International Journal of Research in Social Sciences
Vol. 10 Issue 03, March 2020
ISSN: 2249-2496 Impact Factor: 7.081
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

Intellectual Capital and Financial Management

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ABSTRACT

In the current era of information technology, knowledge is a dominating resource. The accelerated entry of the businesses into the knowledge-based era has attracted the attention of the investors towards Intellectual Capital. The present study is an attempt to examine the intellectual capital performance of 70 companies operating in India during 2010-2015.The association of intellectual capital performance of these companies, with their financial performance, as measured by Return on Assets, Return on Equity & Market to Book Value has been analysed. Value Added Intellectual Coefficient (VAIC) model given by Public was used to measure intellectual performance and its association with the financial performance using Panel Regression Analysis, incorporating Random effects in the model. The findings of the study suggest that intellectual capital has a significantly positive impact on companies' ROA & ROE, where as it failed to reveal its impact on companies' Market Value. Further, other components of intellectual capital; Human Capital Efficiency and Capital Employed Efficiency were found to be having a positive impact on companies‟ ROA and ROE. On the other hand Capital Employed Efficiency failed to reveal any association with companies' Market-to-Book value. In addition to these the Structural
Capital Efficiency indicated positive relationship with the companies' ROE.

Keywords
Intellectual Capital, VAIC, Financial Performance, Panel Regression, Indian Companies

1. Introduction

The accelerated entry of the businesses into the information era has procreated several new terms like Intellectual Capital‟ that did not exist a few decades ago. It has been recognized that Intellectual Capital is embraced in every facet of economic, sociological, political and managerial development in a manner previously unknown and largely unseen[1]. The increasing focus of the business towards its knowledge assets has drawn the attention of the investors as well towards reporting and measurement of Intellectual Capital. Intellectual Capital as defined by Stewart[2],"is the intangible asset used to create wealth or knowledge, intellectual property and experience which helps the company to gain a competitive advantage over others". These are the intangible assets which are not listed clearly on a firm's balance sheet, but certainly impact its performance, thereby revealing the relationship between employees, ideas, and information and measure what is not measured[3].

In the current scenario, sources of economic value and wealth not only comprise of the products manufactured by enterprises but also their intangible assets, i.e. their intellectual capital[4-5]. It is widely believed that intellectual capital plays a great role in creating value[6]. According to Roos and Roos[7] and Bontiset al[8], "Intellectual Capital is that set of intangible assets which not only increases the firm‟s performance but also improves its organizational value". In today's knowledge based socio-economic period where intellectual capital has become one of the imperative production factors, measuring firm's performance may not just be possible with traditional accounting practices. Therefore, the need to develop new methods taking intellectual capital into account has grown[9,10]. The recognition that intellectual capital has an impact on creating value and increasing the financial performance of firms resulted in developing various methods to measure it[3, 7, 11-13]. Most of the recent studies[4,14-17] analyzing the impact of intellectual capital performance on the financial performance of firms used the Value Added Intellectual Coefficient (VAIC) model developed by Pulic[18]. Firer and Williams[19] stated that VAIC is an easily applicable and effective method to measure firms' intellectual capital performance. Studies investigating the link between the VAIC and financial performance suggest that intellectual capital contributes to the profitability, productivity, efficiency and earnings per share of firms[20-22].

The present study analyzes the relationship between the intellectual capital performance and financial performance of 70 companies operating in India during the period 2010 and 2015 using the VAIC model. Panel data regression analysis, which incorporates both cross-sectional and time dimension into the analysis, was used in the study. The findings indicate that intellectual capital has a positive impact on the financial performance indicators ROE and ROA and a negative impact on Market Value of the companies.

2. Research Methodology

The purpose of the present study was to analyze the impact of Intellectual Capital on Indian companies‟ financial performance over a period of 6 years i.e., 2010-2015.

Value Added Intellectual Coefficient[19] (VAIC) method has been used to measure the impact of Intellectual Capital on the firm‟s performance. The method is based on the published audited financial information of the firm, hence, the subjectivity is reduced to a large extent by this method (Deep & Narwal, 2014)[23].The association of Intellectual Capital with the financial performance has been assessed using three firm performance indicators i.e., Return on Assets (ROA), Return on Equity (ROE)

and Market to Book Value (M/B) of the companies. The impact of Intellectual Capital on financial performance of the Indian Companies was assessed using Panel Data Regression (incorporating random effects in the model). Data was collected from the Ace Equity

database (maintained by Accord Finetech Pvt. Ltd Co.), official websites of the selected companies from their annual reports. 70 companies amongst the FE- 500(Financial Express – 500) companies as per the list given by Financial Express 2014 were considered for a period of 6 years i.e., 2010-2015.

3. Hypotheses Construction

As far as the impact of Intellectual Capital on the firm‟s performance is concerned, two models have been constructed. *Model-I* considers VAIC as an intellectual capital indicator whereas *Model-II* considers three components of Intellectual Capital i.e. Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE) as the Intellectual Capital indicators.

The following hypotheses have been constructed to test

Model-I:

H0a: There is an insignificant association between intellectual capital performance (measured by VAIC) of Indian Companies and its ROA

H0b: There is an insignificant association between intellectual capital performance (measured by VAIC) of Indian Companies and its ROE

H0c: There is an insignificant association between

intellectual capital performance (measured by VAIC) of Indian Companies and its M/B

As far as **Model-II** is concerned the following hypotheses have been constructed:

For dependent variable ROA

H0a1: There is an insignificant association between HCE of Indian Companies and its ROA

H0a2: There is an insignificant association between SCE of Indian Companies and its ROA

H0a3: There is an insignificant association between CEE of Indian Companies and its ROA

For dependent variable ROE

H0b1: There is an insignificant association between HCE of Indian Companies and its ROE

H0b2: There is an insignificant association between SCE of Indian Companies and its ROE

H0b3: There is an insignificant association between CEE of Indian Companies and its ROE

For dependent variable M/B

H0c1: There is an insignificant association between HCE of Indian Companies and its M/B

H0c2: There is an insignificant association between SCE of Indian Companies and its M/B

H0c3: There is an insignificant association between CEE of Indian Companies and its M/B

Variable definition Independent Variables

In the current study, Intellectual Capital was measured using the VAIC method. Further, value added intellectual coefficient (VAIC) was used as independent variable. Intellectual Capital has been defined in many different ways, but the most commonly accepted definition categorizes it into *human, structural and customer capital*, so these three components were used as intellectual capital in this paper. The value added intellectual coefficient (VAIC) was used as a degree to reflect the intangible assets of the firm. Following describe the detailed analysis of the concept:

Value added is the difference between the output and input in the organization.

Value Added = Output - Input

Outputs are products and services of the organization while inputs are all the expenses which are incurred in producing the products or services.

It is also expressed as

VA = I + DP + D + T + M + R + W Or VA = W + I + T + NI

Where, I = Interest expenses; DP = Depreciation expenses; D = Dividends;

T = Taxes paid;

M = Equity of minority shareholders in net income of subsidiaries;

R = Retained profits;

W = Wages and salaries; and NI = Profits after taxes.

The first step was to determine the efficiency of the human capital on the value creation of the firm. This was obtained by estimating the ratio VAHU; this is the ratio of VA of the firm to the expenses made by the firm on its human capital. These expenses are reflected in the salaries and wage cost of the firm in their annual reports:

VAHU = VA / HC

Where, VA = Value added for the firm;

HC = Total wages and salary costs for the firm and VAHU = Human capital coefficient for the firm.

The next measure determines the efficiency of the structural capital on the VA by the firm. This is the ratio of structural capital (SC) and value added of the firm represented as SCVA. The SC was calculated as follows:

$$SC = VA - HC$$

Where, SC = Structural capital for the firm; VA = Value added for the firm and

HC = Total wages and salary costs for the firm. Then the relationship is shown as:

$$SCVA = SC / VA$$

Where, VA = Value added for the firm; SC = Structural capital for the firm and SCVA = Structural capital VA for the firm.

The next measure was used to measure the efficiency of the capital employed (VACA). This is the ratio of the value added to the total capital employed by the firm;

$$VACA = VA / CA$$

Where, VA =Value added of the firm and; CA = Capital employed of the firm and

VACA =Value added capital coefficient of the firm.

The sum of these three ratios produced a value, which was denoted as VAIC – an indicator of the firms‟ intellectual ability and performance. If the VAIC of any firm is higher than others it means that the Intellectual Capital efficiency of this firm is higher[23].

$$VAIC = VAHU + SCVA + VACA$$

Where, VAIC = Value added intellectual coefficient for the firm;

VAHU = Human capital coefficient for the firm;

SCVA = Structural capital value added for the firm and VACA = Value added capital coefficient for firm.

Dependent Variables

For testing the association between intellectual capital and financial performance Return on Assets (ROA), Return on Equity (ROE) and Market to book value (M/B) of the firm has been used as the performance indicators.

- Return on Assets (ROA): ROA is measured as the ratio of the net income (less preference dividends) divided by the book value of total assets. It shows the degree to which a firm‟s revenues exceed over cost4,19.
- Return on Equity (ROE): ROE is measured as the ratio between the net incomes (less preference dividends) divided by the book value of total equity. It shows the earnings available to the equity shareholders and is generally considered an important financial indicator for investors.
- Market to book value (M/B): M/B reflects the market valuation of the companies. It is the ratio of Market capitalization of the given year to capital employed of the firm.

MB = Market Capitalization / Book Value of Total Assets Control Variables

For the purpose of examining the relationship, this paper used Panel regressions as the underlying statistical tool. In conducting regression analysis, following control variables were included:

- Size of the firm (SALES): Size of the firm as measured by the natural log of total sales, used here to control for the impact of size on wealth creation.
- Physical capacity (PC): This ratio measures physical intensity i.e. how much fixed assets are there in proportion to total asset, calculated as:

PC = Fixed Assets / Total Assets

- Leverage (D/E): Financial leverage and debt structure as measured by total debt divided by total equity is used to control for the impact of debt service in corporate performance and wealth creation[24].

Other than the above control variables certain Corporate Governance variables have also been controlled to test model-I and model-II.

- Board Composition (BD): Board Composition measured as a proportion of Independent Non- Executive directors and total directors.
- Role Duality (CEOD): CEO role duality expressed as a Dummy variable where 0 means absence of role duality and 1 means presence of role duality i.e. same person acting as CEO and Chairman of the company.
- Audit Committee Size (AUDITSIZE): Audit committee size measured as the number of directors on board present in the audit committee.
- Frequency of Audit Committee Meetings (FREQUENCY): Number of audit committee meetings held within the financial year of the annual report.
- Ownership Concentration (OC): Ownership concentration means how firmly or loosely the management has held the shares of the company. It is expressed as a dummy variable where 0 means loosely held shareholding by the owners and 1 means firmly held ownership.

Panel Regression Model

Since the data was of panel nature consisting of both time series and cross sectional data, panel regression with Random Effects was used for testing both the models.

The regression models developed for carrying out the analysis of the panel data were:

MODEL-I

ROAit = αit + β1itVAICit + β2itPCit + β3itSALESit + β4itD/Eit+ β5itBDit+ β6itCEODit+ β7itAUDITSIZEit+ β8itFREQUENCYit+ β9itOCit+ εit

ROEit = αit + β1itVAICit + β2itPCit + β3itSALESit + β4itD/Eit + β5itBDit + β6itCEODit + β7itAUDITSIZEit + β8itFREQUENCYit + β9itOCit + εit

M/Bit = αit + β1itVAICit + β2itPCit + β3itSALESit + β4itD/Eit + β5itBDit + β6itCEODit + β7itAUDITSIZEit + β8itFREQUENCYit + β9itOCit + εit

Where, αit = Constant term;

VAIC = Value Added Intellectual Co-efficient; PC = Physical capacity;

SALES = Market Capitalization; D/E = Debt Equity Ratio

BD = Board Composition CEOD = CEO Role Duality

AUDITSIZE = No. of members in the Audit Committee FREQUENCY = No. of Audit Committee Meetings OC = Ownership Concentration

ROA = Return on Assets ROE = Return on Equity

M/B = Market to book value and εit = Error term.

MODEL-II

ROAit = αit + β1itVAHCit + β2itSCVAit + β3itVACAit + β4itPCit + β4itSALESit + β6itD/Eit + β7itBDit + β8itCEODit
+ β9itAUDITSIZEit + β10itFREQUENCYit + β11itOCit + εit

ROEit = αit + β1itVAHCit + β2itSCVAit + β3itVACAit + β4itPCit + β4itSALESit + β6itD/Eit + β7itBDit + β8itCEODit
+ β9itAUDITSIZEit + β10itFREQUENCYit + β11itOCit + εit

M/Bit = αit + β1itVAHCit + β2itSCVAit + β3itVACAit + β4itPCit + β4itSALESit + β6itD/Eit + β7itBDit + β8itCEODit
+ β9itAUDITSIZEit + β10itFREQUENCYit + β11itOCit + εit

Where, αit = Constant term;

VAHC = Value Added Human Capital (Human Capital Efficiency);

SCVA = Structural Capital Value Added (Structural Capital Efficiency);

VACA = Value Added Capital Employed (Capital Employed Efficiency);

PC = Physical capacity; SALES = Market Capitalization; D/E = Debt Equity Ratio

BD = Board Composition CEOD = CEO Role Duality

AUDITSIZE = No. of members in the Audit Committee FREQUENCY = No. of Audit Committee Meetings OC = Ownership Concentration

ROA = Return on Assets ROE = Return on Equity

M/B = Market to book value and εit = Error term.

4. Results and Findings

Intellectual Capital and Financial Performance Model-I

Table 1 shows the results of panel regression for model-I using each financial performance indicator (i.e. ROA, ROE, M/B) as the dependent variable.

Table 1: VAIC and Financial Performance

Independent Variables	Dependent Variables					
	ROA		ROE		M/B	
	Coefficients	t-Statistics	Coefficients	t-Statistics	Coefficients	t-Statistics
VAIC	0.4336	5.9134*	1.0176	6.3462*	2.6640	1.6200
D/E	-0.5301	-2.0586**	-4.3665	-7.8334*	-1.6210	-0.2823
PC	61.1825	11.1727*	111.7412	5.4216*	95.2836	0.4044
SIZE	0.4708	0.3912	0.9289	1.1527	122.5404	14.4765*
BD	6.2504	3.1085**	17.3866	2.5393*	36.0172	0.5145
CEOD	0.0818	1.8361	2.5291	0.6966	8.3431	0.2155
OC	6.4489	2.3868*	10.5532	2.2895**	18.1701	0.3664
AUDITSIZE	-0.3730	0.8137	-1.9266	-1.1412	-10.3104	-0.5832
FREQUENCY	-0.2404	0.4732	0.4916	0.5058	-3.6307	-0.3552
Adjusted R2	15.83%		27.51%		33.87%	
F-Value	9.7200*		18.5850*		24.7373*	

*Note: *, **, *** represents level of significance at 1 percent, 5 percent and 10 percent respectively.*

In Table 1 VAIC has been found to be positive and significant at 1% level of significance across ROA and ROE. Whereas, if we talk about the Market to book value of the sampled companies its relation with the firms' Intellectual Capital came out to be insignificant. That means the intellectual capital surely affects the performance of Indian Companies in terms of its ROA and ROE whereas, it had no impact on the market value of its shares. If we further check in the details of the results, the Adjusted R^2s of Model-I came out to be 15.83% for ROA and 27.51% for ROE, which meant that though the

effect of Intellectual Capital on the performance was significant but its quantum was very small.

Model-II

Table 2 shows the results of panel regression for model-II using each financial performance indicator (i.e. ROA, ROE, M/B) as the dependent variable and three components of Intellectual Capital (i.e. HCE, SCE, CEE) as the independent variables.

Table 2: VAIC Components and Financial Performance

dependent Variables	Dependent Variables					
	ROA		ROE		M/B	
	Coefficients	t-Statistics	Coefficients	t-Statistics	Coefficients	t-Statistics
VAHC	0.1250	3.0418*	0.2966	2.6796*	2.8876	1.6341***
SCVA	0.2748	0.9637	3.3855	4.3477**	3.5385	0.2786
VACA	28.5055	31.1897*	53.5534	22.8087*	-13.3179	-0.3709
D/E	-0.3506	-2.5201*	-4.4384	-12.0345*	-1.5075	-0.2606
PC	-78.0688	-8.7842*	-159.026	-7.5123*	183.2250	0.5988
SIZE	0.2462	1.0736	0.2948	0.5138	122.7387	14.3676*
CEOD	-0.2515	-0.2135	1.8396	0.6685	7.6452	0.1956
BD	2.7027	1.6230***	8.1697	1.8297**	39.3707	0.5538
AUDITSIZE	-0.0607	-0.1279	-2.5138	-2.1114**	-9.3138	-0.5214
FREQUENCY	-0.6482	-2.3114**	-0.5003	-0.7161	-3.0516	-0.2941
OC	2.5498	1.5638	5.7557	1.5795	19.7478	0.3931
Adjusted R2	72.01%		63.83%		33.43%	
F-Value	98.5688*		67.9078*		20.0424*	

*Note: *, **, *** represents level of significance at 1 percent, 5 percent and 10 percent respectively.*

In Table 2 VAHC was observed to be significant at 1% level of significance for ROA and ROE whereas, at 10% level of significance for Market-to-Book value of the companies. This meant that amongst all the three Intellectual Capital components, the Human Capital Efficiency was one such component which positively and significantly affected the Financial Performance of the companies consistently for all the three performance indicators. While VACA proved to be having a significant positive association with companies' ROA and ROE at 1% level of significance but failed to prove any such association with the companies‟ Market-to-Book value. Further, SCVA i.e. the Structural Capital Efficiency proved to have a significant positive relation only with companies' ROE at 5% level of significance but failed to establish any such relation with companies' ROA and Market-to-Book value.

5. Conclusion

Firm value is based on more than physical capital. Intangible assets such as Intellectual Capital have always existed, however, it is only recently25 that the accounting profession has seriously attempted to define, disclose and measure them. The relationship between the intellectual capital and companies‟ financial performance has been a subject of many studies. The previous literature claim that intellectual capital has a positive influence on companies‟ financial performance. In the present study the intellectual capital efficiency of

70 companies operating in India during 2010-2015 was calculated using Value Added Intellectual Coefficient (VAIC) and its association with companies' various performance indicators was analyzed.

The findings suggest that intellectual capital has a significantly positive impact on companies' ROA & ROE, whereas, it failed to reveal any evidence of its impact on companies' Market Value. Further, various components of intellectual capital; Human Capital Efficiency and Capital Employed Efficiency were found to be having a significant positive impact on companies ROA and ROE. The Capital Employed Efficiency failed to reveal any such association with companies' Market-to-Book value. Further, the Structural Capital Efficiency only proved the presence of a positively significant relationship with the companies' ROE.

The current study provided an insight into the intellectual capital reporting practices of the Indian companies from a longitudinal perspective and adds to the Intellectual Capital knowledge. Results of the study are consistent with Chen et al.4, which examined Taiwanese firms and found small but positive impact of Intellectual Capital on the Financial Performance of the companies. Firer and Williams19concluded that firms and investors place greater importance on physical and financial capital than the intellectual capital. Though similar conclusion had been supported in this study also but, the importance of intellectual capital in determining the true and fair value of firm‟s performance can not be ignored.

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