

Research article

Impact of Intellectual Capital on Financial Performance

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ABSTRACT

Intellectual capital has been recognized as an important tool for firms to take a competitive advantage. This study has taken intellectual capital and its effects on the returns from equity and assets. For this sake, the data from the audited financial statements of twenty five companies, listed on the Karachi Stock Exchange, for the period 2007-2012 is taken. The Pulic (1998) VAIC model and regression technique is used to analyze results. The results show that the Value Added Intellectual Capital (VAIC) has a positive and significant relationship with ROA and ROE. As for the components of VAIC, i.e. Human Capital, Structural Capital and Capital Employed, the Value Added Human Capital (VAHC) has a positive and significant relationship with ROE and ROA. This study implies the importance of human capital on the value addition of the companies.

Keywords: Value Added Intellectual Capital (VAIC), Human Capital, Structural Capital, Capital Employed, Financial Performance, Return of Assets (ROA) & Return on Equity (ROE).

Introduction

When an organization comes to the formation, first of all it needs to be financially stable to meet all threatens of the external environment. In industrial sector, the main thing which is always the point of discussion for every well known organization is its financial performance. Because, in our country now-a-days, the condition of business is not as good as it should be, so to maintain the financial sustainability the intellectual capital has been accepted as an important factor for achieving the corporate advantages. There are many studies marking the impact of intellectual capital on the profitability of the companies.

Roos and Roos (1997) described the two types of studies for intellectual capital one regarding management and other regarding measurement of intellectual capital. The study about management focused on the management of company's intangible assets, stock of knowledge, and capabilities which renovate value and competitive advantage. On the other hand the study about measurement focused on

how to measure the firm's intangible assets by gathering, analyzing and evaluating nonfinancial information. Burgman, Roos, Ballow, and Thomas (2005) elaborated intellectual capital, as an asset which represent all the stocks no matters with the creation of firm or value of firm, which were not represented on its conventional balance sheet as financial or physical assets. Intellectual capital might be used as intangible asset, as a source of prolonged competitive advantage of an enterprise (Cabrita and Vaz, 2006). An ex-editor of the business magazine "Fortune", Thomas Stewart describes intellectual capital as "something that cannot be touched, although, it slowly makes you rich". According to Fincham and Roselender (2003) there are many arguments based on nature of intellectual capital. They are intangible in nature and also don't have financial value so, they are characterized as hidden assets and it is difficult to identify their contribution and quantify in financial statements. Huang and Hsueh (2007) studied on intellectual capital in consulting firms that signify intellectual capital to knowledge and capabilities of every employee that brings about performance and creates wealth for the enterprises. Roos et al. (2001) defined intellectual capital into three components i.e. human capital, structural capital & capital employed.

Amiri et al. (2010) signified intellectual capital as a lubricant for an organization. Bontis, Kew and Richardson (2000) and Roos and Roos (1997) elaborated that intellectual capital comprised of human and structural capital. Skandia a Swedish firm in its first Intellectual Capital Annual Report described intellectual capital as knowledge possession, applied experience, organization's technology, customer's relation, and professional skill (Edvinsson, 1997, p. 368). Cuganesan (2006); Kim & Kumar (2009); Mouritsen, Larsen, & Bukh (2005) have characterized intellectual capital into three categories: structural capital, relational capital and human capital. Human capital is defined as measure of economic value of employee's skills asset. This concept explains that all labor is not equal but it can be improved by investing in them. Bontis (1998) stated that human capital is heart of intellectual capital. Fitzenz (2000) stated that human capital consists of talent and skills of organization. It is a major source of value addition and is based on knowledge, experience and intellectual agility of employees. Hudson (1993) argued that organizational performance is a mixture of genetics, heritage, experience and education. Human capital is a primary element of intellectual capital which plays an important role in company's growth (Nonanka & Takeuchi, 1995).

Structural capital is defined as intelligence, information system, policies and processes etc. Wu and Tsai (2009) stated that structural capital represents all non-human activities that include databases,

organizational charts and policies. Cohen and Kaimenakis (2007) stated that the companies don't own their human capital while structural capital belongs to organization as a whole. According to Joshi et al (2010) structural capital is knowledge that is created by organization. Bontis (1998) argued that if an organization has poor intellectual capital, then it will be difficult for it to fully utilize its resources. Structural capital effects firm's performance (Hsu, 2006). Capital employed is defined as the total amount of capital used for the acquisition of business. Shaari et al. (2010) explained that capital employed mainly depends upon relationship of capital and organization. Capital employed is an important component of intellectual capital (Bontis, 1998). According to Tornatzky & Fleischer (1990) product and processes have different relations with performance. Products and processes positively effects performance (Damanpour et al., 1989).

Financial performance is defined as a measuring of firm's utilization of resources. According to Chen et al. (2005) performance measurement tools can be helpful in evaluating resource allocation. On the other hand Hsu & Wang (2010) argued that performance measures have been based around financial aspects in order to enhance firm's performance. According to Waddock & Graves (1997) return on equity and return on assets are used separately to measure firm's performance. The portion of income that is returned to the shareholder's equity is known as return on equity, it is also known as the sign of profitability to know that how much profit have been earned through shareholder's investments. Most of the studies are conducted on the banking sectors in different countries like a study conducted by Appuhami (2007) on Thai banking, finance and insurance sectors. The study can be conducted on developing countries and also on manufacturing sectors rather than banking and finance sector. Rehman, Rehman, Usman and Asghar (2012) conducted a study on link of intellectual capital and financial performance in banking sector of Pakistan. The study was conducted on the banking sector of Pakistan for the period of 2010. There were some gaps like the results could be more accurate in case of increasing in number of observations along with the duration of the study. Bollen, Vergauwen, & Schnieders (2005) studied on link of intellectual capital and intellectual property with financial performance. The data was collected from German Pharmaceutical industry. The main issue is that the impact can be analyzed on two or more different sectors. And another issue is that there was insufficient data for the analysis of results, only 41 observations were taken while it can be analyzed by increasing the number of observations. Muhammad and Ismail (2009) studied effects of intellectual capital and firm performance on Malaysian financial sector. The data was taken from 18 companies of financial sector for the period 2007. Analyzing the whole sector on the basis of only 18 companies is

unfair in a way that the whole sector cannot be analyzed on the basis of only 18 companies. Because the financial performance is the focal point of every business organization, hence the present study is pivoted around the impact of intellectual capital in the value addition of organization “What is the impact of intellectual capital on the financial performance of an organization?”

The objectives of the study are to study the extent of the impact of three forms of capital (employed, structural and human) on the financial performance of an organization, to analyze the relationship between different forms of capital and to study the role of the three forms of capital on the value addition of the firm. This study is conducted to analyze the effect of intellectual capital on the financial performance of an organization. Two proxies of performance that is the Return on Equity and Return on Assets are taken to mark for the financial performance. These are commonly used performance indicators in the corporate sector signifying the value added by the employed resources. The sample derived from the manufacturing companies, except for the service sector, listed on the Karachi Stock Exchange is being taken for analysis in this study. As for further studies, the analysis can be made on the service sector to study the impact of intellectual capital on the profitability of the organizations of the respective sector. Also, study can be conducted comparing the financial and non-financial sectors to analyze which form of capital (whether capital employed, structural or human) has more significant impact on the financial performance.

Literature Review

Intellectual capital considers as one of the building block for the financial performance of an organization (Johnson and Kaplan, 1987). Economic performance of any entity depended upon the intellectual capital. A positive correlation was found between the intellectual potential and the economic performance of enterprises (Bornemann, 1999). Chen et al. (2005) studied that market value; current as well as future performance of a firm was positively impacted by both of the intellectual capital and capital employed. Results revealed that the investors positioned high market value of firms with higher intellectual capital, and placed it more competitive as compared to other firms. Tan et al. (2007) also supported these findings by conducting a study in Singapore, he gathered data from one hundred and fifty (150) publicly traded companies, and found positive association between the intellectual capital and current as well as future performance of the firms. They further explored that intellectual capital contribution toward the performance of the company differs in

accordance with industry. From the previous studies a strong positive relationship was found between the intellectual capital and the performance of business (Barney, 1991; Bontis, 1998; and Pulic, 2000b). The researcher Riahi-Belkaoui (2003) found a positive relationship between these two variables i.e. intellectual capital as well as financial performance by focusing on the multinational companies of USA. Makki, Lodhi & Rahman (2008) conducted a study on different sectors of Lahore Stock Exchange-25 of Pakistan. Top 25 listed companies are selected and the data for the period 2002-07 was used. Results revealed that top performing sectors include Oil & Gas, Cement and Chemical; Banking sector found as average performer and least performance found in public sector companies.

Nogueira, Aguiar, Kimura, and Cruz Basso (2010) examined the relationship of intellectual capital and financial performance in Brazil industries and concluded that there is a positive and significant relationship of performance and intellectual capital. Firer and Williams (2003) failed to find strong association between intellectual capital and profitability of South African companies. A study conducted on Australian publically listed companies by Clarke, Seng and Whiting (2010) revealed a direct relationship between intellectual capital and company's performance, predominantly with capital employed efficiency and to a slighter extent with human capital efficiency. According to Goh (2005) a significant difference established among intellectual capital and the performance of the Malaysian banks and the same results were found by the Kamath (2007) for Indian banks. A study conducted in United State of America to measure the relationship between the intellectual capital and multi-national companies' performance. The results revealed that intellectual capital and the financial performance of these companies are positively associated (Riahi-Belkaoui, 2003). Cheng (2010) highlighted that intellectual capital has positive and significant effect on firm's performance. The significance relationship found between VAIC and firm's performance (Chan, 2009a, 2009b; Shiu, 2006a, 2006b; Firer & Williams, 2003 and Saudah Sofia, 2005).

Another study carried out by Bannany (2008) revealed a significant impact of investment in intellectual capital on the performance of banking sector of UK. Kamal, Mat, Rahim, Husin & Ismail (2011) conducted study on 18 listed commercial banks in Malaysia for the years 2004 to 2008. Researcher found significant relationship between intellectual capital variables namely VACA, VAHU and bank performance. Muhammad and Ismail (2009) also conducted a research on Malaysian financial sectors. Annual reports for the year 2007 of 18 banks, brokerage firm and insurance companies were selected to analyze intellectual capital (IC) and financial sector performance. The study highlighted that banking sector of Malaysia more relied on the IC followed by Brokerage firms and insurance companies. They

also explored a positive and significant relationship between the intellectual capital and company's performance. An insignificant and negative relationship was found between human capital and ROA as well as structure capital & ROA. However, Capital employed efficiencies is significantly and positively related with ROA. Dadashinasab, Sofian, Asgari and Abbasi (2012) studied empirical relationship between the value creation efficiency (VEC) and financial performance of the firms from automotive industry along with spare parts sector, listed in Tehran Stock Exchange (TSE). The results demonstrated a positive impact of IC on financial performance of the firms in addition to its components which have a positive and significant influence on Return on Asset (ROA), Return on Equity and Growth Revenues. An empirical relationship was established between the intellectual capital and financial performance. They argued that Valued Added Intellectual Coefficient (VAIC) significantly and positively related with financial performance (ROA) of the sector. They further added that human capital efficiency (HCE) and capital employed efficiency (CEE) have significantly associated with return on assets (ROA) while structural capital efficiency (SCE) has no association with return on assets (ROA) (Ting and Lean, 2009).

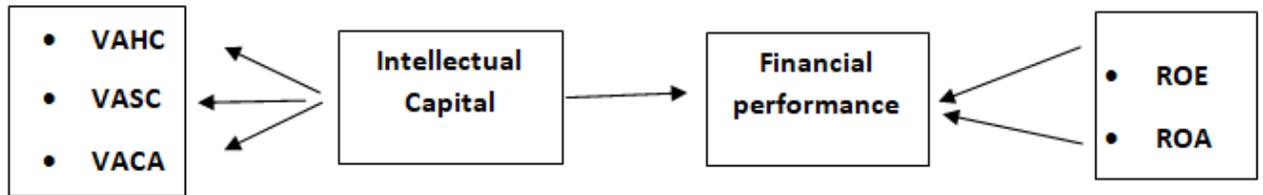
Appuhami (2007) explored significant and positive relationship between VAIC and financial performance of Thailand's listed companies. Ling (2011) carried out a study to explore firm's global performance from the perspective of an intellectual capital. Purposive sampling was used to collect data from the top 1,000 companies of Taiwan. Out of which only 146 valid questionnaires were used for analysis. The outcome showed a positive association between intellectual capital and firm's global performance and a moderating effect of knowledge management strategy on this relationship. Evidence also presented that physical as well as financial and structural capital found the most significant and fundamental drivers for corporate performance. Human capital although insignificant, participated positively and consistently in revenue growth (Razafindrambinina and Anggreni, 2011). Rehman, Rehman, Rehman and Zahid (2011) conducted a study on the Modarba companies in Pakistan. The empirical results highlighted that HCE and financial performance has significant relationship at ($P < 0.1$), SCE also has significant relationship with ROE at ($P < 0.1$) and with EPS at ($P < 0.05$). While at ($P < 0.1$) CEE has significant impact on EPS and at ($P < 0.05$) CEE found significantly related with ROE and ROI. Another study conducted by Rehman et al. (2012) on the banking sector of Pakistan for the year 2010 to determine the impact of intellectual capital on banks' performance. The empirical results showed that HCE, SCE and performance (ROE & ROA) has a positive relationship.

Khan (2012) studied the impact of intellectual capital on the banks' financial performance in Pakistan. The financial statements of 5 banks from 2007-10 were used. Results revealed that financial performance significantly impacted by the intellectual capital as well as its components i.e. HR, SC and relationship with Stakeholders. Kehelwalatenna and Gunaratne (2010) highlighted the empirical relationship among the intellectual capital, firm's performance and investor's responses thereof. The data was taken from the listed firms of both the services as well as manufacturing sectors in Sri Lanka for the period 2002-06. Results revealed a positive association between intellectual capital and firm's performance and a positive association between intellectual capital and costumers responses. Uadiale & Uwuigbe (2011) conducted research on intellectual performance and financial performance in Nigeria. Sample of thirty-two audited financial statements of Nigerian quoted companies was taken. The results showed that Intellectual Capital has a positive and significant relationship with the performance of business organizations in Nigeria.

The literature about the impact of intellectual capital on the financial performance proves that there is a positive relationship between VAIC (value added intellectual capital) and the financial performance of both financial and non-financial organizations. In most of the studies Pulic's (1998) model is used to calculate the value added intellectual coefficient and the performance is measured through the ROE and ROA ratios. Literature also explored that value added intellectual capital has three components i.e. VACA, VAHC and VASC. In most of the studies a positive and significant relationship is found between components of value added intellectual capital (structural capital, human capital & capital employed) and the performance indicator ROE as well as ROA. However, some of the studies contradict with these results. Now, the present study also tried to find out the relationship between these variables and their impact on the financial performance of Pakistani companies listed on Karachi Stock Exchange.

Proposed Research Model

On the basis of literature review the research model of present study is as follow:



VAHC (human capital efficiency) VASC (structural capital efficiency) & VACA (capital employed efficiency) are the components of intellectual capital and ROE (return on equity) and ROA (return on assets) are the performance indicators.

Hypotheses Statements

On the basis of literature review it has been observed that there is a positive relationship between the intellectual capital along with its components and financial performance of companies. So, present study also assumed that a positive relationship exists between these variables and on the basis of our assumption the present study test the following hypothesis:

- H1:** *VACA is positively related with performance indicator ROE.*
- H2:** *VAHC is positively related with performance indicator ROE.*
- H3:** *VASC is positively related with performance indicator ROE.*
- H4:** *VAIC is positively related with performance indicator ROE.*
- H5:** *VACA is positively related with performance indicator ROA.*
- H6:** *VAHC is positively related with performance indicator ROA.*
- H7:** *VASC is positively related with performance indicator ROA.*
- H8:** *VAIC is positively related with performance indicator ROA.*

Methodology

Various approaches and techniques which were followed in previous studies to evaluate the impact of intellectual capital on the financial performance of organizations are as under. Makki et al. (2008) conducted a study on intellectual capital performance of Pakistani listed corporate sectors. The study measured and evaluated the intellectual capital performance of Lahore Stock Exchange index companies (LSE-25). Pulic (1998) approach of the Value Added Intellectual Coefficient (VAIC) was

used to calculate VAIC and regression method to analyze the profitability. Kamal et al. (2011) conducted a research to measure Intellectual Capital and firm performance of commercial banks of Malaysia. The data from 2004-2008 was collected from the sample of 18 commercial banks. The data was collected as pool data and was arranged in a time series dimension. The methodology used in the study was correlation analysis and regression analysis. Muhammad and Ismail (2009) conducted research on intellectual capital and firm performance of Malaysian financial sector. The value added Intellectual coefficient (VAIC) introduced by Pulic (1998) was used to measure the intellectual capital efficiency in the study. Multiple regression analysis was used to investigate the relationships between intellectual capital (measured by human capital efficiency, structural capital efficiency and capital employed) and firm's performance. Clarke et al. (2010) conducted study to examine the effect of intellectual capital on firm performance using a sample of Australian companies listed between 2004 and 2008. IC is measured using Pulic's (1998) Value Added Intellectual Coefficient (VAIC). Uadiale & Uwuigbe (2011) conducted research on intellectual performance and financial performance in Nigeria. The study employed value added intellectual coefficient methodology. The study examined the impact of IC components on business performance measured with Return on Equity (ROE) and Return on Assets (ROA). Appuhami (2007) conducted research on listed companies in Thailand's stock market. Pulic's (1998) Value Added Intellectual Coefficient (VAIC) was used as the measure of Intellectual Capital and developed multiple regression model was also used to find out the impact. Gan and Saleh (2008) measured the intellectual capital performance and financial performance of Malaysian technological intensive industry. VAIC model was used to calculate the intellectual capital performance.

Pandey (2001) conducted a cross sectional study on financial performance of the companies in Malaysia. From the results of selected sample of companies it revealed that not all companies have experienced goal for profit maximization, before deduction of income tax, was absolutely correlated with accounting based ratio. These pinpoint ratios include Return on Assets (ROA) & Return on Equity (ROE). One more study by Pandya and Rao (1998) showed that to estimate the performance of enterprises the management researchers would prefer to apply different accounting ratios. Out of which ROA and ROE are the most common ratios. Mahoney & Roberts (2002) and Waddock & Graves (1997) have followed the two accounting ratio which are ROA and ROE separately to measure the financial performance of the firms. Bontis et al. (2000) conducted research on intellectual capital and business performance of Malaysian industries. The data was taken from 107 respondents of Malaysia.

Cronbach's Alpha test was used to find out the results. Rehman et al. (2012) conducted research on a link of intellectual capital performance and its impact on financial performance of banking sector of Pakistan for the year 2010. The results were taken by the value added intellectual coefficients and the impact of performance was analyzed by predictive analysis.

Tan et al. (2007) conducted a research to investigate the association between intellectual capital and financial performance. The data was collected from 150 listed companies of Singapore exchange. The study used the method of Partial Least Squares for data analysis. Maditinos et al. (2011) conducted a study on impact of intellectual capital on financial performance. The data was collected from a panel of 96 Greek companies listed on Athens stock exchange (ASE). Regression models were used to analyze the results. Alipour (2012) conducted study on effect of Intellectual Capital on financial performance. The data was collected from 39 insurance companies of Iran for the period 2005-07. Partial least squares method was used to analyze the results through ROA ratio. Ahangar (2011) also conducted study on the relationship of intellectual capital and performance of an Iranian company. Value added coefficient technique was used to measure the intellectual capital i.e. structural capital, human capital and physical capital of the company and their impact on corporate performance which was measured using multiple regression technique. Kehelwalatenna and Gunaratne (2010) studied on impact of Intellectual Capital and financial performance. The Pulic's value added coefficient method, the Pearson's correlation analysis and regression models are used to analyze results.

For the analysis of present research the Pulic (1998) Value Added Intellectual Coefficient (VAIC) model is discussed. Moreover, different statistical techniques / methods, used in earlier studies, the most relative and repeated techniques i.e. regression has been selected and reviewed for the analysis of this study.

Data Collection & Sample Analysis

For present study six years data from 2007-2012 is collected from the audited annual reports of the companies listed on Karachi Stock Exchange. The sample of the study is based on the manufacturing industries listed on Karachi Stock Exchange. The data consists of 25 companies from manufacturing industry.

Statistics

In the present study, the variables are

Dependent Variable

The dependent variable of the study is performance which is measured through its two indicators i.e. ROE (return on Equity) & ROA (Return on Assets)

These variables are calculated as:

Return on Equity = Earnings before Tax/ Equity

Return on Assets = Earnings before Tax/ Total Assets

Independent Variable

The independent variable consists of Value added Intellectual Capital which consists of three components i.e. structural Capital, Human Capital and Capital employed.

Techniques

On the basis of literature review the method which is selected to analyze the result of present study is value added Intellectual coefficient to find out the VAIC and to study the relationship of intellectual capital and performance regression analysis was used to analyze the results. In order to calculate VAIC, first of all the firm value for the value addition was calculated. Value addition is basically the difference between input and output. Whereas output represents the value of net sales and input represents all the expenses. Value addition is mainly defined as value created by firm. Value added is calculated as:

$$\text{VALUE ADDITION} = \text{DP} + \text{W} + \text{I} + \text{D} + \text{T} + \text{R}$$

Whereas

DP: Depreciation calculated for the year.

W: Salaries and Benefits.

I: Interest.

D: Dividend paid

T: Taxes paid

R: Retained Earnings.

Human Capital Efficiency (HCE)

Human Capital Efficiency consists of knowledge, experience, productivity and employees. In VAIC model, HC is defined as salaries and wages. Human Capital Efficiency shows the value of firm in terms of dollars on Human Capital Efficiency is calculated as:

$$HCE=VA/HC$$

And Human capital is calculated as: Investment in Human Capital is calculated in terms of salaries and wages at the end of period “t”.

Structural Capital Efficiency (SCE)

Structural capital (SC) consists of strategy, organizational networks and patents. Structural capital is calculated as:

$$SC=VA-HC$$

Whereas Structural Capital Efficiency is calculated as:

$$SCE= SC/VA$$

Capital Employed Efficiency (CEE)

Intellectual Capital cannot create value on its own so, it is combined with Capital (physical and financial). So, Capital Employed (CE) is calculated as

$$CE = Total Assets- Intangible Assets$$

And Capital Employed Efficiency (CEE) is calculated as:

$$CEE=VA/CE$$

CEE shows how much value of firm is created in terms of dollars spent on Capital Employed.

Value Added Intellectual Coefficient (VAIC)

Finally Value Added Intellectual Coefficient is calculated as

$$VAIC= HCE+SCE+CEE$$

The firm uses these three components i.e. Human Capital, Structural Capital and Capital employed for value addition. If value of these components would be high, the more value will be added to the firm and VAIC would also be greater.

Results and Discussion

Efforts have been made in this section to present the evident and concise results which are been supported by proper presentation of the tables. Detailed discussion has been made on results in accordance with the research topic and its objectives. The core objective of present study is to analyze the relationship between different forms of capital (structural, human and employed) and financial

performance characterized by the Return on Equity and Return on Assets. The relationship between these variables is analyzed through regression analysis. The results are summarized below:

In this study, the effect of intellectual capital on the financial performance, characterized by the Return on Equity and Return on Assets, has been analyzed on the basis of data collected from the financial statements of the represented companies. The three forms of capital, namely capital employed, human and structural, and their role in the financial performance of the sampled companies listed on the Karachi Stock Exchange have been analyzed through using regression technique which is presented in tabulated form.

Regression Analysis

The summarization of regression analysis from ROE perspective is represented in Table-4.1. Based on Table-4.1, the R-square for ROE is 43.130 percent. R-Square depicts the fitness of model. It signifies that 43.130 percent of the total variations are explained by the change of VACA, VAHC & VASC. So any change in VACA, VAHC and VASC will result an effect on the ROE R-square. Results revealed that the overall model is significant as ($p < 0.05$) which present a significant association among ROE and VACA, VAHC & VASC. The F-statistic value for ROE is 7.294. It shows the strength on the reliability and effectiveness of the data.

Table 4.1: Regression coefficients, standard errors in parentheses, t-values in brackets and p-values in italic

DV	Constant	VACA	VAHC	VASC	R-Square	F-Statistics
	19.355	2.060	0.648	-5.520	43.130	7.294
	(4.059)	(3.144)	(0.195)	(1.817)		
ROE	[4.769]	[0.655]	[3.328]	[-3.037]		
	<i>0.000</i>	<i>0.513</i>	<i>0.001</i>	<i>0.003</i>		<i>0.000</i>

(ROE: Return on Equity, VACA: Value Added Capital Employed, VAHC: Value Added Human Capital, VASC: Value Added Structural Capital)

On the basis of individual variable evaluation, the results highlighted a significant ($p < 0.05$) and positive relationship between VAHC and ROE. So the results validate study hypothesis (H2) i.e.

VAHC is positively related with performance indicator ROE. On the other hand there is a significant ($p < 0.05$) but negative relationship found between VASC and ROE. So the results do not validate study hypothesis (H3) i.e. VASC is positively related with performance indicator ROE. However, the variable VACA does not give a significant impact towards ROE since the p-value is greater than 5% level of significance. The results also does not validate study hypothesis (H1) i.e. VACA is positively related with performance indicator ROE.

The overall summarization of Table-4.1 at 5% of significance revealed that 1 unit increase in VAHC will result 0.648 units increase in ROE while holding all other variables constant. It emerged a positive relationship between VAHC and financial performance (ROE). On the other hand, VASC is more independent variable in our study that has co-efficient for regression -5.52 showing an inverse relationship with ROE. It means that 1 unit increase in VASC will result 5.520 units decrease in ROE while holding all other variables constant. The results do not validate the hypothesis with only VAHU being significant and having a positive impact on the ROE.

Table 4.2: Regression coefficients, standard errors in parentheses, t-values in brackets and p-values in italic

DV	Constant	VACA	VAHC	VASC	R-Square	F-Statistics
	7.330 (2.597)	2.008 (2.011)	0.708 (0.124)	-0.593 (1.163)	51.194	11.740
ROA	[2.823]	[0.999]	[5.689]	[-.510]		
	<i>0.005</i>	<i>0.320</i>	<i>0.000</i>	<i>0.611</i>		<i>0.000</i>

(ROA: Return on Assets, VACA: Value Added Capital Employed, VAHC: Value Added Human Capital, VASC: Value Added Structural Capital)

The summarization of regression analysis from ROA perspective is represented in Table-4.2. Based on Table-4.2, the R-square for ROA is 51.194 percent. R-Square depicts the fitness of model. It signifies that 51.194 percent of the total variations are explained by the change of VACA, VAHC & VASC. So any change in VACA, VAHC and VASC will result an effect on the ROA R-square. Results revealed that the overall model is significant as ($p < 0.05$) which present a significant association among ROA and VACA, VAHC & VASC. The F-statistic value for ROA is 11.740. It shows the strength on the reliability and effectiveness of the data. On the basis of individual variable evaluation, the results highlighted a significant ($p < 0.05$) and positive relationship between VAHC and ROA. So the results

validate study hypothesis (H6) i.e. VAHC is positively related with performance indicator ROA. On the other, the variables VACA and VASC do not give a significant impact towards ROA since the p-value of both the variables are greater than 5% level of significance. So the results do not validate study hypothesis (H5) i.e. VACA is positively related with performance indicator ROA and (H7) i.e. VASC is positively related with performance indicator ROA.

The overall summarization of Table-4.2 at 5% level of significance revealed that 1 unit increase in VAHC will result 0.708 units increase in ROA while holding all other variables constant. It emerged a positive relationship between VAHC and financial performance ROA.

Table 4.3: Regression coefficients, standard errors in parentheses, t-values in brackets and p-values in italic

DV	Constant	VAIC	R-Square	F-Statistics
	14.789	0.609	67.061	9.551
	(3.600)	(0.197)		
ROE	[4.109]	[3.090]		
	<i>0.000</i>	<i>0.002</i>		<i>0.002</i>

(ROE: Return on Equity, VAICA: Value Added Intellectual Capital)

The summarization of regression analysis from ROE perspective is represented in Table-4.3. Based on Table-4.3, the R-square for ROE is 67.061 percent. R-Square depicts the fitness of model. It signifies that 67.061 percent of the total variations are explained by the change of VAIC. So any change in VAIC will result an effect on the ROE R-square. Results revealed that the overall model is significant as ($p < 0.05$) which present a significant association between VAIC & ROE. The F-statistic value for ROE is 9.551. It shows the strength on the reliability and effectiveness of the data. The results highlighted a significant ($p < 0.05$) and positive relationship between VAIC and ROE. The results validate study hypothesis (H4) i.e. VAIC is positively related with performance indicator ROE.

The overall summarization of Table-4.3 at 5% level of significance revealed that 1 unit increase in VAIC will result 0.609 unit increases in ROE while holding all other variables constant. It emerged a positive relationship between VAIC and financial performance (ROE). The results validate the hypothesis with VAIC having a positive impact on the ROE. The summarization of regression analysis from ROA perspective is represented in Table-4.4. Based on Table-4.4, the R-square for ROA is

49.189 percent. R-Square depicts the fitness of model. It signifies that 49.189 percent of the total variations are explained by the change of VAIC. So any change in VAIC will result an effect on the ROA R-square. Results revealed that the overall model is significant as ($p < 0.05$) which present a significant association between VAIC and ROA. The F-statistic value for ROA is 34.473. It shows the strength on the reliability and effectiveness of the data.

Table 4.4: Regression coefficients, standard errors in parentheses, t-values in brackets and p-values in italic

DV	Constant	VAIC	R-Square	F-Statistics
	6.793	0.715	49.189	34.473
	(2.223)	(0.122)		
ROA	[3.056]	[5.871]		
	<i>0.003</i>	<i>0.000</i>		<i>0.000</i>

(ROA: Return on Assets, VAICA: Value Added Intellectual Capital)

The results highlighted a significant ($p < 0.05$) and positive relationship between VAIC and ROA. The results validate study hypothesis (H8) i.e. VAIC is positively related with performance indicator ROA. The overall summarization of Table-4.4 at 5% level of significance revealed that 1 unit increase in VAIC will result 0.715 unit increases in ROA while holding all other variables constant. It emerged a positive relationship between VAIC and financial performance (ROA). The results validate the hypothesis with VAIC having a positive impact on the ROA. Standard error measures the accuracy concerning to sample data. The standard errors of ROA & VAIC are 2.223 & 0.122 respectively.

Discussions

The purpose of this study is to investigate the efficiency of the three components of intellectual capital in the financial sector, capital employed, structural and human and its relationship with the financial performance of the companies. The study was conducted using the data from the financial statements of listed companies on Karachi Stock Exchange. The method of analysis adopted is the one given by Pulic (1998, 2000, and 2001). The results of the study of impact of intellectual capital on the company's performance are in conformity with the results of the studies conducted by Muhammad and

Ismail (2009); Udiale and Uwigbe (2011); Kamal et al. (2011) and Ahangar (2011). The results are consistent with the findings of Muhammad and Ismail, 2009 who worked on the same relationship on the financial sector of Malaysia. They worked on 18 companies from the financial sector and found out positive and significant relationship between profitability and ROA. Their study revealed that there is negative relationship of structural capital with ROA which is consistent with the findings of this study. However, their study showed a negative relationship of human capital with the profitability and ROA. Here it differs with our study which shows a positive relationship of human capital with ROA and ROE. The results are also in line with the findings of Kamal et al., (2011) who worked on commercial banks in Malaysia (with 10 local banks and 8 foreign banks). Their study revealed a positive and significant relationship of intellectual capital with the performance proxies, ROE and ROA. Their study revealed that there is a significant impact of VACA and VAHC on the ROA and ROE. However, there is no significant impact of VASC towards ROE and ROA.

The results of the analysis show that human capital has a more significant impact on the financial performance as measured by ROE and ROA. This factor to be given a potential emphasis to increase the returns on equity and assets. The other components of intellectual capital, i-e, structural and capital employed do not have a significant impact on the performance of the companies taken as a sample in this study.

Conclusion

The present study describes the relationship of intellectual capital and financial performance. And this study was conducted to extend the efforts of previous researchers to measure the relationship of components of value added intellectual capital and its impact on financial performance of an organization. By using the “Value added intellectual co-efficient” an attempt was made to empirically analyze the value addition as an indicator of intellectual capital and to measure the impact of intellectual capital on company’s performance.

In order to measure this relationship, following hypothesis were tested:

- **H1:** VACA is positively related with performance indicator ROE.
- **H2:** VAHC is positively related with performance indicator ROE.
- **H3:** VASC is positively related with performance indicator ROE.
- **H4:** VAIC is positively related with performance indicator ROE.

- **H5:** VACA is positively related with performance indicator ROA.
- **H6:** VAHC is positively related with performance indicator ROA.
- **H7:** VASC is positively related with performance indicator ROA.
- **H8:** VAIC is positively related with performance indicator ROA.

By using the data of companies from manufacturing industries listed on Karachi stock exchange during 2007-2012, above hypothesis were analyzed and results were concluded that one of the component of VAIC named VAHC has significant and positive relationship with both the performance indicators i.e. ROE (return on equity) and ROA (Return on assets). While VASC has significant and negative relationship with the performance indicator ROE and it has negative and insignificant relationship with ROA and VACA has negative and insignificant relation with both the performance indicators i.e. ROE and ROA. But, when the VAIC was tested with both constants, it resulted that it has significant and positive relation with both ROE (Return on equity) and ROA (Return on assets). The results of the present study are same as of previous studies like Goh (2005) conducted a study on the relationship of intellectual capital and performance of commercial banks of Malaysia for the period 2001-2003. He found that there is a significant relationship between intellectual capital and performance and he also concluded that VAHC has more significant relationship with performance than VACA and VASC. Another study was conducted by Appuhami (2007) who measured the company's performance with the components of intellectual capital; he found that VAIC has significant and positive relation with performance. Whereas in case of its components, both VAHC and VASC has significant and positive relation while VACA has negative and significant relation with performance.

There are many factors which are effective in financial performance of organization and one of them was studied in the present study i.e. intellectual capital and its components. In the present study it was analyzed that how much performance of an organization depends upon the intellectual capital. Three of its components were also analyzed which are human capital, structural capital and capital employed. And these were measured in relation to performance indicator Return on equity and Return on assets. Through the analysis of data and its results, it can be said that many factors are involved in the performance of an organization and every factor contributes in performance in its proportion. In some sectors or industries performance mostly depend on financial factors more than non financial and in some industries the results are different because some depends more on non financial factors than that of financial factors but mostly organization moves toward the investment in capital investments. In this

study, many literatures were reviewed relating to our variables, hypothesis were made and tested and on the basis of these hypothesis, the results are concluded which showed that there should be a proper investment in intellectual capital resources for the improvement of financial performance of organization.

This study represents the importance of intellectual capital for the developing countries and the results showed that intellectual capital is rising as a major performance driver for the organizations. In developing countries, the governments pay more interest towards the capital investments but the results of present study revealed that there should be proper development of intellectual capital resources for creating the value of firms. Present study revealed that intellectual capital and performance have significant relationship, so the management should develop knowledge based strategies in order to increase the intellectual capital and its components. This study would also help the shareholders to understand the value of intellectual capital and its importance for the performance of their companies. The developing countries pay more attention towards the corporate performance which is based on physical assets, but the performance of an organization also depends on knowledge based assets along with the physical assets. So there should be some strategic plans to enhance future performance.

As the present study was based on the relationship of intellectual capital and its components with the financial performance of organization, and the data was analyzed on the 25 companies of manufacturing industries, but the future research would find a broader platform to conduct their study on this relationship in another perspective. In this respect, a study can be carried out by full market study in developing countries like Pakistan so, it will provide better results. And future research should analyze this relationship with other performance indicators.

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