -Cash crops

   -Weather forecasting

   -Fruits and vegetables

   -Fodder and livestock

   -General information

   -Seasonal advice

   -Productivity enhancement

   -Pest control

   -Government subsidies announcements and deals for farmers

These tools help to disseminate customized and actionable advice to farmers, addressing their specific needs and concerns. These digital solutions are serving farmers to get assistance and updated information from the agriculture call center experts through Mobile Phones related to ongoing issues (Raza, Khan, Shahbaz & Saleem, 2020). The study identified an additional character for the agriculture extension services to educate farmers about the use of modern information and communication technologies (ICTs) in farming. However, many extension specialists may need training and capacity-building programs to familiarize themselves with these evolving technologies. Extension agents must raise awareness among farmers about the benefits of using ICTs. Identify barriers that are preventing farmers from adopting modern information sources. Educate farmers on how to use ICTs as a reliable source of agricultural information. This task is challenging but with careful planning and execution, it is achievable (Awan & Ahmad, 2021).

Research Methodology

This study was executed in Khyber Pakhtunkhwa, a province in Pakistan. It is grounded in the philosophical framework of constructivism, which posits that knowledge is derived from human experiences, perceptions and ideas. The research employed a qualitative approach, using cross-sectional and a source of data has been primary as detailed interviews were conducted randomly to collect the data. The population of the study were agriculture inspectors and officers working as call center agents at call center and in remote locations of the multiple districts and those registered farmers who are calling on the virtual helpline (0348-111-70-70), receiving SMS (Agri Info) masking and Robo calls.

Population of the Study

The population of the study consists of registered farmers and agriculture officers who work as call center agents, both at the department's headquarters and in district-level offices. The Agriculture Information Department registers the farmers either online or through local offices across Khyber Pakhtunkhwa, enabling them to benefit from government initiatives like the Subsidy schemes, discounts etc. Currently, over 600,000 farmers are registered across the province including the newly merged districts. Approximately 100 agriculture officers serve as call center agents, either at the central call center or in remote areas at the districts level (Bai, 2021).

Sample and Sample Technique

Clarke and Braun, (2013); Fugard and Potts, (2014); Guest, Bunce and Johnson, (2006) had explored that in qualitative research when detailed interviews were conducted. At point, the interviewer feels data saturation. Normally, sample size of 12 were considered as data saturation point keeping in view the Clarke & Braun observations. Therefore, sample of 13 was believed sufficient for the qualitative Analysis.

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Since most agriculture officers work at the district level, a sample of 13 farmers and 13 call center agents (agriculture officers) from the call center were selected. A purposive sampling technique was used to gather detailed information and insights from individuals with diverse expertise in agriculture. Those farmers were approached who had regular interaction with the call center and agriculture department with relevant experience and exposure. This type of sampling is selective and based on judgment, ensuring that the chosen participants can provide valuable, updated and in-depth information.

Sources of Data

The data was collected through primary source, during that course detailed interviews were conducted from the farmers who are registered with the department and all those agriculture officers and inspectors that are working in call center as call center agents. Most of the officers of the department are working at the district level.

Data Collection Tool

To collect the necessary data, it's crucial to choose a suitable research instrument, tool or adapt an existing one. The selection of the instrument depends on the research design and the type of study being conducted. In this case, the study follows a qualitative design and data was gathered using a specially adapted interview guide with open-ended questions. The collection of the data was done through in-depth interviews with registered farmers and agriculture department officers at their convenience. This facilitated us to unfold the necessary information for accomplishing our objectives. As we focused on the understanding the perceptions of farmers and agriculture department officers working as call center agents regarding the utilization of digital solutions by the Bureau of Agriculture Information in Khyber Pakhtunkhwa. Agriculture officers Interviews were conducted at the call center and at district level, labeling them as Group 01 (R1-R13). We also interviewed registered farmers, labeling them as Group 02 (F1-F13).

Themes

In this study, three themes were under discussion. As per details given below:

1. Virtual Call Center (Smart office-0348-111-70-70)
2. Bulk SMS with Masking (Agri Info)
3. Robo Calls

Virtual Call Center

Savić, Stančin, Jakus, & Tomažič (2010) signifies the importance of call center that operates virtually, meaning agents are not restricted to a physical location or traditional phone lines stations. They can receive and respond to calls from anywhere, using various devices like cell phones or smart devices regardless of their location. This flexibility allows agents to work remotely and still handle calls as if they were at the call center. Providing greater convenience and mobility for the staff members. The virtual call center has got most of the features that traditional call center contains. This solution empowers businesses to cater their customers' requirements by routing their calls to the relevant departments. Multiple features of the virtual call center are given below:

In this digital solution, the service provider issues a Master number, that is also considered as Hotline number. It is a virtual number that has no physical sim. But on the other hand, multiple extension numbers are attached and mapped with this Master number in this study (0348-1117070) is a Master number utilized by the Bureau of Agriculture Department. Managing the master number and extension numbers through web portal is an exciting feature of this digital solution. The executor can assign free minutes allocated to master number with extensions. It empowers businesses to share minutes using the pool minutes feature. A call recording facility is also available in order to ensure and monitor the call agents' performance. During that course cloud services are used for data storage (that includes incoming calling numbers details, call recordings for quality purpose, outgoing calls data, missed calls data, incoming calls data that are made during off days or off peak hours). In order to facilitate the customer web portal has been designed with real time monitoring and user-friendly interface. The extensions mapped with Master number are also mobile numbers that can be operated remotely. The call agents can transfer calls to other agents during the calls. Hence, with all these features one mobile number can be the corporate identity of the department for all the related communications. There is an option of IVR for marketing current promotions or any other information related to the caller or target audience. During Covid-19, when all the offices were closed due to pandemic. The call center of the agriculture department was fully operational as all the call agents were working from home and addressing farmers queries and complaints.

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Bulk SMS (CSMS)

Bulk SMS, also known as CSMS or corporate SMS is a web-based platform that enables users to send large volumes of messages quickly and efficiently. One of its key features is the ability to broadcast SMS with Masking, allowing users to customize the message's origin. In this study, the Agriculture Information Department utilizes this masking feature, labeling messages as (Agri Info), to enhance the significance and credibility of the SMS content. The Agriculture Information Department sends various types of messages in Urdu to farmers at different times and occasions, providing personalized and relevant advice on agriculture including:

- Crop-specific guidance (cash crops, fruits, vegetables, fodder, and livestock)
- General information
- Seasonal tips
- Crop productivity enhancement
- Pest management
- Weather forecasts
- Government announcements, subsidies and offers for farmers.

To ensure two-way communication call center virtual helpline number (0348-1117070) is also mentioned in every SMS. The executor of the portal has several choices in the web portal i.e., maintaining subscriber list, establishing numerous campaigns, scheduling, quick SMS, creation of sub users, profile management, Complete record of SMS sent to users successfully or failed (Hossain, 2020).

Robo Calls

Robo calls in marketing refer to automated phone calls that use pre-recorded messages or voice messages to communicate with customers or prospects. An automated call has been generated from the system with prerecorded voice message. It is an important digital solution that can be very useful for those target audiences who cannot read or have a low literacy tendency.

As a digital solution, robo calls can be beneficial as per below terms:

1. Deliver personalized messages
2. Increase customer engagement
3. Reduce manual dialing and labor costs
4. Improve response rates
5. Enhance customer experience

In the context of Bureau of Agriculture Department, robo calls can be employed to:

1. Send weather updates and flood alerts
2. Provide crops management advice
3. Offer market prices and trends
4. Share best practices and tips
5. Promote products and services

Robo calls can be integrated with other digital solutions like SMS, email and mobile apps to create a multi-channel marketing strategy. They are particularly useful for reaching a large audience, especially in areas with limited internet connectivity (Ghosh, 2019). But in this research the application of Robo calls has been done creatively by the Bureau of Agriculture Department. Such facility is available in the web-based application of Bulk SMS. Preferably the Robo call duration should not be more than 30 seconds. It is a very handy digital solution for those farmers who are unable to read SMS or having low literacy tendency. So, such solution can be used for illiterate farmers in order to transfer the necessary information related to agriculture.

Conclusion

The implementation of digital marketing solutions such as virtual call center, bulk SMS (corporate SMS) and robo calls have successfully overcome obstacles like geographical barriers, language differences and communication gaps. Before the implementation of such digital solutions farmers were of the perception that the agriculture department is only facilitating large-scale and influential farmers. These tools have transformed farmers' perceptions of digital solutions provided by the Bureau of Agriculture Information Department in Khyber Pakhtunkhwa. By utilizing these tools, farmers can now access vital information on new technologies, weather

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forecasts, pest management, Government subsidy schemes etc. This enables them to boost agricultural production and stay informed about various government initiatives (Bai, 2021). The virtual helpline has shown great promise, with agriculture experts receiving an average of over 3000 calls per month. To further improve the service, the department should consider implementing a callback system for missed calls due to various reasons such as network issues, low balance, calls made during weekends or after office hours. This platform can also be helpful to create a virtual marketplace, enabling farmers to sell their yields via call center agents. Additionally, the Masking SMS (CSMS) tool should be enhanced by sending targeted and timely SMS campaigns to ensure effective communication (Malik & Khan, 2020). Currently, approximately 1 million SMS are sent on monthly basis, but this number should be increased to maximize the impact. To enhance effectiveness, targeted SMS campaigns should be implemented. Additionally, robo calls have untapped potential and should be utilized more extensively. The adoption of digital tools by the Bureau of Agriculture Department in Khyber Pakhtunkhwa has been met with overwhelmingly positive feedback from farmers, who now have easy access to expert advice and information. This has dispelled the previous notion that the department only address influential farmers queries and problems, as all farmers can now easily reach out for guidance by calling the virtual helpline 0348-111-70-70 (Bai, 2021). Timely, accurate and relevant agricultural information is crucial for farmers to boost productivity and manage their time effectively. Digital solutions can bridge the literacy gap and ensure that vital information reaches farmers promptly. Additionally, the department should prioritize registering the farmers across the province, as this data will enable the government to easily contact and assist them during various situations like pest attacks, floods or any other natural disasters. Ultimately enhancing their support and facilitation. (Rabbi, Idrees, Ali, Zamin, & Bilal, 2020).

Implications

Following steps should be taken by the Bureau of Agriculture Information Khyber Pakhtunkhwa:

Practical Implications

Regular trainings should be conducted for Agriculture officers at call center to enhance their communications skills at call center capacity. They must have a knowledge of all the services provided by the department. The department should work on their communication skills, customer service skills, phone etiquette, time management, conflict resolution etc. If the farmers' calls are missed, the call center agents should call them back to provide in time information. Such steps will bridge the communication gaps between the farmers and the department. There might be multiple reasons for missed calls but by calling back, the farmers will feel obliged. Sometimes the calls are dropped or disconnected, this issue should be addressed with the service provider. The Department should utilize this vicinity as a virtual market for farmers. This will benefit farmers to trade their produces with good profit margins. With virtual markets, farmers will be able to increase their outreach to multiple buyers and sellers. This will help them in terms of exploring new markets, better price discovery, real time supply chain management, decrease in transaction and transportation costs etc.

Methodological Implications

Upscaling of the existing structure is very important as farmers' expectations and needs are growing gradually. The introduction of modern technology and upgrading of the existing structure will help both parties (department and farmers) in terms of achieving their goals and objectives. Csms message should be simple and precise. Such step will improve the clarity of the messages, it will increase readability and engagement of the farmers. Time management is required when broadcasting Csms and Robo calls. It is very important as farmers are dealing with nature and multiple unforeseen challenges. So, the broadcasting of the messages should be on time and precise to ensure efficiency and effectiveness. Regular callers should be approached by the call center from time to time, by providing them with personalized services, priority services, multiple loyalty and retention schemes. Keeping in view the literacy rate of the farmers Robo calls should be executed frequently at convenient times. Department should avail these digital solutions to register farmers across the province. Robo calls durations should not exceed 30 seconds, as by doing so the audience might lose interest.

Future Study

An attempt was executed to explain the dynamics of the Digital solutions used by Bureau of Agriculture Information Khyber Pakhtunkhwa, but various aspects are still untapped i.e., Quantitative study can also be conducted to acquire the opinion of large sample size from different districts. Moderation and Mediation Analysis is required to find out the relationship between digital marketing variables and perception of the farmers. Mobile

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Application as new variable that has been launched by the Department of agriculture information, unregistered farmers perceptions regarding the digital marketing solutions and establishment of virtual market for farmers.

Limitations

This study relied on primary data collected through detailed interviews from farmers and agriculture officers. However, managing time and scheduling appointments for these interviews posed a significant challenge. Additionally, the farmers' widespread locations made it difficult to access them for interviews. Due to limited resources, a smaller sample size was used, which was a constraint in conducting the study. The limited sample size was a major hurdle in gathering comprehensive findings.

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Does Consumer Regret have an Impact on Negative WOM? The Role of Brand Hate and Brand Loyalty

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Abstract

This study examines the relationship between consumer internal negative emotions and their external negative emotions, brand loyalty, and negative word-of-mouth. We look at how brand hate that consumer experience while selecting a mobile network provider is affected by consumer regret. Using the suggested model, the influence of brand loyalty and brand hate on negative word-of-mouth is also investigated. 361 users of a mobile network provider in Pakistan participated in our online poll. We used structural equation modeling to examine the data. The findings demonstrate that brand hate, an outwardly unpleasant feeling, is positively influenced by consumer regret, a negative inside emotion. Brand loyalty and negative WOM are both favorably and adversely impacted by consumer regret. The findings also showed that although brand hate had a favorable impact on consumers spread of negative information, brand loyalty does not affect negative word-of-mouth.

Keywords: Consumer regret, Brand loyalty, Brand hate, NWOM, Telecom industry

Introduction

With every transaction, a consumer is exposed to new insights and provided with exciting new experiences (Lee, Kim, & Choo, 2025). Every experience and piece of information matters when advising the buyer on later purchases (Sharma, Starčević, & Saha, 2024). The examination of consumer behavior takes into account both the choice that was chosen and the alternative that was not chosen. Following a purchase, buyers may go through a variety of decision-making phases, including contentment, discontent, regret, hate, and brand avoidance (Khatoon & Rehman, 2025). These problems are the ones that have an impact on how consumers feel about the product.

Regret is a common reaction to choices on whether to buy a product or service. A comparison between a current situation and one that may have created a sense of regret (Shih & Schau, 2011). After making a purchase, consumers may regret it for a variety of reasons, including regret over the alternative passed up, regret over not thinking things through well, and regret over thinking things through thoroughly (Lee & Cotte, 2009). According to Wu and Wang (2017), even consumers' unfavorable perceptions of the brands they utilize are a result of regret. Furthermore, as per Tsiros and Mittal (2000), previous studies demonstrate that regret has a detrimental impact on consumer satisfaction. Additionally, it fosters unhappiness and lowers a brand's or product's intention to be repurchased (Awais, 2014; Cui & Niu, 2017).

Moreover, consumers often form unfavorable ties with brands rather than favorable ones (Cui & Niu, 2017). Carroll and Ahuvia (2006) contend that in addition to very good sensations, consumers may also have strongly

unfavorable feelings toward a brand, which might lead to brand hate. A decrease in loyalty to the brand may also result from regret (Bui, Krishen, & Bates, 2011), and it can even cause a consumer to share unfavorable WOM. Consumers that are upset with a brand are likely to propagate additional negative WOM (Wu & Wang, 2017).

By exploring how negative internal emotions might affect negative external emotions and produce negative WOM, this study will add to the liturature on consumer-based branding. Although there has been a growing interest in consumer research on negative emotions (Zhang, Ouyang, Zhang, & Zhou, 2025), the relationship between internal negative emotions such as regret and external negative emotions such as brand hate is still an under-researched field (Khatoon & Rehman, 2025). This is even though regret is an internal negative emotion (Shi, Cui, & Fitzsimmons, 2025). Examining these relationships is crucial because internal negative emotions may manifest externally as brand hate, which is a negative feeling that can be harmfull to the companies (Weitzl, Hutzinger, & Wagner, 2024).

Wen-Hai, Yuan, Liu, and Fang (2019) stated that consumers' retaliatory actions are directly influenced by their negative feelings. This research investigates the influence of regret on brand hate, the most intense negative emotion that can be experienced towards a brand. It is interested in the influence of consumer negative feelings on negative word-of-mouth and retaliatory behavior. Marketing professionals may avoid brand hate before it manifests by understanding what causes it.

According to Kucuk and Kucuk (2019), brand hate has both corporate and consumer-related antecedents. This research aimed to examine consumer regret as a potential cause of brand hate. Managers of brands might benefit from looking at the possibility that consumer regret is a major antecedent of brand hate in their quest to comprehend the grounds for brand hate that are connected to consumers. Limited research has also been done on the emotional causes of brand hate, such as consumer regret (Zhang & Laroche, 2020). Because of this, the emphasis of our study was on the consequences of consumer regret.

The study on consumer regret and brand hate for service businesses is limited. Consumer brand selections in the mobile telecommunications sector have not been properly investigated with regard to these relationhsips. Therefore, by measuring the influence of consumer regret on brand hate, brand loyalty, and negative word-of-mouth as far as mobile network provider consumers' choices are concerned, this study aims at offering telecom businesses' managers suggestions and recommendations.

The choice of the mobile telecommunications sector in Pakistan is particularly relevant due to the highly competitive nature of the industry, with multiple providers (Jazz, Zong, Telenor, Ufone) offering nearly identical services at comparable prices. This saturation leads to low switching costs and frequent brand switching, making it a prime context for studying post-purchase emotions such as regret and brand hate. Furthermore, telecom services are integral to consumers' daily lives, and dissatisfaction with such essential services can provoke stronger emotional reactions than other categories. Pakistan has a high mobile penetration, a mixed service consistency with variation, so the study of these emotional and behavioral consequences offers practical and timely learning to service managers with a goal of better customer retention and reduced reputational loss in negative word-of-mouth.

Literature Review

Consumer Regret

One drawback identified in the post-purchase analysis is buyer's regret (Boujbel & d'Astous, 2015). It may be summed up by saying that it is a negative emotion that individuals have when they contemplate that if they had chosen a different choice, they would have been in a better circumstance. In this sense, regret is an unpleasant feeling that results from contrasting "what can be" with "what is." After making a purchasing choice, regret often follows when one compares the results of the intended and obtained products (Lee & Cotte, 2009).

According to earlier research comparing the chosen and undecided alternatives may have an impact on consumer behavior (Awais, Zulfiqar, Saghir, Sohail, & Rana, 2022; Inman, Dyer, & Jia, 1997; Taylor, 1997). According to Taylor (1997), a person's decision is likely to be influenced by his or her expectations of the rejected options, particularly if those expectations weren't realized by the final option. When a rejected option is seen as being more yielding, the consumer feels regret (Boles & Messick, 1995). Consumers may also feel regret if they believe that, despite the success of the brand they picked, choosing the rival brand would have been a better choice (Awais, Kashif, & Raza, 2020; Tsiros & Mittal, 2000).

Regret is often categorized as a negative feeling in previous research that analyzes consumer emotions as either good or negative (Jang, Kang, & Huan, 2025). Consumer regret, however, is seen as an inwardly negative feeling in this research. Regret often results from consumers making poor judgments (Harrison-Walker, 2019), and the fact that it entails self-blame and inaction proves that there is an underlying emotion (Wen-Hai et al., 2019).

Brand Hate

Love is the most significant emotion., with hate coming in second, studies are increasingly concentrating on theoretical justifications for unfavorable emotions and their connections to brands (Fehr & Russell, 1984). While some academics see hate as a straightforward emotion, most view it as a complex and confused sensation. Hate is described by Plutchik (1991) as disgust and rage.

Brand hate is the strongest negative emotional response to a brand (Bryson, Atwal, & Hultén, 2013). A more intense emotional response that consumers have towards a brand than brand dislike is brand hate (Joshi & Yadav, 2021). When people are dissatisfied with a brand, they may express strong negative sentiments. Therefore, quitting a brand because of very unpleasant emotions like hate or fury may be a sign of brand animosity. Brand hate is a very negative psychological situation that acts negatively, and makes consumers experience horrible and painful experiences at both an individual and a social level, which lead to differences (Kucuk & Kucuk, 2016).

According to Kucuk (2008), when a brand fails and creates discontent, consumers are more prone to have negative feelings toward it. Consumers that are dissatisfied with a brand exhibit negative feelings, and perhaps even hate (Kucuk, 2018). According to Fetscherin (2019) consumers who dislike a brand try switching brands and even become eager to do damage to the brand. Since brand hate is an outward manifestation of negative sentiments and is associated with derogatory actions against a brand, we classify it as an outwardly negative emotion. Additionally, according to Zhang and Laroche (2020), research on brand hate often concentrate on psychological literature and neglects consumer-brand interactions. So, from the standpoint of consumer-based branding, we investigate brand hating.

Negative Word of Mouth

Word of mouth (WOM) is the term used to describe unofficial consumer recommendations. Initially, it was described as a noncommercial method of face-to-face consumer interaction with the product or service by Arndt (1967), who was the first person to explain it. According to Vázquez-Casielles, Suárez-Álvarez, and del Río-Lanza (2013), another definition of word-of-mouth (WOM) is any spoken and personal communication that the recipient does not perceive as being commercial about a company, service, or product regardless of whether the communication is favorable or unfavorable. Before buying a product or service, buyers gain by hearing what other consumers have to say about it (Duhan, Johnson, Wilcox, & Harrell, 1997). The need to obtain a variety of different types of information is the fundamental driver behind this habit (Goldsmith & Horowitz, 2006). In addition to this, before making a purchase decision, people seek information that would put them at rest (Pitta & Fowler, 2005). Reviews, critiques, and recommendations of a product or service, positive or otherwise, influence other individuals who utilize or plan to utilize the subject product or service.

WOM may be positive, negative, or neutral (Yang, 2013). Positive word of mouth encourages consumers to choose their products, whereas negative word of mouth discourages this behavior (East, Hammond, & Lomax, 2008). While analyzing the reasons for negative WOM, business-related aspects were often taken into consideration. The degree of consumer unhappiness, consumer views of the company's response to consumer complaints, and consumer displeasure over unresolved issues were listed as factors that influence consumers to spread negative WOM (Bovee, Thill, Dovel, & Wood, 1995). Nonetheless, we do think that one of the consumer-related elements that result in negative WOM is consumer regret.

Brand Loyalty

The degree of consumer loyalty that can be attributed to a commitment to a particular brand is the essence of the term "brand loyalty" (Aaker, 1991). A strong commitment to repeatedly buy a certain product or service is one example of brand loyalty (Nakamori, Newell, & Han, 2022). Moreover, it refers to a consumer's desire to keep their connection with a brand going strong over time (Palmatier, Dant, Grewal, & Evans, 2006). The choice to continue purchasing a particular brand comes from within the company. On the other hand, it is not the same as a repurchase habit. Brand loyalty is more than just purchasing the same product again and over again; it also refers to the consumer's strong and favorable opinion toward the brand, as opposed to purchasing the same product out of habit (Solomon, Russell-Bennett, & Previte, 2012). Marketers respect devoted consumers because they are

dependable providers of value and have a significant capacity to propagate favorable word-of-mouth among other consumers (Giovanis & Athanasopoulou, 2018).

Hypotheses Development

Consumer regret occurs when the chosen choice is contrasted to one that was rejected due to ambiguity or a lack of knowledge (Shih & Schau, 2011). Brand-switching behavior is most closely associated with regret (Popp & Woratschek, 2017). Several research also shows that regret lowers brand loyalty and consumer happiness (Bui et al., 2011; Davvetas & Diamantopoulos, 2017). Recent research further demonstrates how consumer regret might adversely impact repurchase intentions by motivating a desire to transfer brands (Sarwar, Awang, Habib, Nasir, & Hussain, 2022). The H1 hypothesis is formed based on this research.

H1: There is a negative relationship between consumer regret and brand loyalty.

One of the significant behavioral effects of regret is negative mouthing (NWOM) (Wu & Wang, 2017). Taylor (1997) contends that consumers' contentment may be impacted by the alternatives they do not choose. According to Inman et al. (1997), consumers are less satisfied when they sense regret. Post-purchase regret is linked to unfavorable word-of-mouth, according to earlier research (Castro, Lacap, Garbosa, Jimenez, & Mallari, 2022). Previous research revealed a strong association between consumer complaint behavior and regret due to under- or over-consideration (Tzeng & Shiu, 2019). Consumers communicate their regret via negative WOM as a consequence (Le & Ho, 2020). These results led us to make the following hypothesis;

H2: There is a positive relationship between consumer regret and negative WOM.

Brand hate was thought to have its roots in people's negative prior encounters with brands (Zarantonello, Romani, Grappi, & Bagozzi, 2016). Numerous research has shown a connection between consumer unhappiness and brand hate (Hegner, Fetscherin, & Van Delzen, 2017). Consumer regret has a favorable impact on the behavior of seeking retribution (Wen-Hai et al., 2019). However, the research neglects to address the impact of consumer regret on brand hate. Consumer regret is another sadness-related precursor of hate that has received little attention in brand-hatred research (Farhat, Zouari, & Khemakhem, 2025). According to recent research Zhang and Laroche (2020), sad-related causes of brand hate, such as feelings of sorrow, regret, guilt, humiliation, and disappointment, are what cause negative WOM. Therefore, in this research, we looked at how consumer regret, a sadness-related inner feeling, affected brand hate, an external emotion. The study presented above leads to the following suggestion:

H3: There is a positive relationship between consumer regret and brand hate.

The degree of consumer satisfaction determines whether consumers have a good or negative opinion of a product or brand. One of the elements that contribute to negative WOM is the amount of consumer discontent, which is inversely correlated with brand loyalty (Verhage, Yavas, Green, & Borak, 1990). Negative word-of-mouth is often caused by unsatisfied consumers and a failure to address their issues (M. Williams & Buttle, 2014). Previous research demonstrated that one of the primary causes of negative WOM is consumer discontent (Arruda Filho & Barcelos, 2021). The research presented above leads to the formulation of the following hypothesis:

H4: There is a negative relationship between brand loyalty and negative WOM.

According to Kucuk and Kucuk (2016), consumers' negative experiences have a greater impact on their opinions than their good ones. In this aspect, brand animosity has several negative effects on brands. Public complaints and brand switching are two different sorts of brand hate, according to Fetscherin (2019). Additionally, according to Zhang and Laroche (2020), hate of a particular brand may lead to anti-brand conduct as well as other detrimental effects. Recent research demonstrates that brand hate may even trigger retaliation desires (Bayarassou, Becheur, & Valette-Florence, 2020).

Whining is also a behavior affected by brand hate (Fetscherin, 2019). The consequences of brand hate are brand rejection, brand retribution, and negative word-of-mouth according to Hegner et al. (2017). Many previous studies have held that brand hate leads to negative word-of-mouth (WOM) (Hegner et al., 2017; Zarantonello et al., 2016). Pinto and Brandão (2021) found out that brand hate and negative word-of-mouth (WOM) are highly correlated. Recent research further demonstrates that the major effects of brand hate are poor WOM and complaint behaviors (Zhang & Laroche, 2020). The research presented above informs the development of following hypothesis:

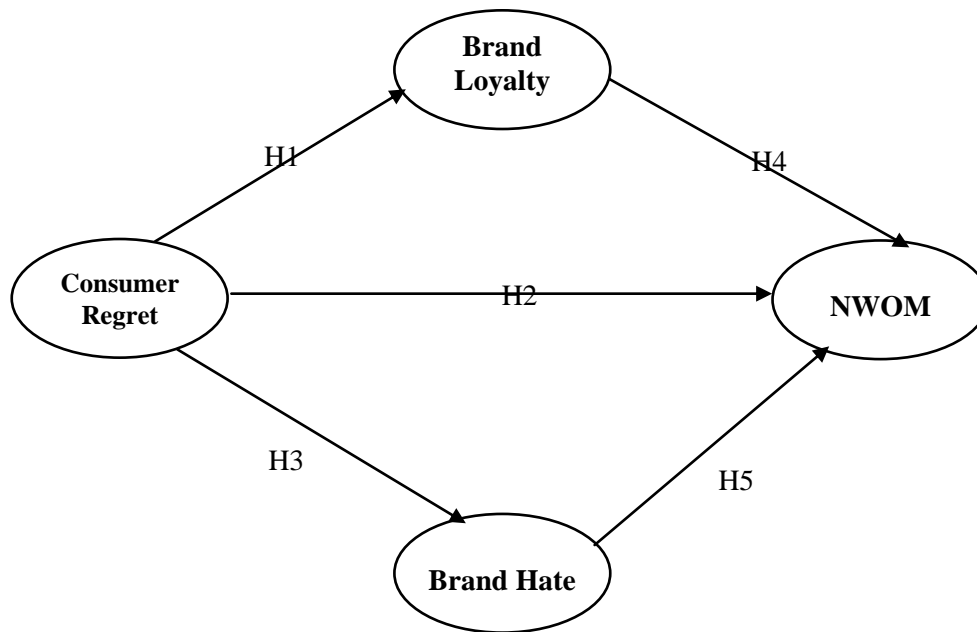*H5: There is a positive relationship between brand hate and negative WOM.*

Fig 1. Conceptual Farmwork

Materials and Methods

This research explores the relationship between consumers' internal negative emotions and their external negative emotions like negative word-of-mouth and brand hate. In this research, the effects of brand loyalty, brand hate, and negative word-of-mouth are explored together with the effects of consumer regret on these variables. In Figure 1, the conceptual framework is shown.

Measures

The Lee and Cotte (2009) research is used as the basis for the instrument of consumer regret. The research by Johnson, Herrmann, and Huber (2006) served as the basis for measuring brand loyalty items. We adopted Hegner et al. (2017) hate and negative WOM items. The initial (18 items) brand hate scale was too extensive and inappropriate for the context of mobile network use. To determine the most relevant version of the scale, So, we conducted a pilot test and a validity check with two branding researchers. Utilizing the original brand hate scale's short form (6 items), which provides superior model fits, we assessed brand hate as a single construct (Hegner et al., 2017). To fit the findings within the context of mobile network use, many things were changed. A 5-point Likert scale is used to measure each construct (APPENDIX).

Checking Common Method Bias

To lessen the typical technique bias, we took various steps both before and after the data collection (CMB). First, we made a selection of the scales based on their validity and reliability. We avoided using leading questions and technical jargon to make the survey items clearer and easier to comprehend. When respondents are unwilling to engage in the survey, a common method bias also manifests (Williams, Hartman, & Cavazotte, 2010). We explained to the participants that their answers would only be utilized for research and that their names would be kept confidential to maximize voluntary participation.

We checked the data after it was gathered to see whether CMB was present. Harman's single-factor methodology, according to MacKenzie and Podsakoff (2012), is insufficient to identify CMB since accurate measurements are not taken. Using more sophisticated techniques as an alternative to Harman's single-factor test is advised by Malhotra, Kim, and Patil (2006). As a direct consequence of this, we put the model through its paces by using the common latent factor (CLF) approach. To carry out CLF, a latent component was included in the measurement model that was used in AMOS. Separate calculations of standardized factor loadings with CLF and without CLF

were made. The assessment of the CMB's results is shown in Table 1. The difference between the estimate values with and without the CLF was discovered to be less than 0.2, confirming that the CMB in this investigation is not significant (Serrano Archimi, Reynaud, Yasin, & Bhatti, 2018).

Table 1: Standardized Regression Weights

Standardized Regression weights	Estimate with CLF	Estimate with no CLF	Diff
B_L4 ← Brand Loyalty	0.862	0.921	0.059
B_L3 ← Brand Loyalty	0.922	0.925	0.003
B_L2 ← Brand Loyalty	0.897	0.901	0.004
B_L1 ← Brand Loyalty	0.828	0.831	0.003
N_WOM4 ← Negative Word of Mouth	0.621	0.773	0.152
N_WOM3 ← Negative Word of Mouth	0.603	0.801	0.198
N_WOM2 ← Negative Word of Mouth	0.636	0.798	0.162
N_WOM1 ← Negative Word of Mouth	0.658	0.838	0.18
B_H4 ← Brand Hate	0.773	0.89	0.117
B_H3 ← Brand Hate	0.763	0.867	0.104
B_H2 ← Brand Hate	0.53	0.662	0.132
B_H1 ← Brand Hate	0.734	0.859	0.125
B_H5 ← Brand Hate	0.738	0.858	0.12
B_H6 ← Brand Hate	0.736	0.839	0.103
CR11 ← Consumer Regret	0.725	0.813	0.088
CR10 ← Consumer Regret	0.845	0.924	0.079
CR9 ← Consumer Regret	0.765	0.871	0.106
CR8 ← Consumer Regret	0.391	0.421	0.03
CR7 ← Consumer Regret	0.414	0.561	0.147
CR6 ← Consumer Regret	0.366	0.451	0.085
CR5 ← Consumer Regret	0.371	0.444	0.073
CR4 ← Consumer Regret	0.374	0.451	0.077
CR3 ← Consumer Regret	0.371	0.497	0.126
CR2 ← Consumer Regret	0.35	0.514	0.164
CR1 ← Consumer Regret	0.321	0.516	0.195

Data Collection and Sampling

With the use of an online poll, we gathered data over two months. Participants in the research were required to be Pakistani citizens who were representatives of Generation Y and who used mobile networks. We made the questionnaire available to everyone online, and we requested the respondents to react via email and social media. We included a short description of the study's objectives and a statement that the information would only be used for research.

We also emphasized the essence of the replies being precise and complete. The questionnaire did not have questions that defined the identity of the respondents. This enabled the members to feel more relaxed and not affected by any possible guidelines. In the process of undertaking the study, we did not target a specific region of Pakistan. The respondents chosen randomly in the survey were the respondents in every part. Demographic profiles of the respondents in Table 2 indicate that respondents have diverse backgrounds. As well, the respondents gave their genuine answers without partiality. All these prove that our sample is a fair representation of the target population.

To be ethical in our study, we followed some of the major principles provided in the literature. Respondents were fully willing and did not provide any personally identifiable information to participate in the survey. Belmont

Report (1979) states that, voluntary participation is an ethical principle in conducting research involving human subjects, and is a display of respect to autonomy. It is important that the researcher does not coerce the participants and that their consent is free. Moreover, the research was conducted under the following conditions; privacy and anonymity of subjects. On the one hand, according to Saunders, Kitzinger, and Kitzinger (2015), anonymity measures people against possible risks and promotes ethical rigor in qualitative and quantitative research. We clearly indicated in our survey tool that any information obtained would be confidential and that it would be used in academics only and did not compromise the informed consent (Babbie, 2020). These processes do not contradict the existing academic principles and ethical standards in conducting social research studies, thus making sure that the research was carried out in an ethical manner.

The online questionnaire is made up of three different parts that were built with the help of Google Forms. The first section asked the demographic composition of the respondents. In the second segment of the questionnaire, the respondents were asked regarding the provider of mobile network they used. Then they provided the rest of the questions keeping in mind their selected brand of the mobile network.The measurements of brand loyalty, brand hate, and consumer regret are included in the second section. Statements concerning negative WOM are included in the questionnaire's third section.

Before drafting the final questionnaire and getting started on the collection of data, we carried out a test study on a smaller number of people as a pilot to ensure that the process for gathering the data worked as we had anticipated it to. This allowed us to make sure that the definitive questionnaire would accurately reflect the results of the test study. In the pilot research, we looked at how simple the respondents found the things to be to understand. We changed the questions that needed clarification and created the questionnaire's final design. Table 2 lists the respondents' demographic information.

Table 2 shows that 53.7% of the respondents were male. Most of the respondents are between the ages of 20 and 30, then those between the ages of 31 and 40. With 23.8% percent holding master's degrees and 39.3 percent holding bachelor's degrees, the respondents are overwhelmingly educated.

Table 2: Demographic Characteristic (N = 361)

		Frequency	Percent
Gender	Female	167	46.3
	Male	194	53.7
Age	20-30	165	45.7
	31-40	97	26.9
	41-50	52	14.4
	51-60	29	8
	Above 60	18	5
Marital Status	Married	198	54.8
	Single	163	45.2
Education	Bachelor	142	39.3
	M.Phil.	43	11.9
	Master's	86	23.8
	Matric a	62	17.2
	Ph.D	28	7.8
Mobile Network	Jazz	110	30.5
	Telenor	73	20.2
	Ufone	91	25.2
	Warid	3	0.8
	Zong	84	23.3

Data Analysis and Results

The structural equation modeling (SEM) technique was put to use to validate the proposed model. We utilized the structural equation modeling software AMOS to carry out this investigation.

Measurement Model

To conduct an assessment of the measurement model, the evaluation of reliability, convergent validity, and discriminant validity are used. To determine whether or not the model is accurate, confirmatory factor analyses (also known as CFA) were performed on each scale. The convergent validity was examined by taking the average variance extracted (AVE) and the composite reliability (CR) and comparing them. Testing for the correlation between latent variables and square roots of the AVE values was performed to ascertain the discriminant validity of the model. From the CFA results, degree of goodness-of-fit could be obtained within the ranges specified (Table 3).

Table 3: Fit Index

Absolute fit Indices	Scores	Cut-off Values
X²/df	0.265	<5.0
CFI	0.923	≥0.90
NFI	0.912	≥0.90
RMSEA	0.054	<0.08

Table 4 provides the CFA findings, AVE, and CR values. The results of the CFA demonstrated that each scale consisted of a single factor, proved that the constructs were substantially loaded onto the scale that corresponded to them, and demonstrated that the scales (latent variables) were meaningfully explained by the scale items (observed variables). To demonstrate convergent validity, the AVE value must be equivalent to or more than 0.50, the CR alpha coefficient must be 0.70 or higher, and the factor load (standardized values) of each item must be greater than 0.50 according to Fornell and Larcker (1981). Table 4 demonstrates that all three requirements are satisfied, proving that the research has convergent validity.

Table 4: Measurement model - Reliability and Convergent validity

Constructs	Item Code	Factor Loading	Cronbach's Alpha	CR	AVE
Consumer Regret	CR11	0.721	0.772	0.942	0.701
	CR10	0.714			
	CR9	0.814			
	CR8	0.816			
	CR7	0.817			
	CR6	0.811			
	CR5	0.829			
	CR4	0.821			
	CR3	0.775			
	CR2	0.789			
	CR1	0.732			
Brand Hate	B_H4	0.89	0.832	0.931	0.693
	B_H3	0.867			
	B_H2	0.762			
	B_H1	0.859			
	B_H5	0.858			
	B_H6	0.839			
Brand Loyalty	B_L4	0.858	0.88	0.932	0.774
	B_L3	0.925			
	B_L2	0.901			
	B_L1	0.831			
Negative Word of Mouth	N_WOM4	0.773	0.818	0.890	0.669
	N_WOM3	0.821			
	N_WOM2	0.838			
	N_WOM1	0.838			

Table 5: Square Root of AVE and Descriptive statistics

Construct	Mean	S. D	1	2	3	4	Square Root of AVE
1. Consumer Regret	2.44	0.83	1				0.84
2. Brand Hate	2.15	0.88	0.617**	1			0.83
3. Brand Loyalty	3.17	1.04	-0.512*	0.215*	1		0.88
4. Negative Word of Mouth	2.51	0.92	0.481**	.537**	-0.345	1	0.82

** $p < 0.01$, *$p < 0.05$

Table 5 displays the evaluation of discriminant validity. The square roots of both the AVE values must be bigger than that of the correlations between both latent variables to achieve discriminant validity (Fornell & Larcker, 1981). All the latent variables have square roots of AVE values that are higher than the correlation coefficients between them, as seen in Table 5.

Hypothesis Testing

SEM was utilized to assess the study's assumptions. We performed structural equation analysis after the measurement model's conditions had been met. The modifications recommended by the AMOS software were made to give the measurement model its final shape. Presenting the structural model in Figure 2.

The 5000 resampling option and a bootstrap method with a 95% confidence interval were used to investigate the effects. In Table 6, statistically significant effects are listed.

Table 6: Structural path coefficients

Relationship	β	t-value	p-value	LLCI	ULCI
Consumer Regret → Brand Loyalty	-0.37**	8.407	0.00	0.11	0.31
Consumer Regret → Brand Hate	0.65**	14.83	0.00	0.54	0.75
Consumer Regret → Negative WOM	0.86*	13.84	0.00	0.87	0.98
Brand Loyalty → Negative WOM	-0.04	0.926	0.45	-0.66	1.61
Brand Hate → Negative WOM	0.56**	12.06	0.00	0.45	0.66

($N = 361$), *$p <0.05$, **$p<0.01$

Using the modifications, the program suggested to improve the goodness of fit values, we constructed covariance between both the error terms of the B_H1 and B_H2 factors of the brand hate scale. It is advised to correlate error terms to improve model fit (Byrne, Shavelson, & Muthén, 1989). In the literature, it is allowed to change the items that assess the same concept in error terms (Hermida, 2015). Both of these factors convey the consumers' strong sentiments about the brand they dislike. The high correlation between these two variables' error terms makes sense. Establishing covariance between both the error terms among these two variables was necessary in order to do further testing on the model.

When evaluating the correlation coefficients, a normalized value of less than 0.10 denotes a "smaller" influence, between 0.10 and 0.30, a "typical or medium" effect, and more than 0.50, a "bigger" effect (Kline, 2015). The findings demonstrate that consumer regret has a considerable negative impact on brand loyalty ($\beta = -0.37$; $p < 0.01$). Consumer regret is positively and somewhat significantly influenced by negative word of mouth ($\beta = 0.86$; $p< 0.05$). Consumer regret is positively and significantly influenced by brand hate ($\beta = 0.65$; $p < 0.01$). The findings also demonstrate that brand loyalty does not significantly affect negative WOM ($\beta = -0.04$; $p > 0.05$). Though, brand hate is positively and significantly impacted by negative WOM ($\beta = 0.56$; $p < 0.01$).
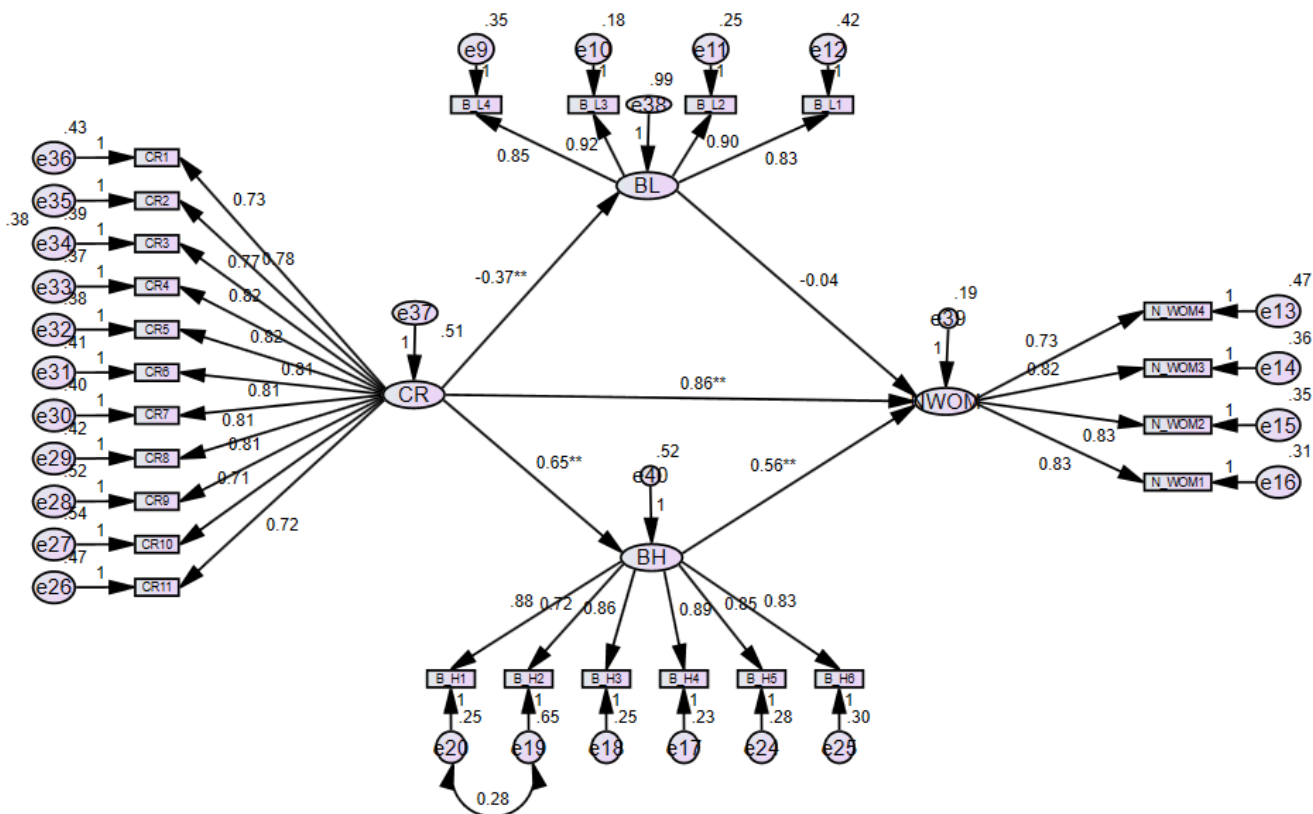
Fig. 2 Structural Model

Discussion

This research adds to the literature regarding consumer regret by confirming a model that investigates the interrelations between consumers' internally felt and externally manifested negative emotions and negative word-of-mouth. The research looks at how regret affects brand loyalty, brand hate, and negative word-of-mouth. Each research hypothesis is looked at. Except for H4, all of the hypotheses are supported. According to the findings, brand hate, unfavorable word-of-mouth, and brand loyalty are all strongly influenced by consumer regret. The findings also demonstrate that negative WOM is strongly positively impacted by both internal and external emotions.

Our findings support earlier studies on the impact of regret on consumer satisfaction. We discovered that brand loyalty is adversely impacted by consumer regret. This result supports the findings of prior research by Bui et al. (2011), which contends that regret reduces consumer happiness and brand loyalty by raising the desire to move brands. The results of much other research similarly indicated a favorable correlation between brand-switching activity and consumer regret (Davvetas & Diamantopoulos, 2017).

This study lends credence to earlier research on the impact of consumer satisfaction on unfavorable word-of-mouth (WOM). The impact of regret on consumers' complaint intentions was shown to be significantly influenced by consumer satisfaction level (Tsiros & Mittal, 2000). Additionally, Tzeng and Shiu (2019) contend that unless consumers have a profound sense of regret, they are reluctant to complain to other parties. Our findings support prior research by showing that the association between consumer regret and unfavorable WOM is mediated by brand hate and brand loyalty. It means that the effects that consumer regret has on negative word-of-mouth could be enhanced or reduced based on the level of consumer happiness (Zhao, Noman, & Abedin, 2025).

The findings also provide weight to earlier research on the link between brand hate and unfavorable word-of-mouth. During this study, we found that NWOM has a strong correlation with brand hate, which is the strongest negative feeling towards a brand. Our results indicate that brand hating leads to bad WOM being shared with the consumers. It has been already demonstrated by several studies that brand haters and detractors of their products are positively correlated (Hegner et al., 2017). Brand hate was found to have one of the most critical outcomes in

the form of NWOM (Kurtoğlu, Özbölük, & Altın, 2025). Also, recent studies have found that brand hating will result in negative WOM and complaint behaviour (Zhang & Laroche, 2020).

This study contributes to the previous research because it examines the relationship between an internal negative emotion (regret) and external negative emotion (brand hate) and negative WOM. The recent study by Wen-Hai et al. (2019) examined the effect that both internal and external sources of negativity have on negative word-of-mouth. They established that regret positively impacts negative WOM and desire to revenge whereas anger did not but boosted desire to revenge. Our research adds to this body of knowledge by showing that consumer regret positively influences brand hate which is an almost identical correlate of negative WOM. Consequently, more negative WOM could be caused by both internal and external feelings.

Theoretical Implications

This study contributes to the existing body of knowledge about the root causes of NWOM. We expand earlier research that primarily concentrates on consumers' negative emotions, such as rage, from a theoretical standpoint (Harrison-Walker, 2019). Our research looks at brand animosity as a potent precursor of unfavorable word-of-mouth. This study contributes new details to the existing body of past research, which mostly focuses on brand hate causes associated to rage. We focused on consumer regret, which is connected to grounds for brand hate that are tied to grief. Zhang and Laroche (2020) assert that emotions such as dissatisfaction, regret, and humiliation play a crucial role in cultivating brand hate. However, brand-hating literature has not taken into account consumer regret. We anticipate that our work will help direct more studies in this field in the future.

By studying the relationship between an internal negative feeling (regret) and an external negative emotion (brand hate) as well as negative WOM, this study adds to the body of prior research. A recent study conducted by Wen-Hai et al. (2019) investigated the influence that both internal and external sources of negativity have on negative word-of-mouth. They found that regret has a positive effect on negative WOM and the desire for revenge, while anger has no effect on negative WOM but elevates the desire for revenge. Our study contributes to this pool of knowledge by demonstrating that consumer regret has a positive effect on brand hate, which is a close correlate of negative WOM. As a result, a greater negative WOM might result from both internal and external emotions.

Practical Implications

This study has some recommendations for brand managers in the real world. Our study model has shown that negative WOM is mostly explained by consumer regret and brand hate. Consumers might experience brand regret as well as brand hate, which brand managers should try to reduce. According to Davvetas and Diamantopoulos (2017), brand loyalty and brand-recommendation behavior are fostered through consumer-brand identification, which might lessen the detrimental effects of regret on consumer pleasure. Understanding consumers' strong sentiments towards businesses might help marketers respond and stop these reactions (Zarantonello et al. 2016).

This research offers various tips for controlling consumers' poor experiences with marketers. Brand hate, one of the negative sentiments about brands, is a stronger negative sensation than disliking a specific brand. Consumers now can quickly share unfavorable WOM through social media. Making websites promote brand hate may have an impact on consumers' purchase choices by harming the brand's reputation (Kucuk, 2008). Therefore, businesses should look into the causes of consumers' unfavorable perceptions of their brands and take the appropriate measures to stop them.

Additionally, this study will help marketers understand how regret and brand hate may contribute to the spread of unfavorable WOM. Before making a purchase they afterward regretted, a consumer who is committed to a brand will not spread rumors about it. The regret of consumers, however, readily results in negative WOM when their internal negative feelings, such as brand hate, manifest externally. Consumer regret fuels their urge to spread this hate. As a result, it has a negative WOM. Therefore, internal feelings like regret have significant ramifications for brand managers attempting to build rapport with consumers who have had unfavorable brand experiences.

In this respect, businesses must pay particular attention to their consumer service division, which has first contact with consumers. As a strategy to control the consumer-brand interaction it will be essential to constantly analyze the consumer comments in all the avenues where businesses interact with consumers. Consumer complaints posted online, particularly on the social media, should be addressed with sharpness. Observing the negative experience and giving the consumers a remedy could help in enhancing the reputation of the brand. Dealing with consumer complaints might even generate good word-of-mouth for the business.

Managers may be able to forecast outcomes more accurately by measuring negative internal feelings like consumer regret. Even while corporations seldom see regret as an internal feeling, emerging technologies will be useful in monitoring. Consumers may simply express their unfavorable opinions on social media nowadays. They may tweet about their regret as it isn't yet manifesting as a negative feeling. Before unhappy consumers generate poor word-of-mouth, businesses should try to reach out to them. It is essential to implement proactive consumer support, which involves alerting consumers before they call consumer care rather than waiting for them to do so.

Identifying brand hate early on is essential for creating positive interactions with consumers (Kucuk, 2021). Consumers in today's world anticipate receiving timely and high-quality service. In addition to this, they anticipate firms to respond to all forms of contact promptly. The consumers get irate the longer it takes to solve their problems. Therefore, it is now essential to find a rapid solution to the issue. Telecommunication industries ought to adopt the interactive forms of communication such as phone support, text chat, and live mobile conversations so that they can quickly address consumer challenges.

New strategies are required to address customer concerns in the digital age. Therefore, companies should update their complaint management processes using contemporary technology. AI-based solutions facilitate the anticipation of future complaints and the resolution of potential problems before they materialize. Telecom companies can also use big data analytics. They should set up exact metrics for gauging customer satisfaction and keep a methodical log of this information. AI-powered chatbots may also offer personalized assistance. These systems employ machine learning to understand each customer's objectives and deliver a personalized experience.

Remorse and bad past experiences may be eliminated with strong brand recognition (Davvetas & Diamantopoulos, 2017). Recent research by Kucuk (2021), indicates that identification mismatch is the antecedent of brand hate. He argues that identity mismatch causes more long-term harm to brands than product or service failures. Furthermore, negative attitudes toward a brand may arise from disidentification with it (Ruppel & Einweller, 2021). Therefore, in order to establish brand identification, companies should focus on building solid customer relationships.

Limitations and Future Research

There are a number of limitations to this study that should be noted. First, the sample size was small (n = 361) and restricted to consumers in a particular Pakistani regional context. Because of this, the results might not apply to larger populations. To improve the validity and reliability of the findings, future research should aim to duplicate this study with bigger and more varied samples. Second, we only looked at customer preferences for mobile network providers. The findings cannot be applied to other product categories or service sectors due to this limited scope. To test the strength of the suggested relationships, future research should look at brand hatred in a range of industries, including food, clothing, and digital platforms. Third, despite recent increases in academic interest, brand hate is still an understudied topic. By analyzing unfavorable consumer-brand relationships, this study adds to the body of literature; however, more comprehensive and multifaceted research is required to fully comprehend the causes and effects of brand hatred. Additionally, this study only looked at the attitudes of Pakistani consumers. Future cross-cultural research could offer comparative insights and aid in generalizing findings across various cultural contexts because cultural values have a significant impact on consumer behavior. Apart from these constraints, future studies should think about adding new variables to improve the existing model. For instance, variables such as brand betrayal, brand forgiveness, and consumer resilience could provide deeper understanding of emotional recovery mechanisms following negative brand experiences. Additionally, social media engagement and electronic word-of-mouth (eWOM) could be explored as mediators or moderators to understand how brand hate spreads and intensifies in online environments. The inclusion of personality traits, such as consumer animosity or need for uniqueness, could help identify psychological predispositions toward brand hate.Lastly, longitudinal studies could be employed in future research to examine how consumer-brand relationships evolve over time and how hate might dissipate, persist, or transform under varying circumstances.

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Appendix

Construct Items

Consumer Regret
I regret the product choice that I made
If I was back in time, I would choose something different to buy
I should have chosen something else than the one I bought
I now realize how much my other choices were
With more effort, I feel that I could have made a better decision
I feel that I did not put enough consideration into buying the product
I regret not putting enough thought into my decision
With more information, I feel that I could have made a better decision
I feel that too much time was invested in getting this product
I think I put too much thought in the buying process
I wasted too much time in making my decision
Brand Loyalty
I will definitely buy the same brand next time
If I need to change the MNO brand I use, I will buy the same brand again
I recommend this brand to others
If I could buy any brand free of charge, I would still buy the same
Brand Hate
I hate brand X
Brand X is awful
I am totally angry about brand X
I am disgusted by brand X
I do not tolerate brand X and its company
The world would be a better place without brand X
NWOM
I spread negative word of mouth about brand
I denigrated the brand to my friends
When my friends were looking for a similar service, I told them not to buy from brand X
I try to influence a lot of people in not purchasing this brand

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Front-Line Employee Attitudes and Their Turnover Intentions: Role of Their Affective Commitment and Job Satisfaction in Call Centers

Front-Line Employee Attitudes and Their Turnover Intentions: Role of Their Affective Commitment and Job Satisfaction in Call Centers

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Abstract

The research was conducted in a non-contrived environment in call center industry and it aims to examine the impact of front-line employee attitudes such as their affective commitment and job satisfaction on their turnover intentions. Survey based quantitative approach was utilized and primary data were gathered by using questionnaire as an instrument from 262 front-line employees in call center industry on all the variables of interest across Islamabad, Rawalpindi, and Peshawar. Validated scales were used for assessing job satisfaction, affective commitment, and turnover intention. Survey data were quantified on a five-point response scale. Statistically data analysis was done through descriptive measures, correlation, and regression. Statistical findings have shown the affective commitment and job satisfaction of employees were inversely associated with turnover intentions of front-line employees. Implications of these results have been discussed in the paper, which infers, increase in positive attitudes of front-line employees result in lowering their intentions to leave organization.

Keywords: Front-line employees, Call center, Affective commitment, Job satisfaction, Turnover intentions

Introduction

In call centers work environment front-line employees are important interface between the organizations and their core and augmented customers, their crucial role helps in delivering quality customer services and achieving organizational objectives (De Keyser et al., 2019; Zakaria et al., 2020). On regular basis they fulfil diverse challenging demands of their clients and supervisors too (Kalra et al., 2021). Customer service representatives who are working at front-line are both inbound and outbound agents who not only facilitate customers but also boost up sales, public relations, brand image and ultimately productivity of organization (Ellahi, Malik, Sulehri, Kiani, & Awais, 2023; Kuokkanen & Sun, 2020; Packard & Berger, 2021). Although they are pivotal to organizational success but mostly, they are underestimated in terms of financial based managerial paradigm and are viewed as just functional inputs instead of being considered as strategic core value. Moreover, they have to work in a stressful environment where they have to face tight supervisory control and low self-esteem that eventually leads to elevated withdrawal intentions (Awais, 2014; Batt & Moynihan, 2002; Pattnaik & Panda, 2020). Employees have multiple interactions every time, work in challenging conditions and are closely monitored that result in decrease in satisfaction of employees and high turnover rate (Ramlawati et al., 2024).

Employee turnover is not easy. Organizations have to suffer and bear huge loss in form of expenses of training and hiring process. Lazzari et al. (2022) reflected that higher turnover possesses significant threat in the shape of decreasing productivity, service quality, and also time invested in employees. According to research, replacement of employee costs 90 to 200 % of annual salary. These research findings also highlight the importance of strategies for retention including psychological aspects such as attitude with organization.

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Existing studies emphasize the rational role of employee's attitudes which is reflected in their affective commitment and job satisfaction to overcome intentions of turnover (Akinyemi et al., 2022). Experimental substantiation in context of Pakistan is still not vast and more research is needed. Employees attitude of affective commitment towards organization and their level of job satisfaction reduces their turnover intentions in the banking sector of Pakistan (Waqar et al., 2023). Furthermore, the facilitation impacts of these variables are constantly increasing in Southeast Asia (Gulo & Ardiansyah, 2025). Pakistan call center industry is boosting rapidly. Due to heavy reliance on satisfied and committed front-line employees, it is important to examine the attitudinal aspects in office daily tasks. This research intends inquiring the role that front-line employee attitudes like affective commitment and job satisfaction play in reducing turnover intentions in Pakistan.

This study has both theoretical and practical contributions as it is highlighting the progressing service-oriented sector with high growth potential economical industry. Present research also broadens worldwide reach about employees' retention to a Pakistani environment, and explains to decision or policy makers to foster positive attitudes, minimize turnover cost, and strengthen service quality standards. Knowledge and findings gained are highly relevant and timely considering the cost constraints, demands and expectations in call center environment.

Literature Review

In studies on organizational behavior, organizational commitment is fundamental. It contributes in not only fostering employee retention but also boost job performance related outcomes. It exhibits affectional connections between the organization and workforce. This encompasses emotional attachment, identification, own willingness to give suggestion and helping in obtaining corporate aims (Meyer & Allen, 1991). In line with the 3-component model, employee's organizational commitment has further three different forms, namely continuance commitment, affective commitment, and normative commitment. Among these three, maximum fame and attraction got employee's affective commitment because of its linkage with other productive measured effects like employee's high level of work engagement, citizenship behaviors, and decreasing rate of their turnover (Li et al., 2022; Memon et al., 2021). Workforce who was having better affective commitment opted and stayed with their own working organization because of emotive relationship that was formed. That is why, this construct is pertinent in explaining and understanding employee's turnover intentions (Mowday et al., 1979; Ribeiro et al., 2022). Recent studies like Kaur and Randhawa (2023) and Xu et al. (2023) further highlight the role that affective commitment plays in decreasing employees' level of stress and burnout. Moreover, longitudinal studies also confirm that affective commitment of employees is significant, relevant and among most reliable predictors of employee's turnover intentions across industrial and cultural backgrounds (Imran et al., 2023).

Employee's job satisfaction, i.e., an additional foundation of their turnover studies is formulated in the form of the favorable emotional reaction derived from employee's evaluation/analysis of their work history (Locke, 1984). Exhibits affective plus cognitive evaluation about job elements like remuneration, job condition, supervision, as well as chances of growth and development (Cranny et al., 1992; Na-Nan et al., 2020). Previous studies in most instances emphasized employees job satisfaction in the capacity of a limited indicator (Boles et al., 2003), but contemporary research often devised job satisfaction as multidimensional (Kim et al., 2023; Zhang et al., 2022). Data driven analysis repeatedly showed workforce with more job satisfaction usually do not develop intentions to leave because their high level of satisfaction from work increases their level of commitment towards work, job engagement, and enduring retention and continuance (House et al., 2023). However, studies also show that employee's job satisfaction frequently play mediation role connecting different practices like employee nurturing human resource policies and employee's inclination towards staying in organization (Nguyen & Nguyen, 2022; Wang & Zhang, 2022). Job satisfaction with inherent and contingent work aspects in close environments such as call centers contributes leading function to reduce turnover ratio at workplace (Ramlawati & Arifin, 2021).

Employees turnover intention and propensity is well known in the role of most proximal precursor of factual employee turnover or withdrawal behavior. It is defined to be a well-organized intention to quit work in an organization where he/she works (Mobley, 1977). Employees turnover intentions are about a better indication of their leaving decision (Hom & Hulin, 1990). Elevated employee turnover rates also air organizational difficulties which ultimately leads to high cost in new employee selection, their training regimes, knowledge drain, and less productivity from compromised service quality (Lazzari et al., 2022; Yin et al., 2023). Call centers work settings where workers are conjunction between the work place and its esteemed customers, after effects of withdrawal or turnover behaviors are concerning, impelled workforce render negative results and reduce organizations efficiency and customers satisfaction at work (Peltokorpi et al., 2023).

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Scholarly perspective provides meaningful insights and understanding towards the mechanism underlying the concept of employee turnover intentions. Traditional turnover theory in organizational behavior studies that is based on classical foundations of March and Simon's (1958) along with Mobley's turnover model (1977), suggested and proposed that workforce do not leave organization when their expected compensations and advantages are greater than other alternative opportunities, whereas dissatisfaction initiates demotivation among the employees which leads to voluntary exit. On the basis of this conception, Ajzen and Fishbein's (1975) attitude and intention work explains the worker's evaluation about his/her job structure their willingness to stay or leave workplace, that afterwards results in actual withdrawal behavior in the company. Empirical work explains a theoretical framework that conveys attitudinal variables like job satisfaction and affective commitment operates and work like crucial precursors towards turnover intentions of employees at work (Ahn & Choi, 2023; Alkhraishi et al., 2023; Nurtjahjono et al., 2023).

This study has continually expressed the fact about workers having higher job-related attitudes like satisfaction and their affective commitment have less chances of turnover and leaving organization. Much of evidence comes from Eastern Asian nations and from South Asia. This difference is evident in Pakistan, where call center industry has gained momentum in recent times and workload in centers have increased the chances of resignation. Contemporary close monitoring of attitudinal employees' variables that leads to turnover is time consuming as well as important. Through elaborating it, this current research plays part in practical knowledge plus theory and provides valuable thoughtful connotation to assist corporations and workplaces in developing key mechanism for increasing their employee's retention intentions instead of turnover in a challenging, dynamic and tense sector. The conceptual framework comprises of following main aspects:

HI: *Employees affective commitment in call center is notably and inversely linked with their turnover intentions.*

H2: *Employees job satisfaction in call center is notably and inversely linked with their turnover intentions.*
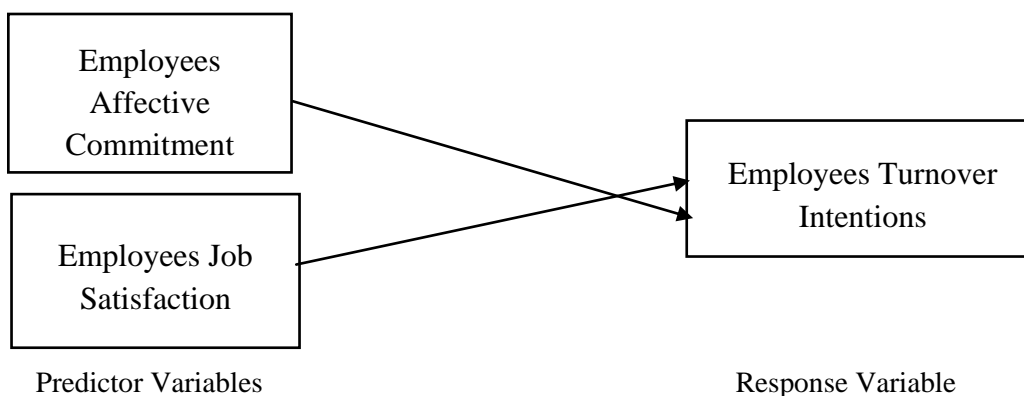

Figure 1: Conceptual Framework of Study

Method

Ongoing investigation being quantitative in nature is structured survey methodology used for overseeing lasting impacts of employee's attitudes including job satisfaction and affective commitment on their turnover intentions in contexts of call center work environment. Study had a cross-sectional single point study design and was made to analyze different workplace trends and patterns in organizational behavior.

Research target audience for examination was comprised of front-line workers from different call centers from Islamabad, twin city Rawalpindi, and also from Peshawar. Three cities specifically got attention due to ongoing expansion in call center industry and expanding opportunities which are given to dedicated workers. For exploring this practical problem, a convenience sampling method was adopted where data were obtained from the participants which were readily available to take part. This sampling technique was perhaps the only useful methodology in call center context since workers have to go through tough schedules which keeps them in rigorous observation and control that makes their availability to participate difficult. But this sampling approach helped in accessing participants effectively. Not only this ensured timely completion of data but it also ensured appropriate sample size which reflected range of front-line employees working experience. Convenience sampling allowed encompassing of employees from different organizations across different cities (Peshawar, Islamabad, Rawalpindi). Despite this, the dependability on convenience sampling has some limitations like generalizability

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and self-selection bias concerns. Therefore, it was important mitigating these limitations. Measures taken carefully for inclusion of workers from a diverse and heterogeneous demographics. And employees from different call centers with diverse operational and functional sizes and conditions covering different metropolises were included in sample. Furthermore, well known and standardized measurement instruments were employed to strengthen the reliability and validity of obtained data, hence lowering the potential biases that were related to this sampling method (Bornstein et al., 2013; Etikan et al., 2016; Taherdoost, 2022).

Total number of 460 questionnaires were uniformly distributed, approximately 57% of the responses were valid, yielding up to 262 responses in total. This survey was for male and female workforce covering varied viewpoints of different groups. Well-organized designed questionnaire helped to obtain data which included employees' demographics, their level of job satisfaction, their affective commitment towards organization, and their turnover intentions. Questionnaire was started with inquiring brief intro and background information, then highlighted purpose of the investigation and afterwards assured volunteering involvement, and confidentiality. However, privacy was maintained and no personnel data was written, this minimized the probable risk factors.

For accurate measurement and examination, well established scales from previous studies were employed. Employees job satisfaction an important study variable was measured through workplace environment relations survey (WERS, 2004) that explains core fundamentals such as employment environment, chances to develop career, and compensation. Present research utilized the well-established scale of organizational commitment designed by Allen and Meyer (1990) for assessment of emotive variable affective commitment of study to appraise extent of employee's fondness for workplace. Employees turnover intentions were monitored by Hom and Griffeth (1995), which was used to measure chances of resigning from work. Responses gathered and differentiated on a scale of 5 which varied from disagree to agree.

After the comprehensive and time taking obtaining data procedure, respondents feedback went through careful observation, coding, and analysis with the help of statistical tool SPSS version 26. SPSS is used for statistical data representation which includes average/mean, standard deviation, and tables of frequency. All these got computed to finalize demographic characteristic of sample. To further examine the relationship among variables, person's correlation coefficient was employed, predictive influence of jobs satisfaction and affective commitment were employed with multiple regression models. Diagnostic test was also conducted to confirm the key premises of regression; this test was conducted before the regression analysis. Diagnostic test included normality, linearity, and residual independence to assure the strength and reliability of findings of study. Moreover, to find internal consistency and instrument's reliability Cronbach's alpha for each scale was computed.

Ethics related issues have large standing in the study. All the study respondents had complete information about the agenda of research, well educated about the cause of the inclusion and had assurance of right to leave anytime without restriction. Data collected was solely gathered for research and study purpose with no extrinsic influence and privileges.

Results

Reliability Analysis

Table 1 of study is presenting the results after analyzing reliability. Values of Cronbach's alpha coefficients for the independent variables affective commitment and job satisfaction were 0.87 and 0.95 respectively and for the dependent variable turnover intentions it was 0.79. Now these values have crossed the advisable threshold value that is 0.70 and showed all the scales that were employed in the study are reliable.

Table 1 *Reliability*

Variables of Study	Values of Cronbach's Alpha	Number of Items
Employee's Affective Commitment	0.87	08
Employee's Job Satisfaction	0.95	10
Employee's Turnover Intentions	0.79	03

Findings that have been mentioned in Table 2 showed that generally or overall the participants were dissatisfied as far as their work is concerned, had little level of affective commitment and inversely they had shown higher intentions to quit their workplaces.

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Table 2 *Values of Mean, Standard Deviation, Skewness and Kurtosis*

Variables of Study	Mean/Average	Standard Deviation/ SD	Skewness Statistics	Kurtosis Statistics
Employee's Job Satisfaction	2.05	0.68	1.56	1.57
Employee's Affective Commitment	1.95	0.48	1.75	2.78
Employee's Turnover Intentions	4.16	0.49	-1.33	2.06

Correlation

Table 3 is showing the findings of correlation between the independent and dependent variables. Correlational analysis has shown that all of the linkages among employee's affective commitment, their job satisfaction, and their turnover intentions were in the anticipated directions. Moreover, statistically at 0.01 level all of them were significant. Predictor variable, employee's job satisfaction exhibited significantly inverse correlation with response variable turnover intentions (r value is –0.550, p value less than 0.01). Moreover, employee's job satisfaction level and their affective commitment had positive correlations (r value is 0.641, p value is less than 0.01). Likewise, employee's affective commitment demonstrated a significantly expected negative correlation coefficient with their turnover intentions (r value is –0.546, p value is less than 0.01). Results have confirmed that employees with elevated levels of satisfaction from their job and increased affective commitment towards organizations are related to their decreased level of negative turnover intentions.

Table 3 *Correlation*

Variables of Study	Employee's Turnover Intentions	Employee's Job Satisfaction	Employee's Affective Commitment
Employee's Turnover Intentions	1		
Employee's Job Satisfaction	-0.550	1	
Employee's Affective Commitment	-0.546	0.641	1

Note: All of the correlation values are statistically significant at the 0.01 level, i.e., 1-tailed; Number of participants were 262

Linear Regression

Analysis of multiple linear regression was done in order to overview linkage between dependent and independent variables, which are front-line employee's affective commitment towards organization, their level of job satisfaction, and their turnover intentions. Before this research was finalized key factors such as expectations were checked thoroughly to ensure credibility of model.

Scatterplots were used to check linearity which showed linearity link between predictor and response variables. Durbin-Waston statistics were used to assess the residuals. This yielded a value of 1.89 which indicated no persistence. The assumptions of Homoscedasticity were checked by plotting residuals vs predicted values plot, showing stable variation across all levels of independent variables. Variance inflation factors were used to find multicollinearity. Values came out to be 1.30 for job satisfaction and 1.25 for affective commitment indicating low multicollinearity. Q-Q plot assessed that the residuals had approximately normal distribution.

Statistically this model was significant as F value came out to be 74.754 and p value is less than 0.01, showing 37% variance in response variable turnover intentions, i.e., 0.371. Value of adjusted R square was 0.368 indicating insignificant diminution, which shows a strong predictive power of model when it would be applied to a broader population of study. Regression coefficient has showed that employee's affective commitment towards organization was a significant component that weakened the influence of employee's turnover intentions in their organizations, i.e., value of β is -0.324, value of t is -5.12 and p value is less than 0.01. Findings imply that every single unit increase in employee's affective commitment would decrease 0.324 units of their turnover intentions, whereby keeping other predictor variable that is job satisfaction constant. Likewise, predictor variable employee's job satisfaction appeared with expected significant inverse relation and values are β value is -0.341, value of t is -

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5.41, and p value is less than 0.01, implying that every single unit increase in employee's job satisfaction would corresponds to a decrease of 0.341 unit in turnover intentions, while controlling for other predictor variable that is affective commitment.

Findings of regression analysis were important to measure the statistical value of the questions as well as assumptions of study. Moreover, it checks goodness of fit of study model and assess to which extent research predictor variables contribute in explaining variance in response variable. Direct impact of employee's attitudes in call centers on worker's turnover intentions indicated that positive employees' attitudes including their affective commitment towards organization and their job satisfaction, had negative relation with their withdrawal and quitting intentions, which infers that ameliorating front-line employee's affective commitment towards organizations and their job satisfaction decreases their probability of turnover intentions.

Findings presented in Table 4 showed that employee's affective commitment towards organization has a significant negative impact on their turnover intentions, i.e., value of β is – 0.324, and p value is less than 0.01. Therefore, at 1% significance level, findings confirmed that employee's affective commitment is significant in predicting their turnover intentions and Hypothesis H1 received support. Likewise, employee's job satisfaction has also came out to have a significant negative relation with turnover intentions, i.e., β value is -0.341, and p value is less than 0.01. Therefore, H2 also received support as it is significant at 1% level. Overall, these result calculations underscore importance of employee's affective commitment and their job satisfaction at workplace in lowering their turnover intentions.

Table 4 *Regression Results*

Independent Variables of Study	Dependent Variable of Study Employee's Turnover Intentions
Employee's Affective Commitment	-0.324[**]
Employee's Job Satisfaction	-0.341[**]
R Square	0.371
Adjusted R Square	0.368
F value (df_1, df_2)	74.754[**] (2, 259)

[**] significant at 0.01 level

The overall results showed that regression model is quantitatively important and provides strong understanding of variation in turnover intentions of employees.

Discussion and Limitations

Repeatedly thorough investigation has highlighted the causal association of workers attitudes and their turnover intentions at work. Drawing upon this framework, current piece of work increases perception and comprehension by highlighting the significant mechanics that operates between front-line employees' attitudes at work and their turnover wish/intentions. Through working and determining workers job satisfaction and their affective commitment with organization as key forerunner and establishing inverse associations with turnover intentions particularly in call centers with stressful environment gave contributions in practical as well as theory. Workforce which was more committed to their duty were better at bonding with the organization and lined up closely with company's core values and objectives. According to Meyer and Allen (1997), employees with more sense of duty were strongly affectively committed and were intended to overachieve. In support of this another argument by Mowday et al. (1979) also showed the same that such employees are of crucial importance for organizational prosperity. Another attitude examining in study, i.e., job satisfaction is also helpful in decreasing withdrawal and turnover intentions, because workers satisfied with their jobs devote more energy to their roles, and got least distracted from other things, and often help in providing innovative ideas which benefit the organization.

All the findings concluded in this research reflects that call center organizations should target retention by encouraging positive employee attitudes. Various tasks including assigning real tasks to employees, prioritizing office work to ensure smooth flow of tasks, reducing role uncertainty, better training programs, removing differences, understanding organizational values, dealing with justice and fairness and promoting creative healthy cultures can make the work environment better and results in job satisfaction. Such mentioned plan of actions fortifies inter organizational connection and inhibit employees' negative turnover intentions. Policy divisors working on eradicating employees' turnover, internal and external aspects of employee's job satisfaction and their

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affective commitment towards organization came out as a practical driver directing on reducing turnover, stabilizing staffing, and lowering cost burdens tied to hiring.

This research has certain shortcomings; it relies on a single method for data gathering. Moreover, cross sectional design halts forming causal links, sample size is also an issue which limits the use of delicate data gathering techniques. Critically this research is about affective commitment and job satisfaction but other important factors that can affect turnover are not included due to scope of study. Occupational stress has been identified as leading feature in influencing turnover in Pakistan. In latest results showing increasing workload stress only affects employee's well-being and increases chances of turnover and leaving organization (Ramzan et al., 2024). Work life balance is crucial in decreasing turnover and strengthen employee's affectionate behavior with the organization (Ahmad Saufi et al., 2023; Lestari & Margaretha, 2021). In upcoming research work it should also be considered. Generally, longitudinal study designs having comparatively larger sample sizes have strength to find over the passage of time changes in attitudes of workforce and can lead to causal inferences. Adding other constructs like stress, leadership, employee's varying personality traits, and morale would importantly ameliorate predictive study models and help in getting deeper insights of employee's turnover at work. Employee morale has been found to be an important insightful variable (Rhodes et al., 2004). In future studies, research model can be further be explored with addition of these dimensions to reinforce theoretical rigor along with practical usefulness, directing holistic and sustainable strategies in call centers and other related service industries.

Conclusion

This research emphasizes that employee turnover intentions must be diminished. High rates of turnover cases can reduce company's operational efficiency, and customer's services quality. To alleviate this issue, call centers should also prioritize improving front-line employees job satisfaction by providing a better work environment, competitive compensation and offering various opportunities. Moreover, they should cultivate affective commitment where employees should feel more connected. This can only be achieved through different recognition programs and better communication among the employees and other higher position holders in organization. Management in call centers and related sectors must devise and enhance core plan of action to increase retention at workplace, reducing intentions to quit and developing a stabilized and peaceful environment at work for workers to achieve aims and higher-level productivity.

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