Investigating the Relationship between Intellectual Capital and Financial Performance in Cement Sector firms in Pakistan

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Abstract
The study examines the relationship between intellectual capital performance and financial performance of cement sector firms listed on Pakistan stock exchange. The study has been conducted using human capital, structural capital and relational capital as the determinants of intellectual capital and return on assets as the proxy of financial performance. The study applies random sampling technique for 20 cement sector firms for the period 2007 to 2016. The study uses correlation and simple OLS to test the hypothesis. The results reveal that intellectual capital as a composite and all its determinants i.e. human capital, structural capital and relational capital have positive significant impact on the financial performance of cement sector firms. The study has practical as well as theoretical implications. The results are expected to help policy makers to rehash their policies by encompassing the approaches that facilitate the intellectual capital of their firms. The study will also help researchers in strengthening their level of understanding of these relationships. Replication of the study may help to validate the hypothesized model and their consequent application in the organizations that share somewhat similar organizational structures.

Key words: Intellectual capital, Correlation, Regression, Cement Sector, Pakistan.

1. Introduction
Most of researches in the area of intellectual capital have been conducted in the developed countries and very rarely the same area has been explored in developing world like Pakistan. The developed world has recognized the importance of intellectual capital as the important financial performance indicator, helping in their competitive advantage. Some of the researches in developing countries have also explored the measurement, valuation and disclosure of the intellectual capital (Kamath, 2008). Intellectual capital has got much importance and attention in the minds of researchers. Due to the conduction of these researchers, it has been widely explored by many researchers (Abeseyekera and Guthrie, 2004). The Business environment has changed a lot in nearest past. The
Competition across the organizations to have core competence has been emerged and is considered very important. The companies now mostly focusing on their intangible assets as there is moving diversion of the companies from production concern to service concerns. So the importance of intangible assets has increased. Innovation and creation is mainly due to the best practices of intangible assets. Similarly, a study was also conducted by Roos (2012) who argues that organizations is highly dependent upon the human capital, as human can contribute as up gradation and development of the organization. Due to this reason the element of human capital is very vital for heavily competitive edge. Considerable importance performance of human capital generates sustainability and success for the firms in future. So organizations are intended to maximize the human capital resources effectively and efficiently utilize it, in best direction to obtain results in term of profitability productivity. (Roos, Pike & Ferstrom, 2012). In business point of view, capital, referring to as such kinds of assets that determined the future cash flow in business cycle. So, the most important and necessary kinds of assets in the nature of business are there tangible assets, because it is very important for the smooth running of business firms. So from these prospective we have needs to focus on the firm’s tangible capital which is referred as physical as well as financial assets of the firm. The value of these kinds of assets can be determined through periodically by public sectors listed companies and would be found and reached easily on the balance sheet of the company’s financial records. So here we have mentioned such kinds of physical assets as land, buildings, machinery, stock inventory, plants, and trucks and so on. Whereas financial assets can be refers to as the working capital, share owners’ equity, retained earnings, prepaid expenses, and accounts receivable etc. In the other hands intangible assets are such kinds of assets as the skills and knowledge of the workforce and its environment, are largely becoming very vital towards forecasting or determining future profits and gain of business entity.

Therefore such kind of physical assets are remaining broadly invisible to the outsider world and also many internal as well. Similarly Thomas Stewart, a founder of the study have also documented that the intangible assets would be credited with having refers to these assets of the organization i.e. the HC, the SC and the RC. While in contrast, Kamran (2008) argued that the intellectual capital has positive significant impact on the financial performance. They analyzed 150 firms for the purpose of analysis and applied correlation and regression techniques. The firm’s Human Capital (HC) represents the employee’s skills, knowledge and talent that are very important to perform the everyday or routine duty tasks, which are closely related to the firm’s core strategy. While the Structural Capital (SC) represent the firm’s knowledge applications systems, information system and databases systems, processes system and some other infrastructure which help and facilitate the strategy of the firm. Similarly Relational Capital (RC) represents the outsider associations of the companies supplier and their customer that gives intellectual support to facilitate and also to makes available the sale of goods and services in an effortless manner or to takes account of the information integrated in business network, which includes relationship outside the business organization such as customer loyalty goodwill and supplier relations.

Young et al. (2006) documented in his study that the industrial revolution which start from the mid-18th century in UK was a great changeover to newly manufacturer
procedure that have cause a huge scale production. Those firms which have easily approached to some new and advance manufacturing system or machineries, equipment, and so on and also have sufficient assets will must have leading position at their competitive world. While as on 21st century the success of any economy is closely dependent upon the knowledge, information, skills, innovativeness, creativity and critical thinking to lunch very new product in market. The equipment of innovation and creativity are gained from the knowledge and thoughts of concerned employees. Through olderways preparing a financial report worksheets have not be measured and considered as cost efficient and suitable.

In previous studies, Bonits et al. (2000) examined the relationship between intellectual capital and firm’s financial performance. They found the positive significant impact of intellectual capital on firm’s financial performance. Similarly, they argued the following model which also shows the significant correlation of Intellectual Capital and Financial Performance of an organization. According to their study Intellectual Capital can affect the financial performance of the organization in fact financial report measures the short term physical assets which are not adequate to determine the true value of a corporation. Therefore the corporations have recently focus on the usefulness of the intellectual capital that leads to the invisible and also the intangible resources of an organizations that can’t have fully entrance by old ways of financial reports (Young et al., 2006). Roos et al. (1997) documented and examine the intellectual capital from two different ways, one of them is the internal side of the firm and the second one is at the external side of the firms. The first one is to the best allocation to paid resources or means, increasing the efficiency and decreasing the cost of the organizations, the second aim is to gives attention to information needed the real or actual investment of the firms to be able about the forecast of future progress and developmental long term plan, which is also called as strategy of the firms. He argue that all these objectives can be obtained through modern measures of accounting.

While In this research study IC is measured through Structural Capital, Human capital, and Relational Capital with the help of using pulic (2000) Value Added Intellectual Coefficient (VAIC) model or simply called pulic model. Pike and Ferstrom. (2012) analyzed and found the positive and significant impact of Intellectual Capital on firm financial performance. While Young et al. (2006) evidenced that there is positive but insignificant impact of intellectual capital on firm’s Financial Performance (FP). While in contrast, Dias (2000) also evidenced a positive significant relationship between Intellectual Capital (IC) and Financial Performance (FP), similarly the relationship between IC and market capitalization has also been analyzed by some previous researchers documenting positive relationship between intellectual capital and market capitalization. (Abeseykera & Guthrie, 2004; Roos, Pike & Ferstorm, 2012). Wang (2011) analyzed non-financial firm for investigating the relationship between intellectual capital and market capitalization and found that intellectual capital has a positive significant impact on the market capitalization of a firm. Similarly, Chang (2007) also investigated the relationship between intellectual capital and market capitalization and evidenced a positive relationship between intellectual capital and market capitalization. While in contrast, Very few studies have been conducted, investigating the relationship between financial performance and market capitalization. Like Sultan (2014) analyzed the
relationship between financial performance financial performance and market capitalization. The study found that as the financial performance increases of a firm, it will directly affect the market capitalization positively. This study is conducted with the aim to achieve the following objectives.

- To measure and evaluate the intellectual capital performance of the listed firms in cement sector on Pakistan stock exchange.
- To examine and investigate the impact of intellectual capital on the financial performance of these listed firms.

2. Literature Review

Itami (1987) investigated that intellectual capital is the most important and vital value indicator of the business organization for the growth in this smart and aggressive capitalistic globe; still it has faces so many obstacles remain to be clear regarding its introduction and definition as well. So till to date intellectual capital is not defined in the same way across the world and sectors. Itami(1987) was one of the earlier contributors who defined the intellectual capital as the intangible assets that comprises of firms technology, loyalty of customer, the brand name, trademark, goodwill of the firms and so on. Similarly Stewart (1997) has documented in his study regarding intellectual capital definition, he asserts that intellectual capital is a concept that describe all three elements of intellectual capital. He furthermore explained that human capital is the combination of the sum of innovativeness, creativity, skillful employees, employees thinking, employees mindset, seniority of employees, employees turn-over rate, employees experiences, and some other skills like learning skills of employees. On the other hand structural capital as the availability of knowledge though collection of highly using the most efficient and effective tested, incorporated, organized as with the irrelevant portion separated out before division. While in similar study Edvisson and Malonev (1997) describe that intellectual capital is the mixture of some components like human capital, structural capital and relational capital.

Bontis et al. (2000) argued that successful corporations taking care of their employees knowledge instead of their tangible assets such as land, building, machinery and equipment. As employees knowledge is the backbone of the company’s development. A financial statement such as balance sheet does not show the true value creation of those activities obtained through its intangible assets. This competitive knowledge has deeply focused on the skills and competencies and refers to the one of the most vital and thoughtful business plan, i.e. intellectual capital. Similarly, they have argued that intellectual capital have positive significant impact on the firm’s financial performance and goodwill. Intellectual capital has got much importance and attention in the minds of researchers. Due to the conduction of these researchers, it has been widely explored by many researchers (Abesekera & Guthrie, 2004). The Business environment has changed a lot in nearest past. The Competition across the organizations to have core competence has been emerged and is considered very important. The companies now mostly focusing on their intangible assets as there is moving diversion of the companies from production concern to service concerns. So the importance of intangible assets has increased. Innovation and creation is mainly due to the best practices of intangible assets.
Similarly, a study in the same area was also conducted by Seviby (1998) who represents the kinds of intellectual capital performance and their effects on the internally structure and externally structure with the individual or employees competences need to deal with situation and concerned with some stated or disclosed information, knowledge, creative skills, practical experiences, value related judgment and social network. In the other hand internal structure being the combination or sum of the evident or patents documents controlled, concepts, patterns, computer skills and management systems, While in the other hand of external structure which is communication of customers with suppliers, which involves the brand name, goodwill, reputation and trademarks etc. Johnson (1999) have investigated that intellectual capital is the combination of some components i.e. the human capital, the structural capital and last one is the relational capital, in which the human capital are treated as the ideal capital. It represents the employee’s skill, knowledge, attitude and talent. In context to this study structural capital represents the innovative capital which will be comprises as the trade marks, patents, copyrights and knowledge application as well and combined with process capital as work procurements and business secrets; similarly relational capital indicates the relationship with customers, suppliers and group of interconnected global world.

Edvinsson and Malone (1997) Argued that human capital is the individual talent, skills, informative knowledge, competencies and the experiences expertise of the whole or entire staff members and the management of a corporation, comprises of the creativeness and innovativeness as well as the capacity of the corporate organization. While in the other hand the structural capital is a defensive framework that paid physical shape and balance of power to human capital which consists of some tangible system using for the relationship and communication or for safeguarding of intellectual material. Similarly relational capital refers to the customer satisfaction, strength, price stability and the financial power of long term clients. Marr and Roos (2005) have conducted a study in which they have investigated that the intellectual capital has positive significant impact on the financial performance of firms. They argued that intellectual capital can be considered as a thoughtful as well as knowledge founded assets of the organization. In organization should needs to determined that how much and how possibly change in these intangible assets can helps to keep vital and crucial important objectives toward the effort and value of the organization. Similarly they have asserted that the property growth can be achieved with the help of some knowledge based economy. Furthermore they have asserted the intellectual capital as a key indicator of the financial performance. In this context the review of literature indicates the importance of intellectual capital on firm’s financial performance.

Miller et al. (1999) also conducted a similar study, in which they are described the feelings of manager toward the importance of the intellectual capital. In this regards, they explained that manager have widely and greatly stressed on intellectual capital performance with the firm’s financial performance and they concluded that there is positive and significant impact of the intellectual capital on the firm’s financial performance. Similarly, Van Buren (1999) documented that intellectual capital is closely related with firm’s financial performance. Low (2000) observed the importance of the non-financial assets and their effects on company financial performance. He found, it significantly associated with one another. Riahi-Belkaoui (2003) has examined the...
relationship of intellectual capital with financial performance. The results of the study show the positive and significant correlation of intellectual capital with the firm’s financial performance. He asserted further that the circumstances must be collective with to highly maximize the company performance. Some other empirical studies that show the positive and significant impact on non-physical assets on both of the firm’s financial performance and inventory returns (Wright et al., 1994). Similarly study was conducted by Aboody and Lev (2000) which shows the impact of intellectual capital on current and future operating earnings which represented very strong correlation. According to some other field of studies like chemical industry for example showed that increase in research and development (R&D) investment have doubled the operating profits (Low, 2000). Muhammad and ismail (2009) conducted a study using 18 Malaysian financial firms, and found a positive and statistically significant impact of the firm’s intellectual capital on financial performance. Similarly, Knappet al. (1999) suggest that when a firm efficiently manages their resources of intellectual capital will be more able to obtain a very strong competitive edge over their competitors or other companies and will also be better than those companies which have not some proper control over their human resources. Similarly, Ting and Lean (2009) have also conducted a study in the same area and mentioned that financial performance and intellectual capital have positively and significantly associated with each other. During their study they used pulic model value added intellectual coefficient (VAIC), the result of study show that intellectual capital and return on assets are positively and statistically significantly associated with each other. Furthermore the study results revealed that all the three kinds of VAIC elements closely and positively associated with firm’s profitability.

2.1 Theoretical Framework
After the review of relevant literature, the following theoretical framework has been developed.

![Theoretical Framework Diagram]

2.2 Research Hypothesis
H1. Intellectual capital has positive significant impact on the financial performance.
H2. Human capital has positive significant impact on the financial performance.
H3. Structural capital has positive significant impact on the financial performance.
H4. Relational capital has positive significant impact on the financial performance.

2.3 Operational Definitions and Measurement
2.3.1 Value Added Intellectual Coefficient (VAIC)
Value added intellectual coefficient can be used to determine, analyze and to measure the economic income as well as to measure the level of intellectual capital toward contribution and value creation of the firms. Pulic (2000) measured the IC as
VAIC = HCE+SCE+RCE. So in this study the same above measurement technique is followed for the calculation of firm’s intellectual capital.
VAIC = HCE+SCE+RCE

HCE means the human capital efficiency, SCE represents the structural capital efficiency, RCE represent Relational capital efficiency, in this study intellectual capital can be represents as the sum of human capital, structural capital and relational capital.

Human capital = Value added / Human Capital
Structural capital = Structural Capital / Value Added
Relational capital = Value Added / Relational Capital

So the above mention variables of the model can be measured through using the following procedure:

VA = Output − Input

Here in this study where inputs of the firms are represented by its resources and costs while in the other hand output consists upon revenues of the firms. However, Stahle and Aho (2011) have also provided some different way to measure the value added:

Value Added = Operating profits + Cost + Depreciation + Amortization

VAIC is the sum of human capital, structural capital and relational capital

Where as

Human Capital = Cost of employee wages + salaries
Structural Capital = Value Added − Human Capital = Operating profit + Depreciation + Amortization

However the value of RC can also be measured by deducting value of intangible assets from total assets of the company.

Relational Capital = Total Assets − Intangible Assets

2.3.2. Return on Assets (ROA)

Return on Assets is the measure of financial performance, which will be measured as, Net Profit / Total Assets of a firm. The same measure was used by Costa (2008).

2.3.3. Model Specification

The following models have been used to test the hypothesis of the study.

ROAi = β0 + β1 ICit + β2 HCit + β3 RCit + β4 SCit + εit

3. Research Methodology

3.1. Types of Research

This is a quantitative research study. The data was quantitatively analyzed.

3.2. Population and Sampling

The population is the total number of observations available in any sitting for the research or investigation. The population of this study is all listed firms of cement sector firms in Pakistan. This study applies random sampling technique for the data analysis of this research. Total 20 firm’s data was included in the data analysis for the period of 2007 to 2016.

3.3. Data Collection and Techniques
The data for the analysis of study was collected from the annual reports of the firms, relevant data available on Pakistan stock exchange and data available on the state bank site also used.

**Statistical Techniques and Tools**
The data of this study was analyzed through statistical techniques like Correlation and regression.

### 4. Results and Discussion

#### 4.1 Correlation Analysis

The table 1 shows the results of a correlation of the study. The results indicate that intellectual capital is positively significantly correlated with the firm financial performance proxy, i.e., return on Assets. This documents that as the value of this ratio increases there will be an increase in the financial performance. The correlation results also reveals that HC, SC and RC significantly positively correlated with the financial performance proxy i.e. ROA, which indicate that as the level of firm HC, SC and RC increases the financial performance of a firm tends to increase.

**Table1: Pearson Correlations analysis**

<table>
<thead>
<tr>
<th>Variables</th>
<th>ROA</th>
<th>IC</th>
<th>HC</th>
<th>SC</th>
<th>RC</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IC</td>
<td>.266</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HC</td>
<td>.210</td>
<td>.199</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC</td>
<td>.123</td>
<td>.024</td>
<td>.130</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>RC</td>
<td>.143</td>
<td>196</td>
<td>.129</td>
<td>.021</td>
<td>1</td>
</tr>
</tbody>
</table>

#### 4.2 Regression Results

Table 2 shows the effects intellectual capital and their determinants on the financial performance of cement sector firms in Pakistan. The results document a positive significant impact of IC on the financial performance, as the tabulate T-value is 2.123, which is significant at 5% probability level. The results also report positive significant impact of the intellectual capital, determinants i.e. HC, SC and RC. All these three variables showing positive significant impact on the financial performance proxy. The t-values of all these three variables are significant at 5% probability level. The explanatory power of the model is quite satisfactory as the R-square value tabulated is 0.45, which documents that 45% changes in financial performance (ROA) is caused by the set of predciting variables of the study. The F- value is statistically significant at 5% probability level, which indicates that the overall model is statistically fitted and significant. The multicolinarity statistics show that there is no multicolinarity issue in the data. The tabulated values of tolerance and variance inflation factor (VIF) are within the acceptable ranges, thereby documenting that no multicolinarity issue in the data of the study. As per Gujarati (2004) the value of VIF for a variable should not exceed 10, however the tabulated values of all explanatory variables are less than 2, which predict non- existence of multicolinarity in the data.
5.1. Conclusion

The study has been conducted with the aim to find and investigate the relationship between intellectual capital and financial performance of cement sector firms. The study has been conducted using intellectual capital as composite and its determinants i.e. HC, SC and RC and Return on asset has been used as the proxy of the financial performance. The study has used random sampling technique for the 20 cement sector firms for the period 2007 to 2016. The final results have been predicted on the bases of simple OLS and correlation. The results revealed that intellectual capital as a composite has positive significant impact on the financial performance. Muhammad and Ismail (2009) also predicted similar findings. The results indicate that HC has positive significant impact on the financial performance, which is in line to the findings of previous researchers (Ting and Lean, 2009; Muhammad and Ismail, 2009). Similarly the results found that SC and RC have positive significant impact on the financial performance. Similar findings were documented by Stahle and Aho (2011). The study has some policy implications. This study will help the decision makers and top management of the cement sector to overlook on these key areas of their firms to tighten their polices and take remedial actions if they feel weaknesses in the practices of intellectual capital. Similar studies can be conducted in future using market capitalization as another dependent variable or mediating variable. Similar studies can also apply structural equation modeling rather than simple OLS.

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