RELATIONSHIP BETWEEN INTELLECTUAL CAPITAL AND FINANCIAL PERFORMANCE OF PAKISTANI NON-FINANCIAL FIRMS. AND A COMPARATIVE STUDY OF TEXTILE AND CHEMICAL INDUSTRY

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ABSTRACT

This study explore the relationship between performance of intellectual capital and profitability measures in non-financial companies listed on KSE for a period of 3 years (2009-2011). And it also conduct a comparative analysis of this relationship between textile industry and chemical industry of Pakistan. Textile industry belongs to old economy and labor intensive, and chemicals belong to the new economy and knowledge intensive. Correlation andfixed effect regression is used for empirical analysis on panel data.This study finds the positive and significant relationship between value-added Intellectual coefficient and both profitability measures (ROA & ROE) in non-financial companies of Pakistan. This empirical evidence proves that Pakistan is also moving toward the knowledge based economy and on the way to get competitive sustainability. Comparative analysis of textile industry and chemical industry also shows the importance of intellectual capital efficiency. VAIC proves strong and positive relationship with firm's profitability (ROA & ROE), almost the same in both industries. But R-square of chemicals is greater than textile industry in every model. So, models with ROA are significant than of ROE.

Keywords: *Intellectual Capital, Non-financial firms, Financial performance, Comparative Study, Textile Industry, Chemical Industry.*

Introduction

Firms with a unique set of resources obtain a competitive edge upon others. The resource-based view of the companies depicts that these distinctive resources enables the companies to develop different type of inimitable strategieswhich give rise to sustainable competitive advantage. With the emergence of new technologies and updated information systems, now business world is using knowledge based resources intensively. According to the knowledge-based view, key resource of the companies is knowledge.

For first time, concept of intellectual capital (IC) was introduced in 1836. IC is an indistinct concept regarding its definition and measurements. Different researchers have defined it in different ways. IC is a multi-disciplinary field because it has been evolved from multiple disciplines (Marr, 2007). Generally, IC is taken in sense of intangible assets which have great impact on the business performance but cannot be viewed from traditional balance sheet. Even though, now IC has become a strategic corporate asset which upsurge financial performance of the company and also create an inimitable competitive advantage.

As the world economy is moving towards knowledge-based economy, the concept of intellectual capital (IC) is getting more attention progressively. So, there is needed to report intellectual capital in financial reports for the clear picture of financials. Its reporting is also supported by previous studies. Intellectual capital investment comes under intangible assets and its reporting (disclosure) is also necessary (M. H.-U.-Z. Khan & Ali, 2010). Intangible resources are not apparently visible like talent, goodwill, skills, expertise, corporate culture, customer relationship and relation withother concerning stakeholders(K. E. Sveiby, 1997). The ability to use intangible assets in more productive way to create a sustainable competitive advantage, boosts up the quintessence of intellectual capital. If same amount is invested in physical assets

and intellectual capital, investment in intellectual capital breeds more profits(Abernethy et al., 2003).

Intellectual capital is gradually becoming an important corporate asset. With the emergence of knowledge based economy, reporting of intellectual capital is also compulsory. Traditional financial statements ignore the reporting of intangible assets. But there is a noticeable gap between book value of the firm and its associated market value. This controversy can be justified by reporting the value created by intellectual capital in financial statements(Edvinsson & Malone, 1997; Lev & Zarowin, 1999). As the knowledge has become a key resource, most of the companies are investing in R&D, employee's training, administrative systems, computer systems, new technologies and customer relations. All such type of investments come under the umbrella of intellectual capital and getting competitive importance side by side with financial and physical capital.

Researchers and academicians are giving attention to intellectual capital from different perspectives. So there have been evolved a number of intellectual capital models and also concerning valuation methods to measure the intellectual capital; Tobin q, MVA, EVA, Skandia navigator, VAIC^{TM}, Balanced Scorecard and Value Chain Score card.

Pakistan is a developing economy. She is also on way toward knowledge economy like other countries in the worldirrespective of its slow development.Her economy is a semi-industrialized. The textile industry of Pakistan is spine of its economy. It provides employment to 40 percent of all manufacturing sector's labor force. It adds 8.5% to total GDP. According to classification of KSE, chemicals consist of two subsectors; chemical and pharmaceutical. Chemical contributes almost 1% to GDP and pharmaceutical also contributes almost 1% to GDP. Pharmaceutical is much vibrant and productive because it covers a almost 70% requirement of finished medicines of Pakistan. Pakistan's chemical industry has great potential but there is need to make it more competitive. Now the world has become a global world. For the survival of any company whether it belongs to any industry, has to compete internationally. Any type of unique set of resources/assets, a company has, it provides competitive edge upon others. Nowadays intellectual capital has become an important corporate asset and efficient use of intellectual capital also provides a sustainable competitive advantage to the business.

This study explored the relationship between investment in intellectual capital and financial performance of non-financial companies of Pakistan. So the objectives of this study are the following. Firstly, it analyzed the measurement of intellectual capital by VAIC^{TM} and its effect on traditional profitability measures (ROA & ROE) of non-financial companies listed on Karachi stock exchange (KSE) collectively and impact of IC components is also viewed individually. Secondly, a comparison of two industries, textile and chemical is carried out. During comparison, impact of intellectual capital as a whole and its components on financial performance (ROA and ROE) of these industries is viewed and compared. Textile industry belong to the old economy and labor intensive, while chemical industry belong to the new economy and knowledge intensive. The findings of this study grasp the importance of intellectual capital in Pakistan's business environment.

This study is organized into different sections. Section II contains literature review, identified gap and hypothesis. Section III is comprised of methodology portion. Section IV represents the empirical analysis and section V finally concludes this study.

Literature Review

Intellectual capital is an aggregate measure. IC is broadly categorized in two key components; human capital and structural capital. Human capital is the knowledge and competence which employeesown and vanish from the organization if the employee move out (Bontis, 1999; Bontis, Keow, & Richardson, 2000). While structural capital belongs to the organization. It includes all type of knowledge based resources which an organization have except related to human like organizational infrastructure, databases, innovative capital, administrative programs, strategies and information technologies(Edvinsson, Roos, Roos, & Dragonetti, 1997). IC comprised of triplicate model, including internal capital (inner latent components of the organization like technologies, patents and information systems), human capital and external capital (links with stakeholders, relational capital)(K. E. Sveiby, 1997).

There is no any single definite methodology for valuation of intellectual capital. There has been developed various methodologies for its valuation. Commonly used valuation methods to measure the intellectual capital are Tobin q, MVA, EVA, Skandia navigator, VAIC^{TM}, Balanced Scorecard and Value Chain Score Card(Kaplan, Kaplan, & Norton, 1996; Pulic, 1998, 2000; Stewart, 1990; Tobin, 1969). . Each method has different pros and cons (K. Sveiby, 2010). Sveiby (2010) developed four main categories by grouping numerous available methodologies; return on assets (ROA) methods, direct IC methods, scorecards methods and market capitalization methods. Value added intellectual coefficient (VAIC^{TM}) comes under the umbrella of ROA methods and very useful for elucidating the financial value of company's intangible assets. VAIC model was established and instigated by Ante Pulic for the calculation of IC in the organizations(Pulic, 1998, 2004). VAIC is used to gauge the efficiency of firm's key resources.He identified human capital, physical capital and structural capital as key drivers of wealth creation. This model has a key assumption that the expenses related to employees are not cost. He treated them as an investment in long run for organizations.

VAIC acts as an indicator which helps in evaluating the value creation efficiency of firms regarding intellectual capital. There are five steps for the calculation of VAIC(Chan, 2009b; Chen, Cheng, & Hwang, 2005; Janošević, Dženopoljac, & Bontis, 2013; Kujansivu & Lonnqvist, 2005; Pulic, 2000)

Step 1: VA= Output-Inputs

Output=total revenues and Output=all costs related to sales excluding employees cost

OR VA=D+EC+A+OP

VA=Value Added, D=Depreciation, EC= Employee Cost (salaries and wages), A=Amortization and OP= Operating profit

Step 2: HCE=VA/HC

HCE=Human Capital Efficiency, HC=Human Costs (salaries and wages)

Step 3: SCE=VA/SC

SCE=Structural capital efficiency, SC=Structural Capital=VA-HC

Step 4: CEE=VA/CE

CEE=Capital Employed Efficiency, CE=Book value of Total Assets of a firm

Step 5: VAIC=HCE+SCE+CEE

VAIC=Value Added Intellectual Coefficient.

Value added means value added by company's resources. HCE is the measure of the contributed efficiency by human capital in value creation. SCE is all comes from the organization setup. CEE is the efficiency measure of the physical capital invested in the organization. According to Pulic, VAIC as an overall efficiency of the company, is a collective measure of these three efficiencies and acts as an indicator of company's intellectual ability. VAIC measures added value of the company per unit money investment. There are some limitations of VAIC. It cannot incorporate

the firms with negative equity or negative OP due to their negative value addition (Chu, Chan, & Wu, 2011). It also cannot identify clearly the synergetic effect of different types of capital for value creation(Andriesson, 2004). Despite of these drawbacks, VAIC is an financially-based and objective measure of intellectual capital efficiency(Chan, 2009a; Steven Firer & Williams, 2003).

VAIC is a widely used measure in viewing the relationship between corporate performance and intellectual capital. There are numerous studies which have been used this and analyzed the positive impact of intellectual capital on firm's performance.Australian banks which heavily invest in components of intellectual capital are more profitable than others with low investment in IC(Pulic, 2004). Only high-tech industries found positive correlation of IC with financial and economic performance(Zéghal & Maaloul, 2010). They analyzed the data of 300 UK companies for year 2005. Empirical evidence suggests that profitability, market valuation and productivity of the company in South Africa could be explained by the performance of its intellectual capital (S Firer & Stainbank, 2003).

Wang and Chang (2005) used Partial Least Square Approach for viewing the impact of intellectual capital on information technology firm's performance. Their study was based on Taiwan. They found the direct impact of components of intellectual capital on firm's performance(Wang & Chang, 2005). And they found human capital as a leading component because it was effecting other components of intellectual capital. Intellectual capital can be used as an indicator of future performance of the companies in Taiwan(Chen, et al., 2005). Most compelling components of intellectual capital were structural capital and physical capital based on the study of Indonesian companies (Razafindrambinina & Anggreni, 2007). They found these both components played positive role in increasing the future performance of the companies. Pal & Soriya(2012) carried out a comparison study between two sectors of India; pharmaceutical and textile sector. They deployed panel data and analyzed the impact of intellectual capital on the performance of the companies (ROE, MB, ATO and ROA) by using fixed effect model and random effect model(Pal & Soriya, 2012). They found positive association of intellectual capital with financial profitability but this association was intense in pharmaceutical sector. They did not found any association between productivity and IC.Chu et al.(2011) found the positive relationship between structural capital and corporate performance of firms for Hong Kong Stock Exchange. But CEE was still chief indicator of financial profitability.

Such studies are also there which did not found any association between intellectual capital and firm's performance.(Kujansivu & Lonnqvist, 2005) studied 20,000 Finnish companies by using VAIC for measuring the efficiency and value generated with the use of intellectual capital. They found no vibrant association between intellectual capital's value and its efficiency. They also found different associations in different industries. Another study on Hong Kong Stock Exchange found no any significant relationship among intellectual capital and 4 different financial performance measures; ROE, MB, ATO and ROA(Chan, 2009a, 2009b).

All above studies are showing mix results regarding the relationship between IC and financial performance of the companies. The association between components of intellectual capital and corporate profitability is of different levels among different industries and as well as of different nature among different countries. But most of them have positive and significant relationship.

A lot of work has been done on this topic all around the world. Most of the studies have been done on developed countries. But implication of intellectual capital concept is

not same in both East and West (Andriessen & van den Boom, 2007). In Pakistan, there are very few studies related to it(Rehman, Rehman, & Sahid, 2011), (F. A. Khan, Khan, & Khan, 2012), (Makki, Lodhi, & Rahman, 2008), (Alia, Qadus, Waseem, & Zaman, 2012), (Khalique, Shaari, Abdul, Isa, & Ageel, 2011), (Ali & Ali, 2011). Pakistan, as a developing country, has a great potential for structural capital efficiency and human capital efficiency among the components of intellectual capital. So this study provides the better and clear understanding of relationship of intellectual capital and its components with financial performance of non-financial companies and alsoin depth analysis of two industries, textile and chemicals by comparative study. This research is a valued addition in the existing literature regarding the importance of intellectual capital in Pakistan.

According to the objectives of this study, there are three main hypothesis. First two are for general analysis and third one is for comparative analysis between textile industry and chemical industry.

H_1: Intellectual capital (IC) is positively related with the profitability of firms.

H_2: Higher the efficiency of components of IC (HCE, SCE & CEE), the profitability of the firms will be high.

H_3: Intellectual capital in chemicals is more positively related to the profitability of firms than textile industry

Data and Methodology

1 Sample and Data Collection

Sample of this study is non-financial companies listed in Pakistani stock exchanges (KSE). Study period is from 2009 to 2011. Data on required variables is collected from annual financial statements of the companies, KSE data sources and SBP data bank.

Random sampling technique is used for sample selection. At the start, data was collected for 356 companies. Thirty one companies was dropped due to missing data on required variables and there became 975 company year observations. At the end outliers were removed with the help of SPSS software. In this way, now the final sample is 917 company year observations (Table 1). Sample almost includes the companies from all industries which comes under non-financial segment according to KSE classification (Table 2).

2. Variables and their measures:

- *Dependent variable*: Financial measures of organization's performance: ROA (Operating Income/Total Assets), ROE (Net Income/Shareholders Equity)(Janošević, et al., 2013), (Chen, et al., 2005).
- *Independent variable*: VAIC™, Human Capital Efficiency, Structural Capital Efficiency and Capital Employed Efficiency(Pulic, 2004)
- *Control variables:* Leverage (Total Debt/Total Assets) and Firm Size (natural log of Total Assets) (Chu, et al., 2011; Mondal & Ghosh, 2012; Zéghal & Maaloul, 2010)

3. Models& Techniques:

Descriptive statistics, correlation and Panel data regression analysis are used in order to check the effects of investment in Intellectual Capital on Financial Performance of the organizations by deploying panel data. Four basic models are used in present study. Model 1 & 3 are used to test first hypothesis. And model 2 & 4 are used to test second hypothesis.

Model 1: $\mathrm{ROA}_{it} = \beta + \beta_1 \mathrm{VAIC}_{it} + \beta_2 \mathrm{LEV}_{it} + \beta_3 \mathrm{SIZE}_{it} + \varepsilon_{it}$

Model 2: $\mathrm{ROA}_{it} = \beta + \beta_1 \mathrm{HEC}_{it} + \beta_2 \mathrm{SCE}_{it} + \beta_3 \mathrm{CEE}_{it} + \beta_4 \mathrm{LEV}_{it} + \beta_5 \mathrm{SIZE} + \varepsilon_{it}$

Model 3: $\mathrm{ROE}_{it} = \beta + \beta_1 \mathrm{VAIC}_{it} + \beta_2 \mathrm{LEV}_{it} + \beta_3 \mathrm{SIZE}_{it} + \varepsilon_{it}$

Model 4: $\mathrm{ROE}_{it} = \beta + \beta_1 \mathrm{HEC}_{it} + \beta_2 \mathrm{SCE}_{it} + \beta_3 \mathrm{CEE}_{it} + \beta_4 \mathrm{LEV}_{it} + \beta_5 \mathrm{SIZE} + \varepsilon_{it}$

Empirical Results and discussion

1. Descriptive Statistics:

Table 3, 4 & 5 provides the results of descriptive statistics of all non-financial companies, textile industry and chemicals respectively. Table 3 depicts that total observations are 917. ROA has low mean value (4.80) than ROE (13.15). There is great difference between maximum (277.69) and minimum (-336.33) vales of ROE because sample include all type of firms with no distinction between high and low profitable firms. HCE has high mean value (3.74) than SCE and CEE. It means human capital efficiency is high than other two efficiencies of non-financial firms in Pakistan.

By viewing table 4 & 5, descriptive of chemicals and textile industry are compared. Chemical industry has higher mean values of ROA (10.64) and ROE (22.55) than textile industry (2.18) and (6.06) respectively. It means chemicals is more profitable than textile industry in Pakistan and investors are getting more return in chemicals industry. The mean values of HCE is higher in chemicals while mean values SCE and CEE are lower than textile industry. Over all intellectual coefficient of chemicals (4.32) is better than textile industry (3.38).

2. Pearson Correlation

Pairwise correlation is calculated with SPSS. Table 6, 8 & 10 provides the results of correlation of aggregate measure of intellectual capital VAIC for all non-financial companies, textile industry and chemicals respectively. ROA has positive and significant relationship with all except Lev. Lev has negative and significant linkage with ROA. And same is the case for ROE. Pairwise correlation is calculated with SPSS. Table 6, 8 & 10 provides the results of correlation of aggregate measure of intellectual capital VAIC for all non-financial companies, textile industry and chemicals respectively. ROA has positive and significant relationship with all except Lev. Lev has negative and significant linkage with ROA. And same is the case for ROE. Table 7, 9 & 11 provides the results of correlation of components of intellectual capital for all non-financial companies, textile industry and chemicals respectively. According to table 7 & 9, ROA has positive and significant relationship with HCE, CEE and SIZE while negative relationship with SCE and LEV.One star represents significance at 5% and two stars represent significance at 1%.

Table 11 illustrates that ROA has significant association at 1% with all independent and control variables. ROA has positive correlation with HCE, SCE, CEE and SIZE of the firm but negative relationship with LEV. ROE also has the same association but insignificant linkage with LEV.

According to table 9 & 11, intellectual capital in chemicals is more significantly and positively associated with profitability measures of the company (significance at 1%) than Textile industry.

3. Regression results

Data used in this study is panel data. So I apply panel data regression in this study. First, F-test is used to decide between simple classical regression and fixed effect model. F-test is significant in all models so we are safe to use fixed effect model. Then for decision between fixed effect model and random effect model, Hausman test is adopted. The value of chi-square is significant in all models for that test. So, fixed effect model is used as the basis of empirical analysis in this study.

Results of model 1 & 2 are depicted in table 12 and 13 respectively. Table 12& 13 shows the aggregate impact of intellectual capital (VAIC) on the profitability measures ROA & ROE of firms respectively (from non-financial segment, textile and chemicals industry). Table 12 provides the evidence that by increasing efficient use of intellectual capital in non-financial firms, return on assets will increase definitely. So, H_{1a} is proved statistically significant.

Leverage has negative (-10.54) and significant relationship between return on assets of the firms. This relationship is conventional, as the firm move toward more debt its return on assets decreases. R-square is 14.2%. Table 13 also shows the comparison between textile industry and chemicals industry. Both industries have positive impact of IC on ROA but chemical industry creates more variability in ROA due to high R-square (37.19%). F-statistic is significant for all regressions in model 1 which confirms the suitability n fitness of the model.

Tables of the Study

Table 1

Final Sample

	Firm years
Initial sample	1068
Less: Companies having missing data	93
Less: Outlier	58
Final sample	917

Table 2

Sample Configuration

	Industry	**Frequency**	**%age**
1	Textile	364	40
2	Cement	53	5.7
3	Information & communication Services	29	3.2
4	Mineral Products	17	1.8
5	Fuel & Energy	39	4.2
6	Electrical Machinery	21	2.3
7	Motor vehicles, Trailer & Auto parts	58	6.3
8	Paper, Paperboard and Products	21	2.3
9	Coke & Refined Petroleum Products	25	2.7
10	Other Manufacturing	69	7.5
11	Other Foods	38	4.1
12	Chemicals, Chemical Products & Pharmaceuticals	90	9.8
13	Sugar	93	10.1
	Total	**917**	**100**

Table 3

Descriptive Statistics of non-financial companies

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	917	-31.92	49.26	4.8056	12.35668
ROE	917	-336.33	277.69	13.1567	46.67044
VAIC	917	-30.09	98.40	5.0666	7.74110
HCE	917	-30.86	96.77	3.7461	7.50654
SCE	917	-5.66	8.81	.7034	.79392
CEE	917	-11.07	26.02	.6170	1.56716
Leverage	917	.00	6.12	.6681	.38230
Size	917	7.89	19.39	14.7463	1.67901

Table 4

Descriptive Statistics of Textile Industry

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	364	-29.19	32.50	2.1809	10.23747
ROE	364	-336.33	187.50	6.0609	50.25533
VAIC	364	-12.14	27.69	3.5971	3.38999
HCE	364	-13.62	19.34	2.1693	2.89309
SCE	364	-2.37	8.81	.7075	.86182
CEE	364	-11.07	25.43	.7201	1.76695
LEV	364	.00	6.12	.7499	.43186
SIZE	364	7.89	18.07	14.2289	1.43231

Table 5

Descriptive Statistics of Chemicals Industry

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	90	-13.72	46.82	10.6420	13.52348
ROE	90	-81.67	158.68	22.5531	36.21124
VAIC	90	-15.71	20.92	4.3243	4.51679
HCE	90	-17.17	19.69	3.1224	4.33143
SCE	90	-.78	1.85	.5814	.38557
CEE	90	-.08	1.62	.6204	.34693
LEV	90	.16	2.04	.5809	.35547
SIZE	90	11.27	19.03	14.8041	1.81826

Table 6

Correlations of Non-financial Companies

	ROA	ROE	VAIC	LEV	Size
ROA	1				
ROE	.511**	1			
VAIC	.297**	.161**	1		
LEV	-.392**	-.049	-.113**	1	
Size	.232**	.100**	.302**	-.273**	1

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

Table 7

Correlations of Non-financial Companies

	ROA	ROE	HCE	SCE	CEE	LEV	Size
ROA	1						
ROE	.511**	1					
HCE	.293**	.145**	1				
SCE	-.085**	.081*	.019	1			
CEE	.107**	.058	.017	-.055	1		
LEV	-.392**	-.049	-.123**	.046	.009	1	
Size	.232**	.100**	.306**	.022	.018	-.273**	1

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

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

Table 8

Correlations of Textile Industry

	ROA	ROE	VAIC	LEV	SIZE
ROA	1				
ROE	.543**	1			
VAIC	.459**	.134*	1		
LEV	-.329**	-.059	-.196**	1	
SIZE	.282**	.021	.309**	-.498**	1

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

Table 9

Correlations of Textile Industry

	ROA	ROE	HCE	SCE	CEE	LEV	SIZE
ROA	1						
ROE	.543**	1					
HCE	.521**	.258**	1				
SCE	-.158**	-.022	-.146**	1			
CEE	.106*	-.155**	.018	-.065	1		
LEV	-.329**	-.059	-.213**	-.011	-.021	1	
SIZE	.282**	.021	.370**	-.065	.018	-.498**	1

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

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

Table 10

Correlations of Chemicals

	ROA	ROE	VAIC	LEV	SIZE
ROA	1				
ROE	.792**	1			
VAIC	.621**	.539**	1		
LEV	-.562**	-.156	-.306**	1	
SIZE	.365**	.443**	.432**	-.196	1

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

Table 11

Correlations of Chemicals

	ROA	ROE	HCE	SCE	CEE	LEV	SIZE
ROA	1						
ROE	.792**	1					
HCE	.589**	.484**	1				
SCE	.325**	.574**	.185	1			
CEE	.373**	.330**	.262*	-.110	1		
LEV	-.562**	-.156	-.310**	-.041	-.068	1	
SIZE	.365**	.443**	.409**	.350**	.138	-.196	1

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

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

Table 12: Fixed Effect Model Results

Model 1	Non-Financial Companies	Textile Industry	Chemicals Industry
Intercept	-82.40***	-227.0***	-156.0*
	(-3.84)	(-5.66)	(-1.77)
VAIC	.5518***	1.280***	.9004***
	(9.76)	(7.94)	(2.96)
LEV	-10.54***	-6.195***	-45.62***
	(-5.55)	(-2.81)	(-4.28)
SIZE	6.201***	16.11***	12.78**
	(4.31)	(5.77)	(2.15)
F-statistics	51.61***	44.39***	15.54***
Hausman test	19.76***	36.72***	12.46***
R-square	.1412	.1282	.3719

Note: Coefficient values, in parenthesis are t-value: ROA is dependent variable
*,** and *** represent significance level at 10%, 5% and 1% respectively

Table 13:Fixed Effect Model Results

Model 3	Non-financial Companies	Textile Industry	Chemicals Industry
Intercept	-251.6**	-648.0**	-421.4
	(-2.05)	(-2.48)	(-1.17)
VAIC	1.869***	4.293***	3.620***
	(5.78)	(4.08)	(2.91)
LEV	-31.51***	-11.67	-129.7***
	(-2.90)	(-0.81)	(-2.98)
SIZE	18.73**	45.49**	34.02
	(2.27)	(2.50)	(1.40)
F-statistics	16.65***	9.54***	9.93***
Hausman test	24.33***	17.66***	13.01***
R-square	.0197	.0024	.2175

Note: Coefficient values, in parenthesis are t-value: ROE is dependent variable
*,** and *** represent significance level at 10%, 5% and 1% respectively

Table 14:Fixed Effect Model Results

Model 2	Non-Financial companies	Textile Industry	Chemicals Industry
Intercept	-82.47***	-219.9***	-113.3
	(-3.84)	(-5.51)	(-1.65)
HCE	.5389***	1.574***	.7342***
	(8.86)	(7.72)	(2.81)
SCE	.6897	.7183	8.531**
	(1.50)	(1.07)	(2.65)
CEE	.6535***	.7404**	20.52***
	(3.18)	(2.43)	(5.09)
LEV	-10.53***	-5.967***	-47.02***
	(-5.54)	(-2.73)	(-5.60)
SIZE	6.198***	15.61***	8.872*
	(4.30)	(5.62)	(1.91)
F-statistics	30.95***	28.11***	23.30***
Hausman test	29.80***	46.50***	373.2***
R-square	.1408	.1374	.4891

Note: Coefficient values, in parenthesis are t-value: ROA is dependent variable
*,** and *** represent significance level at 10%, 5% and 1% respectively

Table 15:Fixed Effect Model Results

Model 4	Non-financial Companies	Textile Industry	Chemicals Industry
Intercept	-254.1**	-619.8**	-196.2
	(-2.10)	(-2.39)	(-0.89)
HCE	1.382***	5.544***	1.571*
	(4.03)	(4.18)	(1.88)
SCE	7.220***	10.96**	74.29***
	(2.78)	(2.52)	(7.21)
CEE	5.717***	.5150	66.17***
	(4.93)	(0.26)	(5.12)
LEV	-31.44***	-10.70	-118.5***
	(-2.93)	(-0.75)	(-4.41)
SIZE	18.61**	43.13**	13.40
	(2.29)	(2.39)	(0.90)
F-statistics	13.40***	7.24***	35.58***
Hausman test	45.84***	27.12***	66.04***
R-square	.0215	.0056	.3724

Note: Coefficient values, in parenthesis are t-value: ROE is dependent variable
*,** and *** represent significance level at 10%, 5% and 1% respectively

According to the table 13, intellectual capital is positively and significantly affect the ROE. It means intellectual capital has positive perception among the investors. Textile industry again has slightly higher relationship bet intellectual capital efficiency and ROE. But chemicals industry again has high R-square (21.75%) than textile industry (.0024). With the help of table 12 & 13, hypothesis of this study H_1 is statistically proved. But prediction power of model is higher in chemical industry than textile industry. Among the profitability measures, intellectual capital has greater impact on ROA than ROE.

Results of model 2 & 4 are depicted in table 14 & 15 respectively. Table 14 shows the relationship between efficiency of components of intellectual capital and firm's profitability measure (ROA). Efficiency of human capital, structural capital and physical capital are positively related with return on assets of non-financial companies of Pakistan. But structural capital efficiency is proved statistically significant. It means structural capital in non-financial companies is not good contributor in firm's profitability. Textile industry and chemicals industry, both have positive relationship between efficiencies of intellectual capital's components and ROA. Chemical industry has significant relationship of HCE, SCE and CEE with ROA at least at 5%. But SCE has insignificant relationship with ROA. Coefficient (20.52) of CEE in chemical is much higher than textile industry. R-square of chemical industry (48.91%) is again higher than textile industry (13.74%).

Table 15 shows the results of model 4, overall analysis of non-financial segment and comparative analysis of textile and chemical industry for ROE. Efficiency of human capital, structural capital and physical capital are positively related with return on equity of non-financial companies of Pakistan at 5% level. Textile industry and chemicals industry, both have positive relationship between efficiencies of intellectual capital's components and ROE. Chemical industry has significant relationship of SCE and CEE with ROE at 1%. But HCE has insignificant relationship with ROE even though at 5%. It means human capital efficiency is not impacting significantly in return on equity. Textile industry has insignificant impact of capital employed efficiency on return on equity. Coefficient (74.29) of SCE in chemical is much higher than textile industry and this

also makes sense because chemicals is more knowledge based industry. R-square of chemical industry (37.24%) is again higher than textile industry (.56%). So, hypothesis H_3proved the positive relationship between intellectual capital and profitability measure but did not proved statistically significant.Among the profitability measures, intellectual capital has greater impact on ROA than ROE.

Conclusion

As the world economy is moving towards knowledge-based economy, the concept of intellectual capital (IC) is getting more attention progressively.Intellectual capital is gradually becoming an important corporate asset and has a great impact on the profitability. Gap between market value of the company and book value of the company is justified with the interpretation of intellectual capital.

This study finds the positive and significant relationship between value-added Intellectual coefficient and both profitability measures (ROA & ROE) in non-financial companies of Pakistan. It means by increasing performance of intellectual capital in organizations will increase their profitability. This empirical evidence proves that Pakistan is also moving toward the knowledge based economy and on the way to get competitive sustainability. In component analysis, structural capital efficiency has positive association with firm profitability but it could not be proved statistically significant in the case of return on assets.

Comparative analysis of textile industry and chemical industry also shows the importance of intellectual capital in Pakistan's business environment. Intellectual capital proves strong and positive relationship with firm's profitability (ROA & ROE), almost the same in both industries. Structural capital efficiency is not proved statistically significant linked with ROA in case of textile industry. It means, textile industry do not have much importance of high tech information systems and other innovative structural capital than chemicals. But textile industry has great potential for human capital. So, by investing in manpower, profitability can be improved.

1. Limitations& implications

This study is restricted to non-financial companies of Pakistan listed on KSE, so with the help of this research we will get insight into just non-financial segment. During the generalizability of that research limitations of VAIC approach also should be consider.

Findings of this study can help the companies to get knowledge about the importance of elements of Intellectual Capital(IC).Companies can also see how IC can affect its financial performance in this emerging knowledge based economy.Future research avenues are also opened.

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