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Intellectual Capital Efficiency and Sustained Competitive Position of KSE-100 Index Companies in Pakistan

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Abstract
Intellectual capital is a value creating a tool that makes it possible to deploy firm's tangible and intangible array of resources in such a way that no other can access or duplicate it in the industry, and led towards the sustained competitive position. The study evaluates the performance of 100 top performing companies listed on Karachi Stock Exchange that remain at the competitive position for last five consecutive years during the period 2009-2013. A panel data set has been compiled from the audited annual reports of the KSE 100 index companies covering the period 2009-2013, and panel regression analysis are utilized. Value added intellectual coefficient (VAIC)" methodology is utilized to measure the intellectual capital efficiency and acts as an independent variable in explaining the firm competitive position in terms of profitability, productivity and market capitalization. Empirical results suggest that intellectual capital efficiency is found to be significant determinants in explaining the KSE 100 index companies. Other explanatory variables such as firm size, leverage, firm's physical capital intensity, and book value of the company also found to be statistically significant with expected signs in the panel regression analysis.

Key Words: Intellectual capital efficiency, KSE 100 Index Companies, Market Capitalization, Sustained Competitive Position, Pakistan.
JEL Classification: G14, M15, M41, O34

Background Information

Intellectual capital is a source of innovation for effective implementation and maintenance of intangibles (Handy, 1989; Amir & Lev, 1996; Brooking, A, 1996), that leads towards modernization of knowledge and sustainability in any institution in the longer term perceptive (Teece, 2000; Stewart, 1994). In fact, "Intellectual" is derived from word intellect means intelligence, mental power and caliber and "capital" means wealth or resource, so "intellectual capital" is better utilization of resources with the help of human caliber or intellect for gaining profit or advancement of an institution. Stewart (1991, 1997) enlightened it as a brain power and source of systematic guidelines for better working of an organizational resource for gaining profitability

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while Sveiby's (1998) linked it as a value creating tool with knowledge management (Zhou & Fink, 2003). This phenomenon requires continued up gradation of knowledge (Roos, 1997; Edvinsson 1997) and proceed as a main cause of organizational renewal (Ståhle& Hong, 2002; Seetharaman et al., 2002).Further Lynn (1998) and Roslender et al. (2006) explained that up gradation of human capital work activities as well as proper rehearsal is essential for better execution of intellectual capital. Otherwise, it becomes a source of burden for the organization. However, Stam (2009) enlightened that sometimes too much upgradation causes anxiety among employees for leaving old skills and adapting new one and makes intellectual capital to act as liabilities. In short, "Intellectual Capital" collectively specifies as the resources that determine the value of an institution".

Review of Literature

The word "Intellectual capital efficiency" means efficiently adoption of constitutions of intellectual capital for overall worth enhancement of an institution by making appropriate investment (Pulic, 2000). The idea of intellectual capital efficiency is utilized as standard for better estimation of financial and intellectual resources of an enterprise.Paulic (2004) categorized it into Human capital efficiency and structural capital efficiency for employees. Human capital is most imperative constitute not only for intellectual capital but also for effective working of an organization. As skilled workforce grant more opportunities for better outcome more effectiveness with respect to material and time and this leads toward achievemnet of advantage (Hudson, 1993). Bontis (2000) considered human capital as a source of innovation and also act as source for renewal of skills, processes and knowledge of an organization. Edvinsson and Malone (1997) also enlightened human capital as a major cause of wisdom, ability, inventive, education for getting desire objective of the enterprise. Flamholtz and Main (1999) argued that skilled labor has become a major cause for getting opportunities and it leads towards better performance. It is also considered as investment of an organization with respect to its future prosperity (Roselender, 1997). Thus, Human capital efficiency stands for efficient consumption of workforce for value creation of the organization.

While Structural capital efficiency consists of all processes and instruments that are directly or indirectly associated with job related activities of institutions, and defined it is a way of exceptional information flow within and outside the enterprise. J., S. (2006) enligthed this term structural capital as a measure of strength of the institution. Thus, both human capital and structural capital efficiency (SCE) are imperative for effective utilization of organizational resources and its long term improvement.

In view of potential benefits associated with the intellectaul capital effeciency, a wide array of empirical studies[1] have been found relating the organization perofrmance and intellectual capital effeciency both in case of developing and developed economies, small and medium sized, commercial and non-commerical enterprises.Unlike

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developed economies, advancement of technology and innovation started in late twenties in Pakistan and that's the one reason that intellectual capital efficiency phenomenon is first time investigated in case of Lahore Stock Exchange companies by (Makki and Lodhi; 2008, 2009 and 2010). Afterwards Bharathi (2010) and Rehman et al. (2013) extend VAIC analysis of banking and insurance sector in Pakistan, but still a large number of top performing and benchmark companies like KSE 100 index companies are remaining unverified for this investigation. In this regard, the present study attempts to fill this gap and investigate this phenomenon in the case of KSE 100 index companies. It is worth mentioning, that Karachi Stock Exchange Ltd (KSE) is the Pakistan's largest and one of the oldest stock exchanges in South Asia in terms of market capitalization. With many national and international organizations listings, and the top 100 index companies are the benchmark for efficient performance as selected in index formation process on the basis of very competitive criteria as follows: 1) capital efficiency (25%); 2) profitability (25%); 3) free floatation of shares (7.5%); 4) turnover of shares (2.5%); 5) corporate social responsibility (2.5%); and 6) transparency and investors relations and compliance with listing of companies and securities regulations (22.5%). Undoubtedly, It is the KSE 100 index companies' technical, physical, capital and most important intellectual capital that might have played an influential and unbeatable role.

The study revolves around two objectives: first to determine the sector wise level of intellectual capital efficiency in the case of selected KSE 100 index companies; and second, does intellectual capital efficiency contribute in explaining the KSE 100 index companies performance or not? To measure the intellectual capital efficiency, the most popular "Value added intellectual coefficient (VAIC)[2]" technique introduced by Paulic (2004) is utilized and VAIC is calculated for only those top performing companies that are remaining in the index during the whole study period i.e. 2009-2013. Company's performance is measured by profitability and productivity indicators such as return on the asset's return on equity and asset turnover ratio while company's market capitalization is used as a proxy for company's market performance.

The rest of the paper is organized as follows. Section II builds up a theoretical framework underlying this study, Section III elaborates on the model specified, data utilized and research methodology undertaken in this analysis. Section VI describes the empirical findings and section V concludes the discussion.

Theoretical Model

Rahman and Ahmed (2012) identified three major benefits of applying the concept of VAIC methodology: 1) It provides a standard and consistent basis of measuring the value of intellectual capital and thereby firm value, allowing effective conduct of an international comparative analysis; 2) All data used in the VAIC calculation is based on audited information taken from financial statements (Pulic, 1998, 2000) such as the balance sheet or the profit and loss account, and therefore, the calculations can

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To study the impact of intellectual capital efficiency on KSE 100 index companies' competitive advantage, a theoretical framework has been adopted from " The Resource-Based View of the Firm's Competitive Advantage". This view of firm competitive advantage has been originated from the seminal contributions done by Coase (1937), Selznick (1957), Penrose (1959), Stigler (1961), Chandler (1962,1977), and Williamson (1975), that emphasizes the importance of firm's tangible and intangible resources andfirm's capability to deploy these unique resources in such a strategic way that no other firms can access or duplicate these resources, in the long run, and thus result into firms' sustained competitive advantage (Conner, 1991, p122; Rumelt, 1984, p557; Mahoney and Pandian, 1992, p263; Rugman and Verbeke, 2002). Barney (1991) associate these unique resources to following attributes: a) valuable; b) rare among a firm's current and potential competition; c) imperfectly imitable; and d) there cannot be strategically equivalent substitutes for these resources. Such type of resources can lead to a firm to a sustained competitive position in the industry. In the modern world, it is widely recognized that firm's intellectual capital is the only one that can bring innovation, knowledge advancement, effective and optimal deployment of the tangible and intangible resources and may lead to sustained competitive advantage discussed above. Figure.1 depicts the theoretical framework undertaken based on "Resource based view of firm competitive Advantage" to analyze the impact of Intellectual capital efficiency of KSE 100 Index companies' competitive position during the underlying period. Besides the intellectual capital efficiency, firm size, physical capital intensity, net income, leverage and book value are taken as control variables in the regression analysis as suggested by Shabrati (1990).

Model, Data and Research Methodology

To measure the Intellectual Capital efficiency, a study has utilized the most popular "Value added intellectual coefficient (VAIC)" technique introduced by Pulic in 1988 (Pulic, 2004). According to this independent variable VAIC is a combination of "human capital efficiency, structural capital efficiency and capital employed efficiency".

VAIC= CEE+ ICE

ICE= HCE+ SCE

Where

CEE= Capital employed efficiently;

ICE= Intellectual capital efficiency;

HCE= Human capital efficiency and

SCE= Structural capital efficiency for companies.

To measure the impact of intellectual capital efficiency on firm performance, panel regression models as defined in Eq. 3.1, Eq. 3.2, Eq.3.3 and Eq. 3.4 are utilized.

$ROA_{it} = \alpha + \beta_1 (VAIC_{it}) + \beta_2 (FS_{it}) + \beta_3 (LV_{it}) + \beta_4 (PCI_{it}) + \beta_5 (BV_{it}) + \beta_6 (NI_{it}) + \varepsilon_{it}$ Eq. 3.1

$ROE_{it} = \alpha + \beta_1 (VAIC_{it}) + \beta_2 (FS_{it}) + \beta_3 (LV_{it}) + \beta_4 (PCI_{it}) + \beta_5 (BV_{it}) + \beta_6 (NI_{it}) + \varepsilon_{it}$ Eq. 3.2

$ATO_{it} = \alpha + \beta_1 (VAIC_{it}) + \beta_2 (FS_{it}) + \beta_3 (LV_{it}) + \beta_4 (PCI_{it}) + \beta_5 (BV_{it}) + \beta_6 (NI_{it}) + \varepsilon_{it}$ Eq. 3.3

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$MC_{it} = \alpha + \beta_1 (VAIC_{it}) + \beta_2 (FS_{it}) + \beta_3 (LV_{it}) + \beta_4 (PCI_{it}) + \beta_5 (BV_{it}) + \beta_6 (NI_{it}) + \varepsilon_{it}$ Eq. 3.4

Three measures of performance: productivity, profitability and market performance, where productivity and profitability of the firm provide the accounting view, while market capitalization provide a market based view (Banimahd et al., 2012) of the firm competitive performance are included as the dependent variable in the regression analysis. For profitability, we have used Return on asset (ROA) and Return on equity (ROE) of the firm, while Asset turnover (ATO) is taken as productivity measure, which is calculated by dividing company sales of its total assets. For the market evaluation study used market capitalization (MC) that is calculated by multiplying the companies' share price by its number of shares outstanding. On the right hand side, VAIC and other control variables such as firm size, leverage, physical capital intensity, book value of a firm and net profit are included in the regression analysis as control variables.

The study is based on secondary data collected from the audited annual reports of KSE 100 index companies for the period 2009-2013. A group of 88 companies who remains at the top of the list of KSE 100 index companies during the whole study period have been selected and panel data set has been constructed.

Empirical Results and Discussion

Although all of the 88 selected KSE 100 index companies are at the top and benchmark for efficiency, but the descriptive statistic revealed that these companies have a wide disparity in terms of return on equity, and market capitalization. Overall performance in terms of return on equity is much better than in case of Return on assets, as shown in the results, showing the prospective incentives to invest in these companies from a shareholder's point of view (Paulic, 2004).

Table 1: Descriptive Statistics 2009-2013

	Mean	Median	Standard deviation	Ob servations	Cross-Sections
Return on Asset (ROA)	8.624	6.097	8.311	440	88
Return on Equity (ROE)	22.680	19.674	20.565	440	88
Market Capitalization (MC)	37.5	10.9	96.8	440	88
Value Added Intellectual Coefficient (VAIC)	29.706	13.029	53.276	440	88

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Asset Turnover (ATO)	1.835	1.951	0.661	440	88
Firm Size (FZ)	10.463	10.366	0.655	440	88
Leverage (LV)	338.023	143.068	579.820	440	88
Physical Capital Intensity (PCI)	32.441	32.472	27.249	440	88
Book Value (BV)	21.4	10.1	34.2	440	88
Net Income (NI)	4.26	1.25	9.42	440	88

* Market capitalization, book value and net income are in billion rupees. rupees

Companies' market performance is also highly dispersed from its mean showing that operating companies are much different in terms of market capitalization, may be based on their variant tangible and intangible resources. This can also be assessed by the high value added intellectual capital efficiency coefficient as turned out to be 53.276, while on average its value is 29.70. In short, study in part explained that all 100 index companies' works according to phenomena of intellectual capital efficiency, however the degree of intellectual capital efficiency is variant across the companies depending upon their tangible and intangible resources capacities.
[Sector wise Intellectual capital Efficiency about here]

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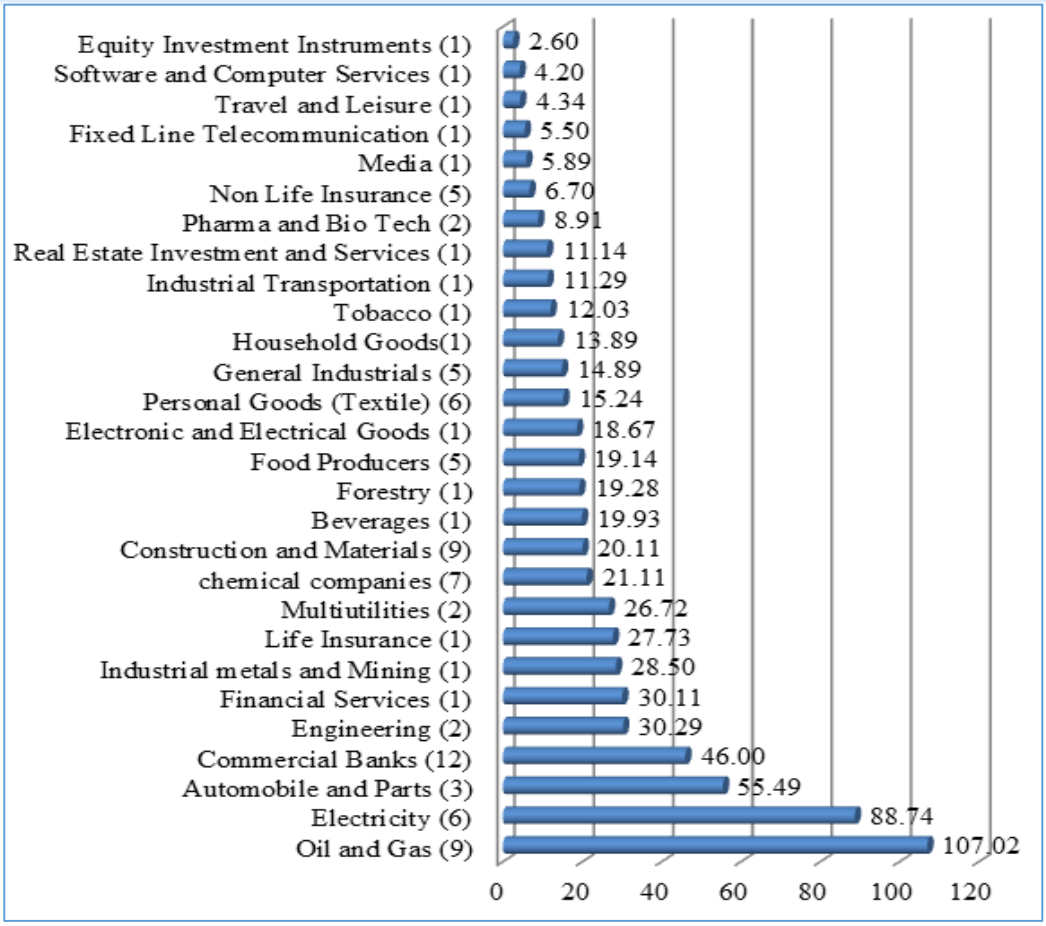

Similarly sector wise intellectual capital efficiency results also depict that energy sector are at the top of the list in terms of intellectual efficiency, mainly because of their access to unique, rare, imperfectly imitable resources. After that automobile industry showing high intellectual capital efficiency as calculated VAIC value is "55.49" and banking industry turned out to be in fourth position in the list (see Figure 2). However the Software and computer service sector" is second last in the list because this sector is in initial stage due to late advancement of information and technology in Pakistan. Thus, it is verified that KSE-100 index companies performance are operating according to the idea of intellectual capital efficiency, however, at varying levels both across the sectors as well as companies.In panel regression analysis, to select between the fixed effects and random effect model Hausman test is applied and result proposed that the fixed effect model is better in this case. This outcome is justified as it can be seen that there are wide disparities among the companies in terms of intellectual capital efficiency and leverage ratios as depicted by the respective standard deviations shown in table 1, and fixed effect model allows separate intercept value for each company in the selected sample (see Eq. 3.1 to Eq.3.4).

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Table 2: Relationship between Value Added Intellectual Coefficient (VAIC)& Companies Performance

Dependent Variable	ROA	ROE	ATO	Market Capitalization
Constant	-2.474680 (-1.5137)	1.257853 (1,6816)		
			5.936314* (8,2428)	4.766237* (4.022831)
Value Added Intellectual Coefficient (VAIC)	0.335335* (5.3282)	0.108571* (3,3318)		
			0.226799* (9.9931)	0.086759** (2.30922)
Firm Size (FZ)	0.288269*** (1.8295)	- 0.738791* (-7.5146)		
			-0.406686* (-5.7959)	0.562216* (4,8544)
Leverage (LV)	-0.209015* (-2.3832)	0.332259* (6.9063)		
			0.060554** (-1.8951)	-0.311868* (-5.92167)
Physical Capital Intensity (PCI)	0.207699* (2.9657)	-0.019281 (-0.5529)		
			0.038800 (1.5422)	_ _
Book Value (BV)	-1.35E-11* (-6.5346)			
		-0.058162 (-0,9767)	-2.00E-12* (-2.6959)	-3.69E-12* (-2,9908)
Net Income (NI)	6.55E-11* (8.8375)			
		0.811026* (38.4179)	7.32E-12* (2.7600)	1.14E-11* (2.60840)
R2	0.76339			
Adjusted R2	0.69979			
Prob (F-State)	0.00000			
DW stat	1.851998			
		0.929907	0.980865	0.95999
		0.911067	0.975438	0.94868
		0.000000	0.00000	0.00000
		1.930456	1.74444	1.54781

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*1 % significant, ** 5% significant, *** 10% significant

Estimation results shown in Table 2 illustrates that there is a significant positive impact on intellectual capital efficiency (VAIC) on KSE 100 index companies' performance and overall empirical results are fine in terms of expected signs, coefficient values and goodness of fit (see Table 2, column 2-5). For instance, companies Return on assets and Return on equity (profitability indicators) are positively related to its VAIC value, and confirm the impact of company's intellectual capital efficiency.

Similar results are evidenced in cases where Asset turnover ratio, (as productivity measure) and market capitalization (as a proxy for market performance) are used as the dependent variable in regression models as defined in Eq. (3.3) and Eq. (3.4). Table 2 column 4 shows that the intellectual capital efficiency of companies has a dominant impact on productivity (ATO) as compared to all other variables used in the analysis. Net income, leverage, physical capital intensity is showing positive and significant results while book value and firm size turned out to be negative, may be the result of diseconomies of scale and mismanagement problems in case of larger companies in terms of assets and sales. This model also gives consistent results to existing literature as aligned to studies, undertake by Makki and Lodhi (2008, 2009 and 2010) in Pakistan and in other countries as well.

Conclusion and Policy Implications

The study attempts to investigate the intellectual capital efficiency impact on KSE 100 Index companies' performance during the period 2009-13. We have selected the top 88 companies belonging to 34 sectors listed on Karachi Stock Exchange, that remain the benchmark for performance as remain at the top and become the part of 100 index formation for last five consecutive years 2009-2013. The study used a research framework based on "Resource Based view of Firm Competitive Advantage" that emphasizes the firms' internal resources and capability to utilize these resources in such a unique and efficient way that no other can duplicate in competition leads to a sustained competitive position in the market. In this regard, firm's Intellectual Capital work as a source of innovation, knowledge enhancement and result in effective implementation and optimal utilization of firms' tangibles and intangibles, and efficient allocation of resources.

Although a large number of studies related to intellectual capital efficiency and firm performance are available and proved its significance widely. Similarly Makki and Lodhi (2008) have verified this relationship in the case of LSE listed companies, Bahrati (2010) and Rehman et al. (2013) for banking and insurance sector in Pakistan, but the present study has a unique contribution as it linked the KSE 100 Index companies' sustained competitive position to its intellectual capital efficiency during the successive period of their competitive advantage. This study has used the audited annual reports, the most reliable data for the verification of underlying hypothesis.

Panel regression analysis proved the positive relation of intellectual capital efficiency with profitability, productivity and market performance. The study has important useful

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policy implications for the companies and sectors to build and maintain their intellectual capital to gain and sustain the competitive position with the help of proper implementation of training and development and human development investment activities.

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