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RESEARCH PAPER

The Role of Intellectual Capital in Firm's Financial Performance in Pakistan

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ABSTRACT

The objective is to consider the significant impact of intellectual capital on firm's financial performance. The data was gathered from the Oil & Gas sector for the period of 10 years (2010-2020). The Panel data regression results were taken in order to examine the empirical relationships. The Fixed Effect (FE) model is to be accepted for the ROE & EPS and the random effect model is to be accepted for ROA. The Intellectual capital (IC) is considered as the unique organizational resource that can help to influence the business performance. However, the ineffective developments of the IC can adversely affect the performance of the business. It is found that human capital efficiency is notably increase the return on assets and earnings per share. The human capital efficiency does not show any relationship with return on equity. The structural capital efficiency put the firm towards better return on assets and return on equity. It is shown in the results that structural capital efficiency insignificantly explains the earnings per share. The relational capital efficiency is significant factor that improve the return on assets of firms. The relational capital efficiency does not show any role in the prediction of return on equity and earnings per share. It is derived from the results that capital employed efficiency significantly enlarge the return on equity of firms. The results have shown no significant relationship of capital employed efficiency with return on assets and earnings per share. The study contributed to the existing studies in strengthening the connection between the IC components and the FP of the business. The study would provide some valued perceptions for the business in order to capitalize the intellectual capital to endure the competitive advantage.

KEYWORDS EPS, Firms Financial Performance, Intellectual Capital, Oil & Gas Sector, Pakistan, ROA, ROE

Introduction

The need of the intellectual capital as the tactical asset having capability to produce a justifiable reasonable advantage over the time has recommended the intellectual capital (IC). IC is also to be considered as one of the main factors. It is deliberated the utmost treasured strategic asset for the firms. The accomplishment of the business is recognized on the effective administration of the possessions that are knowledge based (Gómez-Valenzuela, 2022). The IC has a progressive relationship with the corporate worth of the business. The IC consists of intangible assets that can be converted into profits (Ovechkin, 2021). The researchers can highlight the various elements of intellectual capital depending on the research goals. The various elements of intellectual capital have the ability to measure the fixed / physical assets of firm. It has added to the value of firm, as usually the firms are unable to measure the IC because the Intangible assets are reckoned in the balance sheet, that includes the goodwill, patents, and trademarks but, as we are aware that the IC is never displayed in the balance sheets (Naushad, 2019).

The intellectual capital in financial reports is valued because of the objective and quantitative financial information. Many of the studies have focused on modifying the VAIC by extending the lists of intellectual components (Goh, 2005; Ovechkin, 2021; Arsalan, 2015; Rehman, 2011; Nassar, 2018). Pakistan falls in the developing economies and studies have

been mostly conducted in banking sector. Haris (2019) researched on the IC performance with banks profitability. Rehman (2012) researched among the link of IC performance and the Banking sector corporate performance. Ahmad (2019) researched on the connection with the structural capital and the corporate performance in Pakistan's textile sector. Arsalan (2015) studied the IC performance of the Gas & Oil sector of Pakistan and the influence on the corporate returns. It reveals that the IC efficiency has comparatively greater contribution for the acceleration of the monetary results of the oil & gas sector as compared to the physical / tangible assets. Less attention has been given to the Oil & Gas sector (Marketing Companies) of Pakistan and to achieve this purpose research on this sector was conducted.

Moreover, previous studies had some mixed or inconsistent findings. Various studies had positive, negative & insignificant results. Saeed (2016) found an affirmative relationship between the HC with corporate governance and there is adverse relationship between SC and the return on Equity. Aziz (2018) found a negative relationship between the IC and the market value and a positive relation between the HC & the SC with the ROE. Pablo (2021) also investigated the affiliation among the IC and the FP in the Colombian listed banking entities. The conclusion reached by them was the link between VAIC & the financial indicators along with the corporate value are varied and therefore a consistent result cannot be reached. Shaneeb (2021) found the impact of the IC on the FP in Indian textile industry. The outcome portrayed that the IC productivity has the substantial and affirmative connection along with the productivity and ROE of the Indian industry of textile.

Previous researches had major focus on the other sectors and in developed countries. Ovechkin (2021) considered the impact of the IC towards the firm financial performance of the Russian agricultural firms. As per our knowledge, no previous study has included the relational capital in the study for Oil & Gas sector of Pakistan. This study also tends to scrutinize the outcome of IC on the efforts of firm and shall provide its input to how important it is to reduce the energy crisis. Oil & Gas sector is considered as backbone of the economy and is considered as the most impactful sector of Pakistan economy (Zahid Mir– ICAP article, 2020). The segment has a substantial share in the growth of the economy and therefore it has great significance. The growth of this sector is considered as crucial in order to enhance the growth of the economy in Pakistan (Saleh, 2015). The Oil and marketing sector hit the worst problem when the prices were lowered in the country and the local companies were forced to sell at a price lower than their purchases imported price.

The purpose for the study is to investigate the intellectual capital and its components relationship with financial performance of firms. The study has analyzed the VAIC components (HCE, SCE and RCE) to identify the relationship with financial indicators (ROE, ROA and EPS).

Literature Review

IC states to the Ownership of knowledge, applied information, relationship with the customer and the specialized expertise that gives the business a viable edge in the market. It is the addition for all the intangible and the evidence connected resources and establishment of the value with the use of the organization (Edvinsson & Malone, 1997). The IC is divided in different types such as the HC, SC, and RC that are related to the knowledge-embedded personalities, managerial structures, procedures and systems. The Intellectual Capital (IC) enterprise classifies the IC such as the range of the outer and inner skills. The intangible assets allow the firms to change the physical / tangible assets and the financial, human resources interested in a system of value creation (Danilla, 2021). IC was defined as a knowledge that can be used through the organization in a directive to accomplish the business goals. It is seen as the intangible assets to help the company to sustain its operations (Yound, 2004).

Stewart (1997) describes the IC as the most valuable asset whose competence is to develop the growth of the business. Porter (1999) argued that in order to achieve success in any organization, which is competing in an environment, is the better engagement of the intellectual resources. Many previous researches have made an effort to improve original VAIC model some of the IC components were not included in the original VAIC model (Danilla 2021). Ulum (2017) in his study attempted to modify the model of VAIC with the addition of the relational capital in its framework. Ulum (2015) presented a revision of the Public's VAIC that was named mainly as the MVAIC. He also added the RC as the third component of VAIC duly measured by the marketing costs.

Xin Li (2020) in the study tried to discover the association among the IC, VC along with the performance of inventive companies and sectors. The observed analysis demonstrations that HCE & the CEE have a greatest impact on the viability of the corporations for a period of research and the RCE and the SCE are not related to it. Our study was conducted in comparison with the prior methodologies and thus supplements up the past literature that are concerned with reviewing the significant factors in the performance of the firm. As per our knowledge considering Pakistan, none of the authors has researched on the RC as the component of the IC for the Gas & Oil sector in Pakistan and thus we have included this variable in our study.

Under Pinning Theory

The Resource based theory is the underpinning theory that represent the strategic resources from other resources. The view of the firm is that it maintains a justifiable relative benefit in order earn higher profits with the ownership of the intangible assets (Riahi-Belkaoui, 2003). The RBT view is that the resources are the focal initiative for the competitiveness and the performance of the firm. The role of the tangible/ physical assets is recognized in the literature and the role of intangible assets is yet to be monitored and investigated on wider basis. RBT is one of the commonly accepted principles in the field of strategic administration (Newbert, 2007).

Human capital is explained for the employees of organization along with their characteristics such as their information, familiarity, obligation, knowledge and motivation (Stewart, 1997). The scholars in the arena are of the view that the HC is to be considered as the most important & vital component of IC because the firms are not able to achieve anything without it (Kianto, 2017). The development of the new knowledge needs some sort of level of existing information and knowledge, employee skills and proficiency as an essential part of the organization's innovation (De Winne & Sels, 2010). The Innovative and tell- informed employees possibly would progress with the different and revolutionary ideas (Anand, Gardner, & Morris, 2007). According to the pervious literature we hypothesized that,

H1a: There is significant relationship between Human Capital Efficiency (HCE) and ROA.

H1b: There is significant relationship between Human Capital Efficiency (HCE) and ROE.

H1c: There is significant relationship between Human Capital Efficiency (HCE) and EPS.

Structural Capital and firm performance

The structural capital is inclusive of the organizational processes, trademarks, databases, information systems, along with other elements of the intellectual infrastructure of the organization (Bontis, 2001). The structural capital tends to remain at the firm when the staff go to their respective homes and it consists of processes, methods and other processes (Malone, 1997). The structure capital includes different data, inventions, knowledge, organizational processes, culture, software & the hardware systems etc (Roos,

2005). It can be defined as the organizational knowledge contained in expertise, databases, and practices. It is mentioned for almost all of the administrative abilities that enable to respond to the needs of the market and various encounters. The SC (Structural capital) is the supportive set-up enabling the whole company to manage in the usual way. The SC can be used without diminishing its worth. There might be costs for the enhancements but for the negligible costs of re- use will be zero and hence it deserves a lot more of attention then it is currently given. According to the pervious literature we hypothesized that,

H2a: There is significant relationship between Structural Capital Efficiency (SCE) and ROA.

H2b: There is significant relationship between Structural Capital Efficiency (SCE) and ROE.

H2c: There is significant relationship between Structural Capital Efficiency (SCE) and EPS.

Relational Capital and firm performance

The relational capital represents all the resources that emerge from the relation network (Medina, 2011). It is termed as the capability to take the inflow of the data with the collaboration of the outward community consisting of contractors, suppliers, clients and Government (Bontis, 2008). Relational Capital (RC) is inclusive of all the permits, license, and contracts that are done with the contractors, vendors, suppliers, government and the society. It reflects the organizational capability to sustain relations between the stakeholder that includes the customers, suppliers and shareholders (Ordones, 2004). The relational capital is also known as social capital (External) referring to the value and the information surrounded through the relationship with its clients, dealers and associations (Edvinsson & Malone, 1997). According to the pervious literature we hypothesized that,

H3a: There is significant relationship between Relational Capital Efficiency (RCE) and ROA.

H3b: There is significant relationship between Relational Capital Efficiency (RCE) and ROE.

H3c: There is significant relationship between Relational Capital Efficiency (RCE) and EPS.

Capital Employed and firm performance

Capital employed depicts the value created by the efficacy of organization with the use of the relevant monetary resources (Arsalan, 2015). The CEE depicts that how the efficiently an organization creates the value with the use of its monetary capital is measured as the ratio of the VA to the CE. The capital employed is measured by book value of assets of the organization (Elvan, 2017). Xin Li (2020) conducted the study to observe the influence of IC and the value creation on the firm's FP. They determined that the CEE is the core components of the intellectual capital it integrates the efficiency of wealth. The constituents of the IC are considered as the important factors for the purpose in determining the accomplishment of the organization. Haris (2019) emphasized that the CEE measures the effectiveness of the CEE. A positive connection was seen between the CEE and the FP as reported by (Chen at al., 2005; Ting & Lean, 2009).

H4a: There is significant association with Capital Employed Efficiency (CEE) and ROA.

H4b: There is significant association with Capital Employed Efficiency (CEE) and ROE.

H4c: There is a significant association with Capital Employed Efficiency (CEE) and EPS.

The research conducted by Meihami (2014) to discover the connection of IC and firm performance of the business of the Iranian companies in the manufacturing sector. The relationship found by them was a positive one between the IC & the productivity of the

employee. Firer and Williams (2003) discovered the role of IC by the usage of VAIC. The VAIC identified the role in financial returns in accounting that are ROA (Return on Assets) and ATO (Asset's turnover). The IC is known as one the most valued tactical asset for the firm as its accomplishment and competitiveness is based on the administration of these strategic assets such as the HC, SC & RC etc. Kharal (2014) examined the consequence of IC on the performance of the organization in the Pakistani oil & gas industry. A positive relationship was established between the IC & the performance of organization in this sector. (Kujansvju, 2005). Ulum, Kharismawati & Syam (2017) evaluated the MVAIC in order to measure the performance for the Indonesian-banking segment. The outcome of the research substantiated that MVAIC model is detailed model to quantify the performance of IC that based on VAIC. Their study used the financial indicators such as ROA, ROE & PER, the data was extracted from the public firms in Indonesia.

Material and Methods

This research aims to identify the intellectual capital role in the prediction of financial performance of firms in oil and gas sector of Pakistan. For this purpose, the data is collected from the annual reports of the firms listed in the PSX from 2011-2020. The targeted oil and gas sector firms are selected based on intellectual capital information. The firms which have employed the intellectual capital like human capital, structural capital, capital employed and relational capital are comprised of sample of the study. The fixed effect model and random effect model estimation methods are employed due to diagnostic testing.

Estimated Model

The dependent variable is the financial performance and constituent of the IC as an independent variable. The study used these two measurements for greater understanding of the effect of the IC on the firm financial performance. The intellectual capital and its components are the most significant features that move the firms towards better performance. They can utilize the resources efficiently in getting the desired performance. The better use of skills, knowledge, capabilities and experiences lead the firm towards better position in the market. The study has developed the following model

$$FP_{it} = \beta_0 + \beta_1 IC_{it} + \varepsilon_{it}$$

In the above model, FP is categorized as Return on Assets (RoA), Return on Equity (RoE) and Earnings Per Share (EPS). The IC is the intellectual capital and it is comprised into human capital efficiency, structural capital efficiency, relational capital efficiency and capital employed efficiency.

Table 1
Measurements of the Variables

Variable	Measurement	Sources
HCE (Human Capital efficiency)	HCE is the proportion of the value added that is divided by the HC. Value added = Operating Profit + Employee Costs + Depreciation+ Amortization HC = Total expenditures invested on personnel HCE =VA/ HC	Ovechkin (2021) Hamdan (2018)
(SC)Structural Capital	Ratio of the SC divided by the valued added. Structural capital = (VA – HC) / VA	Ovechkin (2021)
(CEE)Capital Employed Efficiency	The ratio of the value added divided by the capital employed. CEE =VA / CE Capital employed = Equity + long term liabilities (Book Value of the net assets)	Ovechkin (2021), Arsalan (2015)
(RCE)Relational Capital Efficiency	The RC is calculated as the marketing expenses of the company	Diyanty (2019)

	RCE is measured by RCE=RC/VA	
Modified WAIC	VA= Operating Profit + Employee Costs + Depreciation + Amortization.	(Kunt & Huizinga, 1999)
Return on Equity (ROE)	Ratio of Net income to total shareholders' equity Net Income / Total Shareholder's equity	(Chan, 2009b), (Ovechkin, 2021)
(ROA)	Ratio of net income to the book value of the total assets. Net Income / Book Value of Total Assets	Hamdan (2018), Danilla (2021)
Earnings Per Share (EPS)	Market Prices Share / Prices Earnings Ratio OR Profit For the year / Weighted Average Number of Shares	Ulum (2017)

Results and Discussion

Descriptive analysis and correlation analysis

The descriptive analysis is reported in Table 1, indicating the average behavior of the variables. It is depicted that return on assets is having the average value 0.032, representing that most of the firms in oil and gas sector are in profit. The return on equity is showing the average behavior 0.033 while the standard deviation is 2.015. It is explored from the results that this sector has an extensive earnings per share. They are earnings the huge per share earnings. The human capital efficiency is showing the mean value of 4.63 with the standard deviation 5.25. The structural capital efficiency has the average behavior in oil and gas sector is 0.93. It is further notified from the descriptive analysis that relation capital and capital employed efficiency has the average value 0.029 and 0.429 respectively.

The results in Table 2 are correlation analysis, representing the correlation analysis. It is very difficult to draw the conclusion based on simple correlation analysis. It only represent the direction of variables. Keeping in view the correlation analysis, it is notified that all the variables partially correlated and there is no indication of high correlation. Hence, it is notified that no multicollinearity issue is found the in the model.

Table 2
Descriptive Analysis

Variable	Observation	Mean	Standard dev.	Minimum	Maximum
ROA	79	0.032	0.071	-0.296	0.174
ROE	79	0.033	2.015	-14.330	7.404
EPS	79	13.136	31.113	-130	86
HCE	79	4.63	5.25	-8.981	27.266
SCE	79	0.93	2.35	-2.196	20.576
RCE	60	0.029	0.157	-0.992	0.331
CEE	79	0.426	0.387	-0.217	2.679

Note: ROA = Return on assets, EPS = Earnings per share, ROE = Return on Equity, HCE = Human capital efficiency, CEE = Capital employed efficiency RCE = Relational capital efficiency, SCE= Structural capital efficiency,

Table 3
Correlation Analysis

VARIABLES	ROA	ROE	EPS	HCE	SCE	RCE	CEE
ROA	1.0000						
ROE	0.1174	1.0000					

EPS	0.7622	-0.0815	1.0000				
HCE	0.7207	0.0244	0.4517	1.0000			
SCE	0.0498	0.8158	-0.0487	0.0726	1.0000		
RCE	0.1040	-0.5105	0.0720	-0.0368	-0.4358	1.0000	
CEE	-0.224	0.2621	-0.2349	-0.1441	-0.0029	0.1154	1.0000

Note: ROA =Return on assets, ROE= Return on equity, EPS= Earnings per share, HCE= Human capital efficiency, RCE= Relational capital efficiency, SCE= Structural capital efficiency, CEE = Capital employed efficiency

Regression Analysis

The regression results in identifying the relationship of intellectual capital with financial performance of firms are presented in Table 3, 4 and 5. It is notified from the results that human capital efficiency is notably increase the return on assets and earnings per share. The better and efficient human capital leads the firms towards better financial performance. HCE has a noteworthy relationship with the FP (Chen, 2005; Xin Li, 2020). The efficient human capital can capitalize their skills and knowledge for the success of a firm. The human capital efficiency does not show any relationship with return on equity.

The structural capital efficiency put the firm towards better return on assets and return on equity. The firms which are maintaining the structural capital efficiently can improve their performance. A high level of structural capital would enlarge the financial performance of firms. It is shown in the results that structural capital efficiency insignificantly explain the earnings per share.

The relational capital efficiency is significant factor that improve the return on assets of firms. The high level of relational capital can move the firm towards better operational performance. They can make their performance better after having the high level of relational capital. The results are similar to the previous studies as conducted by Filip Sardo (2017) who concluded that the association between the RCE and ROA is positive. The relational capital efficiency does not show any role in the prediction of return on equity and earnings per share.

It is derived from the results that capital employed efficiency significantly enlarge the return on equity of firms. The results are similar to the findings of (Firer & Williams, 2003). Diyanty (2019) in their research concluded that the CEE and ROE were having a positive association among them. Our results are further supported with the study of Arsalan (2015) who concluded in his study that the association of CEE with ROE is positive. Hamdan (2018) found out that CEE had a positive relationship with the ROE.

Overall, the intellectual capital marks the financial performance better (Chen et al., 2005; Tan et al., 2007; Ulum, 2009a). The firms which are owing better and efficient intellectual capital can have better market position in terms of financial performance. These findings are consistent with (Tan, 2007; Chen et al., 2005; Khanqah et al., 2012; Vaz & Cabrita, 2005; Maviridis, 2005; Goh, 2005; Rehman et al., 2011; Jian et al., 2006; Cabrita, 2008; Bontis, Tseng & Goo, 2005; Makki et al., 2008).

Table 4
Estimation results between intellectual capital components and return on assets (Random Effect Model)

Dependent Variable is ROA				
Description	**Coefficient**	**Standard Error**	**Z-Value**	**P-Value**
HCE	0.009238	0.0022879	4.04	0.000
SCE	0.046144	0.0216559	2.13	0.033
RCE	0.257697	0.0201688	2.87	0.004

CEE	-0.035066	0.0311265	-1.13	0.260
R-Square	0.4692			

Table 4
Estimation results between intellectual capital components and return on Equity (Fixed Effect Model)

Dependent Variable is ROE				
Description	**Coefficient**	**Standard error**	**T-Value**	**P-Value**
HCE	-0.17166	0.03800	-0.45	0.670
SCE	4.31740	1.15696	3.73	0.014
RCE	10.0474	5.06766	1.98	0.104
CEE	1.39511	0.26026	5.36	0.003
R-Square	0. 4868			

Table 5
Estimation results between intellectual capital components and Earnings Per Share (Fixed Effect Model)

Dependent Variable is (EPS)				
Description	**Coefficient**	**Standard error**	**T-Value**	**P-Value**
HCE	4.078799	0.6760	6.03	0.000
SCE	-4.049748	7.9557	-0.51	0.613
RCE	13.03138	38.237	0.34	0.735
CEE	-7.51499	7.3751	-1.02	0.313
R-Square	0.4654			

Conclusions

The study aims to identify the intellectual capital and financial performance of firms in oil and gas sector of PSX. The intellectual capital is divided into human capital efficiency, structural capital efficiency, relational capital efficiency and capital employed efficiency. The final performance of firms are return on assets, return on equity and earnings per share of firms in Pakistan. The target population was non-financial firms in oil and gas sector of Pakistan Stock Exchange. The time frame is covered into 2010 to 2020. The fixed effect model and random effect model are applied based on Hausman diagnostic testing. It is found that human capital efficiency is notably increase the return on assets and earnings per share. The human capital efficiency does not show any relationship with return on equity. The structural capital efficiency put the firm towards better return on assets and return on equity. It is shown in the results that structural capital efficiency insignificantly explains the earnings per share. The relational capital efficiency is significant factor that improve the return on assets of firms. The relational capital efficiency does not show any role in the prediction of return on equity and earnings per share. It is derived from the results that capital employed efficiency significantly enlarge the return on equity of firms. The results have shown no significant relationship of capital employed efficiency with return on assets and earnings per share.

Recommendations

The study used ROA, ROE & EPS whereas Assets Turnover, Sales Growth, Fixed assets Turnover can be used for future studies. Our main contribution was to test the relational capital efficiency against the financial indicators of the industry. Similar studies for the developed countries can be done to scrutinize the various relationships of the study in future.

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