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Article

Impact of Intellectual Capital on Firm Value: The Moderating Role of Managerial Ownership

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Abstract: Rapidly changing dynamics of globalization and increasing market competition are causing the companies all around the world confronting several new challenges and opportunities. To be competitive and successful apart from relative importance of physical resources, companies must adapt modern strategies and policies regarding market flexibility and development. The purpose of this study is to empirically investigate the relationship between intellectual capital and firm value. Furthermore, the moderating role of managerial ownership has been evaluated with the help of regression analysis. The sample included the panel data taken from non-financial firms listed on Pakistan stock exchange (PSX) covering the period 2010-2015. A sample of 79 firms out of 384 firms have been selected with the help of systematic sampling technique. VAIC (Value Added Intellectual Coefficient) model has been used for the calculation of intellectual capital. Tobin's Q has been taken as a measure of firm value. Managerial ownership has been tested as moderator. Based on data analysis, it is concluded that the relationship between intellectual capital and firm value is positively significant. It is also concluded that managerial ownership moderates the relationship between intellectual capital and firm value negatively.

Keywords: Intellectual Capital; Firm Value; Managerial Ownership; Tobin's Q; VAIC.

JEL Classification: O34; G32; J24

1. Introduction

Rapidly changing dynamics of globalization and increasing market competition, companies all around the world confronting several new challenges and opportunities (Bchini, 2015). In order to be competitive and successful apart from relative importance of physical sources, companies have to adapt modern strategies and policies regarding market flexibility and development (Hejazi, Ghanbari, & Alipour, 2016). Moreover, evolution of knowledge economy from industrial economy also puts greater pressure on companies to use soft resources efficiently as human capital and knowledge, which have become major factors of economic growth. In past, companies' success, profitability and value mainly depend on tangible assets like land, infrastructure and equipment (Nuryaman, 2015) but in current global economy intangible assets contributing approximately 80% in companies' value through human capital development and knowledge management (Vodák, 2011). Companies' ability to use information and knowledge has become the key factor of information economics in this modern world (Noradiva, Parastou, & Azlina, 2016) so the companies can effectively transform intangible assets into tangible value. Urwin, Karuk, Hedges, and Auton (2008) called branding as reputational asset which ultimately creates value for the firm. So, investment in intellectual capital is inevitable in this modern era of globalization due to its long-term return on investment. So, the relationship between independent

variable i.e. intellectual capital and dependent variable i.e. firm value is an important research domain which can further highlights the dynamics of financial management.

In this knowledge era intellectual capital has become the imperative facet of firm's value. In literature of financial management this is called intellectual capital; this is the intangible value for the firm which creates through structural capital, value added capital and human capital. Nowadays companies are mainly focusing on intellectual capital due to increasing investor's interest. To win the investor's confidence your business must possess strong intangible value. On the other side it can be said that intellectual capital can contribute in firm value through share price (Feimianti & Anantadjaya, 2014) profitability, return on investment and return on equity (Emamgholipour, Pouraghajan, Tabari, Haghparast, & Shirsavar, 2013). Moreover, the impact of managerial ownership cannot be neglected in developing countries such as Pakistan where interest alignment issue is higher between managers and shareholders. Gradually the importance of intellectual capital has evolved therefore, it is obvious to analyze the dynamics of intellectual capital and its effects on business performance. Furthermore, the business environment in Pakistan economy is very uncertain which also provides a justification to conduct this investigation in Pakistani environment.

In financial management dynamics of investment are one of the key factor for better financial results. Higher management is one of the strongest influence on investment whereas intangible assets due to their varying high interests in investment. Managers made investment decisions always for better financial performance (profitability) and business value however, sometimes they take investment decisions in order to achieve their personal goals instead of shareholders' goals (Noradiva et al., 2016; Shahveisi, Khairollahi, & Alipour, 2017). Two opposing hypotheses are found in literature regarding the different behavior of managerial ownership which are referred as interest-alignment and entrenchment hypotheses. According to interest-alignment hypothesis, the interest alignment issue between managers and shareholders is decreases by increasing the managerial ownership while the opposite is the case in entrenchment hypothesis (Chen & Chuang, 2009). Therefore, this study has also investigated the moderating role of managerial ownership between the dependent and independent variables i.e. intellectual capital and firm value.

Business decision making regarding financial aspects required in-depth analysis of financial market, firm dynamics and market conditions to achieve desired business goals. The high rate of success of financial decision yields high returns in terms of firm performance (profitability) and firm value. On the other hand, importance of intellectual capital also emphasizes that managers have to make intelligent decisions to create high business value. Many scholars and researchers have tried to explain the relationship between above two stated variables through various methods (Ozkan, Cakan, & Kayacan, 2017). In financial management literature the most effective and widely used model is VAIC (Value Added Intellectual Coefficient) model. The model was initially developed by Pulic (1998) which was later revised in 2004. The model is also helpful to compare the financial performance of different firms (Firer & Mitchell Williams, 2003). In literature both significant and insignificant relationships are observed between VAIC and firm value. Few studies also witnessed that not all the components of VAIC model have significant relationship with firm value. (Mosavi, Nekoueizadeh, & Ghaedi, 2012) concluded that human capital efficiency positively significant with firm value. Few studies also found no relationship between VAIC and FV. Therefore, there is an obvious need to study the relationship between VAIC components and firm value as well in Pakistani context.

Moreover, (Li & Zhao, 2018) suggested that there is a need to investigate the role of organizational system in the casual relationship of intellectual capital and firm value. Managerial ownership is considered one of the strongest elements of organizational system during financial decisions of the organizations. Several studies highlighted the importance of managerial ownership as well (Noradiva et al., 2016). Since, financial performance is the strong predictor of firm value so it could affect the causal relationship between intellectual capital and firm value. So, this study is designed to investigate empirically the relationship between intellectual capital and firm value through the moderating role of managerial ownership within the context of Pakistan.

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2.1. Research objectives

Research objectives for this study are listed below

1. To analyze the impact of intellectual capital on firm value.
2. To analyze the moderating role of managerial ownership between the relationship of intellectual capital and firm value.

2. Literature Review

Intellectual capital was first used by Tom Stewart in 1991 when he wrote an article for "Fortune Magazine" titled as "Brainpower: How intellectual capital is becoming Americas' most valuable asset" (Kalkan, Bozkurt, & Arman, 2014). According to (Stewart, 2007) intangible assets of the firm like experience of employee, information, knowledge, intellectual material and intellectual property which is used to generate wealth are called intellectual capital. It covers more than copyrights, patents, trademarks etc. "Human capital, structural capital, customer/external capital" are referred as 3 basic components of intellectual capital (Bharathi Kamath, 2008; Clarke, Seng, & Whiting, 2011; Kalkan et al., 2014; Noradiva et al., 2016; Nuryaman, 2015).

Kalkan et al., (2014) stated that human capital is a key source of intangible asset for a company. Companies nowadays are in constant race of finding the knowledge employees with some specific abilities which can be helpful for companies to attain their financial goals and creating firm value (Jacobsen, Hofman-Bang, & Nordby, 2005).

A non-human capital which provides a support to human capital is referred as structural capital (Kalkan et al., 2014). According to Sveiby (1998) the capital which provides the infrastructure support for increasing the employee performance can be referred as structural capital. When employees leave the office after their work, the instruments remained in office are referred as structural capital (Roos, Pike, & Fernstrom, 2007).

Jacobsen et al., (2005) studied that customer capital is the third and last part of intellectual capital which is also referred as relational or external capital. Relationship of a firm with its stakeholders is also best defined by customer capital (Jacobsen et al., 2005; Kalkan et al., 2014; Nuryaman, 2015). According to (Nuryaman, 2015) customer capital helps firms maintain a good relationship with its external as well as internal stakeholders which include customers, consumers, government, employees, creditors, suppliers, and other parties. Customer capital not only increases the satisfaction level of stakeholders but it also results in high loyalty of the stakeholders with the firm (Kalkan et al., 2014).

Intellectual capital is recognized as strategic asset for sustainability of firm in the age of high competition. Moreover, investor prefer those firms with better efficiency of intellectual capital (Chen, Cheng, & Hwang, 2005). According to (Mehralian, Rajabzadeh, Reza Sadeh, & Reza Rasekh, 2012) in the age of competition intellectual capital is being considered as toll which deliver business success. (Mehralian et al., 2012) conducted a study on pharmaceutical companies registered on Iranian stock exchange for the investigation of relationship two variables termed as intellectual capital and firm value. Nineteen firms were selected for study under covering the period of six years (2004-2009). On the basis of data analyses no relationship was found among study variables.

According to Shaban and Kavida (2013) knowledge based economy is the big tree having where innovation can be referred as the branches of the tree while intellectual capital can be referred as the roots which provides the support to innovation process. (Shaban & Kavida, 2013) inspected the relationship of intellection capital with firm performance and firm value. VAIC was used for calculation of intellectual capital of final sample of 22 IT firms (after elimination of 11 firms having discrepancies in data set) listed in Bombay Stock Exchange 500. The data was collected for 9 years from 2003 to 2011. No statistical significant relationship was concluded between independent and dependent variables. However, three components of VAIC were used in this study and only CEE has positive relationship with M/B ratio.

Berzkalne and Zelgalve (2014) examined the relationship between intellectual capital as independent variable and firm value as dependent variable. This research was done on 64 (Estonia 29, Latvia 11 & Lithuania 24) companies listed on Baltic in which data of 7 year (2005 to 2011) was used. Purposive sampling technique was followed for data collection from financial statements. Correlation

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analysis was used to examine the relationship. Tobin's Q was used to measure the firm value whereas, VAIC was used to measure the value of intellectual capita. A positive and significant relationship was concluded between intellectual capital and firm value in the companies of Lithuania and Latvia, whereas, no such relationship was not found in Estonia's companies.

Iranmahd, Moeinaddin, Shahmoradi, and Heyrani, (2014) studied the impact of intellectual capital on firm value as well as on cost of finance. The population of the study included all listed firms of Tehran covering the years 2005 to 2012. Intellectual capital was measured by VAIC method and market value of stock was considered as firm value. By applying correlation and regression analysis researcher concluded that neither intellectual capital nor its components have any statistical significant relation with firm value.

Nejati and Pirayesh (2015) also examined the effect of intellectual capital on firm value. By applying systematic removal method, the study was conducted on 132 firms of Tehran stock exchange whose data was collected by the Tehran stock exchange organization covering period of 6 years starting from 2008 and ending at 2013. A positive correlation was concluded between intellectual capital and firm value. It was also concluded that there was significant relationship between applied capital, structural capital & human capital efficiency and company's intellectual capital.

Li and Zhao (2018) investigated the dynamic relationship between intellectual capital and firm value of Chinese listed firms. Organization and human capital were used for the measurement of VAIC while, ROA, ROE, growth and return are used as the proxies for firm value. GMM and IV estimation models are used for data analysis purpose and scholars concluded that organizational capital positively affects the firm value while no relationship was found between human capital and firm value.

According to resource based theory developed by (Barney, 1991) a company uses its available resources in order to get competitive advantage in market. According to Hakiki and Ferdianti (2015) resource-based theory is related with the management and utilization of a company's available strategic resources. Hakiki and Ferdianti (2015) stated that with the help of strategic resource utilization a firm can even get abnormally high returns and become more competitive but, the resource utilization decision making is very complicated as a firm has to decide whether a particular investment for particular assets is essential or not. Based on resource-based view, intellectual capital should create the value for the company. But literature does not support this view all the time which can be due to different other factors contributing towards firm value positively as well as negatively. On the basis of literature reviewed it is found that intellectual capital either has significant relationship with firm value (Berzkalne & Zelgalve, 2014; Chen et al., 2005; Lotfi, Elkabbouri, & Ifleh, 2016; Nejati & Pirayesh, 2015; Pouraghajan, Ramezani, & Mohammadzadeh, 2013) or not significant at all (Mehralian et al., 2012; Shaban & Kavida, 2013). The mix results motivated the researcher here to further test this phenomenon in Pakistani environment. The first major study hypothesis on the bases of resource-based theory is

H1: *There is a significant relationship between Intellectual Capital and Firm Value.*

According to (Grob, 2007) managerial ownership is considered as the most important type of ownership structure in academic field due to the importance of management in agency relations. (Brickley, Lease, & Smith Jr, 1988) also stated that managerial ownership is more effective part of corporate governance which aids to resolve the conflicts between managers and shareholders. According to (Noradiva et al., 2016) managerial ownership motivates the managers to monitor the firm performance positively to enhance the return for their ownership in the company. Past studies have clearly demonstrated that higher level of managerial ownership contributes towards higher level of firm performance as well as firm value (Hanson & Song, 2000; Sun, Ding, Guo, & Li, 2016). It is also found that managers having higher ownership in the firm tend to take such investment decisions which focus mainly on the long-term value of the business (Mohd-Saleh, Rahman, & Ridhuan, 2009). According to Mohd-Saleh et al., (2009) such major decisions include the investments in long-term projects and intellectual capital as well. On the other hand managers with lower managerial ownership or no ownership are found to focus on mainly those investment decisions which provide short term value enhancement so that managers can gain personal benefits from such enhancements. Liang, Huang, and Lin, (2011) stated that previous studies have concluded mix results regarding the relationship between ownership and firm value. Keeping in view the importance of intellectual capital,

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Liang et al., (2011) investigated the relationship among ownership, proxies of intellectual capital and corporate value. The researchers concluded that a direct relationship exist between ownership and business value.

Noradiva et al., (2016) examined the relationship between intellectual capital and firm value by using Pulic VAIC method. Moreover, the role of managerial ownership was also examined in this study. Noradiva et al., (2016) concluded that managerial ownership did not moderate the relationship between intellectual capital and Firm value. The researchers further discussed that the insignificant result showed that higher level of managerial ownership has led the role of managerial ownership towards entrenchment, instead of alignment. (Bohdanowicz, 2014) also concluded that managerial ownership is negatively associated with HCE (Human capital efficiency). (Bohdanowicz, 2014) also stated that negative association was due to entrenchment effect of insider ownership.

Hakiki and Ferdianti, (2015) also investigated the impact of ownership structure on the relationship between intellectual capital and firm value by using VAIC for the measurement of intellectual capital. The researchers collected the panel data from banking companies listed on BEI (Indonesian Stock Exchange). The data was collected from 2009 to 2012. The sample data contained 27 firms with the help of purposive sampling method. Unlike the study of (Noradiva et al., 2016) it was concluded that managerial ownership moderates the relationship between intellectual capital and firm value. But it was also found that the nature of the relationship is negative which means by increasing the level of managerial ownership the firm value decreases. Moreover, no moderating effect was found in the case of institutional ownership.

Florackis, Kostakis, and Ozkan, (2009) studied the relationship between managerial ownership and firm performance by using semi-parametric estimation techniques. The study was conducted on UK listed companies on UK stock exchange during 2000 to 2004. Firm performance and market data like equity market value, total debts and total assets was taken from data streams. However, data about firm's board, managerial ownership, and owner structure was obtained from Hem Scott Guru Academic. There were 1010 firms on which analysis was done after exclusion of financial firms. Due to some particular characteristics financial firms were not taken as a part of study. Firm performance was taken as dependent variable and was measured with the help of Tobin's Q. Managerial ownership was taken as percentage of equity owned by executive directors. It was concluded that there exist an association between independent variable i.e. managerial ownership and dependent variable i.e. firm performance at the level of 15 % or less than 15% holding of equity by executive directors. But at intermediate and high level of equity holding by director did not support the hypothesis and there was no clear and strong evidence seen regarding the managerial ownership and firm performance relationship at middle and high level of equity holding by executive directors.

According to agency theory, the conflict of interest between agents (managers) and principals (shareholders) can be mitigated with the help of managerial ownership (Jensen & Meckling, 1976). The concept of agency theory was first coined by (Berle & Means, 1932) who stated that by decreasing the equity ownership of managers, the managers start pursuing their personal interests and gains instead of shareholders' interest i.e. maximizing the shareholders' return. According to Jensen and (Jensen & Ruback, 1983) the managers in case of interest conflict tend to utilize the available resources of the company to their benefits and ignore such investments which may increase shareholder return. According to agency theory managerial ownership helps to reduce the agency problems arising due to the interest alignment issues between managers and shareholders (Jensen & Meckling, 1976). The similar results were found from the studies conducted by (Hanson & Song, 2000; Sun et al., 2016). The results of these both studies concluded that increasing the level of managerial ownership can affect the firm performance and value positively due to managers' ownership in the firm. However, all studies on the impact of ownership structure do no provide the same results which mean all studies do not follow the agency theory fully. The studies conducted by (Noradiva et al., 2016) found non-significant moderation of managerial ownership between VAIC and firm value. This different behavior of MO is supported with two either interest-alignment hypothesis or entrenchment hypothesis. However, the researcher has also taken the agency theory for the hypothesis development here and has developed

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following hypothesis regarding the moderation effect of MO between intellectual capital and FV as well as FP.

H2: *Managerial Ownership moderates the relationship between Intellectual Capital and Firm Value.*

3. Research Methodology

In the end, appropriate sampling framework and data analysis techniques have also been discussed in detail.

3.1. Selection of appropriate research philosophy and research design

The appropriate selection of research philosophy is totally based on our research objectives. It is very clear from our research objectives that objective solution is required for our research problem. So, keeping in view the nature of research aims and objectives, the researcher has selected positivism research philosophy for this research work. Moreover, the rest of the research methods, tools and data analysis has also been chosen on the basis of positivism research philosophy. Appropriate research design for current study is Quantitative. Moreover, our research objectives also require quantitative solution of the problem instead of qualitative solution of the problem.

3.2. Sample size and technique

Based on research objectives; the researcher has selected "Purposive Sampling" technique to select only those firms which have complete data on our study variables. In the final sample total 79 firms out of 384 non-financial firms listed on Pakistan Stock Exchange (PSX) are selected for data analysis. Moreover, the panel data has been extracted for six years from 2010 to 2015. So, total number of observations become 474 (79 x 6) which fulfills the criteria of minimum sample size stated by (Hair, Black, Babin, & Anderson, 2010). (Hair Jr, Hult, Ringle, & Sarstedt, 2016) stated that minimum sample size can be calculated by multiplying the number of variables with 10. In this way, out sample should have at least 50 (5 x 10) respondents.

3.3. Data collection sources

The major data sources are secondary which include annual reports of the selected firms in our sample, official websites of the firms, regulating authority websites such as SBP, SECP, and PSX.

3.4. Data analysis tools

The collected data was organized in the excel sheet and then the data was imported in EViews 9.0 for statistical analysis. Different statistical tools were applied for data analysis purpose which included descriptive, correlation, regression and moderation analyses.

3.4.1. Panel data analysis

Panel data is referred to such data which has the mixture of two types of data set i.e. time series and cross-sectional. The first type of data can be defined as the collection of observations at different time intervals for a single subject while, cross-sectional data can be defined as the collection of observations at a single time for different subjects. In this research work, the data collected falls under the category of the panel data so the appropriate regression model has been used on panel data. The appropriate models related to panel data include "common-effect model, fixed-effect model and random-effect model". For appropriate selection of effect model two statistical tests named as "Redundant Test (Likelihood Ratio Test) and Hausman Test" are used.

3.4.2. Moderation analysis

According to (Olson, Parayitam, & Bao, 2007) a moderating variable can be defined as a factor or process that changes the impact of independent variable on dependent variable. The change occurs in the form of either strength or direction.

3.4.2. Conceptual framework

This research study includes three types of variables. These types include independent, dependent and moderating. Intellectual Capital (IC) has been taken as independent variable. Firm Value (FV) has been used as dependent variable. Managerial Ownership (MO) has been taken as moderating variable.

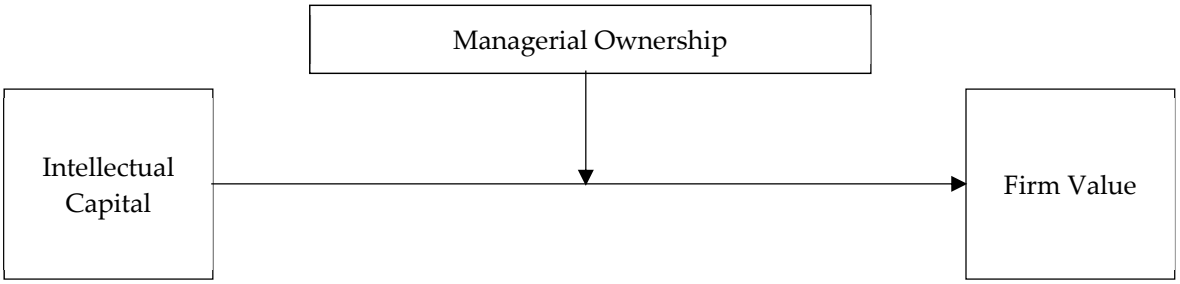

Figure 3.1 Conceptual Framework

3.5. Relationship among study variables

3.5.1 Independent variable (Intellectual capital)

VAIC model has been followed for the calculation of intellectual capital. The model was developed by (Pulic, 1998). Value Added (VA) component has been added in all components of intellectual capital. According to (Pulic, 1998) VAIC along with its three components can be calculated by using the formulas which are discussed afterwards. Value addition has been calculated through the following formula.

VA = OUT – IN – D

Where,

OUT = Total Sales Revenue

IN = Total Cost of Sales excluding Personnel Expenses

D = Depreciation Expense

Now, VACA (Value Added Capital Employed) is our first proxy which is used for VAIC. VACA can be referred as the measure of value addition which is obtained through 1 unit of physical capital. The formula used for the calculation is give below.

VACA = VA / CE

Where,

VA = Value Addition as discussed earlier

CE = Capital employed (Total Assets – Intangible Assets)

Now, VAHU (Value Added Human Capital) is calculated by using the following formula.

VAHU=VA/HC

Where,

VA = Value Addition

HC = Human Capital (Salaries and benefits of a firm's employees)

VAHU = Value Added Human Capital

It shows the value addition with respect to unit amount investment in human capital. In the last, STVA (Structural Capital Value Added) is used to measure the amount of structural capital investment to generate the value for the firm. The formula used for the calculation is give below.

STVA = SC / VA

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Where,
SC = Structural Capital (VA – HC)
VA = Valued Addition
STVA = Structural Capital Value Addition
Finally,
VAIC = VACA + VAHU + STVA

3.5.2 Dependent variable (Firm Value)

In this study, Tobin's Q (TQ) is used for the measurement of firm value. Following formula is used for Tobin's Q measurement (Maditinos, Chatzoudes, Tsairidis, & Theriou, 2011).
Tobin's Q = Total Market Value of the Company / Total Book Value of the Company

3.5.3 Moderating variable (Managerial ownership)

Equity holding of top executives in a firm is referred as managerial ownership (Hakiki & Ferdianti, 2015; Noradiva et al., 2016). It is normally presented in percentage.

3.6 Research hypotheses

On the bases of research questions, objectives and reviewed literature, following are the hypotheses of this research study.
H1: There is a significant relationship between Intellectual Capital and Firm Value.
H2: Managerial Ownership moderates the relationship between Intellectual Capital and Firm Value.

3.7 Econometric Models

On the bases of research question, objectives and hypothesis, different models have been used in this research study for estimation purpose.
Testing of First Hypothesis
$TQ_{it} = \beta0 + \beta1\ (VAIC)_{it} + \varepsilon_{it}$
$TQ_{it} = \beta0 + \beta1\ (VACA)_{it} + \beta2\ (VAHU)_{it} + \beta3\ (STVA)_{it} + \varepsilon_{it}$
Testing of Second Hypothesis
$TQ_{it} = \beta0 + \beta1\ (MO)_{it} + \varepsilon_{it}$
$TQ_{it} = \beta0 + \beta1\ (VAIC)_{it} + \beta2\ (MO)_{it} + \varepsilon_{it}$
$TQ_{it} = \beta0 + \beta1\ (VAIC)_{it} + \beta2(MO)_{it} + \beta3(VAIC \times MO)_{it} + \varepsilon_{it}$
Where;
β0 = Intercept Point
β1 – β3 = Respective Coefficient of Independent & Moderating Variables.
VAIC = Value Added Intellectual Capital
TQ it = Tobin's Q
MO = Managerial Ownership

4. Data Analysis and Results Discussion

4.1. Descriptive Analysis

Results of descriptive analysis are presented below in table 4.1. This table indicates that managerial ownership has highest standard deviation in current sample data i.e. 27.4763%. This shows that difference between minimum and maximum values of managerial ownership is higher as compared to other study variables.

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Table 4.1 Descriptive Analysis

Variables	Minimum	Maximum	Range	Mean	Median	Std. Dev.	N
VAIC	-6.8819	14.7807	21.6626	2.9675	2.6350	2.9237	474
STVA	-3.7974	4.2053	8.0027	0.4637	0.5515	0.8821	474
VACA	-0.2827	0.8841	1.1668	0.1845	0.1518	0.1720	474
VAHU	-7.9138	13.7426	21.6564	2.3193	1.8298	2.5809	474
TOBINS_Q	0.2737	9.7553	9.4816	1.4218	0.9357	1.3777	474
MO	0.0001	97.4792	97.4791	26.5109	14.7002	27.4763	474

4.2. Correlation Analysis

After analyzing the data with descriptive analysis, the researcher applied the correlation analysis and results are presented below. The correlation table-4.2 shows that VAIC, STVA, VACA and VAHU have positive correlation with Tobin's Q. The coefficient values for these variables are 0.284, 0.071, 0.533 and 0.261 respectively. The table further shows that MO has negative correlation with Tobin's Q i.e. -0.220. This shows that increase in managerial ownership will result in decrease in firm value which is in accordance with entrenchment effect.

Table 4.2: Correlation Analysis

	TOB_Q	VAIC	STVA	VACA	VAHU	MO
TOB_Q	1					
VAIC	0.284	1				
STVA	0.071	0.418	1			
VACA	0.533	0.547	0.034	1		
VAHU	0.261	0.954	0.129	0.541	1	
MO	-0.220	-0.267	-0.139	-0.209	-0.241	1

4.3. Assumptions of regression analysis

4.3.1. Stationarity of data

To check the stationarity of data the researcher has applied the "Panel Unit Root Test" with the help of Eviews. It is first assumption for the regression analysis. The data should be stationary. For this purpose, results of two tests have been analyzed i.e. Levein, Lin & Chu test, PP – Fisher Chi-Square test. If the value statistics are significant then our data is stationary. In the opposite case, it must be ensured that the data is stationary before running regression analysis. Table-4.3 shows that all study variable used in this study are stationary at level.

Table 4.3: Panel unit root test: Summary

Variables	Levin, Lin & Chu t	Prob.	PP - Fisher Chi-square	Prob.
VAIC	-37.646	0	385.45	0
STVA	-66.92	0	337.68	0
VACA	-65.329	0	273.243	0
VAHU	-39.341	0	389.611	0
TOBINS'Q	18.9846	0	249.402	0
MO	-188.65	0	286.805	0

4.3.2. Multi-collinearity

Now, the second assumption for regression analysis is the non-availability of multi-collinearity in our sample data set. Although, there are many tests in statistics which can be used to detect the multi-collinearity in our data set but the simple one is correlation analysis which is presented in table-3.4.

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This table is mini version of table-4.2 as it contains the correlation between independent variables only.

Table 4.4: Multi-collinearity Test Correlation between Independent Variables

	VAIC	STVA	VACA	VAHU	MO
VAIC	1				
STVA	0.418	1			
VACA	0.547	0.034	1		
VAHU	0.954	0.129	0.541	1	
MO	-0.267	-0.139	-0.209	-0.241	1

According to table-3.4 it is clear that almost all of our variables are free from multi-collinearity except the correlation between VAHU and VAIC is 0.954 which shows high multi-collinearity. But, as it is known that VAHU is a component of VAIC which means both are not used in any of regression model together so, no multi-collinearity issue exist in our data and regression analysis can be proceeded.

4.4. Panel Data analysis

All hypotheses in this study have been tested with the help of regression analysis. All preliminary requirements for running panel data regression analysis have been met. Now, our first hypothesis regression model is given below.

$$TQ_{it} = \beta 0 + \beta 1\ (VAIC)_{it} + \varepsilon_{it}$$ **Model No. 1**

Table 4.5: Regression Analysis—Model (1) Dependent Variable: TOBINS_Q

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.983782	0.085613	11.49105	0.0000
VAIC	0.147610	0.020703	7.129989	0.0000
R-squared	0.123372	F-statistic		10.95389
Adjusted R-squared	0.112109	Prob(F-statistic)		0.000000

According to table-4.5 it is clear that the coefficient of VAIC is positive i.e. 0.147610 and it has significant relationship with dependent variable i.e. Tobin's Q at 1% significance level. The values of R^2 and adjusted-R^2 for this model are 12.34% and 11.21% respectively. The reason behind these lower values includes the fact that VAIC is not the only predictor of firm value. F-statistic (10.95389) is also significant at 1% significance level which shows our model is significant. This result also shows that our first alternative hypothesis is accepted. Now researcher has also investigated the relationship between VAIC components and firm value i.e. Tobin's Q. So, the regression model for this test is given below.

Now, next regression model is developed in order to evaluate the impact of the components of VAIC and Tobin's Q

$$TQ_{it} = \beta 0 + \beta 1\ (VACA)_{it} + \beta 2\ (VAHU)_{it} + \beta 3\ (STVA)_{it} + \varepsilon_{it}$$ **Model No. 2**

Table 4.6: Regression Analysis—Model (2) Dependent Variable: TOBINS_Q

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.566060	0.083059	6.815180	0.0000
STVA	0.143679	0.060623	2.370056	0.0182
VACA	4.490265	0.361656	12.41585	0.0000
VAHU	-0.017034	0.024355	-0.699407	0.4846
R-squared	0.331486	F-statistic		28.82156
Adjusted R-squared	0.319985	Prob(F-statistic)		0.000000

According to table-4.6 it is clear that STVA is positive i.e. 0.143679 and it has significant relationship with dependent variable i.e. Tobin's Q at 5% significance level. Moreover, from table 4.6 it is also

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found that VACA is also positive i.e. 4.490265 and it also has significant relationship with dependent variable at 1% significance level. Furthermore, VAHU is negative i.e. -0.017034 and it has no significant relationship with dependent variable at 5% significance level. The values of R^2 and adjusted-R^2 for this model are 33.15% and 31.99% respectively. F-statistic (28.82156) is significant at 1% significance level which shows our model is significant. This component wise analysis shows that two components of VAIC positively affect the firm value while one component does not affect the firm value at all. Moreover, it is also found that VACA is more prominent in affecting the firm value while, VAHU is not affecting the dependent variable i.e. firm value in this data set.

4.4.1. Regression analysis (for moderation)

Now, the researcher has first checked the direct relationship between moderator i.e. managerial ownership and Tobin's Q with the help of following regression model.

$$TQ_{it} = \beta 0 + \beta 1\ (MO)_{it} + \varepsilon_{it}$$ **Model No. 3**

Table 4.7: Regression Analysis—Model (3) Dependent Variable: TOBINS_Q

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.716247	0.108035	15.88605	0.0000
MO	-0.011106	0.002229	-4.982760	0.0000
R-squared	0.049792	F-statistic		24.73312
Adjusted R-squared	0.047778	Prob(F-statistic)		0.000001

According to table-4.7 it is clear that the coefficient of MO is negative i.e. -0.011106 and it has significant relationship with dependent variable i.e. Tobin's Q at 1% significance level. The values of R^2 and adjusted-R^2 for this model are 4.98% and 4.77% respectively. The reason behind the lower value include the fact that Managerial Ownership is not the only predictor of firm value. There are so many other variables exist in literature which directly affects the firm value e.g. capital structure, dividend policy, corporate governance etc. Moreover, the negative effect of managerial ownership is very low as compared to other variables affecting the firm value. To check the model significance, F-test was also applied during the regression analysis and results show that F-statistic (24.73312) is also significant at 1% significance level. The relationship between independent variable and dependent variable is further tested in the presence of managerial ownership (MO). For this purpose, following regression model has been used.

$$TQ_{it} = \beta 0 + \beta 1\ (VAIC)_{it} + \beta 2\ (MO)_{it} + \varepsilon_{it}$$ **Model No. 4**

Table 4.8: Regression Analysis—Model (4) Dependent Variable: TOBINS_Q

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.241842	0.113844	10.90827	0.0000
VAIC	0.128245	0.021256	6.033457	0.0000
MO	-0.007566	0.002231	-3.390813	0.0008
R-squared	0.144481	F-statistic		11.24262
Adjusted R-squared	0.131629	Prob(F-statistic)		0.000000

According to table-4.8, it is clear that the coefficient of VAIC is positive i.e. 0.128245 and it has significant relationship with dependent variable i.e. Tobin's Q at 1% significance level. But, still the MO is negative i.e. -0.007566 and its relationship with Tobin's Q is significant at 1% significance level. The values of R^2 and adjusted-R^2 for this model are 14.45% and 13.16% respectively. Although in the presence of MO, VAIC is still positively affecting the firm value but MO also still have negative relationship with Firm value. To check the model significance, F-test was also applied during the regression analysis and results show that F-statistic (11.24262) is also significant at 1% significance level.

Now, to check the moderating impact of MO between VAIC and Tobin's Q, the researcher has introduced an interaction term in model number 12 before running the regression analysis. The

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interaction term has been obtained by multiplying the value of MO with VAIC and following regression model has been formed.

$$TQ_{it} = \beta 0 + \beta 1\ (VAIC)_{it} + \beta 2\ (MO)_{it} + \beta 3\ (VAIC \times MO)_{it} + \varepsilon_{it}$$ **Model No. 5**

Table 4.9: Regression Analysis—Model (5) Dependent Variable: TOBINS_Q

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.094837	0.142545	7.680653	0.0000
VAIC	0.175987	0.025804	6.820054	0.0000
MO	-0.002732	0.002611	-1.046583	0.2958
INTERACTION	-0.002177	0.000619	-3.516286	0.0005
R-squared	0.135608	F-statistic		24.57819
Adjusted R-squared	0.130090	Prob(F-statistic)		0.000000

According to table-4.9, it is clear that the coefficient of VAIC is positive i.e. 0.175987 and it has significant relationship with dependent variable i.e. Tobin's Q at 1% significance level. But, still the MO is negative i.e. -0.007566 and its relationship with dependent variable is insignificant at 5% significance level. But, here the significance of the individual variables is not concerned rather the researcher is concerned with the significance of Interaction term and it is clearly seen that Interaction Term (VAIC x MO) is negative i.e. –0.002177 and it has significant relationship with dependent variable which shows that moderation effect of managerial ownership is negative between independent variable and dependent variable. These results are also in accordance to correlation analysis results where managerial ownership was negatively correlated with Firm Value (Tobin's Q). The values of R2 and adjusted-R2 for this model are 13.56% and 13.01% respectively. To check the model significance, F-test was also applied during the regression analysis and results show that F-statistic (24.57819) is also significant at 1% significance level.

3.4.2. Effect size for moderation analysis—Model (5)

Now, to check the effect size of this moderation analysis the researcher has compared the R^2 values as suggested by (Champoux & Peters, 1987). The R2 values of model no.5 which is presented in table 4.9. With the help of values presented in table 4.9 the researcher has calculated the change in R2 i.e. ΔR2. The value of R2 in the presence of interaction term i.e. 13.56% is subtracted from the value of R2 in the absence of interaction term i.e. 14.45%. So, ΔR2 is -0.89% (13.56% - 14.45%). This shows that R2 has changed due to interaction term which means managerial ownership has moderated the relationship between independent variable i.e. intellectual capital and dependent variable i.e. firm value and effect size is -0.89%.

5. Conclusion and Recommendations

5.1 Conclusion

Investigation of relationship between independent variable i.e. intellectual capital and dependent variable i.e. firm value was the first objective of this study and it is achieved fully i.e. VAIC is affecting firm value significantly and relationship is found positive. The results are in accordance with resource-based theory as well as with the studies of (Berzkalne & Zelgalve, 2014; M.-C. Chen et al., 2005; Nejati & Pirayesh, 2015; Noradiva et al., 2016; Nuryaman, 2015). In case of component-wise analysis it is concluded that two of three components of VAIC i.e. VACA and STVA and positively as well as significantly related to dependent variable i.e. firm value among which VACA is more prominent due to higher positive value of its co-efficient while, VAHU has insignificant relationship with firm value. Investigation of role of managerial ownership between independent variable i.e. intellectual capital and dependent variable i.e. firm value, was the second objective of this study. More specifically, the moderating role of managerial ownership between independent and dependent variable is tested. A negative and significant moderation effect of managerial ownership is concluded between independent and dependent variables. The negative relationship shows that

managerial ownership has followed the entrenchment effect instead of interest-alignment effect as concluded by (Chen & Chuang, 2009; Noradiva et al., 2016).

5.2 Recommendations

It is strongly recommended that managers should take initiatives to invest their resources more in intellectual capital because it has proved to be positively affecting not only the firm performance but firm value as well. This study has also shown an inverse relationship between managerial ownership and firm value supporting the entrenchment effect therefore, the role of board of directors become crucial and they must take steps to either lower the level of managerial ownership in order to mitigate the entrenchment effect or they should monitor their performance to ensure the alignment of interest between managers and shareholders.

5.3 Practical Implications

Future researchers must evaluate the other parameters of corporate governance as well which can provide more insight about the negative behavior of managerial ownership. It is also recommended to conduct a sector-wise analysis in order to check which sectors of our industry need more concentration regarding the effective resource allocation decision making. Moreover, the current research study can also be conducted by taking different sampling techniques used in this research work. Intellectual capital is not only important for non-financial sector but it is also important for financial sector therefore, it is also recommended that future researchers must evaluate these effects in financial sectors as well.

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