

Impact of Intellectual Capital on Firms' Market Value and Financial Performance: Empirical Evidence from Pakistan

Muhammad Khalid Rashid¹

Abdul Aziz Khan Niazi²

Misbah Noreen³

Abstract

The objective of this study is examine the influence of intellectual capital (IC hereafter) on performance of firm market value of organization. The sample contains listed firms of Pakistan. Data were collected for the period ranging from 2003-2016. In this study Value Added Intellectual Coefficient (VAIC) methodology is applied for investigation. The impact of value added coefficient is seen on firm performance and firm's market value separately, and then the impact of elements of value added intellectual coefficient is investigated accordingly. Panel data regression is used to analyze the empirical relationships. The results show that there is no significant impact of IC on market value of firm hence concluded that the dissimilarity in market and book worth is due to market inefficiency. Positive and significant relationship has been found between return on equity and human capital; also, positive significant relationship has been found between structural capital and return on equity concluding that IC has influence on financial performance of non-financial firms listed on PSE.

Keywords: Intellectual Capital, Market Value of Firm, Financial Performance of Firm.

Introduction

Innovation and knowledge are the most important factors for knowledge intensive economy; also, these are dominating than other assets of the company such as labor, land and capital. Managing the intangible assets and intellectual capital (IC) has become the prominent factor of organizational success in most of the industries specially which are knowledge based. Financial economists led their attention to the new approach for the business in 20th century that firms have financial resources, capabilities and assets which are unique from the other organizations and become the source of creating value for shareholders. Firms can measure their all physical assets from the balance sheet of the business. Firms are unable to measure the IC because intangible assets are included in the balance sheet consists of good will, trade mark and patents but IC is not mentioned in balance sheets. Nonetheless, IC is most important asset of the business that contributes to the value of firm. There has observed too much gap in market and book value of firm and this increasing gap is due to the reason that some important intangible assets such as IC

¹ Government College of Science, Lahore

² University of Engineering and Technology, Lahore

³ PhD Scholar, University of Lahore, Lahore

are not reported in financial statements of the firm but these are equally important to increase market value of firm.

IC is much important to the organizations because human capital (employees) of the organization has much knowledge about the organization, about work processes, about their job and about the different internal and external situations of the organization. The organizations working globally have to face complicated and multipurpose environment and they have more need to manage their human capital and IC to cope with situations. Human skills can be improved by employee training and development, by conducting trainings of employees, IC can be increased because by doing so the employees can get knowledge about the processes, procedures, and rules and about the history of the organizations regarding stakeholders. They become able to perform their job well by giving them trainings about their job performance. Existing knowledge is base for the new knowledge; it is a cumulative process to capture the knowledge of the existing employees and sharing this knowledge with new employees for increasing IC base. Some sectors are knowledge intensive and those sectors give proper attention for the management of IC that has great importance for financial performance of those firms. Traditional financial reporting basically focuses primarily physical asset such as land, building and machinery. It ignores most valuable asset of the company that is IC, so there is need to give great attention toward IC models.

There is too much literature on IC for developed economies as well as for few developing economies but there is little literature on IC in developing countries like Pakistan. Although there is literature available on IC, performance and market value but this is mostly on knowledge intensive industries like service sector and financial sector; also, there is no consensus about the affiliation of IC and performance and market value firm's for different economies and different sectors. There is much literature about IC, financial performance and market value of firms in knowledge intensive industries of developed economies, but there is little literature on IC and firm's financial performance for banking sector and services sector for developing economies and for Pakistan as well. There is less literature to find the impact of IC for manufacturing sectors of Pakistani firms. There is need to explore the association of IC, firm performance and market value in banking industry in Pakistan. Non-financial sector is also very important because these are not only the financial and service industries the which can get benefit by the management of knowledge and employees development and IC management but non-financial firms can also increase their financial performance and market value if they give proper attention to IC. This study provides practical insight to recognize that how much important is IC for creation of value for shareholders. Our findings increase

understanding of firms about IC for non-financial firms in developing economics like Pakistan.

Literature Review

“Intellectual capital” terminology was firstly used by John Galbraith in 1969, when economies moved from industrial age to informational age. This study classified the assets and liabilities of companies according to their book and market values to achieve the desired objectives.

Meihami et al. (2014) explore the connection of IC and firm’s business performance of manufacturing Iranian companies. To measure IC, they followed the Pulic model (Public, 2000) i.e. IC can be measured by VAIC. They find positive connection between IC and employee productivity, relationship between IC and product quality is also positive, and competitive advantages and IC have positive and significant relationship.

Kharal et al. (2014) determined the effect of IC on organizational performance in oil and gas sector in Pakistan. This study was checked the IC as value driver for organizational performance in this sector. They also engaged public model to measure IC. The data was collected from 12 oil and gas companies listed on Pakistan Stock Exchange (PSE). They employed OLS regression technique and correlation analysis to check the relationships among variables. They concluded positive association of IC and organizational performance in oil and gas sector in Pakistan.

Yeganeh et al. (2014) investigate the connection of firm’s performance and IC of the private insurance companies of Iran and decompose IC in to three elements like (Bontis et al; 2000). The three elements of IC used in this study were Structural Capital, Relational Capital and Human Capital. They used simple regression, multiple and stepwise regression to check the relationship of SC, RC and HC on performance of insurance companies. Results showed significant direct connection between firm’s financial performance and SC, HC also showed positive significant relationship with performance of private insurance companies. But in multiple regression model when all the elements are used simultaneously; there exist significant positive relationship between SC and firm’s financial performance and also positive relationship between HC and firm’s financial performance of private insurance companies of Iran but found insignificant relationship in case of RC. It was concluded that HC played important role in organizational development in knowledge base economy and pioneer industries mainly focus on this issue and used their HC for innovation and development purpose.

Wen-Min-Lu et al. (2013) conducted study to find the impact of IC on operating efficiency of insurance companies of China. They have used the sample of 34 insurance companies for the period of 2006 to 2010. To check the effect of IC on operating

performance of firms, they used HC, RC and SC; using truncated regression analysis they have found that SC, HC and RC have positive significant impact on operating efficiency of insurance companies working in China.

Abdullah and Sofian (2012) conducted study in Malaysia to check connection of IC and firm's financial performance. The prior studies about IC have used three elements of intellectual capital; SC, HC and RC but the novelty of this study was that it has included a new component namely spiritual capital. By spiritual capital means honesty, morale, ethics, faith, motivation, self-esteem and sincerity. The findings also concluded positive relationship among four elements of IC and performance of firms. This study had increased the literature on IC by introducing fourth component of IC namely spiritual capital and had proved the positive significant relationship of spiritual capital and firm's financial performance. In this study, it was found that relational capital (RC) has stronger relationship with firm's financial performance; after RC. Spiritual capital has strongest relationship and after that SC and the least positive relationship is between HC and firm's financial performance is found in this study.

Laure and Bontis (2012) conducted study on banking sector of Luxembourg and Belgium for investigation of effects of IC and elements of IC on performance of firms. Sample of study consisted of 200 banks of Luxembourg and Belgium; Results of the analysis showed that HC positively influencing the performance of firm's directly; it also has a positive and significant effect on firm's financial performance indirectly. Structure Capital (SC) has positive but insignificant relationship with firm's financial performance. In the same way, RC has significant positive but insignificant impact on business financial performance while RC has negative significant impact on the relationship between SC and firm's financial performance.

Wang (2011) conducted study of firms listed in Taiwan. It used data of all Taiwan listed companies for the period of 2001 to 2007. From the results of pooled OLS regression, it was evident that HC and SC have positive significant impact on firm but in case of RC it has found insignificant relationship.

Pulic (2000) introduced a convenient method for the measuring IC in any firm. He argued that capital employed (tangible assets) and (non-tangible assets) IC are sources for creating market value of firm and IC consists of structural and human capital. He used VAIC methodology for the measuring IC by introducing three elements of IC: SC efficiency, HC efficiency and capital employed efficiency.

From literature review it is found that the largest part of the literature on IC is for services sectors and financial sectors. IC is considered more central for knowledge intensive industries; too much literature is found for banking sector and services sectors of many developed economies and little literature is also found for financial sectors of

Pakistan, there is need to check the empirical relationship of IC and market value and IC and firm's financial performance of manufacturing firms of Pakistan.

Data and Methodology

Data and Sample Selection

The study used panel data to obtain results. The study used panel data that has been taken from the financial statements of the sample firms. They have selected the sample on the bases of availability of data required to use in our study for the period of 2003 to 2016. Most of the companies contain required information from 2003 to onward. Due to this reason, data from 2003 to 2016 were collected.

Independent Variables

This study has included four independent variables which are used by Pulic (2000) in his study. Capital employed efficiency is used as proxy of value added efficiency due to capital employed.

This study measured human capital efficiency using total expenditure made on employees as investment that will increase skills and expertise of human capital and the human capital efficiency can be expressed in terms of unit measurement to interpret the investment made on employees.

SC efficiency is used to represent value added efficiency due to SC.

Finally, the proxy for intellectual efficiency value added is combination of three elements. The study used data of annual financial reports of firms to calculate the efficacy of SC, human capital and capital employed by suing five steps to used (VAIC) model in this study: The step by step procedure is given below:

$$VA_{it} = output_{it} - input_{it} \quad (1)$$

Output represents the total revenue earned from sale of goods and services during a particular period. The input represents all expense of the firm in the period to generate that revenue, but these expenses do not include tax, dividend, lower labor cost, interest and depreciation. The use of above equation for the calculation of VA is based on theory of stakeholder's view. Theory of stakeholder's view state that all parties which influence or can be influenced by the firm have stake in the firm. Employees, directors, vendors, community and Govt. can be stakeholders of the firm.

For the calculation of value added by the firm we have used the methodology which was used by Riahi-Balkaoui (2003) in his study. For the calculation of VA of the firm for a specific time period he suggested the following formula to be used for net retained earnings for that period.

$$R_{it} = S_{it} - B_{it} - Dp_{it} - W_{it} - I_{it} - D_{it} - T_{it} \quad (2)$$

Where R_{it} represents the retained earnings for firm i and time t , S_{it} represents to net revenue for firm i and time t , that business generate from sale, B_{it} represents cost of goods sold including all operational expense other than cost of tax, dividend, interest, labor and depreciation for firm i and time t , Dp_{it} represents depreciation expense for firm i and time t , W_{it} represents salary and wages that we pay to our labor for firm i and time t , I_{it} is interest expense of the period for firm i and time t , D_{it} denotes the dividend given to shareholder for firm i and time t , and T_{it} is tax for firm i and time t .

By re-arranging the elements of equation

$$S_{it} - B_{it} = Dp_{it} + W_{it} + I_{it} + D_{it} + T_{it} + R_{it} \quad (3)$$

Left hand side of the equation shows the difference of sale revenue and cost of goods sold except interest, tax, depreciation, wages and dividends and retained earnings. So, the expression $S_{it}-B_{it}$ represents the total value generated by the firm that would be distributed among stakeholders of the firm.

Right hand side represents the distribution of value added amongst the stakeholders of the firm according to the theory of stakeholder view. We will do some further step for the calculation of VAIC and co-efficient of efficiency of the three elements that are SC, HC and capital employed. Using the method of Pulic (1998) and firer & Williams (2003),

Capital employed = Shareholders funds plus long term liabilities of firm

Human capital= total investment on personnel for the period.

Structural capital= VA-HC

Further the efficiency co-efficient has been calculated in the following way

VACA= VA/CE VAHU= VA/HU STVA= SC/VA

VAIC= VACA+VAHU+STVA

We divided SC/VA in case of STVA, following the argument of Pulic (2000) that there is an inverse relationship between SC and HU. That's why the measurement of STVA is not similar to other ratios.

Dependent Variables

In our study, basically there are two dependent variables:

1. Financial performance
2. The ratio of market value of firm to book value firm

The market to book value of firm and market worth of firm's common stock is measured by multiplying the outstanding shares and market price of share.

Book value of the common stock is calculated from financial statements by subtracting preferred stock from stock holder equity.

To measure the financial performance, we have used two proxies.

1. ROE which is measured as Net income to shareholder's funds ratio

2. ROA which is measured Net income to Total assets ratio

Control Variables

1. Size:

The variables size is also include due to its importance and measured as natural log of total assets of the selected firms.

$$FS = \ln (\text{Bookvalueofassets})$$

2. Leverage:

In this study leverage is denoted with L while calculated by total liabilities to Market worth of firm (VenugopalanThotleKat et al. 2013).

$$L = \frac{\text{Total Liabilities}}{\text{Market worth of firm}}$$

3. Sales Growth:

The proxy for sales growth is measured as change in sales of current year scaled by the sales of last year.

$$\text{sales} = \frac{\text{sales}_{t+1} - \text{sales}_t}{\text{sales}_t}$$

We have used panel data in our study to find out the connection of IC, performance and elements of IC with firm's performance. Also, due to panel data we panel setting to explore the association of market value of firms, elements of IC and market value of firm. In our analysis, we have used balanced panel data for the period of 2003 to 2016 for a sample of 39 non-financial firms conveniently selected for which the data were completely available for market and balance sheet indicators.

Regression Models

Following panel data regression models are used to test and analyze the hypothesis used in our study.

$$M / B = \alpha + \beta_{1,it} VAIC + \beta_{2,it} SGR + \beta_{3,it} L + \beta_{4,it} FS + \varepsilon_{it} \quad (1)$$

$$M / B = \alpha + \beta_{1,it} VACA + \beta_{2,it} VAHU + \beta_{3,it} STVA + \beta_{4,it} SGR + \beta_{5,it} L + \beta_{6,it} FS + \varepsilon_{it}$$

$$ROE = \alpha + \beta_{1,it} VAIC + \beta_{2,it} SGR + \beta_{3,it} L + \beta_{4,it} FS + \varepsilon_{it} \quad (3)$$

$$ROA = \alpha + \beta_{1,it} VAIC + \beta_{2,it} SGR + \beta_{3,it} L + \beta_{4,it} FS + \varepsilon_{it} \quad (4)$$

$$ROE = \alpha + \beta_{1,it} VACA + \beta_{2,it} VAHU + \beta_{3,it} STVA + \beta_{4,it} SGR + \beta_{5,it} L + \beta_{6,it} FS + \varepsilon_{it}$$

$$ROA = \alpha + \beta_{1,it} VACA + \beta_{2,it} VAHU + \beta_{3,it} STVA + \beta_{4,it} SGR + \beta_{5,it} L + \beta_{6,it} FS + \varepsilon_{it}$$

Results and Discussions

In this study, different statistical analyses have been conducted to find objective of study. These analyses include penal data regression results of fixed effects, descriptive statistics of proxies and correlation among variables.

Descriptive Statistics:

Descriptive statistics is the basic analysis used to determine the characteristics of variables used in study. Basic characteristics described in descriptive statistics include mean, minimum (MIN) value, maximum (MAX) value and standard deviation value for all dependent (DV) and independent (IN) variables. Descriptive statistics for the panel data of 2003-2016 on variables of the study is given in Table 1 (Appendix: 1). Table 1 shows that mean value of Market to book value ratio is 1.4746 which indicates the existence of gap between book value (BV) and market value (MV) confirming the basic theoretical discussion that there is increasing gap between book value (BV) and market value (MV) because IC is not available in financial statements of firm. From the given sample 32.19% of the market value is not reflected in financial statements.

$$= [1.4746-1.00]/ 1.4746= 32.19\%$$

Also, market to book value ranges from negative value to positive value indicating that for some periods there was negative value of IC; firms were not giving proper attention to manage their IC.

VAIC has minimum value of -14.65 and maximum value of 55.69 indicating that some firms have managed their IC while some have not managed. Value added intellectual coefficient have high standard deviation of 8.78 around the mean of 7.61 indicating that there is much difference in the behavior of firms in managing their IC.

Correlation analysis:

From Table 2 (Appendix: 1) results of correlation indicate that there is positive and significant relationship between Return on assets and VAIC and elements of IC; SC, human capital and value added capital employed. These results are in accordance with hypotheses of the study that IC and elements of IC have positive relationship with Return on Assets. Positive relationships are also found in case of return on equity and VAIC and all elements of IC; value added capital employed, human capital and SC. These relationships are also according to the expected relationships. The correlation matrix information explains that there is no higher correlation among variables. The information regarding correlation among explanatory variables confirm that there is no multicollinearity among explanatory variables.

Choice of Panel Data Estimation:

As mentioned above this study consist on panel data analysis. To deal with panel data we have to use pooled OLS, Fixed effect and random effect models. These three methods have their merits and limitations. We must have to choose best one to deal with panel data issues and biasness. The choice between random and fixed effect is made through Hausman Test and fixed effect is found to be more appropriate to use. The results are reported below:

H1: *fixed effects model is more appropriate*

The following are the test cross-section random effects

Table 1: *The Correlated Random Effects Results: Hausman Test*

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f	Prob.
Cross-section Random	33.4327	5	0.000

The findings obtained indicate that fixed effects are more appropriate to report the results. This decision is made on the basis of probability of above results due to that null hypothesis is rejected.

Regression Analysis (Fixed Effects Results)

The basic purpose of the research is to find the connection of IC and market worth and firm’s financial performance, and to find the affiliation of elements of IC and market value of firm and firm’s financial performance. Results of Table 3 (Appendix: 1) represent the empirical results of panel data regression for the relationship of VAIC and market to book value in the presence of firm size, leverage and sales growth as control variables of the study. Table 3 has shown that there is insignificant relationship between market to book value ratio and VAIC indicating that investors give less importance to value added intellectual coefficient while placing value to firm.

Table 3 (Appendix: 1) presents the results of Model 3 & 4. Results demonstration positive connection between VAIC and Return on Equity. This relationship confirms the hypothesis of the study and gives empirical evidence from sample firms that IC has positive and significant impact on firm’s financial performance.

This study used ROE and ROA as performance measures. Like ROE, ROA and VAIC have positive and significant relationship, reconfirming the importance of value added IC for firm’s financial performance.

Table 4 (Appendix: 1) shows the results for model 2; the empirical results indicates that IC and capital employed efficiency are positively correlated with each other. The results also indicate insignificant relationship between IC and human capital and SC in this study. These results indicate that investor gives no importance to SC efficiency and human capital efficiency and these elements of IC influencing the market value of firm in case of this study. The results of this study found insignificant impact of IC and market value firm.

Empirical outcomes of Model 5 & 6 are also presented in Table 4; Results that ROE and Human Capital efficiency has a positive relationship, where SC efficiency and ROE are also positively correlated. Results of the Model 5 have empirically proved that all elements of IC is positively influence the performance of firms in case of ROE. Results of Model 6 show that there are the two elements of IC and both elements are positively correlated with ROA. The results about SC efficiency and capital employed

efficiency both have positive influence on ROA. The similar result is not significant in case of ROA and Human capital efficiency of firms in Pakistan.

Conclusion

This research has been done to explore the relationship of IC, market value and performance of firms in the context of Pakistani firms. The sample contains non-financial firms of Pakistan and the study period ranging from 2003-2016. The findings provide gap in both firm's market value and firm's book value. The variable IC is non-physical assets of the firm and not reported in any financial statement prepared by corporations. But these the assets which are sources for competitive advantage for firm and are source for value creation for firm. IC includes human capital, RC and SC; human resource is the main source for conducting business strategies and business activities but these are not represented in financial statements.

This study followed the methodology of VAIC used by Chen et al. 2005; Firer & Williams, 2003. According to this methodology VAIC was generated by the sum of VACA, VAHU and STVA. ROA and ROE is used for firm performance. The market value to book value is used as market value of firm. The IC is not enough to determine the value of firm and performance of firm. The following are the control variables included in model size, leverage and sales growth of firms. Data for all these variables is taken from financial statements of randomly selected sample of firms selected from 16 non-financial sectors listed on Pakistan Stock Exchange. Different statistical analyses have been conducted to reach the objective of this study, descriptive analysis showed the mean value of market to book value as 1.4746 which means that market value for the sample is more than book value, and a part of value of firm is not reported in financial statements that is IC a source of value creation. Correlation analysis have shown positive relationship between firm's financial performance measures and IC measures to confirm that IC is the source of competitive advantage and value creation for firm.

Finally, from regression analysis no significant relation is found between market to book value and IC and elements of IC which indicates that IC has no influence on market value of firm; this is probably because of the reason that Pakistani markets are not perfect markets. Regression analysis has shown positive relationship between human capital and return on equity indicating that human resource is the source of competitive advantage for business which facilitates the strategies and operations of business and increases the firm's financial performance, human capital adds value through knowledge, experience, innovation and expertise. In the same way, direct relationship has been found between Social Capital and ROA and ROE confirming the hypothesis that structures and good working environment facilitates employees to perform operations in better way. It is concluded from the study that like many other developed economies and services and

financial sectors IC has positive influence on performance of firms so due to this reason and results found firms have to manage their IC for better results.

Limitations and Direction for Future Research

IC was considered more important for knowledge based industries, financial and services industries, but it is equally important for manufacturing firms. Due to data availability problems, sample of the study was not large enough and selected from 16 sectors of firms listed on Pakistan Stock Exchange. Because of small sample the findings can't be generalized to all sectors and all manufacturing firms. There is need of research on IC for individual sectors and a comparative study should be conducted for other markets as well.

This study used two measured by ROA and ROE as performance of firm, the studies may use to introduce new performance measure such as Sales growth and Assets turn over. In contemporary research, HC, SC and VAIC were measured by secondary data that can also be measured using primary data directly from human resource of firms.

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APPENDIX

Table 1: Descriptive Statistics

Variables	Mean	Minimum	Maximum	Standard Deviation
VACA	.5675	-1.4668	3.8726	.5933
VAHU	6.1556	-13.7879	55.7149	8.65676
STVA	.6840	-.5229	1.9282	.2577
VAIC	7.6130	-14.6512	55.6950	8.7835
ROE	23.2701	-85.9000	97.6800	24.9430
ROA	11.6042	-29.1700	55.9500	13.2833
M/B	1.4747	-1.6667	7.9853	1.4076
FS	8.1926	4.2002	12.4753	1.6749
L	1.3424	-8.6298	13.1697	2.1955
SGR	.2174	-1.0000	1.3616	.3504

Table 2: Correlation Analyses

	FS	L	M/B	ROA	ROE	SGR	STVA	VACA	VAHU	VAIC
FS	1	.112	.166	.086	.058	-.134	.369	-.087	.334	.348
L		1	.320	-.210	-.247	.029	-.089	.139	-.045	-.050
M/B			1	.392	.281	-.073	-.118	.301	-.033	-.010
ROA				1	.795	.117	.246	.265	.044	.066
ROE					1	.155	.139	.340	.031	.058

SGR	1	.017	.056	.052	.063
STVA		1	-.416	.556	.526
VACA			1	-.219	-.09
VAHU				1	.096
VAIC					1

Table 3: Value added intellectual coefficient and market value: (Model-1,3 & 4) Fixed Effects Results

Variable	M/B		ROA		ROE	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
C	3.050	.077	6.658	.772	-2.938	.000
VAIC	.002	.000	.256	.000	.584	.690
FS	-.246	.734	.155	.041	2.523	.000
L	.273	.027	-.397	.000	-2.398	.000
SGR	-.455	.001	2.877	.000	9.373	.000
R-squared	.605	.625		.455		
Adjusted R-squared	.569	.590		.405		
F-statistic	16.675	18.101	.000	9.071	.000	.000
Durbin-Watson stat	1.573	1.772		1.824		
Number of Observations	547	547		547		

Table 4: Elements of intellectual capital and market value of firm: (Model- 2, 5&6) Fixed Effects Results

Variable	M/B		ROA		ROE	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
C	2.657	.000	-4.239	.003	-9.556	.000
VACA	.474	.000	15.629	.000	5.797	.000
VAHU	-.001	.204	.142	.051	.073	.899
STVA	-.134	.000	5.105	.000	2.248	.627
FS	-.211	.013	2.643	.710	.140	.000
L	.253	.000	-2.548	.005	-.420	.000
SGR	-.479	.000	8.561	.000	2.576	.000
R-squared	.628		.605		.750	
Adjusted R-squared	.592		.567		.726	
F-statistic	17.512	.000	15.919	.000	31.103	.000
Durbin-Watson stat	1.587		1.925		1.895	
Number of Observations	546		546		546	