

Intellectual Capital Efficiency and Corporate Financial Performance

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Abstract

The focus of this study is to investigate the linkages between the intellectual capital and the financial performance in manufacturing companies of Pakistan. For the purpose of this study financial data of 46 selected manufacturing companies were collected from their financial statements, covering the year 2011 through 2015. Both descriptive and inferential statistics were used to generalize the results. Intellectual capital performance is measured by Value Added Intellectual Coefficient (VAIC™) that is comprised of human capital efficiency, structural capital efficiency and capital employed efficiency. The financial performance is measured through return on assets, return on equity, return on investments and earnings per share. The results showed that the intellectual capital has significant effect on the financial performance of the manufacturing firms.

Key Words: Intellectual Capital Efficiency, Financial Performance, Human Capital Efficiency, Structural Capital Efficiency, Capital Employed Efficiency

Introduction

One of the emerging areas of discussion in this modern age is the intellectual capital and its role in the success of the business. It is considered as the most important competitive edge over other companies. In today's spirited economic environment of the corporate world, the success of the organizations is mostly measured by the very vital factor of the intangible assets in the field of finance, which is known as "intellectual capital". It significantly affects the standards and values in a knowledge based economy (Bontis, 2001; Yalama, 2007). Moreover, the intellectual capital is recognized as the most important element among all the other intangible assets in an organization to get the competitive advantage or the competitive edge (Lonnqvist et al., 2008; Shaari et al., 2010); to boost the performance of the entity and to support the economic development of the country. The intellectual capital is found to set positive direction towards the performance and effectiveness of the company (Cohen & Kaimenakis, 2007; Chong & Lin, 2008; Tovstiga & Tulugurova, 2009).

The dimensions in which we can divide the intellectual capital are the human capital (How much skilled and trained the work force is), structural capital (how strong the structure of the organization), relational capital (how much strong the relations are with the other firms) and the capital employed that is the real capital that is invested in the business. These all intangible assets of any progressive company play a very important role in the progress of the firm (Malone & Edvinsson, 1997; Roos, 2005). There is a dire need to examine the importance of these intangible assets of the firm which can make a difference among the other competitive companies in the market; where 20% & 80% assets in the corporations comprises of tangible and intangible assets respectively (Roos et al., 2005). Highly skilled workforce, smooth relations in the market, strong structure and a handsome capital boost the overall performance of the firm or in other words play like the catalyst.

Pakistan being a populous country with best economic corridor has got huge potential in market for many economic and commercial activities (Ahmed & Ahmad, 2008). A proficient and practical monetary framework is essential for the economic development of any country, yet the role of intellectual capital is also recognized as one of the most important elements to support the economic development of the country (Lonnqvist et al., 2008; Shaari et al., 2010). The monetary policy of Pakistan is playing out an imperative part in the financial and economic development (Anwar et al., 2010), and is widely researched; thus

Research Question

To what extent Intellectual Capital Efficiency influences financial performance of manufacturing companies of Pakistan?

Rationale of the Study

In the developing countries like Pakistan where the trend of intangible assets is on boom, the same is the tenacity of this research i-e to find the prominence and the influence of the role of intangibles like Intellectual capital in the performance of any organization. The results will lead to the findings that whether the intellectual capital is playing a vital part and how it adds value to the performance of the firm.

Significance of the Study

In today's information based business environment firms are focusing more towards value based learning and as such they are putting more resources in intellectual capital (Juma & Payne, 2004). The need for intellectual capital is growing with the extension of the data, information, learning, and knowledge age (Guthri, 2001). The traditional capital as per theories of finance, that is, financial capital, labor, properties, physical resources and money are not considered liable alone to keep up the firm proficient and successful (Stahle & Hong, 2002). The analysts believe that impalpable resources are more critical in the value generation of the firm (Ahmadi et. al., 201). The present study is an attempt in that direction to empirically investigate the linkages between the studied variables to highlight the significance of the intellectual capital efficiency in enhancing the financial performance of the manufacturing sector of Pakistan.

Literature Review

The perception of scholarly capital was at first presented by Karl-Erik Sveiby in the mid- 1980s and further investigated by Edvinsson and Malone (1997), Sullivan (1998), Andriessen and Stam (2004), Bontis (2004), Edvinsson (2005), and Andriessen and Stam (2005). Bandyopadhyey and Bhartish (2005) showed their concern towards the significance for associations to comprehend their scholarly capital resources and ought to be overseen on top most priority, if the organizations want to win the competitive edge over its environment of competition. Process for formation of value is generally characterized by the main source known as Intellectual Capital. Regardless of industry, the competency of the companies is critically reflected by intellectual capital. Johnson and Kaplan (1987) explained that the most important factor for the performance of an organization could be intellectual capital. Consequently, intellectual capital has to improve by the executives of the firm. They have to learn about to improve this intangible competitive factor. They have to learn about how to improve this intangible competitive factor. They have to learn to improve their efficiency within the organization as well as in knowledge based economy.

The moving pattern from conventional economy to information based concentrated economy amid

the most recent two decades, have made the administration business to take a principle part in esteem creation procedure of the firm (Sofian et al., 2011). Besides, educated capital assumes a key part in the organizations general execution and turn into the fundamental wellspring of accomplishing aggressive edge over contenders (Sofian et al., 2011). Scholarly capital, subsequently have an awesome potential for upper hand and this upper hand prompt to enhance the execution of the firm (Moon & Kym, 2006). Competency theory of an organization is needed as per the argument of Reich (1990) that recognizes the “value of talented people” to the system of any organization.

The intellectual capital is vital for information sensitive organizations (Sveiby, 1997; Stewart, 2001). So the intellectual capitals are each one of those immaterial assets of the association which makes value for the association. Intellectual capital has three classifications human, inner structural and social capital (Clarke et al, 2010). The human capacities, abilities, demonstrable skill and so on refer to the Human Capital. The interior structure capital comprises of advancement created by the innovative work groups, approaches, and inner environment and so on (Guthrie & Petty, 2000). Intellectual capital comprises each one of those non-physical wellsprings of significant worth that are joined with the representatives capacities, association's assets and method for working and the associations with their partners (Lönnqvist, 2004).

Malik et al. (2012) studied the importance of intellectual capital and relationship with corporate performance's tri dimensional theory, while comparing the Islamic banking system and the conventional banking system. The study concocted the outcomes from every part of V.A.I.C, the relationship between the three resource bases advantage, productivity and market valuation are mixed. Therefore the latest argument of researchers shows that only through innovative ways of checking the behavior of intangible assets maximized output can be reached. Rehman et al. (2012) directed a study by taking the banking sector in Pakistan. Intellectual Capital has turned into a key hotspot for learning based economy. So it was a pioneer study to gauge the intellectual capital execution and its effect on budgetary execution. The study revealed that intellectual capital execution in government banks, private banks, business banks and Islamic banks are generally seen to human capital efficiency.

Rehman et al. (2011) conducted a study and took Mudarba companies of Pakistan as a sample. With the end goal of measuring the execution of Mudarba organizations, the study used VAIC™ in their study as a key methodology. The study predicted that the human capital efficiency is one of the vital segments for measuring the scholarly capital effectiveness which implies more prominent the venture infused on proficient workers; implies high human capital efficiency, which is likewise bolstered by experimental results that has a noteworthy connection with financial performance of

Mudarba organizations. The other two modules of value added intellectual capital were also found in direct relationship with financial performance of Mudarba companies. Ahangar (2011) utilized the VAIC™ to quantify the execution of scholarly capital and its impact on monetary returns of organizations of Iran. Human Capital Efficiency has positive and huge impact on money related profits of organizations while on the other hand, the relationship of auxiliary capital and physical utilized capital were not demonstrating noteworthy budgetary execution of organizations.

Khaliq (2011) endeavored to investigate the relationship between the performance of companies and the components of intellectual capital of companies of Pakistan with building three research hypotheses with dependent variable of organizational performance and independent variables of human capital, structural capital, and social capital. The outcomes demonstrated the direct association between parts of intellectual capital and hierarchical execution of managing a financial segment in Pakistan. The outcome additionally delineated that human capital element has more positive association with firm's performance when contrasted with structural capital efficiency and social capital components. Maditinos et al. (2011) took sample of ninety six listed companies of Athens stock exchange for the purpose to investigate empirically that how intellectual capital relates itself with the performance of these 96 listed companies. He argues that the relationship of human capital efficiency is higher than any other component of the intellectual capital and also human capital having the positive and direct relation with return on equity.

Aziz (2010) studied the effect of intellectual capital on pharmaceutical industry of Jordan and he found that it had positive and huge effect on execution of Jordan pharmaceutical industry. Notwithstanding, the study included that high investment done in human capital is more productive and returnable than basic capital and physically utilized capital. Zeghal and Maaloul (2010) demonstrated experiential results that VAIC™ has immediate, huge and positive connection with, stock monetary and financial execution of the organizations. He included that capital utilized effectiveness is the most vital determinant which plays in securities exchange and VAIC™ has just huge connection with market execution of cutting edge businesses. Joshi et al. (2010) led a study to gauge the scholarly capital execution through model of VAIC™. They contended that Australian banks have more positive and noteworthy relations with Human Capital Efficiency which implies that more interest in people will demonstrate in the long run, indicating more and abnormal state of productivity than Structural Capital Efficiency and Capital Employed Efficiency. Laing et al. (2010) examined the trial association of IC execution and budgetary execution of motel industry of Australia over the period of 2004-2007 driving VAIC™ theory. They contemplated that Intellectual Capital Efficiency relies on upon Human Capital Efficiency of cabin industry of Australia which distinctly stimulates cash related execution of motel industry.

Cabrita and Bontis (2008) investigated the intellectual capital performance of fifty three Portuguese banks using Structural Partial Least Square Model and examined that the ultimate thing which strengthens the performance of the banks is the human capital efficiency which significantly affect the structural capital and relational capital. Kamath (2008) made his research on top most twenty five pharmaceutical firms by using the method VAIC™ and reached to the result that human capital efficiency is more valuable than structured and capital employed efficiency to boost up the productivity and profitability of pharma industry and also Yalama and Coskun (2007) got same findings conducted on the profitability of the firms. He employed VAIC™ and DEA analysis for the period of 1995-2005 and came to the conclusion that intellectual capital IC has significant positive effect on firm's profitability.

Pew et al. (2007) worked on Singapore stock exchange by taking 150 listed companies concluded that intellectual capital has a positive, direct and significant relation with the firm's financial performance of the taken sample. Same results showed in a study (Mohiuddin, Najibullah, & Shahid, 2006) conducted on 17 commercial banks of Bangladesh by using the Pulic's VAIC™ model for the purpose of measuring intangible of the banks. They derived the results that commercial banks have direct and significant relationship with Human Capital Efficiency than Structural Capital Efficiency and Capital Employed Efficiency. Tan et al. (2007) conducted another study in which he presumed that Intellectual Capital execution has noteworthy connection with association's execution and its future execution by using the same VAIC™ model of Pulic. Kamath (2007) used VAIC™ methodology in his study for the purpose of finding the empirical relation while conducting the study to measure the intellectual performance of Indian banks. He mentioned that Human Capital Efficiency (HCE) lies much more in foreign banks than public banks. But the physical capital employed is found more in public banks than in foreign banks.

Ji-Jian et al. (2006) was guided the study to gage the IC execution and its impact on budgetary execution of 32 vehicles associations recorded in Shanghai Stock Exchange. The correct disclosures revealed that each one of the determinants of VAIC™ have substantive effect on cash related execution of 32 vehicles countries.

Mavridis and Kyrmizoglou (2005) studied Greek banking system from the period of 5 years from 1996-1999, discovered the experimental relation that human capital efficiency is more imperative than physical capital employed. Mavridis (2005) managed to conduct a study using model of Pulic, VAIC™ on 17 commercial banks and reached to the result that Physical employed capital and Value Added have positive and strong relation. Sofia (2005) contended that scholarly capital has immediate and positive connection with execution of money related firms and same results are

supported by Riahi-Belkoui (2003) who reasoned that scholarly capital has immediate and substantive effect on execution of US multinational corporate segment. Goo and Tseng (2005) took 500 Taiwanese companies by using VAIC™, argued the experimental connection of scholarly capital execution and its effect on money related execution. They investigated that IC has positive substantive impact on monetary execution.

Methodology

In the frame work of the present study there are two main variables, Intellectual capital and corporate performance. Where intellectual capital is independent variable and corporate performance is dependent variable. There is need to operationalize these two major concepts into the measurable form so that we can calculate the value of the intangible assets. The independent variable i.e. the intellectual capital is divided into three main components that are Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE). Corporate performance is further divided into four segments to calculate the firm's performance. These include Return on Equity (ROE), Return on Investment (ROI), Return on Assets (ROA) and Earnings per Share (EPS).

Hypothesis

Following hypothesizes are developed on the basis of findings of the literature review

H₁: Higher intellectual capital efficiency leads to higher return on assets in manufacturing companies

H₂: Higher intellectual capital efficiency leads to higher return on equity in manufacturing companies

H₃: Higher intellectual capital efficiency leads to higher earnings per share in manufacturing companies

H₄: Higher intellectual capital efficiency leads to higher return on investments in manufacturing companies

Population & Sampling

The study selected Textile and Cement sector of Pakistan to look into the linkages between intellectual capital and corporate performance. The population of the study comprised of 57 composite textile companies and 23 cement companies, listed on Pakistan Stock Exchange. 31 composite textile companies and 15 cement companies have been chosen for the study on the basis of availability of data for the period of study ranging from year 2011 to 2015.

Measurements of Variables

The Value Added Intellectual Coefficient (VAIC™) will be utilized as a part of this study as a fundamental strategy to gauge the intellectual capital which was presented by Pulic (1998). Question about the VAIC™ arises that how it calculate the intellectual capital or intangible assets. Public (1998) defined the criteria to measure these intangible assets by giving different formulae.

Value added Intellectual Co-Efficient VAIC™

$$VAIC^{TM} = H.C.E + S.C.E + C.E.E.$$

Where;

$$H.C.E = V.A / H.C$$

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$$S.C.E = S.C / V.A$$

$$C.E.E = V.A / C.E$$

$$V.A = R.E + D.D + T + E.C + D + A$$

$$= O.P + E.C + D + A$$

$$H.C = \text{Payroll costs}$$

$$R.E = \text{Retained Earnings}$$

$$D.D = \text{Dividends}$$

$$T = \text{Taxes}$$

$$E.C = \text{Total employees expenses viewed as investments}$$

$$D+A = \text{depreciation and amortization}$$

$$O.P = \text{Operating Profit}$$

$$S.C = V.A - H.C$$

$$C.E = \text{Book Value of firm's Net assets}$$

$$V.A, = \text{Value Added}$$

Econometric Model

Following econometric model is used to test the relationship between the studied variables

$$Y_{it} = \alpha + \sum_{i=1}^n \beta X_{it} + \mu_{it}$$

Y = Dependent Variable

X = Independent Variable

α = Intercept

β = Coefficient of Independent Variables

i for Firm,

t for time period.

μ = Error term

The applied econometric model is translated for the given study as:

$$ROA_{it} = \alpha_0 + \beta_{it} VAIC + \varepsilon_t$$

$$ROE_{it} = \alpha_0 + \beta_{it} VAIC + \varepsilon_t$$

$$ROI_{it} = \alpha_0 + \beta_{it} VAIC + \varepsilon_t$$

$$EPS_{it} = \alpha_0 + \beta_{it} VAIC + \varepsilon_t$$

Data Analysis

Results of descriptive statistics (Table 1) revealed that return on equity is having mean value of 4.6948. Its minimum value is negative i.e. -25.14, which implies that some of the organizations have negative results as for return on equity is concerned. The return with greatest value is 63.97%, it implies that highest value is demonstrating better results and financial specialists might be sure that their overall earnings are positive and further maximum earnings value is indicating better results. The standard deviation which measures the variation in the return on equity indicated the variation in the return of 11.97 percent, which demonstrates much variation in the return. Return on Asset mean value is demonstrating 1.3449 percent return and least return is in negative which is - 20.5 and most extreme profit is very nearly 32.4 with standard deviation of 6.8. This indicates that assets returns are quite volatile in these companies. Earnings per share mean value is 7.07 for every share with minimum earnings per share in negative value of - 82.54 and its maximum value is 64.720 and the variation in earning per share is 22.25. This also indicated the same trend of volatility in these companies as return on assets. Similar relationships were observed in return on investment demonstrating the mean return of 0.441 with minimum value -16.43, maximum value indicating 11.12 and standard deviation is around 6.82. One of the most critical variable which is utilized for the intellectual capital is the VAIC i.e. value added intellectual co- efficient; its mean value is demonstrating that the intellectual capital is just about four times of financial performance and its base value is demonstrating that - 19.87 which implies once in a while VAIC don't put any part in the financial performance of the organizations, then again its maximum value is 66.49 which lets us know that occasionally organizations utilizing nineteen times VAIC puts its part in financial

performance as an intangible and hidden resources of the non-financial organizations, and the variation in this factor is 7.8.

Table 1 - *Descriptive statistics*

	Mean	Std. deviation	Minimum	Maximum
ROE	4.6948	11.9741	-25.1400	63.9700
ROA	1.3449	6.8218	-20.5300	32.4300
EPS	7.0792	22.2592	-82.6400	64.7600
ROI	0.4496	6.8218	-16.4316	11.1266
VAIC	5.4520	7.8384	-19.8703	66.4915

Results of correlation matrix (Table 2) revealed the correlation among the studied variables ROI, ROA, ROE, EPS and VAIC of manufacturing companies of Pakistan. Return on Assets has a positive relationship with VAIC (intellectual capital) with magnitude 0.4125. Return on investments is positively corresponded with every one of the factors aside. Return on investments has positive association with intellectual capital VAIC with a value of 0.1054. Return on equity has positive relationship with intellectual capital VAIC which shows the value of 0.1353. Earnings per share have positive relationship with independent variable which shows the positive value of 0.3065.

Table 2 – *Correlation Matrix*

	ROA	ROI	ROE	EPS	VAIC
ROA	1.0000				
ROI	0.1738	1.0000			
ROE	0.2731	0.3475	1.0000		
EPS	0.4567	0.3382	0.5231	1.0000	
VAIC	0.4125	0.1054	0.1353	0.3065	1.0000

Fixed effect model results (Table 3) indicated that the independent variable is affecting the Return on assets. For example VAIC the proxy of intellectual capital has a positive coefficient with a value of 0.1482 and its P value is less than five percent. The overall model has good fit because its F statistics is significant. Durbin Watson value shows the autocorrelation problem which in this case showing closer to the value of 2, resulting no autocorrelation among the variables. The main independent variable which is the VAIC, measure of intellectual capital showing the significant value which is the main concern of this study.

Table 3 - *Intellectual Capital & Return on Assets*

ROA	Coefficient	Std. Error	t-statistics	P-value
Constant	-7.775963	12.63964	-0.615204	0.5392
VAIC	0.148212	0.054012	2.744056	0.0067
R-Square	0.6262	P-value for F	0.0000	
F statistics	6.1547	Durbin-Watson Stat.	1.8390	

Hausman test (Table 4) tells us that whether fixed effect should be used or random effect should be used for the purpose of reporting our result and considering for the conclusion of the study. The Hausman test is showing that fixed effect should be used in the study because P-value is less than .05.

Table 4 - *Hausman Test: Intellectual Capital & Return on Assets*

	Coefficients		Difference	
	Fixed Eff.	Random Eff.	Fe-Re	S.E
VAIC	0.148212	0.219606	0.000473	0.0010
P value			0.0037	

Fixed effect model results (Table 5) indicated that the intellectual capital has the positive coefficient which is 0.1155 and its P-value is additionally significant which implies that when VAIC will increase then return on equity will increment. The overall model has good fit because its F statistics is significant. Durbin Watson value shows the autocorrelation problem which in this case showing closer to the value of 2, resulting no autocorrelation among the variables. The main independent variable which is the VAIC, measure of intellectual capital showing the significant value.

Table 5 - *Intellectual Capital & Return on Equity*

ROE	Coefficient	Std. Error	t-statistics	P-value
Constant	-32.26013	21.94467	-1.470067	0.1433
VAIC	0.115507	0.093775	1.231749	0.0216
R-Square	0.6343	P-value for F	0.0000	
F statistics	6.3721	Durbin-Watson Stat.	1.5999	

Hausman test (Table 6) is demonstrating that fixed effect model ought to be utilized as a part of this study since P-Value is under .05 and conclusion ought to be composed by fixed effect model.

Table 6 - Hausman Test: Intellectual Capital & Return on Equity

	Coefficients		Difference	S.E
	Fixed Eff.	Random Eff.	Fe-Re	
VAIC	0.11	0.11	0.00	0.91
Pvalue			0.03	

Fixed effect model results (Table 7) indicated that independent variable is insignificantly affecting the Return on Investment. All the three controlled variables also showing insignificant results. Durbin Watson value showing no autocorrelation among the variables.

Table 7 - Intellectual Capital & Return on Investment

ROI	Coefficient	Std. Error	t-statistics	P-value
Constant	-9.25	7.82	-1.18	0.23
VAIC	0.05	0.03	1.49	0.13
R-Square	0.22	P-value for F	0.38	
F statistics	1.09	Durbin-Watson Stat.	1.97	

Hausman test (Table 8) is demonstrating that random effects should be used in this study since p value is greater than 0.05 and conclusion should be written according to the random effects model.

Table 8 - Hausman Test: Intellectual Capital & Return on Investment

	Coefficients		Difference	S.E
	Fixed Eff.	Random Eff.	Fe-Re	
VAIC	0.05	0.03	0.00	0.62
P value			0.09	

From the fixed effects results (Table 9) it is depicted that there is positive relationship between our main independent variable that is the intellectual capital and return on investments as a positive coefficient of 0.9104 is mentioned. That means when there is an increase in VAIC (intellectual capital) then the earning per share EPS also enhanced. In other words VAIC is directly proportional to the EPS. Earnings per share (EPS) also showing the significant P-Value. The overall model has good fit because its F statistics is significant. Durbin Watson value shows the autocorrelation problem which in this case showing closer to the value of 2, resulting no autocorrelation among the variables. The main independent variable which is the VAIC, measure of intellectual capital showing the significant value which is the main concern of this study. This model of fixed effect is appropriate for the study.

Table 9 - *Intellectual Capital & Earning per Share*

EPS	Coefficient	Std. Error	t-statistics	P-value
Constant	-74.73473	48.59096	-1.538038	0.1258
VAIC	0.910436	0.207640	4.384675	0.0000
R-Square	0.5123	P-value for F	0.0000	
F statistics	3.8592	Durbin-Watson Stat.	1.7414	

Hausman test (Table 10) tells that fixed effect should be used in this study since p value is less than .05 and conclusion should be written according to the fixed effects model.

Table 10 - *Hausman Test: Intellectual Capital & Earning per Share*

	Coefficients		Difference	S.E
	Fixed Eff.	Random Eff.	Fe-Re	
VAIC	0.910436	0.897628	0.008757	0.8911
P value			0.0413	

Conclusion

The main concern of the study was to analyze how and to what extent intellectual capital efficiency affects various parameters of corporate performance including return on assets, return on equity, earnings per share and return on investment. The study concluded that intellectual capital efficiency behaves differently and with different magnitude with various measures of corporate financial performance of manufacturing companies of Pakistan. Intellectual capital was found to have significant positive relationship with return on assets, return on equity and earnings per share whereas insignificant positive relationship was observed between intellectual capital and return on investment. This indicated that intellectual capital adds more value to the equity owners rather than all funds' suppliers including financiers. There is a need to look further into it that what factors are actually causing insignificant relationship between return on investment and intellectual capital. To improve the results of this study and to add to the generalizability of the study there is a need to increase the sample size and add control variables in the study including firms' specific factors like firms' age, firms' growth rate, macroeconomic factors, corporate governance, government role and policies etc.

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