

Impact of Intellectual Capital on Shareholders Earning

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Abstract: The importance of Intellectual Capital (IC) and the related philosophy of knowledge economy have captured the attention of researchers and business enterprises in WTO era. IC has been widely recognized as a critical tool to run the business successfully in highly competitive environment. Models have been introduced to measure numerous facets of IC, i.e. Skandia Navigator, Tobin's Q and VAICTM. This paper examines the impact of IC efficiency on shareholders earning using Value Added Intellectual Coefficient called VAICTM developed by Ante Pulic (1998). Regression models are constructed to explore the impact of IC efficiency on earnings per share (EPS). Seven-year data of Lahore Stock Exchange Index companies (LSE-25) was obtained from audited financial reports to calculate human capital, structural capital and capital employed efficiency of companies related to different industrial sectors. Results through multiple regression techniques support the argument that IC efficiency contributes significantly towards earnings per share. The study is a pioneering attempt in Pakistan to measure the impact of IC efficiency on earnings per share using cross sectional time series data.

Key words: Knowledge Economy, Intellectual Capital, Earnings Per Share, VAICTM, LSE-25.

INTRODUCTION

Conventional double entry accounting system and corporate performance measurement systems were developed when the agriculture based economies were being transformed into manufacturing era and factors of production at that time were limited to financial and physical resources, mostly land and labor. Drucker (1993) adds that unique contribution of management in 20th century results in 50-fold increase in productivity of manual worker by converting labor intensive economy into mechanical economy. Now the world economies are again under transformation and changing from manufacturing to knowledge intensive activities. The 21st century is witnessing a shift from manufacturing work to knowledge work through an increase in productivity due to knowledge worker. This has convinced many companies and even countries to plan strategies for repositioning in the emerging knowledge economy. In the current era of knowledge economy, business resources comprise of 20% tangible value and 80% intangible value (Roos *et al.* 2005). But conventional accounting and corporate performance measurement systems are heavily inclined towards financial and physical resources and lack relevant information on performance of Intellectual Capital (IC) resources. Therefore, it is argued that new ways of monitoring operations are needed to achieve maximum productivity from intangible resources in the new century of knowledge economy.

In knowledge economy, IC is considered crucial for the competitiveness of companies regardless of the industry. Bornemann (1999) suggested correlation between intellectual potential and financial performance. IC has become critical strategic intangible asset that can transform a national company into an international, multinational and transnational corporate powerhouse. The services sector plays vital role in the growth of economies around the globe and its share in overall gross domestic product (GDP) of a country rise more rapidly than production sector. In this situation, IC measurement and management has become extremely important (World Bank, 2006). This paradigm shift from manufacturing era to knowledge economy requires corporations to maximize value creation from its intellectual capital to succeed in the WTO regime (Roos *et al.* 2005). Competitive edge can be gained through enhancing value creation efficiency from human brain's creative expertise and through its better utilization on operational structure and customer and supplier relations.

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Significance of IC at Corporate Level:

Stewart (1994) views the value of IC that cannot be touched, but still makes a person rich. Canadian Institute of Chartered Accountant's survey concludes that intellectual resources are critical for firm's success (Ghosh & Wu, 2007). Many companies around the globe adopted IC managing strategies earlier and were very successful in improving their productivity and efficiency. Skandia Insurance Company, the developer of Skandia Navigator had achieved 75% saving in administrative expenses while at the same time enhanced productivity by 400% over a period of 6 years (Morgan, 1998). Abernathy *et al.* (2003) estimate that investment in IC creates twice fruits as compared to the same amount of investment in physical assets. McKinsey's ranking of the top 10 Asian companies creating most value for shareholders in the period 1995-2001 included three Taiwanese companies. These companies significantly focused on human capital and network effect rather than on investing in physical capital (Tseng and Goo, 2005). Toshiba, the electronics company, after adopting intellectual capital management (ICM) in its factory has achieved 20% more productivity each year (Fruin, 1997). On the other side there are many organizations which were collapsed due to their inability to manage and exploit knowledge resources (Antal *et al.* 1994).

Importance of IC Management for Pakistan:

Study of IC is important for achieving the value creation efficiency from all its components, as they are intangible and complicated to recognize and exploit. Moreover, tools to handle IC in accounting are at developing stages. IC has been regarded as a moving force for business success (Pulic, 2004). The vital role of knowledge is emphasized in World Development Report (1998) as "today's most technologically advanced economies are truly knowledge based". Drucker (1993) indicates that knowledge which is superior to land, labor and capital is the only meaningful factor of production. Economic managers of many countries feel that it is inevitable to transform the production-based economy to knowledge-based economy to improve the pace of economic development.

Research Objectives:

The study is based on the argument that shareholders earning is an outcome of IC efficiency. It views that IC is responsible to bring more earnings per share (EPS) for shareholders after attaining maximum value creation efficiency. The main objective of this research paper is to find out how IC efficiency components; HC, SC and CE correlate each other and how jointly, they affect EPS of a company across the LSE-25 companies over the seven years period.

Review of Relevant Literature:

IC has been recognized as an important corporate edge which plays vital role towards extra financial performance. In the developed world, the term IC is widely used by research community in their academic and professional research, however, there have been very few studies that have used emerging economies as a case for evaluating the implications of IC at stock exchange level.

In recent studies related to IC and financial performance of firm, Chen *et al.* (2005) examined the relationship between value creation efficiency and market to book value ratios after controlling R&D and advertising expenditure which were considered as part of structural and relational capital respectively. They investigated successfully the relationship of IC with firm's current and future performance. Their empirical investigation found significant positive impact of IC on firm's market value, return on equity and return on assets. Tseng and Goo (2005), using structured equation model to analyze the relationship between IC and corporate value of Taiwanese manufacturers, visualized positive relationship between IC and corporate value. Shiu (2006a) examined relationship between value addition efficiency and profitability (ROA), market valuation (M/B) and productivity (revenue to sales ratio) on 80 Taiwan listed technology firms. His findings suggest significant positive correlation between intellectual capital efficiency computed through Value Added Intellectual Coefficient (VAIC) and profitability and market valuation but negative correlation with productivity. This situation provokes the researchers to conduct more studies and conclude the relationship between value addition efficiency and earnings. Shiu (2006b) once again applied VAIC method to measure corporate performance through quantile regression approach and found that VAIC components have significantly different impact on ROA and M/B throughout the distribution. Tan *et al.* (2007), using VAIC methodology on 150 listed companies' data of Singapore Stock Exchange, conclude that IC and company performance have moderately positive relationship while contribution of IC to company performance differs by industry. They applied partial least square technique and found weak correlation between IC and future earnings. Their results also prove higher contribution of IC in service and lower contribution in industrial sectors. While Bontis *et al.* (2001) have found significant relationship between IC and business performance.

One of the current studies conducted by Appuhami (2007) using VAIC method on Thai banking, finance and insurance sector finds very strong and significant relationship between firm's IC and investors' capital gains on shares. Later study, conducted by Yalama & Coskun (2007) on intellectual capital performance of banking sector of Istanbul stock exchange, reveals strong association of VAIC with profitability using relatively new technique of Data Envelopment Analysis in IC. Ghosh and Wu (2007) found IC as significant explanatory variable of firm value after controlling the effect of financial performance on firm value. While Kamath (2008), using VAIC methodology found that IC has major impact on profitability and productivity in Indian pharmaceutical companies.

Impact of IC and its components on financial performance is being studied over the last 9 years but still no consensus has been reached on its solid role due to mixed results in studies conducted in different countries. Firer and Williams (2003) applied VAIC on 75 listed companies of South Africa to study the association between the efficiency of value added and profitability (ROA), productivity (assets turnover) and market valuation (M/B), but empirical results found were generally limited and mixed between three components of VAIC and dependent variables. While, Tan, *et al.* (2007) find moderately positive relationship of IC and financial returns of companies. These mixed and inconclusive results prompt researchers to conduct more research on the role of IC towards earnings across time and nations in different domestic settings to conclude the relationship.

The VAICTM Methodology:

The Value Added Intellectual Coefficient (VAIC) used in this study as a basic methodology to measure the IC was introduced by Pulic (1998). The core concept of VAIC is that the human capital is mainly responsible for overall value creation performance of the firm. Pulic (1998) considers VAIC as universal indicator which shows value creation ability of a company in quantitative terms and represents as measure of business efficiency in a knowledge based economy. VAIC is based on the following five calculations: The model considers company's ability to add value through:

$$VA = OUT - IN \text{ ----- Equ (1)}$$

where, VA is the value addition from current year resources,
 OUT = Total Sales (revenue from sale of goods and services), and
 IN = Cost of bought in materials, components and services/inputs
 The input (IN) includes all expenses incurred in earning the above revenue except employee cost.
 Alternatively, the value added can be calculated as:

$$VA = OP + EC + D + A \text{ ----- Equ (2)}$$

Where OP = Operating Profit, EC = Employee Cost, D = Depreciation
 and A = Amortization

The first measure of the model is 'value added efficiency through capital employed' and is calculated as:

$$VACA = VA/CA \text{ ----- Equ (3)}$$

where VACA is the efficiency of physical capital employed by the firm. It is obtained by dividing value added by the capital employed.

Alternatively, CA can also be calculated as:

$$CA = \text{Common Stock} + \text{Preferred Stock} + \text{Retained Earnings} + \text{Company Reserves} + \text{Long Term Debts}$$

OR

$$CA = \text{Capital Employed (net book value of total assets)}$$

The model gives central role to human capital therefore, employee expenses are not treated as cost. This calculation of the model shows how much VA is created by each unit of currency spent on employees. Pulic (1998) argues that salary of an employee is usually determined on the basis of their performance by market forces. So, it is logical to measure human capital on the same criteria.

Second measure of the model which shows the ability of human resources in creating value is given by VAHU and is calculated as:

$$VAHU = VA/HC \text{ ----- Equ (4)}$$

VAHU represents the Human Capital Efficiency of a firm, where value addition is divided by cost of Human Capital (HC). The cost of human capital is treated as investment rather than expense and calculated as:

HC = Total salaries and wages (Direct labour + Indirect labour + Admn., Marketing and Selling salaries).

The third measure of model is Structural Capital (SC) efficiency which shows the contribution of SC in value creation.

$$STVA = ST/VA \text{ ----- Equ (5)}$$

where STVA is the structural capital efficiency of the firm and is calculated through dividing cost of structural capital by value added (VA). The ST is calculated by subtracting HC from the VA.

$$ST = VA - HC$$

Finally the cumulative IC efficiency of all three components of VAIC is calculated by adding capital employed, human capital and structural capital efficiencies:

$$VAIC^{TM} = VACA+VAHU+STVA \text{ Equ (6)}$$

VAIC calculated by equation (6) indicates the overall corporate value creation efficiency of a firm. VAIC does not provide money value of IC. It simply adds the three efficiency factors of IC and calculates efficiency index that shows how IC of a company contributes towards value addition. As an index, higher the VAIC better will be the efficiency and value creation ability of the firm. Global popularity of VAIC method can be envisaged from its utilization in academic and institutional research carried out by scholars in Austria, Croatia, Japan, Singapore, Taiwan, India, China, Sweden, Greek and Malaysia.

Investigating IC in Lahore Stock Exchange Index Companies:

This study investigates link between VAIC and shareholders earning based on Lahore Stock Exchange index companies (LSE-25). The research is quantitative and based on 7 years data gathered from audited annual reports of the companies covering the period 2001-07. LSE-25 companies have been selected for research; considering them larger companies with more intellectual assets. Comprehensive data related to IC performance can be extracted from annual reports of publicly traded companies. More than 90% trading of Lahore Stock Exchange is done in LSE-25 companies. That's why study is user oriented and meets the need of 90% traders, who like to see that how IC efficiency of LSE index companies contributes towards their earnings. Moreover, LSE-25 companies cover more than five industrial sectors, thus increasing the generalizability of the research outcome. The research investigates the EPS, and its association with IC efficiency using VAIC methodology. The earning of shareholders is measured by dividing earnings available to common stockholders with number of outstanding shares.

The figure 1 shows the relationship between IC efficiency and firm performance in terms of EPS. The IC efficiency of a firm is measured by CEE, HCE and SCE.

Proxy measures for independent, dependent and moderating variables are given in Table 1, where (X₁, X₂, X₃) are taken as independent variables and represent efficiency determinants of VAIC i.e. HCE, SCE and CEE. While (X₄, X₅, X₆, X₇) are moderating variables.

Table 1: Dependent, independent & moderating variables and their description

Variable	Symbol	Description
Y	EPS	Earnings Per Share
X ₁	HCE	Human Capital Efficiency
X ₂	SCE	Structural Capital Efficiency
X ₃	CEE	Capital Employed Efficiency
X ₄	MEETING	Frequency of board meetings
X ₅	NOEXEC	No. of executives in an organization
X ₆	ASSET	Amount of total assets in an organization
X ₇	CEOEXDIR	Total remuneration of chief executive officer, executives and other directors

- H₁ All else being equal, companies with greater HC efficiency tend to have higher earnings per share
- H₂ All else being equal, companies with greater SC efficiency tend to have higher earnings per share
- H₃ All else being equal, companies with greater CE efficiency tend to have higher earnings per share

Moderating Variables:

Size of the company, salaries of top level executives, frequency of the board of directors’ meetings and number of executives in an organization are included in the model with the intention to capture further IC components and possibly enhance VAIC model.

It is argued that size of the firm has impact on organizational learning and structural capital. As organizations get matured and expanded, they are able to exploit more assets and workers as a result become stronger in relation to workplace culture, knowledge sharing, operational procedures, customer and supplier relations. Lyles and Salk (1997) and later Ho and Williams (2003) find that size and leverage increase the impact of IC on financial performance considerably.

Meetings of the board of directors are generally treated as intellectual exercise by executive and non executive directors. Executive directors are usually responsible for running day to day operations of the company. While non executive directors keep independent and close eye on executives and over-see whether their activities and policies are fruitful for the business. In accordance with Pakistani Companies Ordinance (1984), each listed company must hold at least four board meetings in a year. In this way, good combination of executive and non executive directors on the board with reasonable number of meetings in a year play important role towards overall performance of the company. Vafeas (1999) found that operating performance improves following the years of high frequency of board meetings.

Literature also supports that remuneration of directors and other executives have significant impact on board efficiency as well as company performance. Merhebi *et al.* (2006) conclude that CEO pay-performance association is positive and statistically significant in Australia. Coleman and Biekpe (2002) conclude that board size has significant impact on Tobin’q and ROA.

According to the Companies Ordinance (1984) Government of Pakistan, executive means officer other than CEO and directors drawing basic salary of more than Rs.500,000 in a financial year. They are usually knowledge workers and act as heads of their sections/departments. They supervise operations related to procurement, processing, system development, marketing, finance, R & D and general administration. They are not actual doers but their duty is to get the job done through subordinates. Being intellectuals and real knowledge workers, they are important part of HC. Their efficiency contributes directly to HC, SC, CE. Due to their expected contribution towards overall IC efficiency, it is argued that impact of number of executives on IC efficiency in a firm should be studied. Keeping in view these studies, size (ASSET), frequency of board meetings (MEEING), number of executives in the firm and board/executives (NOEXE) remuneration (CEOEXDIR) are introduced in the model as moderating variables.

Population:

The Lahore Stock Exchange is the 2nd largest stock exchange of Pakistan having more than 520 companies listed on its main board. It came into existence as company limited by guarantee in 1970 registered under Securities and Exchange Ordinance (1969) Government of Pakistan. The Index started on January 1, 2002 is composed of top 25 companies (LSE-25) based on market capitalization (stock price per share multiplied by number of share transacted). It includes only ordinary listed equities and excludes listed Mutual Funds, Modaraba Companies and Term Finance Certificates. The index is revised in January and July each year based on traded volume in the last one year (LSE Annual report 2007). The year 2007 index includes seven banks, seven oil, gas and power companies, five cement enterprises, two chemical/fertilizer concerns and four others related to different sectors as given in Table 2.

Table 2: LSE-25 index components-sector wise (2007)

Sector	Firms	Firm Years
Banks	7	49
Oil/Gas/Power	7	49
Cement	5	35
Chemical/Fertilizer	2	14
Others	4	28
Total	25	175

(Lahore Stock Exchange Annual report 2007)

LSE-25 index companies were selected keeping in view the fact that the most companies listed on LSE have large IC assets as well as experience of exploiting them. Comprehensive IC performance data and IC related disclosures of these companies are generally provided in their annual reports. More than 90% trading of Lahore Stock Exchange is done in LSE-25 companies, which enhances the usefulness of the study for big majority of traders. Finally, LSE-25 index represents numerous industries thus improves generalizability of the findings.

Data Collection:

The study is quantitative and based on 7 years data that is generally provided by publicly listed companies in their audited annual reports. These annual reports for the period 2001 to 2007 were gathered through direct contact, databases, Lahore stock exchange and websites of relevant companies. Stock prices were collected from various issues of the daily Business Recorder; a leading business newspaper, to calculate the market value of the company’s ordinary shares.

Descriptive Statistics:

For better numerical understanding of the data, basic descriptive statistics has been applied. Due to very less extreme observations in the data, it was thought appropriate to compute arithmetic mean as a measure of central tendency rather than median. The primary measure of variation used in descriptive statistics is standard deviation, whose value is given in the original units of the data, i.e. percentage, Pakistani Rupees, numbers etc. None of the measures of variation is negative.

Table 3: Descriptive statistics – 2007

Variable	N	Minimum	Maximum	Mean	Std. Deviation
EPS	25	-6.61	27.30	6.58	9.33
CEE	25	-0.0799	0.6291	0.1868	0.1918
HCE	25	-0.5288	19.2346	4.9079	4.0402
SCE	25	-0.5167	2.8910	0.727848	0.5883
ASSETS	25	6400688000	762194000000	129556094202	166401987070
MEETINGS	25	22	95	46	19
CEOEXDIR	25	25287000	2060840000	460700504	483676037
NOEXEC	25	13	929	186	215

Table 3 shows minimum, maximum, mean and standard deviation of all dependent, independent and moderating variables for the year 2007. In 2007, average HC performance index of a firm remained at 4.91 with average assets remained at Rs.129.56 billions respectively. On average LSE-25 companies created value of Rs.4.91 for every one rupee spent for human capital. Maximum HC efficiency is 19.23 shown by Oil & Gas Development Corporation and the minimum HC efficiency is -0.588 gained by Karachi Electricity Supply Corporation as the company is running in losses. Average EPS of LSE-25 companies increased considerably from 2.38 in the year 2001 to 6.58 in 2007.

4.4 Determining Relationship among Variables:

Correlation coefficient provides a quantitative measure of the strength of the linear relationship between independent and dependent variables. Pearson product-moment correlation for the year 2007 (Table: 4) shows that companies with high asset structure are more likely to be high in EPS ($r = 0.493$).

Significant relationship of HC with EPS and CEE emphasizes that knowledge, skill, experience, creative ideas, leadership and entrepreneurial abilities of human resources have strong impact not only on EPS but CE efficiency also. It can be concluded from correlation matrices 2001-2007 that HC and structural assets are playing important role towards earnings of firms through fulfilling their primary responsibility of developing structural and relational capital.

Structural capital efficiency has negative correlation with size of the total assets ($r = -0.046, -0.126, -0.163, 0.107, -0.057, -0.172, -0.152$) in all seven years period except in the year 2004. Possible explanation of this negative correlation is that SC efficiency deteriorates when companies expand their business without enough human capital competencies to exploit the expansion. The LSE-25 companies SC efficiency has been reduced with the increase in the size; as a result, assets remained underutilized.

Another evident aspect of correlation matrices over the period of 2001-07 is negative correlation of HC efficiency with size ($r = -0.114, -0.201, -0.214, -0.235, -0.139, -0.288, -0.236$) of the firm in all seven years indicating that as the size of a company increases the HC efficiency declines. Emerging economies like Pakistan usually face the problem of shortage of employee competence and expertise. As a result, careless hiring of human resources in absence of managerial abilities jeopardizes utilization of manpower and thus reduces its HC efficiency toward value creation.

Table 4: Correlation matrix – 2007

Variable	EPS	CEE	HCE	SCE	Assets	Meetings	Ceoexdir	Noexec
EPS	1.00							
Sig. (2-tailed)	-							
CEE	.363	1.00						
Sig. (2-tailed)	.075*	-						
HCE	.382	.691	1.00					
Sig. (2-tailed)	.059*	.000***	-					
SCE	.161	.057	.147	1.00				
Sig. (2-tailed)	.442	.787	.483	-				
Assets	.493	-.276	-.114	-.046	1.00			
Sig. (2-tailed)	.012**	.182	.587	.829	-			
Meetings	.132	.375	.261	-.018	.157	1.00		
Sig. (2-tailed)	.530	.065*	.207	.933	.453	-		
Ceoexdir	.070	-.033	-.123	-.114	.378	.248	1.00	
Sig. (2-tailed)	.740	.874	.559	.586	.063*	.233	-	
Noexec	.096	.041	-.035	-.276	.365	.351	.881	1.00
Sig. (2-tailed)	.647	.847	.868	.181	.073*	.085*	.000***	-

* Correlation is significant at the 0.10 level (2-tailed).
 ** Correlation is significant at the 0.05 level (2-tailed).
 *** Correlation is significant at the 0.01 level (2-tailed).

Correlation matrices indicate that higher the HC efficiency is; the greater the SC efficiency will be (r = 0.147, 0.313, 0.314, 0.300, 0.316, 0.221, 0.336) and ultimately earnings also. That’s why most organizations try to convert HC to SC to manage maximum earnings performance and to cover the risk of high caliber employees turn over. Positive relationship of HC efficiency with SC efficiency is consistent with the results found by Chen, *et al.* (2004). The lower the relationship of SC efficiency and CE efficiency, the weaker the contribution of CE efficiency towards EPS would be. Finally, it can be concluded that to acquire the synergistic value from all three measures of VAIC; it would be highly beneficial to have significant correlation among all its components.

Regression Assumptions:

According to Berry (1993), to draw a conclusion based on regression analysis, certain assumptions must be true. These assumptions were checked before running the regression models. Independence is assumed as all values of variables were taken from separate business entities. Linearity assumption is verified through scatter diagrams between independent and dependent variables. In addition normal probability plots of the residuals also confirm that there is no serious violation of normality assumption.

Durbin Watson (D-W) test was applied to diagnose first order autocorrelation problem. D-W values fall between 1.68 to 2.48 in almost all the years. As D-W has been considered closer to 2 in all situations (Tables 5-11), so regression model would be appropriate method (Neter, *et al.*, 1996).

Problem of high correlation among independent variables is captured through drawing correlation matrix, which remained -0.236 to 0.88 among different variables over the period 2001-07 and was treated below the limits in all regression models. Tabachnick and Fidell (1996) explain that 0.90 or greater bivariate correlation between independent variables indicates multicollinearity. Multiple regression tables (Tables 5-11) depict Variance Inflationary Factor (VIF) less than 9.00 in all cases indicating that none of the independent variable is substantially explained by the other independent variables. As Myer (1990) suggests, value of less than 10 does not pose threat of multicollinearity.

White’s heteroscedasticity test with no-cross-products was applied using E-Views software. The LM-stat less than critical value in almost all the cases suggests that variances at each level of independent variables are homogeneous thus indicating no evidence of heteroscedasticity. In this way, we can rely on regression results and there is no need to go for weighted or generalized least square.

Regression Analysis:

To understand the dynamics of IC and its impact on EPS, it would be advantageous to apply regression model to the dependent and independent variables. The regression line gives an estimation of the linear relationship between a dependent variable and one or more independent variables or covariates. General syntax for multiple regression equation for population is:

$$Y_{ji} = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \dots + \beta_k X_{ki} + e_i$$

Left side (Y) of the equation specifies the outcome variable while right side β_1 specifies the coefficient of first independent variable (X_1) and β_2 is the coefficient of second independent variable (X_2), β_n specifies the coefficient of nth independent variable (X_n) and e_i is the difference of predicted and observed value of Y for the i^{th} participant.

Multiple regression results links IC efficiency with earnings performance. Regression equation considers earnings per share (EPS) as dependent variable. The three independent variables are capital employed efficiency (CEE), human capital efficiency (HCE) and structural capital efficiency (SCE). While the four moderating variables are size of the total assets of the company (ASSET), frequency of board meetings (MEETING), salaries of CEO, directors & other executives (CEOEXDIR) and number of executives in the company (NOEXEC). All independent and moderating variables were taken together in each regression equation. Considering the earnings per share dependent on intellectual capital efficiencies, the following equation is developed:

$$Y_{EPS} = \beta_0 + \beta_1 (HCE) + \beta_2 (SCE) + \beta_3 (CEE) + \beta_4 (ASSET) + \beta_5 (MEETING) + \beta_6 (CEOEXDIR) + \beta_7 (NOEXEC) + e_i$$

Using SPSS ver-13, results of the regression equation for the years 2007 to 2001 are shown in tables: (see Tables 5-11)

Table 5: Multiple regression results for the year 2007 (Dependent: EPS)

	Beta	VIF
CONSTANT	-0.9948	
CEE	27.3434	2.402
HCE	0.1767	2.138
SCE	2.7449	1.439
ASSET	0.0000	1.368
MEETING	-0.1037	1.466
CEOEXDIR	-0.0000	8.705
NOEXEC	0.0097	8.934
	Durbin-Watson = 2.312	R ² = 0.595

Table 6: Multiple regression results for the year 2006 (Dependent: EPS)

	Beta	VIF
CONSTANT	-9.4771	
CEE	15.2004	2.161
HCE	0.0522	1.763
SCE	10.8174	3.368
ASSET	0.0000	1.479
MEETING	0.0048	1.282
CEOEXDIR	0.0001	8.848
NOEXEC	-0.01965792	8.525
	Durbin-Watson = 2.163	R ² = 0.402

Table 7: Multiple regression results for the year 2005 (Dependent: EPS)

	Beta	VIF
CONSTANT	-3.3051	
CEE	14.4169	1.952
HCE	-0.1634	1.788
SCE	6.5673	1.281
ASSET	0.0000	1.520
MEETING	-0.0139	1.062
CEOEXDIR	0.0000	8.852
NOEXEC	0.0122	8.204
	Durbin-Watson = 2.369	R ² = 0.369

Table 8: Multiple regression results for the year 2004 (Dependent: EPS)

	Beta	VIF
CONSTANT	0.0381	
CEE	18.6376	3.181
HCE	-0.3519	1.686
SCE	0.3531	1.183
ASSET	0.00001	1.429
MEETING	0.0616	4.183
CEOEXDIR	-0.0000	9.004
NOEXEC	-0.0023	8.740
	Durbin-Watson = 1.784	R ² = 0.289

Table 9: Multiple regression results for the year 2003 (Dependent: EPS)

	Beta	VIF
CONSTANT	-3.3012	
CEE	15.3817	2.201
HCE	-0.0305	1.464
SCE	1.7448	1.274
ASSET	0.0000	1.124
MEETING	0.0555	1.552
CEOEXDIR	0.0000	8.731
NOEXEC	-0.00219	7.499
	Durbin-Watson = 1.612	R ² = 0.325

Table 10: Multiple regression results for the year 2002 (Dependent: EPS)

	Beta	VIF
CONSTANT	1.1431	
CEE	37.1864	4.988
HCE	-0.1506	1.813
SCE	-6.9721	1.267
ASSET	-0.00001	1.532
MEETING	0.0827	2.219
CEOEXDIR	-0.00001	5.362
NOEXEC	-0.0021	1.424
	Durbin-Watson = 2.039	R ² = 0.569

Table 11: Multiple regression results for the year 2001 (Dependent: EPS)

	Beta	VIF
CONSTANT	-0.6075	
CEE	38.1025	7.932
HCE	0.1809	3.720
SCE	-8.1283	1.551
ASSET	-0.00001	1.244
CEO	0.0001	1.078
EXECUT	-0.00001	6.529
	Durbin-Watson = 1.465	R ² = 0.684

Note: Data related to frequency of meetings and number of executives were not available in 2001, as there was no disclosure requirement by Securities and Exchange Commission of Pakistan in this year. So moderating variables are asset size, CEO's remuneration and executives remuneration.

Importantly, the explanatory power for all year 2001-07 remained upto 68.4% in regression equation ($R^2 = 0.684$), which is quite satisfactory. These results are much significant than the study done by Firer and Williams (2003) who found R^2 up to 30% in identifying relationship between IC and corporate performance. From moderating variables, number of meetings by the board of directors in a year remained comparatively significant having β value up to 0.08. Indicating that an increase in one unit of meeting can bring 0.08 rise in EPS. From these results, we may conclude that all three efficiencies of VAIC that are; HCE, SCE and CEE have significant influence on EPS. Moderating variables i.e. more number of meetings by the board of directors can enhance the IC efficiency to get maximum value from tangible and intangible assets. Remuneration of CEO, executives and directors also show positive β , which means EPS can be increased after increasing managerial remuneration.

Conclusion:

The main research issue of this study was to determine the impact of IC efficiency on earnings per share through empirical research. The β values confirm the premise that there is moderating to highly positive correlation between IC efficiency and earnings. Further, impact of moderating variables introduced in the study reveal that frequency of board meetings, number of executives and CEO's & other executives' remuneration have significant impact on EPS and can be accommodated in VAIC to have a better picture of IC efficiency. It has been observed through the multiple regression results that investment in SC brings more value than investment in CE or HC. The research finally concludes that:

1. There is a significant positive relationship between company's structural capital efficiency and earnings per share
2. There is a significant positive relationship between company's capital employed efficiency and earnings per share

But the results related to human capital efficiency and EPS remained mixed and inconclusive. It could be due to the fact that many Pakistani business managers like other developing countries invest heavily in human capital without caring availability of efficient management to exploit it. As a result, human capital efficiency deteriorates and leads to reduction in overall intellectual capital efficiency as well as earnings per share.

Contribution of the Study:

This study contains penal data empirical tests of association between IC and EPS in Pakistan thus would be a good source of reference to conclude the role of IC towards financial performance globally. Business managers may benefit by understanding the importance of allocating its precious resources to support IC and ultimately firm's financial performance and EPS. As, the investment in intellectual capital brings higher financial return than the same investment in physical assets. After understanding the role of IC, managers would be in a better position to control EPS through controlling their firms' IC efficiency. It can also be used as an indicator for future EPS. In addition, the study further expands the analysis to determine whether number of top level executives, their remuneration and meetings including assets size of a firm have any influence on boosting the impact of IC efficiency on shareholders earning, which were found significant in many years. So, these components can be included to expand VAIC model. Potential investors and fund & portfolio managers seeking more EPS will be benefitted after having new idea of IC modeling which provides better measure of evaluating the firm in association with traditional approach of net profitability.

Policy Implications:

Keeping the significant role of IC towards financial performance and EPS, the study emphasizes the need to draw the intellectual capital standard for measuring and disclosing IC in financial reports. Japanese government's intellectual capital reporting guidelines and intellectual capital statement guidelines by Danish Ministry of Science may be considered as precedence. Due to availability of information related to IC efficiency, potential investors would be in a better position to estimate the risk associated with their investment which may reduce borrowing cost and ultimately reduction in weighted average cost of capital for the company.

Limitations of Research:

This study is based on LSE-25 companies of the Lahore Stock Exchange. At the moment, different countries around the world apply different national accounting standards, disclosure and listing requirements. These differences can also affect the results of this model in other regions, as Pulic's model used in this study takes data from published annual reports based on specific country's accounting framework. Since data related to private limited companies is not publicly available. This research is limited to listed companies and its results may not be generalized to non-listed private corporate sector.

5.4 Further Research Avenues:

As the components of IC and IC models have not been finalized yet, more studies on comprehensive and widely agreed VAIC are needed. Future research may fully explore not only parameters of IC but try to develop some exhaustive IC model usable for external stakeholders as well as internal management to evaluate the IC performance of a firm, which could also be acceptable to International Accounting Standard Board (IASB) for financial reporting. Structural equation modeling may also be used for better understanding of inter-relationship among different components of intellectual capital and their cumulative impact on financial earnings.

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