CHAPTER 5

FINDINGS AND CONCLUSIONS

This study assesses the relation between Intellectual capital and corporate performance. The uniqueness of this study lies in the fact that an in depth analysis has been done to understand the impact and predictive ability of intellectual capital on corporate performance using PLS –Path Modeling. The study has been done on select Indian industries which are knowledge intensive from 2000 to 2010 (11 years). Intellectual capital efficiency has been measured using Value Added Intellectual Capital Coefficient VAIC™ put for by Ante Pulic. Corporate performance has been measured using financial performance indicators (MV/BV, ROE, ROA, EPS, and MCAP)

To address the research objectives two approaches has been employed. First, Correlation Analysis and One way ANOVA has applied to investigate the significant relationship among the variables studied and to understand efficiencies of select industries like Banking, Pharmaceutical, Electronics and Information Technology. In the second phase of analysis PLS- Path Modeling has been used to confirm the theory behind the conceptual frame work and study the impact and predictive ability of intellectual capital on corporate performance.
5.1 FINDINGS: RESEARCH OBJECTIVE-1

To estimate, evaluate and rank the Intellectual capital efficiency measured by VAICTM with regard to four Indian industries namely Banking, Pharmaceutical, Information Technology and electronic sectors for a period of eleven years (2000 – 2010)

- The mean values from the descriptive statistics (Table 7 and 8) suggest that the sampled companies has been efficient in creating value from intellectual capital base

- The mean value of components of intellectual capital like VACA, VAHU, and STVA indicates that human capital is the most important factor contributing to value creation from intellectual capital base.

- The mean value of market to book value (MV/BV) of 3.58 indicates that investors generally value the sample industries in excess of their book value of net assets as reported in financial statements.

- With respect to VAIC ranking Banking Sector tops the list with mean value of 11.08 for VAIC followed by Pharmaceutical industry with VAIC 5.78, Electronic industry with mean VAIC of 3.43 and finally Information Technology Industry with a VAIC of 3.41.

- Comparison of mean values of VACA, VAHU and STVA of different industries suggest that the sampling industries were able to create values from human capital employed than from physical or structural capital. This finding is consistent throughout all the industries taken for study.
• The Mean ratio of Market to Book value (MV/BV) of various industries highlights the existence of an increasing gap between market value and book value of companies sampled.

• Remarkable disparity between market value and book value may be due to poor valuation of intellectual capital.

• 68.32% of pharmaceutical and 85.56% of Information technology firm’s market value are underrated when compared to banking and electronic industries. The mean ratio of MV/BV reveals that 63.2% of Electronic firm’s value has not been captured in the financial statement.

• MV/BV of banking industry reveals that about 36% of the banking firm’s market value is hidden from financial statements.

• Knowledge Centric companies have huge hidden values which are not visible to traditional accounting methods and divergence specifically indicates something not accounted in the balance sheet.

5.2 FINDINGS: RESEARCH OBJECTIVE-2

To study the significant relationship between Intellectual capital variables and Corporate Performance variables.

Correlation analysis

• VAHU or human capital efficiency has significant positive association with MCAP (.108) but not with ROE (-.145) and ROA (-.346)
- VACA shows significant positive relationship with ROE (.391) and ROA (.167) but shares a negative relationship with MCAP (-.096). This demonstrates that an increase in value creation efficiency by physical capital would influence profitability.

- STVA - structural capital efficiency shows significant positive relationship with EPS (.110) and MCAP (.240), but is negatively correlated to ROE (-.098) and ROA (-.382).

- Physical capital shows significant positive correlation with ROE and ROA. Human capital shows significant positive correlation with MCAP and structural capital shows significant positive correlation with EPS and MCAP. Thus the hypothesis H1 stands partly accepted.

5.3 FINDINGS: RESEARCH OBJECTIVE-3

To explore the differences among various industries with regard to Intellectual Capital Performance.

One way ANOVA and Tukey’s HSD

- Hypothesis II states that there is a significant difference among the four Industries with regard to the intellectual capital variables (VACA, VAHU and STVA)

- Fischer’s F-test proves that there is significant difference among four industries with regard to Intellectual Capital variables.

- Post-Hoc test (multiple comparison test) Tukey’s (HSD) test shows that all the pairs are significantly different. The category grouping makes it clear that Intellectual Capital of four industries chosen for study is significantly different. Hence Hypotheses II stands accepted.
5.4 FINDINGS: RESEARCH OBJECTIVE- 4

To study the multivariate relationship and impact among observed variables that measure intellectual capital and corporate performance.

To study the predictive relevance of IC on CP.

**PLS-Path Modeling**

- Formative model has been used for this study.

- Multicolinearity statistics for the data reveal that VIF values of all variables are less than 10. Hence it has been concluded that there is no harmful multicolinearity among the variables selected for study.

- Goodness of fit – GoF index values for banking, electronics, IT and Pharmaceutical industries are as 0.82, 0.75, 0.69, 0.81 respectively. These values speak in favor of the model. In case of IT industry the value is less compared to all others. Since most of the values are close to .9 which is the accepted standard it speaks in favor of this model.

- Cross loading results for all industries show that manifest variables VACA, VAHU and STVA are more loaded in its own latent variable Intellectual capital than CP and manifest variables MV/BV, ROE, ROA, EPS, and MCAP are loaded more on its latent variables CP than IC. The manifest variables measure the latent variables conclusively.

- The $R^2$ value of the endogenous variable has values of 0.56, 0.88, 0.76, 0.72 respectively for bank, electronics, Information technology and Pharmaceutical industry. This shows the inner
specification of the model and the variance. i.e. in case of banking industry 56% of the variance in corporate performance is caused by Intellectual capital. The highest impact is found in electronic industry followed by IT industry.

- Regression weight of the path coefficient for all the industries show a t-statistic value of more than 1.96. Hence the path coefficient is valid and significant with respect to all industries studied.

- The relative impact of predictive relevance is found by blind folding redundancies. The values range from 0.153 for banking industry, 0.408 for electronics, 0.276 for IT and 0.326 for Pharmaceutical industry. High predictive relevance is shown by electronic and pharmaceutical industry and other industries show medium predictive relevance. **Hence hypotheses H3 and H4 stand accepted.**

5.5 CONCLUSION

Intellectual capital has become a pivotal source of creating wealth and providing superior performance for a contemporary business organization. Based on a sample drawn from listed companies of four major IC centric Indian industries (Information technology, Electronics, Pharmaceutical and Banking) this study investigates

- The intellectual capital efficiency of these Indian industries by using VAICTM methodology by Ante Pulic.

- The relationship between components of intellectual capital and corporate performance
The differences among these industries with respect to intellectual capital

The ability of intellectual capital to impact corporate performance and its predictive relevance.

Summary report on the IC contribution to CP

**Banking industry:** Intellectual capital efficiency measured by VAIC has the a mean value of 11.08, which is relatively a high. It explains the value addition brought about by IC components. For every one rupee invested 11.08 rupees of value has been added. Hence it can be concluded that banking industry reflects high organizational efficiency. It would be worthwhile to understand which components in IC contribute to the overall efficiency. Analysis reveals that the biggest contributor is human capital with 9.5 mean values HU. The other two indicators like physical capital and structural capital do not bring in value addition as they generate only 70 and 86 paise respectively for (VACA and STVA) for every rupee invested. Adoption of technology in banking has not reduced the importance of human factor (employees) in the industry. Model testing reveals that 56% of the change in corporate performance is brought about by intellectual capital. It is clear evidence to policy makers that by improving the efficiency of IC components especially capital and structural value more value addition (growth) can be brought in. At firm level, banks can take steps to bring down the NPA. This can increase the quality and utility of capital which in turn would add more value. Banking industry should wake up to the fact that there are large unbanked areas and to capture those markets it should design innovative models. All this would lead to better harnessing of Structural capital and Physical capital which can increase wealth creation.
Pharmaceutical Industry:

The mean value of VAIC for all the years is 5.78. This value is comparatively low when compared to banking industry. For every one rupee invested the value addition is 5 rupee. The contribution from human capital is more than other components of IC. It contributes 4 rupees for every one rupee invested. 72% of the change in corporate performance is brought about by intellectual capital making it clear that IC can impact more in this sector to bring value addition. Improved efficiency in structural capital elements like better technology, R&D, Patents, acquiring state of the art technology and resources can improve corporate performance. The pharmaceutical industry is undergoing an unprecedented change with the introduction of product patents along with the earlier process patents. This has made the competitive environment more turbulent as more multinational companies would be setting up plants in India and vice versa. Hence Indian companies have great opportunities in the area of generics, biotechnology and outsourcing which stems from the structural capital. Thus an efficient use of structural capital can improve the performance and create value in this sector.

Electronic & Information technology industries

The mean value of VAIC for electronics and IT are 3.43 & 3.41. In both the cases the Human capital contributes more towards the value creation than other IC components. The impact of 88 % is noted in electronic industry and 76% in IT industry. It is evident that in the Indian context that structural capital efficiency and better use of physical capital can lead to long term value creation in the industry.
The results of this study have lot of practical implications. By means of a longitudinal study for 11 years (2000 – 2010), it has been observed that sample (Indian) companies are capable of creating value from their intellectual capital base. Among the major IC components mentioned above Human capital has turned out to be the most efficient value creator. It is heartening to note that companies are utilizing intellectual capital to create value addition. The study also provides evidence for the increasing gap between market value and book value. The relationships between components of IC and that of CP are shown as below:

- VACA has significant positive relationship with MCAP
- VAHU has significant positive relationship with ROE and ROA
- STVA is having significant positive relationship EPS and MCAP. These relationship make H1 partly accepted.

Moreover the study finds additional evidence for the existence of gap between market value and book value which reflects the poor reporting and valuation of intellectual capital. Hypothesis II predicts that there is a significant difference between industries with respect to intellectual capital for various industries studied. This has been proven by one way ANOVA followed by Tukey’s HSD.

This research provides a different dimension for the study on intellectual capital by analyzing the impact of Intellectual capital on corporate performance. The analysis has been undertaken using PLS-Path Modeling. PLS –PM is considered as an apt tool for this study because of sample size, non-normal distribution of data, use of formative model and such a study has not been conducted in the Indian context.
The analysis reveals support for the hypotheses 3 and 4 which proves that intellectual capital can impact corporate performance and it has a predictive relevance. The model gives strong support for the underlying theoretical underpinnings on IC. PLS analysis explains a good model fit and theoretical confirmation of the conceptual model. This study suggests that those theories and practices that place high value to IC are strongly supported and appreciated. Moreover it provides evidence that VAIC™ model proposed by Ante Pulic is a valid tool for measuring intellectual capital. The higher impact if IC on CP is found in electronic industry followed by Information technology industry, pharmaceutical industry and last by banking industry. It is evident from the results that for knowledge centric industries IC is crucial and affects the corporate performance more than a service industry like Bank.

Overall empirical findings provide various insights which should be of interest to scholars, academicians, Policy makers, Businessmen and other stake holders including investors. This study breaks the monotony of assessing business organizations through the lens of financial performance alone. It provides evidence that the Business performance is not only a result of heavy top line and bottom line figures, but many factors which are intangible can impact corporate performance in a big way. Rather than fixed assets, intangibles assets – especially Intellectual Capital have now become the value drivers of organizations. More transparent measurement and reporting of Intellectual capital will help organizations and stake holders to value the organizations better. This study clearly shows that electronic sector and IT sector performance is heavily impacted by intellectual capital. Companies can develop strategies on the basis of these insights. No organizations can own the critical IC assets like employees, their knowledge customers etc. Hence such Intellectual Capital oriented companies should not only look at sales or profit figures, but in turn try to convert the above mentioned critical IC assets to something which companies can own. This
includes new knowledge or skill set, a new manufacturing process etc which will help business organizations to improve performance and generate profits.

Apart from the above mentioned factors, studies like this will help regulators and policy makers to initiate the measurement of intellectual capital which is an Intangible Asset. There is lot of pressure on business organizations for more disclosure as there is little transparency on this aspect. Companies can initiate methods to identify and develop intellectual capital assets which would help them to leverage human capital and eventually use it as a strategic asset. Conventional methods of enterprise valuation like profit margin, sales, market capitalization asset turnover have all become obsolete as most of these measures do not reflect the true value of the organization. This study has given empirical evidence for the same. It is right time for organization to move from the conventional valuation models and embrace a holistic valuation models which recognizes physical assets and intellectual capital assets.

5.6 LIMITATIONS

This study is directed towards four major intellectual capital oriented industries in India. To test the robustness of findings for other industries and countries, additional research is necessary. Hence, similar research could be applied to other industries in order to find out whether relationship between intellectual capital and its components on the corporate performance is the same as found in this research. It would be possible to get more insights into whether the conceptual model works well with other industries also. This will help us to better understand the inherent capability of these industries to create value from intellectual capital.
Furthermore, the influence of time and industry would help organizations to plan better to extract value from intellectual capital. Inherent limitations of using secondary data are applicable for this study too.

5.7 FURTHER RESEARCH

Valuation and reporting of intellectual capital assets is still in its nascent stages and measurement methods are ambiguous. If reporting of intellectual capital asset improves then it would bring more clarity and direction for future research. Advanced statistical methods like fuzzy logic, neural network could be adopted to explore relationship between intellectual capital and corporate performance.

In summary this research provides a different dimension to the study of intellectual capital by using PLS-PM method. Study provides empirical evidence on the impact of intellectual capital on corporate performance and its predictive relevance. This research shows that VAIC™ is a valid tool in measuring intellectual capital and proves that intellectual capital has become an indispensible part of a modern organization. Business entities need to nurture, value IC to harness superior performance and stay ahead in the competition.