

**IMPACT OF INTELLECTUAL CAPITAL ON THE
FINANCIAL PERFORMANCE OF FIRMS LISTED IN
NATIONAL STOCK EXCHANGE OF INDIA LTD**

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DECLARATION

I hereby declare that the thesis entitled, **IMPACT OF INTELLECTUAL CAPITAL ON THE FINANCIAL PERFORMANCE OF FIRMS LISTED IN NATIONAL STOCK EXCHANGE OF INDIA LTD**, embodies the result of my research work carried out under the guidance and supervision of **Professor M.SELVAM**, Research Advisor, and that I have not submitted the above thesis to any University for any Degree, Diploma, Associateship, Fellowship or any other similar titles previously.

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W	URL: https://www.researchgate.net/publication/331649328_The_Impact_of_Intellectual_Capital_on_Financial_Performance Fetched: 2019-10-10T11:01:48.9530000	 5
W	URL: https://dokument.pub/dl/7fmmov-4263-flipbook-pdf Fetched: 2022-05-05T05:29:42.0400000	 1
W	URL: https://www.researchgate.net/publication/347443342_Does_intellectual_capital_investment_enhance_firm_performance_Evidence_from_pharmaceutical_sector_in_China	 6

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LIST OF ABBREVIATIONS USED

VAIC	- Value Added Intellectual Coefficient
ROA	- Return on Assets
ROE	- Return on Equity
NPM	- Net Profit Margin
EPS	- Earnings Per Share
DER	- Debt Equity Ratio
RONW	- Return on Net Worth
IC	- Intellectual Capital
INR	- Indian Rupee
HC	- Human Capital
SC	- Structural Capital
CE	- Capital Employed
ICE	- Intellectual Capital Efficiency
HCE	- Human Capital Efficiency
SCE	- Structural Capital Efficiency
CEE	- Capital Employed Efficiency
R&D	- Research and Development
LSE	- Lahore Stock Exchange
MESDAQ	- Malaysian Exchange of Securities Dealing and Automated Quotation
SFA	- Stochastic Frontier Analysis
ASE	- Athens Stock Exchange
CFA	- Confirmatory Factor Analysis
PCB	- Private Commercial Bank

OLS	- Ordinary Least Square
ATO	- Asset Turn Over
VACA	- Value Added Capital Employed
ROS	- Return on Sales
BSE	- Bombay Stock Exchange
SME	- Small Medium Enterprise
USA	- United States of America
PC	- Physical Capital
NH	- Null Hypothesis
RBI	- Reserve Bank of India
SD	- Standard Deviation
VA	- Value Added
VARC	- Value Added Relational Capital
IBM	- International Business Machine
SPSS	- Statistical Packages for Social Sciences
Lev	- Leverage

ABSTRACT

Intellectual assets are employed in the service industry, in a variety of ways, to reduce costs and to increase efficiency through innovative activities. The aim of the present study was to investigate the impact of intellectual capital performance on the financial performance of sample firms. Intellectual capital performance of firms was measured by using VAIC methodology, in respect of 30 firms covering Banking, Information Technology and Pharmaceutical Firms of service index of NSE Nifty. The required data for this study, collected from ProwessIQ, CAPITALINE Database, Yahoo Finance and Money Control, were analysed by using statistical tools like Descriptive Statistics, Correlation Matrix and Regression Analysis for the period of 10 years from 1st April 2010 to 31st March 2019. The findings of this study were arrived at by using descriptive, correlation and regression analysis. The findings of the present study are subject to a few limitations, which could be taken by future researchers. The current study, for instance, focuses on firms of Nifty service sector operating in India. It was suggested that the sample firms could enhance its financial performance by means of managing its intellectual ability in a suitable way. The implication of this study is that it would help the Indian service industry and the regulators to address the factors affecting firms' financial performance and to take action to maximize their value creation. Future research in this domain might be extended to alternative domestic settings and also to alternate industries in service-oriented settings. It was pioneering empirical research, that examined the impact of intellectual capital on financial performance of the service sector firms in India.

Keywords: Intellectual Capital, Financial Performance, Knowledge Management and Service Sector

Chapter-I

Introduction

In the last two decades of the 20th Century, an unprecedented revolution has resulted in many remarkable changes in the corporate environment. In the industrial capitalism, the business depends on tangible physical assets, leading to a new economy called the 'knowledge economy'. In the knowledge economy, the production of goods or services and value creation depends on intangible assets. Besides, the role of knowledge assets becomes vital for developing and managing global competitiveness. The intellectual capital was recognized as sustainable strategic assets to acquire and maintain competitive advantages (**Grant, 1991**). According to **Gu and Lev (2001)**, the intangibles are the key drivers for the success of business firms. Business competition due to globalization of trade and the deregulation of key economic sectors, is governed by the advent of information technology. **Stewart (1994)** has identified four related forces which contribute to the knowledge economics, namely, Globalization, Computerization, Economic Disintermediation and Intangibilization. According to **Egginton (1990)**, the intangible portion of the economy has grown well due to its growth such as services, information in specialized knowledge databases, services associated with products, etc. According to **Bontis et al. (1999)**, in the knowledge economy, the economic value is developed from creating, processing, communicating and selling information content than the value added by traditional goods and services. These intangibles are primary construct of knowledge economy, that are inherently different from physical and financial assets. These assets are from non-physical sources and they do not have any physical and financial embodiment. The intangible assets such as patent or a brand or a unique organizational supply chain, generated cost savings or offered competitive benefits. (**Lev and Mintz, 1999**). Similarly, **Edvinsson and Sullivan (1996)** viewed that intangible asset like knowledge and skills of employees,

key organizational processes, brand, loyalty, trust and relationship networks are the driving forces in the knowledge economy. In other words, the knowledge-based assets create the foundation for the capabilities of the firms. Hence, it is essential that every organization need to give greater recognition to their knowledge assets or intangible assets or intellectual assets for their survival and growth. Besides, many organizations in the service sector, namely, information technology, consulting firms, law firms, pharmaceutical companies, banking and finance companies and other service organizations, mainly rely on their intellectual assets for their success (**Lynn L.K. Lim and Peter Dallimore, 2004; Aino Kianto et al. 2010; Ahmed Elsetouhi et al. 2015; Jasmina Ognjanović, 2017; Chihcheng Lo et al. 2020**). Greater reliance on the intellectual capital is important for the organizations to maximize the value of their intellectual capital and to enhance it continuously. Intellectual capital is vital for maintaining competitive advantage and it is a valuable resource for the wealth creation of firms (**Murugesan Selvam et al. 2020**). The importance of intellectual capital was in recognizing and utilizing the potential benefits of intellectual capital to open up new avenues for future growth (**Bharathi Kamath, 2007**). In this new knowledge era, the organizational development comes from the maximum utilization of organization's intangible capabilities and their competencies. The non-imitability of these intangible capabilities and competencies makes an organization's intellectual capital valuable and strategically important. Therefore, managing the intellectual capital is vital if organizations in the service sector were to survive in highly competitive markets (**Stewart and Ruckdeschel, 1998**).

1.1. Intellectual Capital

The first economist, who employed the term, “intellectual capital”, was J.K. Galbraith in 1969. The first economist, who researched the intellectual capital, was **T.A. Stewart (1991)**. There are numerous definitions of intellectual capital since 1980s (**Goh, 2005**). **Bontis (2001)** asserted that most of the intellectual capital literature report an accounting and financial perspective. **Brooking (1996)** defined the intellectual capital as the niche given to combined intangible assets, that enables the corporate firms to operate. **Bontis (2001)** viewed the intellectual capital as the assortment of intangible resources and their flows. **Edvinsson and Malone (1997)** outlined intellectual capital as a supply of intangible assets, that usually do not appear on the record. **Roos and Roos (1997)** defined intellectual capital as the total knowledge of company’s members and practical translation of this knowledge like trademark, patents and brands. According to **Wiig (1997)**, the intellectual capital is the knowledge, experience, intelligence of worker as well as knowledge resource, stored in an organization’s databases system process, culture and philosophy.

According to **Stewart (1997)**, the intellectual capital consists of the components like human capital, structural capital, and customer capital. Intellectual capital presents intangible resources like education, knowledge, employees’ competences, skills, intellectual agility, customer relationship, brand names and organizational structure of the organization.

Sardo and Serrasqueiro (2017) pointed out that intellectual capital is an important resource for organizations’ value creation. Intellectual capital is taken into account as the vital strategic asset for sustainability of the organization in a competitive environment (**Khan, 2014**). The organizations that are characterized with high levels of

intellectual capital are likely to outperform organizations with low overall levels of intellectual capital (**Hussinki et al. 2017**). According to **Molodchik et al. (2012)**, higher intellectual capital endowment promotes the level of product novelty.

1.2. Components of Intellectual Capital

The components of Intellectual Capital consist of Human Capital, Structural Capital and Capital Employed.

1.2.1 Human Capital (HC)

Human Capital is defined as the knowledge, skills, experience, intuition and attitudes of the workforce. Intellectual Capital can be increased by increasing the capacity of each worker. Besides, it refers to the capability of individual employees to provide solutions to customers (**Tapsell and Sherrill, 1998**). Human Capital is the firm's collective capability to extract the best solutions from the knowledge of its people. The human capital is a source of innovation and strategic renewal and it is from brainstorming in a research lab, daydreaming at the office, throwing out old files, re-engineering new processes, improving personal skills or developing new sales leads (**Bontis et al. 1999**). Individual competence is important for organizations. It includes skill, education, experience, values and social skills. People are the only true agents in business because all assets and structures, whether tangible, physical products or intangible relations, are the result of human action and depend ultimately on the people for their continued existence (**Nahapiet and Ghoshal, 1998**).

1.2.2. Structural Capital (SC)

Structural Capital consists of a wide range of patents, concepts, models, and computer and administrative systems. They are created by the employees and they are thus generally 'owned' by the organization. Sometimes, they can be acquired from

elsewhere. The decisions to develop or invest in such assets, could be made with some degree of confidence on the employees. Also, the ‘culture’ or the ‘spirit’, belongs to the internal structure of the organizations. The internal structure and the people together constitute the ‘organization’ (Mehralian et al. 2012). Structural Capital is the firm’s organizational capabilities to meet market requirements. An individual employee may have a high level of intellect and skill, but if the organization has poor systems and procedures to track his or her actions, the overall Intellectual Capital may not reach its fullest potential (Sharabati et al. 2010).

1.2.3. Capital Employed (CE)

Capital Employed is an indicator of value added created by one unit of Physical Capital towards company value added. CE is the component of Value Added (VA) with a physical working model (CE) and it can be obtained from total equity and company net profit. In the value creation process, intellectual potential represented in employees’ expenses will not be calculated as input. It is to be noted that if one unit of CE produces a greater return in a company, the company is more developed at utilizing CE i.e., available funds (Tan et al. 2007).

1.3. Measurement of Intellectual Capital

According to Goran Roos and Stephen Pike (2004), there are several models such as Market Capitalization Methods (MCM), Return on Assets Methods (ROA), The Skandia Navigator, Intangible Assets Monitor, Inclusive Valuation Methodology, Value Added Intellectual Coefficient™ (VAIC™), Knowledge Capital Earnings Method (KCEM), Economic Value Added and Balanced Scorecard for measuring and reporting of intellectual capital. These various models for measuring Intellectual Capital were segmented by Sveiby (2010). The categories are an extension of the classifications

suggested by **Luthy (1998) and Williams (2000)** under Direct Intellectual Capital Methods (DIC). In this study, **Pulic's (2000)** VAIC model is popularly used to measure intellectual capital efficiency of Indian companies because the method requires publicly available accounting information.

1.4. Intellectual Capital and Financial Performance

According to **Garcia-Parra et al. (2009)**, the performance of firms is defined as a measure of productivity, whereby the resources are committed to a business, to guarantee its permanence and growth, thus, generating value for the investors. Developing these resources to increase the assets of the investors could be the purpose of any company (**Ittner and Larcker, 2003**). Therefore, the measurement of the company's performance is manifest through several indicators. A group of indicators, used in most studies (**Molina-Parra et al. 2017**), correspond to those of productivity such as, Return On Assets (ROA) and Return on Equity (ROE) (**Rivera and Ruiz, 2011**). These three indicators [the number of assets, their nature (operational or total) and the right to own the resource (equity)], measure the ability of firms to generate profits (**Rivera and Ruiz, 2011**). However, the intangible nature of some resources or assets makes it difficult to measure the correct performance of the company because the intellectual capital is not reflected in the financial reports of the businesses (**Shiu, 2006**). But its measurement is essential to analyze its effect on the performance of businesses (**Puntillo, 2009**). Hence, new models to measure the intangibles are focused on the economic performance of the business (**Sveiby, 2010**). Sufficient evidence exists on the use of the VAIC model in the service sectors, measuring the intellectual capital impact over the performance of businesses (**Kianto et al. 2010; Elsetouhi, 2015; Ognjanović. (2016); Al-Azzam et al. 2017**). Many studies, that analyze the relation

between VAIC components and the financial performance of businesses, use the return on assets (ROA) as one of the variables (**Mondal and Ghosh, 2012; Joshi et al. 2013**) due to the fact that there is positive relationship between financial performance indicators and VAIC.

Many companies do invest in employee training, research and development, customer relations, computer and administrative systems, etc. These investments are growing and they are competing with physical and financial investments. **Zéghal and Maaloul (2010)** described changes in the investment structure in the context of knowledge-based economy. Tangible assets continued to be important factors of production and service sectors. The financial statements of the companies, prepared following traditional accounting model, cover most of the physical and financial assets of the organizations but the value of intangible assets is ignored. The absence of intangible assets from financial statements (**Lev, 2001**), leads to increase in the gap between the market value and book value of the companies and this has motivated the researchers to examine the reason behind it. In recent years, the companies, in the knowledge intensive industry, experienced a dynamic and competitive environment. Competition, at the cross-border scale, compels domestic companies to adjust their competitive position by achieving sustainable financial performance. In the knowledge-intensive industries, the Intellectual Capital (IC) generally represents the critical resource in the value creation process. Traditional measures of company performance, which are based on conventional accounting principles, are unsuitable in the new economy (**Firrer and Williams, 2003**). But such measures are the main basis of decision making. The conventional performance measurement techniques may lead the managers, investors, and other stakeholders to make inappropriate decisions when the

large portion of investment of firms are in the form of intangible assets. Therefore, there is a need to investigate the impact of intellectual capital on the financial performance of services sector, which has been the principal driver of the Indian economy, contributing 55 per cent of the growth of real GDP (**Annual Report - Reserve Bank of India**). Besides, the service sector will grow manifold mainly on account of the India's low-cost advantage. To capture the performance of the companies belonging to service sector, NSE Indices had developed the Nifty Service Sector Index, to capture the performance of the companies in the service sector. NSE Nifty services sector index includes 30 firms of banking, information technology and pharmaceutical firms.

Chapter-II

*Review of Literature
and Design of the
Study*

The second chapter focuses Review of Literature and Design of the Study. Hence this chapter is divided into sections as follows

Section 2.1. Review of Literature

Section 2.2. Design of the Study

2.1. Review of Literature

A comprehensive review of literature was made in order to improve the level of insight into the domain of intellectual capital performance (Human Capital, Structural Capital and Capital Employed) and financial performance of firms to find out the research gap for further examination. The relevant earlier studies have been reviewed and summarized.

Nick Bontis (1998), in his study, **Intellectual Capital: An Exploratory Study that Develops Measures and Models**, explored the development of items and constructs through principal components analysis and partial least squares (PLS). The study, advocating the subjective measures and optimal structural specification showed a valid, reliable, significant and substantive causal link between dimensions of intellectual capital and business performance.

An analytical study entitled, **Intellectual Capital and Business Performance in Malaysian Industries**, by Nick Bontis et al. (2000), using Correlation, Regression (both standardized and Stepwise) and psychometrically radiated questionnaire, examined three elements of intellectual capital (human capital, structural capital and capital employed) and their relationship within two industry sectors in Malaysia. The study concluded that human capital was important regardless of industry type and it has a greater impact on the financial performance of the sample companies

Firer S et al. (2003), in their study, **Testing the Relationship between Intellectual Capital and a Company's Performance Evidence from South Africa**, investigated whether the performance of a company's intellectual capital could explain organizational performance. The findings indicated that relationships between the performance of a company's intellectual capital and profitability, productivity and market valuation are informative.

Steven Firer and S. Mitchell Williams (2003), in their study entitled, **Intellectual Capital and Traditional Measures of Corporate Performance**, using Value Added Intellectual Coefficient (VAICTM) Method, examined the association between the efficiency of value added (VA) through three major components of a firm's resource base (physical capital, human capital and structural capital) and three traditional dimensions of corporate performance (profitability, productivity and market valuation). It was found that the association between the efficiency of VA and market valuation was generally limited and mixed.

A paper on, **Intellectual Capital – Does it Create or Destroy Value?**, by Ante Pulic (2004), argued that the transformation of economic reality under a knowledge economy is needed and treating IC as a resource, equal to that of land and physical assets, would improve the business performance of any firm.

A research paper entitled, **The intellectual capital performance of the Japanese banking sector**, by Dimitrios G. Mavridis (2004), examined the intellectual or human and physical capital of the Japanese banking sector and discussed their impact on the banks' value-based performance. The study found that the existence of intellectual capital recorded significant effect on the financial performance of various groups of Japanese banks.

Paula Kujansivu and Antti Lonnqvist (2005), in their paper titled, **Intellectual Capital and Firm Performance of US Multinational Firms: A Study of the Resource-Based and Stakeholder Views**, found that the US multinational firms, with sustainable comparative advantage, earned superior profits by owning or controlling intangible strategic assets. It was found that intellectual capital was statistically significant in respect of sample companies.

The study on, **An Empirical Investigation of the Relationship between Intellectual Capital and Firms' Market Value and Financial Performance**, by Ming-Chin Chen et al. (2005), evaluated the relationship between the value creation efficiency and firms' market valuation and financial performance of Taiwanese listed companies, using the VAIC model. It was found that three components of value creation efficiency (physical capital, human capital, and structural capital) did have positive effect on firms' value and their profitability.

An empirical research paper, by Sudi Sudarsanam et al. (2006), entitled **Real Options and the Impact of Intellectual Capital on Corporate Value**, examined why traditional valuation methods failed to reflect the unique characteristics of IC. The study found that richer framework to intellectual capital positively impacted the financial performance of firms.

A study on, **Reporting Intellectual Capital Flow in Technology-based Companies: Case Studies of Canadian Wireless Technology Companies**, undertaken by Artie W. Ng (2006), explored the development of an intellectual capital flow statement. The study confirmed that the inter-relationship between the components of intellectual capital and business growth performance, among the sample wireless technology companies, positively remained at high level.

Mitchell Van Der Zahn et al. (2007), in their research paper titled, **Is there an Association between Intellectual Capital Disclosure, Underpricing and Long-run Performance?**, empirically tested the extent of intellectual capital (IC) disclosure in the prospectus of an unseasoned IPO. The analysis was based on a sample of 228 Singapore IPOs listing during the period 1997-2003. The empirical findings indicated positive association between the sample companies.

Vijaya Murthy and Jan Mouritsen (2008), in their study entitled, **The Performance of Intellectual Capital**, analyzed the relationship between intellectual capital and financial capital, using the case study method. The study confirmed the positive relationship between intellectual capital and financial capital during the study period.

Harold Harlow (2008), in his research paper entitled, **The Effect of Tacit Knowledge on Firm Performance**, measured the use of the tacit knowledge index (TKI), to assess the level of tacit knowledge within firms and its effect on firm performance. The regression and correlation were used to analyze the innovation and financial outcomes. The study found significant relationship between a firm's level of TKI and the firm's innovation performance.

Scott Erickson and Helen Rothberg (2009), in their paper titled, **Intellectual Capital in Tech Industries: A Longitudinal Study**, used the data over time on intellectual capital levels in three high-tech industries. The study found better establishment of knowledge management and protection as strategic options that increased the corporate performance.

The study entitled, **Intellectual Capital and Performance in Wood Industries of Argentina**, by Carlos Maria F-Jardo'n and Maria Susana Martos (2009), tested diverse models to verify the previously mentioned relations, applied to wood manufacturer SMEs of Obera' (Argentina). The study found that the intellectual capital directly affected the business performance of sample companies during the study period.

Daniel Ze'ghal and Anis Maaloul (2010), in their research study on, **Analyzing Value Added as an Indicator of intellectual capital and its consequences on company performance**, examined the role of value added (VA) as an indicator of intellectual capital (IC) and its impact on the firm's economic, financial and stock market performance. The results showed clearly that companies' IC did have positive impact on economic and financial performance. However, the association between IC and stock market performance was only significant for high-tech industries.

An experimental study entitled, **Empirical Study on the Relationship between Intellectual Capital and Corporate Value: A Quantile Regression Model**, by JI Yi-Cheng and Fu Chuan – Rui (2010), studied the relationship between various resources and corporate value. The study, by using Descriptive Statistics, Correlation and Quantile Regression, found that the physical capital had significant and positive impact on the values of all listed companies and the impact became stronger when the company's value went up. The human capital had stable and positive effect on corporate value for majority of sample companies but it significantly influenced the companies with high value. It was structural capital that positively affected those companies with median value.

Murale and Jayaraj (2010) in their research article on, **Impact of Intellectual Capital on Financial Performance: A Resource Based View Using VAIC**

Approach, measured the impact of human capital on the financial performance, by using return on capital employed, return on average assets and financial value and market value to book value. The study found that there was positive correlation between the market value to book value and financial performance of sample companies.

A study, **An Empirical Study of the Impact of Intellectual Capital on Business Performance**, by Samuel Kai Wah Chu, et al. (2010), analyzed the Intellectual Capital Performance of Hong Kong companies and its association with business performance. The research study presented new insights into the utilization of intellectual capital by businesses in Hong Kong. It was found that intellectual capital created impact on business performance in the companies surveyed in Hong Kong.

Abdel, et al. (2010), in a study on, **Intellectual Capital and Business Performance in the Pharmaceutical Sector of Jordan**, explained the relationship between the value creation efficiency and financial performance. VAIC model and Multiple Regression Analysis were the statistical tools used in this study. The study did not find any strong relationship among the components of VAIC, the CEE and different measures of the financial performance.

A research study by Aino Kianto et al. (2010), titled, **Intellectual Capital in Service- and Product-oriented Companies**, examined the main differences in IC stocks, creation, management and protection mechanisms between service-oriented and product-oriented companies. The results demonstrated that service-oriented companies reported more human capital and renewal capital and focused more on IC creation than product-oriented companies. In addition, IC protection was stronger in product-oriented companies.

The study entitled, **Intellectual Capital and Firm Performance in Australia**, by S. Martin Clarke, et al. (2011), analyzed the effect intellectual capital (IC) on the firm performance of Australian companies. The study, employing correlation analysis, found that there was direct relationship between VAIC and performance of Australian publicly listed firms, particularly in respect of CEE and to a lesser extent with HCE. A positive relationship between HCE and SCE in the earlier period and performance in the current year was also found.

Reza Gharoie Ahangar (2011), in his paper titled, **The Relationship between Intellectual Capital and Financial Performance: An Empirical Investigation in an Iranian Company**, examined the relationship among the components of IC and organizational success. Correlation analysis and VAIC Model were used in the study. It was found that there was relationship between the performance of a company's intellectual capital and profitability and between employee productivity and growth in sales.

Rubina Afroze (2011), in his research study entitled, **Intellectual Capital and Its influence on the Financial Performance**, identified the influence of Intellectual Capital (IC) on the financial performance of 13 Private Commercial Banks (PCBs) of Bangladesh, listed with Dhaka Stock Exchange Limited. It was found that there was statistically significant correlation between the IC efficiency scores and financial performance indicators, in addition to the statistically significant influence of IC on the financial indicators.

Fethi Calisir et al. (2011), in their paper on **Intellectual Capital in Development and Investment Banks of Turkey**, assessed the development and investment banks in Turkey in terms of intellectual capital performance, by using

VAIC. The development and investment banks recorded declining trend for all types of efficiencies.

Mu Shun Wang (2011), in his paper entitled, **Intellectual Capital and Financial Performance**, tested the relationship between intellectual capital and financial performance. The study using OLS and Panel Data Regression, found that the management ought to put emphasis on human training, customer related management and research development inputs, to cope up with the changes.

Dimitrios Maditinos et al. (2011), in their paper on, **The impact of Intellectual Capital on Firms' Market Value and Financial Performance**, studied the impact of IC on firms' market value and financial performance. It was found that there was statistically significant relationship between human capital efficiency and financial performance.

Biserka Komnenic and Dragana Pokrajcic (2012), in their study entitled, **Intellectual Capital and Corporate Performance of MNCs in Serbia**, investigated to find out whether intellectual capital (IC) exercised any impact on organizational performance as well as to identify the IC components, using data from 37 multinational companies. It was found from the analysis that human capital was positively associated with all the three corporate performance indicators (ROA, ROE and RONW).

The research paper titled, **Impact of Intellectual Capital on Performance of Indian Corporate Sector**, by Sushila Soriya and Karam Pal Narwal (2012), examined the relationship between corporate intellectual capital and its components, with return on equity and market valuation of the Indian companies. The study concluded that intellectual capital was negatively associated with the market valuation but not with return on equity.

Amitava Mondal and Santanu Kumar Ghosh (2012), in their research study entitled, **Intellectual Capital and Financial Performance of Indian Banks**, investigated empirically the relationship between intellectual capital and financial performance of 65 Indian banks. The value added intellectual coefficient method was applied for measuring the value based performance of banks while ROA, ROE ATO were used as the variables. The analysis indicated that there was relationship between the performance of a bank's intellectual capital, and financial performance indicators (namely profitability and productivity).

A research study, by Taghizadeh Khanqah et al (2012), titled, **An Empirical Investigation of the Impact of Intellectual Capital on Financials' Market Value and Financial Performance: Evidence from Iranian Companies**, studied the impact of intellectual capital on the market value and the financial performance of firms. There was statistically significant relationship between the structured capital efficiency and financial performance (ROE and ROA).

Mahesh Joshi, et al. (2013), in the study entitled, **Intellectual Capital and Financial Performance: An Evaluation of the Australian Financial Sector**, examined the relationship between IC performance and the financial performance of the financial sector. The value added intellectual coefficient approach, developed by Pulic, was used to determine the IC performance of the Australian financial sector. The study found that the value creation capability of financial sector in Australia was highly influenced by the human capital.

The study on, **Intellectual Capital and its Association with Financial Performance: A Study of Indian Textile Sector**, by R. Deep and K. Pal Narwal (2013), investigated the relationship of intellectual capital with financial performance

measures of Indian textile sector. Value Added Intellectual Coefficient (VAIC/) method was applied for measuring the intellectual capital of the companies. It was observed that intellectual capital in textile sector reported significant and positive relationship only with the profitability of companies.

The study titled, **Intellectual Capital and Company Value**, by Irina Berzkalne and Elvira Zelgalve (2013), examined the value, which was off-balance-sheet. Large differences did exist between market value and book value of the company. The study investigated the impact of intellectual capital on company value. The study reported mixed results on the relationship between value added intellectual capital coefficient and company value.

Sriranga Vishnu and Vijaykumar Gupta (2014), in their study entitled, **Intellectual Capital and Performance of Pharmaceutical Firms in India**, examined the relationship between IC and performance of the 22 large Indian pharmaceutical firms, using Regression Analysis for the variables like ROS, ROA, HCE, SCE, RCE and CEE. The research proved that there was positive relationship between IC and performance variables during the study period.

A study on, **Review of Empirical Research on Intellectual Capital and Firm Performance**, by Henri Inkinen (2015), observed that the basis of value creation has shifted from tangible factors of production towards intangible resources such as intellectual capital. The study demonstrated that IC influenced firm performance mainly through interactions, combinations and mediations. There was a great deal of evidence on the significant relationship between IC and firm's innovation performance.

Bharathi Kamath (2015), in her study titled, **Impact of Intellectual Capital on Financial Performance and Market Valuation of Firms in India**, investigated the impact of Intellectual Capital on the financial performance and market value of Financials in India. The study, using the VAIC methodology, found that the financial performance and market value were in fact influenced by the IC of the firms.

Aparna Bhatia and Kushpoo Aggarwal (2015), in their study on, **Intellectual Capital and Financial Performance of Indian Software Industry: A Panel Data Analysis**, examined the impact of intellectual capital on 51 software companies listed in BSE. The study, by using regression model and employing sample variables, namely, ROA, RONW and VAIC, found that intellectual capital was a positive predictor of profitability.

The study on, **Impact of Intellectual Capital on Corporate Performance**, by Deepa Venugopal and Subha (2015), used the analytical approach to measure the value of firms, by using Ante Pulic's value added intellectual capital method. The study, covering two major Indian industries, namely, banking industry and information technology industry, found that intellectual performance influenced the performance of sample Financials.

Research, conducted by Yi An (2015), entitled, **Intellectual Capital Disclosure and the Information Gap: Evidence from China**, analyzed the annual financial report of top 100 Chinese based A-share listed firms, by adopting a mixed method approach, to disclose the practice of Chinese companies through IC. The study found that there was no statistically significant information gap between the anticipation of Chinese stakeholders and the real disclosure of respective Financials.

A qualitative study titled, **The Relationship between Intellectual Capital, Innovative Work Behavior and Business Performance Reflection**, by Ali Sachin Ornek and Siyret Ayas (2015), confirmed the results of existing research, advocating the necessity of IC on the financial performance since the presence of intellectual capital created more value and triggered the financial performance of sample companies. The study also found positive relationship between human capital and financial performance.

Santi Gopal Maji and Mitra Goswami (2016), in their research paper entitled, **Intellectual Capital and Firm Performance in Emerging Economies: The Case of India**, measured the impact of intellectual capital on corporate performance of Indian engineering sector using VAIC and fixed effect regression model. The results indicated that IC efficiency and physical capital efficiency were positively and significantly associated with the firm performance. Besides, the coefficient of human capital efficiency was positive and significant in the case of sample firms.

An empirical study on, **Intellectual Capital and Business Performance**, by Peter Clearly and Martin Quinn (2016), analyzed the performance of Small Medium Enterprises, and tested the association between cloud-based accounting/financial infrastructure and business performance. The study concluded that the financial infrastructure created significant impact on human capital and relational capital.

A study entitled, **Intellectual Capital Disclosure by Chinese and Indian information Technology Companies : A Comparative Analysis**, by Qianyu Wang, et al. (2016), examined the extent and quality of voluntary intellectual disclosures by information technology companies of China and India. Indian IT companies proved to perform better than Chinese IT companies in the extent and quality of disclosures.

Antonio Meles et al. (2016), in their research paper entitled, **The Impact of the Intellectual Capital Efficiency on Commercial Banks Performance: Evidence from the USA**, studied the efficiency in the usage of intellectual capital on the financial performance of American banks. By covering 40,000 observations, this study proved that HC, as the subcomponent of IC efficiency, reported greater impact on the financial performance of sample banks than other components of IC.

Murugesan Selvam et al. (2018), in the paper, **Intellectual Capital: Its Effect on Financial Performance of Indian Private Sector Banks**, evaluated and estimated the Modified Value-Added Intellectual Coefficient on the financial performance of 21 Indian private sector banks. The study found that the value of MVAIC of Indian private sector banks proved its dynamic relationship with the financial performance of sample banks. It is suggested that the management of sample banks ought to pay due attention to managing its Intellectual Capital.

Dai Binh Tran and Duc Hong Vo (2018), conducted a study on, **Should Bankers be concerned with Intellectual Capital? A Study of the Thai Banking Sector**, to examine the causal effect of intellectual capital performance on financial performance at Thai listed banks. The results showed that bank profitability was driven mainly by human capital efficiency to make a profit. However, the capital employed efficiency marginally reduced the bank profitability in the current period but it could have positive effects on future profitability.

Neha Smriti and Niladri Das (2018), in the paper, **The Impact of Intellectual Capital on Firm Performance: A Study of Indian Firms listed in COSPI**, examined the effect of intellectual capital on financial performance of Indian companies. The study observed that sample Indian firms performed well and efficiently, utilizing their

IC. Human capital did have major impact on the firms' productivity during the study period.

Suryanarayan Mohapatra et al. (2019), in a research study on, **Intellectual Capital and Firm Performance: Evidence from Indian Banking Sector**, estimated the operating efficiency of 40 Indian banks as a proxy of performance measure, using the output-oriented DEA-BCC model. It was found that out of the three components of intellectual capital, only human capital efficiency was positively and significantly associated with operational efficiency while structural capital and finance capital had exercised negative impact on the efficiency of banks.

A study entitled, **Intellectual Capital Performance and its Impact on Indian Commercial Banking Industry**, by Murugesan Selvam et al. (2019), using the Value-Added Intellectual Coefficient (VAIC), measured the impact of intellectual capital on the Indian banking sector. The impact of human and physical capital of the Indian banking sector, on the bank's value-based performance (Bank's financial performance and its market value), was tested. The study confirmed that there was progress in the overall performance of sample banks by IC over the study period. But this study reflected the biased growth of a few sections in the Indian banking segment.

An empirical study, conducted by Jian Xu and Bingham Wang on, **Intellectual Capital Performance of the Textile Industry in Emerging Markets: A Comparison with China and South Korea**, analyzed intellectual capital performance of the textile industry in China and South Korea and measured the contribution of IC sub-components to companies' performance. The results showed that the aggregate intellectual capital positively affected the earnings, profitability and productivity of textile companies in China and South Korea.

Godfred Kesse Oppong and J.K. Pattanayak (2019), in their study on, **Does Investing in Intellectual Capital Improve Productivity? Panel evidence from Commercial Banks in India**, studied how IC had improved banks' productivity, measured in terms of asset turnover ratio, using a panel of 73 commercial banks in India. The study found that some components of intellectual capital improved productivity of sample banks.

A study entitled, **Intellectual Capital, Knowledge Sharing, and Innovation Performance: Evidence from the Chinese Construction Industry**, by Yongfu Li, et al. (2019), explored the relationship between intellectual capital, knowledge sharing, and innovation performance of construction enterprises. The mediating effect of knowledge sharing on the relationship between intellectual capital and innovation performance, by using data collected from a questionnaire survey was also examined. The study found that intellectual capital not only exercised direct and positive influence on the innovation performance of construction enterprises but also it positively affected their innovation performance through knowledge sharing.

Murugesan Selvam et al. (2020), in their research study on, **Intellectual Capital and Profitability Ratios of Foreign Banks Operating in India: A Structural Equation Model Approach**, measured the impact of intellectual capital on the profitability ratios in respect of the foreign banks in India. Twenty-seven foreign banks were studied and analyzed, by using Modified Value-Added Intellectual Coefficient method and Structural Equation Method. It was found that all the components of intellectual capital indicators did have their impact positively on the banks' profitability ratios. The study suggested that the foreign banks need to focus mainly on the Human Capital Efficiency and Relational Capital Efficiency.

A study on, **The Contribution of Intellectual Capital to Financial Stability in Indian Pharmaceutical Companies**, by Giuseppe Festa et al. (2020), investigated the top five pharmaceutical companies in India to determine whether their financial structures were sound or not. The study reported that the financial structure of the selected companies seemed stable. The changes in the Indian pharmaceutical scenario, regarding the patent system, forced the companies to consider the impact of IC carefully.

An empirical study entitled, **The Interrelationship between Intellectual Capital and Firm Performance: Evidence from China's Manufacturing Sector**, by Jian Xu and Jingsuo Li (2020), examined the impact of intellectual capital and its components (human, structural and relational capitals) on the performance of manufacturing listed companies in China. This study revealed that intellectual capital enhanced the firm performance in China's manufacturing sector.

A study entitled, **Effect of Intellectual Capital on Sustainable Corporate Performance of NIFTY Financial Services Companies**, undertaken by Vadivel Thanikachalam et al. (2021), examined the role of Intellectual Capital, in the sustainable performance of NIFTY Financial Services Companies. This study found that Intellectual Capital (Human Capital, Structural Capital and Capital Employed) reported significant relationship with sustainable corporate performance of sample companies.

Shafique Ur Rehman et al. (2021), in a study on, **Intellectual Capital and Innovative Performance: A Mediation Moderation Perspective**, explored central questions related to the connection between intellectual capital and the innovative performance of organizations, through the mediating role of Management Control Systems (MCS) and business strategies. The study revealed that the intellectual capital

significantly influenced the business strategies and innovative performance. MCS and business strategies significantly mediated the relationship between intellectual capital and innovative performance.

The literature, reviewed above, presented many empirical and experimental research studies and surveys undertaken earlier, on the same lines of the proposed research. Some studies have keenly focused on the impact of intellectual capital on the financial performance of firms in India. Nevertheless, there is no comprehensive study, which covered the efficiency of intellectual capital and its impact on the financial performance of service sectors in India. Hence the present study.

2.2. Design of the Study

2.2.1. Statement of the Problem

A number of research studies have focused on intangible assets of firms, like knowledge and information of the employees. The use of information technology is the major resource in the knowledge-bound economy (**Murugesan Selvam et al. 2020**). **Marr and Moustaghfir (2005)**; **Iazzolino and Laise (2013)**; **Meles et al. (2016)** and **Ozkan et al. (2017)** studied the importance of intellectual capital as the main source for improving the financial performance of the firms in the knowledge economy. Many companies, on their own, have been investing their capital adequately in the training of employees, research and development, customer relations, computer and administrative systems (**Organization for Economic Cooperation and Development, 2006**). The firms' investments on intangible assets are growing every day, on par with physical and financial assets.

Through the application of intangible assets called intellectual assets, companies have been gaining sustainable competitive advantage and enhancing their performance (Petty, R. and Guthrie, J, 2000; Dimitrios Maditinos, et al., 2011). For generating value of company, the intellectual capital needs to be identified, measured and valued completely. The intellectual capital should be synchronized with strategy and goals of every company. But the growing gap between the market value and book value of the companies in India, has been widening and such gap urged the researchers to address the reasons involved in it.

The conventional performance measures, used by the traditional company, valorized only the traditional accounting principles and they are unsuitable for the technology-enabled economy (Firrer and Williams, 2003). According to Tayles, M (2007), it is difficult to quantify the value of the intangible assets absolutely. But the modern accounting practices insist on disclosing the actual amount of intellectual capital in the annual reports of firms and this need to be informed to all the stakeholders, particularly to the investors.

The efficiency of intellectual capital performance and its impact on the financial performance, is an important issue, that relates to the way and the manner in which the financial resources available to a firm are judiciously used to achieve the overall corporate objective of a firm. It is, therefore, important that the firm's performance and its efficiency has to be measured properly on a regular basis in order to ensure sustainability. This is particularly relevant the Indian firms, particularly service sector firms, where services tend to require relatively less physical capital and more human capital (Bidisha CHAKRABORTY, 2015). Majority of firms do not perform as expected by its stakeholders. Hence, the task of measuring the performance of

intellectual capital in an organization becomes a major issue for investigating the reasons for low and high performance of workers. Against this background, this study was carried out to measure the performance, efficiency and impact of intellectual capital on the financial performance of service sector firms.

2.2.2 Need for the Study

India, an emerging economy, is moving towards a knowledge-based economy (**Murugesan Selvam, et al., 2020**). The details about intellectual capital of firms in its annual reports are incomplete. Only a few companies, particularly service-based industries generate voluntary disclosures about intangible assets (**Bharathi Kamath. G, 2008**). There is no extensive study in India, measuring the relationship between intellectual capital and financial performance of firms particularly knowledge intense firms by using VAIC. Hence, this attempt. This study would help the companies to realize how financial performance is influenced by intellectual capital over a period of time. This analysis could furnish the initial frameworks for measuring the ingredients of intellectual capital, influencing the financial performance of sample companies in a competitive environment. The current study would broaden the application of intellectual capital of the developed world to the context of a developing economy and may attest the importance of intellectual capital in the current globalized scenario (**Vishnu, S., and Gupta, V. K, 2014**). The findings of the present study would provide practical inputs for numerous players like policy makers, regulators, shareholders and management of firms including banks.

2.2.3. Objectives of the Study

The present study was carried out with the following objectives:

- To investigate the efficiency of intellectual capital performance and financial performance of sample firms in India.
- To test the relationship between intellectual capital performance and financial performance of sample firms in India.
- To analyze the impact of intellectual capital performance on financial performance of sample firms in India
- To summarize the important findings and offer suggestions for the overall improvement of the performance of sample companies in India.

2.2.4. Hypotheses of the Study

The efficiency of intellectual capital and financial performance of the firm is evolving issue in which some studies emphasize intellectual capital (**Neha Smriti and Niladri Das, 2018**). But some other studies failed to prove the roles of intellectual capital (**Miles et al., 2000; Dolfsma, 2005; Yusuf, 2013; Ulum et al., 2016 and Dženopoljac, 2016**). The intellectual capital performance of the companies mainly relied on the strategic management and ability of the organizations (**Bharathi Kamath, 2007 and Aino Kianto, et al., 2010**). Few academic researchers found that the effective utilization of human resources would help the competitiveness of the organization (**Wang, et al., 2005; Ting, L. W. K., and Lean, H. H, 2009 and Nguyen, V. C, 2020**), whereas other researchers questioned the lucrative benefits and contribution of intellectual capital on the financial performance of firms (**Chaminade, C., & Roberts, H, 2003; Pulic, A, 2004; Yang, C. C, 2009; Mehralian et al., 2012; Cenciarelli, V.**

G, et al., 2018, Renaud, K, et al., 2019 and Hong Vo, et al., 2021). Taking into account these conflicting views, the following three null hypotheses were framed and tested in the study.

NH-1: There is no efficiency of intellectual capital performance and financial performance of sample firms.

NH-2: There is no relationship between intellectual capital performance and financial performance of sample firms.

NH-3: There is no impact of intellectual capital performance on the financial performance of sample firms.

2.2.5. Methodology of the Study

2.2.5.1 Sample Selection

As stated earlier, the main aim of this study was to examine the impact of intellectual capital on the financial performance of firms. The application of intellectual capital is high in service sector firms than in the case of other firms. Hence, it was proposed to select sample firms from NIFTY service index. The sample size for this study covered all the companies, listed in NIFTY service index of National Stock Exchange of India Limited (NSE). There were 30 firms listed in NIFTY service index. The sample companies of 30 could be classified under three sectors i.e., public sector banks (10 firms), information technology firms (10 firms) and pharmaceutical firms (10 firms). But due to non-availability of required data, three companies, namely, MPHASIS LIMITED and COFORGE LIMITED (information technology firms) and ALKEM LABORATORIES LIMITED (pharmaceutical firm) were not included in the sample size. Finally, 27 companies were selected as the sample for this study. The list of sample companies is furnished in **Annexure-I**.

2.2.5.2. Sources and Collection of Data

The required data for this study were collected from the audited and published annual reports of sample companies, as available at ProwessIQ Database, maintained by the Center for Monitoring Indian Economy, CAPITALINE Database, Yahoo Finance and Money Control. The other required data for this study were collected from the National Stock Exchange of India Limited (NSE), RBI Website, books and journals.

2.2.5.3. Period of Study

The Global Financial Crisis of 2007 affected all sectors, more particularly the service sector of India. But after the global financial crisis, the year 2009-10 witnessed signs of recovery. This was taken as the period of study to examine the impact of intellectual capital on the financial performance of sample firms, especially the post global financial crisis period of 10 years from 1st April 2010 to 31st March 2019.

2.2.5.4. Tools used in the Study

The present study examined the impact of intellectual capital on financial performance of sample companies in India and to achieve this, the following tools were employed for the analysis, as detailed below.

i. Descriptive Statistics

a. Mean

The term “mean” is put forward in mathematics and statistics to distinguish it from other average such as the median and the mode.

$$\text{Mean } \bar{x} = \sum \frac{X_i}{N}$$

Where,

\bar{x} = represents mean

Σ = Symbols of summation

X_i = value of the i^{th} item X, $i=1, 2, 3, 4, \dots, n$

N= total number of items

b. Standard Deviation

Standard deviation is also known as historical volatility and is used by investors as a gauge for the amount of expected volatility. The formula for standard deviation is

$$\sigma = \sqrt{\frac{\sum (X - \mu)^2}{N}}$$

Where,

σ – Population of standard deviation

x- Observation

μ - population mean

N- Total number of elements in the population

Σ - sum of all values $(x-\mu)^2$

c. Maximum and Minimum

In mathematics, calculation of maximum and minimum, known collectively as extreme, are the largest value (maximum) or the smallest value (minimum), that a function takes in at point either within a given neighborhood (local extreme) or on the function domain in its entirety (global extreme).

ii. Correlation

In order to estimate the degree of relationship between two or more variables, the correlation is an important measurement. It measures the strength of the relationship among two variables. The correlation association between the variable is measured by the value of coefficient. The following is the equation used to identify the coefficient of correlation.

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

Where,

N=Number of observations.

$\sum x$ = Dependent variable.

$\sum y$ = Independent variable.

iii. Regression

The regression model as used by **Ngoc Phu Tran and Duc Hong Vo (2020)**; **Vadivel Thanikachalam et al. (2021)** is used in this study as shown below.

$$\text{Model-1 } ROA_{it} = \beta_0 + \beta_1 ROA_{it} + \beta_2 VAIC_{it} + \beta_3 HCE_{it} + \beta_4 SCE_{it} + \beta_5 CEE_{it} + \beta_6 SIZE_{it} + \beta_7 DER_{it} + \varepsilon_{it}$$

$$\text{Model-2 } ROE_{it} = \beta_0 + \beta_1 ROE_{it} + \beta_2 VAIC_{it} + \beta_3 HCE_{it} + \beta_4 SCE_{it} + \beta_5 CEE_{it} + \beta_6 SIZE_{it} + \beta_7 DER_{it} + \varepsilon_{it}$$

$$\text{Model-3 } NPM_{it} = \beta_0 + \beta_1 NPM_{it} + \beta_2 VAIC_{it} + \beta_3 HCE_{it} + \beta_4 SCE_{it} + \beta_5 CEE_{it} + \beta_6 SIZE_{it} + \beta_7 DER_{it} + \varepsilon_{it}$$

$$\text{Model-4 } EPS_{it} = \beta_0 + \beta_1 EPS_{it} + \beta_2 VAIC_{it} + \beta_3 HCE_{it} + \beta_4 SCE_{it} + \beta_5 CEE_{it} + \beta_6 SIZE_{it} + \beta_7 DER_{it} + \varepsilon_{it}$$

Where:

ROA_{it} , ROE_{it} , NPM_{it} , and EPS_{it} were the dependent variables for companies i in year t and measured, as explained

α_0 = constant.

$\beta_0, \beta_1, \beta_2, \dots, \beta_7$ = coefficients of the independent variables, details of the definitions of the independent variables.

Eq. (1), (2), (3) and (4), have been estimated by using linear regression.

2.2.5.5. Variables used for the Analysis

A. Dependent Variables

For the Measurement of Financial Performance

a. Return on Assets (%)

$$ROA = \frac{\text{Net Income}}{\text{Average Total Assets}}$$

b. Return on Equity (%)

$$ROE = \frac{\text{Net Income}}{\text{Average Stockholders Equity}}$$

c. Net Profit Margin (NPM) (%)

$$NPM = \frac{\text{Net Profit}}{\text{Revenue}}$$

d. Earnings Per Share (EPS) (%)

$$EPS = \frac{\text{Net Income} - \text{Preferred Dividends}}{\text{Weighted Average Shares Outstanding}}$$

B. Independent Variables

For the Measurement of the Value Added Intellectual Coefficient

The intellectual capital is measured by VAIC, which is basically the sum of these components i.e., human capital efficiency, structural capital efficiency and capital employed efficiency (Pulic, A, 2000; Riahi-Belkaoui, A, 2003; Kamath, G.B, 2007; Amitava Mondal, 2016; Vera Diyanty et al. 2019; Murugesan Selvam et al. 2020 Ngoc Phu Tran and Duc Hong Vo, 2020; Vadivel Thanikachalam et al. 2021).

Algorithm for computing the VAIC in the case of firms' IC performance follows the following five steps (A.Riahi-Belkaoui, 2003).

Step- 1

Value-Added Intellectual Coefficient (VAIC_{it})

$$\text{VAIC}_{it} = \text{Human Capital Coefficient (VAHC}_{it}) + \text{Structural Capital Coefficient (STVA}_{it}) + \text{Capital Employed Coefficient (VACA}_{it})$$

Where,

VAIC_{it} = indicates firms intellectual capital efficiency on financial performance

Step- 2

Value-Added Human Capital Coefficient (VAHC)

$$\text{Human Capital Efficiency (HCE)} = \text{Value Added (VA)/Human Capital (HC)}$$

Where,

HC_{it} = Investment in the Human Capital during the 't' period or total salary and wage including all incentives

VAHC_{it} = Value Added by one unit of Human Capital invested during the period of 't'

Step- 3

Value-Added Structural Capital Coefficient (STVA_{it})

Structural Capital Efficiency (SCE) = Structural Capital (SC)/ Value Added (VA)

Where,

SC_{it} = structural capital (value added (VA_{it})-human capital (HC_{it}))

STVA = the proportion of total VA accounted by structural capital

Step- 4

Value-Added Capital Employed Coefficient (VACA_{it})

Capital Employed Efficiency (CEE) = Value Added (VA)/Capital Employed (CE)

Where,

CA_{it} = total assets-intangible assets at end of 't' period

VACA = the value created by one unit of capital employed during the 't' period.

Step- 5

Value Added

Value Added = W+I+D+T+R

Where,

W-wages, I-interest, D-dividend, T-taxes and R-net income

ROA estimates how efficiently the firms could manage their assets to produce profits during a period (**Phusavat et al. 2011; Parham and Heling, 2015**). Likewise, ROE quantifies the firm's profitability by revealing how much profit firms generate with the money shareholders had invested (**Buallay, 2017; Ngoc Phu Tran and Duc Hong Vo, 2020**). Further, the NPM is equal to net profit (also known as net income) divided by the total revenue expressed as a percentage (**Chang and Hsieh, 2011 and Mondal, A. and Ghosh, S. K, 2012**). EPS indicates a company's ability to produce the net profits for common shareholders (**Kwarbai and Akinpelu, 2016; Vadivel Thanikachalam et al. 2021**).

C. Control variables

In this study, the Size and Debt Equity Ratio (DER) were calculated as the natural logarithm, as control variables.

2.6.6. Limitations of the Study

The findings of the present study are subject to few limitations, as follows.

- The current study focused only on thirty firms of service sector, which included public sector banking, information technology and pharmaceutical firms operating in India. Hence, the findings of this study may not be applicable to all firms of other industries.
- The pharmaceutical firms were used as service sector firms of this study, as classified by Nifty service index. Hence, the pharmaceutical firms were used as service sector firms for the purpose of this study.

- This study used only secondary data, without interviewing the managers or decision-makers of sample firms. Field investigations were not undertaken to provide a better understanding of strategic and operational choices in the sector due to time factor.
- The data from CMIE alone were used in this study. The limitations, applicable to data from CMIE, would be applicable to this study also.
- The criticisms of the VAIC model are applicable to this study also. All the limitations associated with various tools, are applicable to this study also.
- No comparison (sector wise, age wise, size wise, ownership wise, etc.) was made.
- This study used the existing model (VAIC), framed for a similar study.

Chapter Scheme

This research work would consist of six chapters.

The **First Chapter** contains the introduction of intellectual capital (IC) and financial performance of companies to present an overview of how intellectual capital could be measured.

The empirical studies on intellectual capital and financial performance are reviewed and Design of the Study are present in the **Second Chapter**.

The **Third Chapter** addresses the measurement of efficiency of intellectual capital and financial performance of sample companies in India using VAIC.

The analysis of the relationship between intellectual capital performance and financial performance of sample companies in India is dealt with in the **Fourth Chapter**.

The **Fifth Chapter** presents the impact of intellectual capital performance on the financial performance of sample companies in India.

The **Sixth Chapter** summarizes the major findings, drawn from the study and offers suggestions and conclusion.

Chapter-III

***Efficiency of Intellectual
Capital Performance and
Financial Performance***

One of the prime aims of this study was to investigate the efficiency of intellectual capital and financial performance variables of sample firms. Hence this study endeavored, in this Chapter, to measure the efficiency of intellectual capital and financial performance variables, by employing descriptive statistics, as used by **Neha Smriti and Niladri Das (2018)**, **Thanikachalam (2019)** and **Murugesan Selvam (2020)**. The Descriptive Statistics includes Minimum, Maximum, Mean and Standard Deviation. The analysis of descriptive statistics is presented in three sections as follows.

Section-A: Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of BANKING SECTOR FIRMS

Section-B: Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of INFORMATION TECHNOLOGY SECTOR FIRMS

Section-C: Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of PHARMACEUTICAL SECTOR FIRMS

Section-A

Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of sample banks

As stated earlier, sample banks included State Bank of India, Bank of Baroda, Punjab National Bank, Indian Overseas Bank, Canara Bank, Union Bank of India, The Jammu and Kashmir Bank, Indian Bank, Central Bank of India and UCO Bank. The detailed analysis of descriptive statistics, for the ten sample banks, is given as follows.

- 3.1 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of STATE BANK OF INDIA
- 3.2 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of BANK OF BARODA
- 3.3 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of PUNJAB NATIONAL BANK
- 3.4 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of INDIAN OVERSEAS BANK
- 3.5 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of CANARA BANK
- 3.6 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of UNION BANK OF INDIA
- 3.7 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of THE JAMMU AND KASHMIR BANK
- 3.8 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of INDIAN BANK
- 3.9 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of CENTRAL BANK OF INDIA, and
- 3.10 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of UCO BANK

3.1 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of STATE BANK OF INDIA

The results of descriptive statistics of the **STATE BANK OF INDIA** are provided in **Table-3.1**, according to which the values of intellectual capital performance variables ranged between minimum of 1.579 (HCE), 0.366 (SCE), 0.117 (CEE), 2.064 (VAIC), 0.130 (ROA), 0.006 (ROE), 0.869 (NPM), 0.687(EPS), 10.911 (Size) and 0.008 DER) and maximum of 13.963 (HCE), 0.928 (SCE), 0.759(CEE), 15.633 (VAIC), 3.480 (ROA), 0.613 (ROE), 1.444 (NPM), 1.162 (EPS), 11.803 (Size) and 0.267 (DER). As pointed out earlier, the minimum and maximum values of RCE and VAIC were the lowest and the highest respectively. The mean values and SD values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size, DER were recorded at 9.211, 0.838, 0.572, 10.622, 1.069, 0.372, 1.246, 0.968, 11.524, 0.108 and 3.713, 0.170, 0.225, 4.046, 1.004, 0.169, 0.170, 0.129, 0.312 and 0.080 respectively. The higher mean values, among components of VAIC, were earned by HCE (9.211) than that of SCE (0.838) and CEE (0.572) for **STATE BANK OF INDIA**.

The HC, a key component (HCE) of VAIC, recorded a value more than the mean value of physical assets, indicating that **STATE BANK OF INDIA** generated high value from intangible assets than from the physical assets. The value of VAIC was at 10.622, implying that **STATE BANK OF INDIA** earned an average value of INR 10.622, for each one INR on intangible assets held by the bank. In other words, there was efficiency of IC of **STATE BANK OF INDIA**. Regarding the efficiency of financial performance, the value of NPM was at 1.246, reporting the highest mean value. It was observed that the **STATE BANK OF INDIA** mobilized huge margin, next to ROA (1.069).

Table-3.1: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of STATE BANK OF INDIA during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	1.579	13.963	9.211	3.713
SCE	10	0.366	0.928	0.838	0.170
CEE	10	0.117	0.759	0.572	0.225
VAIC	10	2.064	15.633	10.622	4.046
Financial Performance (Dependent) Variables					
ROA	10	0.130	3.480	1.069	1.004
ROE	10	0.006	0.613	0.372	0.169
NPM	10	0.869	1.444	1.246	0.170
EPS	10	0.687	1.162	0.968	0.129
Control Variables					
Size	10	10.911	11.803	11.524	0.312
DER	10	0.008	0.267	0.108	0.080
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

It was evident that out of four variables considered for this study, two financial performance variables, namely, ROE (0.372) and EPS (0.968) did not realize the efficiency. Hence, null hypothesis “(NH-1): **There is no efficiency of Intellectual Capital Performance and Financial Performance of STATE BANK OF INDIA**”, was partially accepted.

3.2 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of BANK OF BARODA

Table-3.2 shows the results of Descriptive Statistics, for identifying the efficiency of intellectual capital and financial performance of the **BANK OF BARODA**, during the study period from 1st April 2010 to 31st March 2019. As stated earlier, HCE, SCE, CEE, VAIC were employed as independent variables to measure the efficiency of intellectual capital whereas ROA, ROE, NPM and EPS were adopted as dependent variables to understand the efficiency of financial performance of **BANK OF BARODA** and Size and DER were considered as control variables.

The results of descriptive statistics revealed that the values of intellectual capital performance variables moved from minimum of 1.896 (HCE), 0.849 (SCE), 0.812 (CEE), 3.740 (VAIC), 0.020 (ROA), 0.084 (ROE), 0.370 (NPM), 0.540 (EPS), 5.693 (Size) and 0.030 (DER) to the maximum of 2.274 (HCE), 0.897 (SCE), 1.238 (CEE), 4.373 (VAIC), 0.970 (ROA), 0.440 (ROE), 1.420 (NPM), 1.640 (EPS), 6.247 (Size) and 0.910 (DER). The mean values and standard deviation values of sample variables of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size, and DER were recorded at 2.051, 0.870, 1.016, 3.938, 0.585, 0.345, 1.059, 1.132, 5.966, 0.454 and 0.130, 0.016, 0.166, 0.209, 0.311, 0.107, 0.341, 0.303, 0.183, 0.372 respectively.

Table-3.2: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of BANK OF BARODA during the Study Period from 1st April 2010 to 31st March 2019

	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	1.896	2.274	2.051	0.130
SCE	10	0.849	0.897	0.870	0.016
CEE	10	0.812	1.238	1.016	0.166
VAIC	10	3.740	4.373	3.938	0.209
Financial Performance (Dependent) Variables					
ROA	10	0.020	0.970	0.585	0.311
ROE	10	0.084	0.440	0.345	0.107
NPM	10	0.370	1.420	1.059	0.341
EPS	10	0.540	1.640	1.132	0.303
Control Variables					
Size	10	5.693	6.247	5.966	0.183
DER	10	0.030	0.910	0.454	0.372
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation		ROA – Return on Assets			
HCE – Human Capital Efficiency		ROE – Return on Equity			
SCE – Structural Capital Efficiency		NPM – Net Profit Margin			
CEE – Capital Employed Efficiency		EPS-Earning Per Share			
VAIC –Value-Added Intellectual Coefficient		DER-Debt Equity Ratio			

The **BANK OF BARODA** earned more value from HCE (2.051) than from SCE (0.870) and CEE (1.016). In other words, the mean value of VAIC was more than the mean value of physical assets (CEE), implying that the **BANK OF BARODA** created more values from intangible assets than from physical assets.

The value, secured by VAIC (3.938), revealed that **BANK OF BARODA** recorded an average value of INR 3.938, for each one INR invested on intangible assets. Therefore, it is inferred that **BANK OF BARODA** enjoyed the efficiency of intellectual capital during the study period. From the analysis of efficiency of financial performance, it is clear that the value of EPS, at 1.132, recorded the highest mean value among the dependent variables, indicating that the **BANK OF BARODA** acquired huge profits, followed by NPM with the mean value of 1.059. But the ROA and ROE did not create efficiency during the study period. The overall analysis concluded that two financial performance variables performed efficiently whereas two variables, namely, ROA (0.585) and ROE (0.345) did not do so. Hence, the null hypothesis “(NH-1): **There is no efficiency of Intellectual Capital Performance and Financial Performance of BANK OF BARODA**”, was partially rejected.

3.3 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of PUNJAB NATIONAL BANK

The results of Descriptive Statistics, for testing the efficiency of intellectual capital and financial performance of the **PUNJAB NATIONAL BANK**, during the study period from 1st April 2010 to 31st March 2019, are provided in **Table-3.3**.

Table-3.3: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of PUNJAB NATIONAL BANK during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	1.425	2.484	2.113	0.338
SCE	10	0.759	0.916	0.872	0.050
CEE	10	0.501	1.300	0.842	0.279
VAIC	10	3.471	4.026	3.828	0.198
Financial Performance (Dependent) Variables					
ROA	10	0.190	1.600	0.979	0.462
ROE	10	0.094	0.543	0.409	0.131
NPM	10	0.844	1.442	1.209	0.188
EPS	10	0.707	1.161	0.948	0.166
Control Variables					
Size	10	5.128	5.611	5.422	0.161
DER	10	0.620	1.460	1.077	0.263
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

As mentioned earlier, the variables, namely, HCE, SCE, CEE and VAIC were considered as independent variables to scale the efficiency of intellectual capital whereas ROA, ROE, NPM and EPS were employed as dependent variables for identifying the efficiency of financial performance of **PUNJAB NATIONAL BANK** and Size and DER were adopted as control variables. It is noted from the results of descriptive statistics that values for sample variables of intellectual capital performance ranged between the minimum values of 1.425 (HCE), 0.759 (SCE), 0.501 (CEE), 3.471 (VAIC), 0.190 (ROA), 0.094 (ROE), 0.844 (NPM), 0.707 (EPS), 5.128 (Size) and 0.620 (DER) and the maximum values of 2.484 (HCE), 0.916 (SCE), 1.300 (CEE), 4.026 (VAIC), 1.600 (ROA), 0.543 (ROE), 1.442 (NPM), 0.161 (EPS), 5.611 (Size) and 1.460 (DER) during the study period. The minimum and maximum values revealed that the capital employed efficiency of sample bank recorded the lowest value and valued added intellectual coefficient reported the highest value, among the intellectual capital variables considered for the study. The comparison of the financial performance variables indicated that ROE recorded the lowest minimum value and ROA registered the highest maximum value. The mean values and standard deviation values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER were recorded at 2.113, 0.872, 0.842, 3.828, 0.979, 0.409, 1.209, 0.948, 5.422, 1.077 and 0.338, 0.050, 0.279, 0.198, 0.462, 0.131, 0.188, 0.166, 0.161, 0.263 respectively. **PUNJAB NATIONAL BANK** accumulated more value from HCE, which is one of the components of VAIC, earning a value of 2.113 than from SCE (0.872) and CEE (0.842). In other words, the human capital generated more value than the mean value of physical capital (CEE) of the sample bank. The compound value of VAIC was at 3.828, denoting that **PUNJAB NATIONAL BANK** generated an average value of INR 3.828 for each one INR of

intangible assets. This indicated that **PUNJAB NATIONAL BANK** was able to succeed in achieving the efficiency of intellectual capital during the study period. While analyzing the efficiency of financial performance, it was found that the value of NPM at 1.209 was the highest mean value among the dependent variables. In other words, **PUNJAB NATIONAL BANK** acquired huge profits but the variables of financial performance such as ROA (0.979) ROE (0.409) and EPS (0.948) failed to reach the required efficiency. Hence, the null hypothesis “**(NH-1): There is no efficiency of Intellectual Capital Performance and Financial Performance of PUNJAB NATIONAL BANK**”, was partially accepted.

3.4-Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of INDIAN OVERSEAS BANK

Table-3.4 reveals the results of descriptive statistics, for examining the efficiency of intellectual capital and financial performance of the **INDIAN OVERSEAS BANK**, during the study period from 1st April 2010 to 31st March 2019. It is to be noted that HCE, SCE, CEE and VAIC were treated as independent variables to evaluate the efficiency of intellectual capital while ROA, ROE, NPM and EPS were taken as dependent variables to identify the efficiency of financial performance of **INDIAN OVERSEAS BANK** and Size and DER were employed as control variables. The mean value reflected the nature of variable set and the value of standard deviation indicated the measure of dispersion from its mean value, in respect of intellectual capital performance variables and financial performance ratios. The minimum and maximum values identified the range of tested variables during the study period.

Table-3.4: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of INDIAN OVERSEAS BANK during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	3.264	4.452	4.155	0.457
SCE	10	0.872	0.946	0.910	0.025
CEE	10	0.298	0.595	0.479	0.100
VAIC	10	4.712	5.875	5.545	0.435
Financial Performance (Dependent) Variables					
ROA	10	0.060	1.330	0.730	0.449
ROE	10	0.090	0.478	0.377	0.125
NPM	10	0.178	0.501	0.394	0.105
EPS	10	0.040	0.091	0.058	0.014
Control Variables					
Size	10	11.717	12.879	12.491	0.415
DER	10	0.025	0.193	0.075	0.057
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

The results of descriptive statistics clearly revealed that during the study period, the values of intellectual capital performance variables moved from the minimum values of 3.264 (HCE), 0.872 (SCE), 0.298 (CEE), 4.712 (VAIC), 0.060 (ROA), 0.090 (ROE), 0.178 (NPM), 0.040 (EPS), 11.717 (Size) and 0.025 (DER) to the maximum values of 4.452 (HCE), 0.946 (SCE), 0.595 (CEE), 5.875 (VAIC), 1.330 (ROA), 0.478 (ROE), 0.501 (NPM), 0.091 (EPS), 12.879 (Size) and 0.193 (DER). Besides, the values of mean and standard deviation for HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size, DER were recorded at 4.155, 0.901, 0.479, 5.545, 0.730, 0.377, 0.394, 0.058, 12.491, 0.075 and 0.457, 0.025, 0.100, 0.435, 0.449, 0.125, 0.105, 0.014, 0.415, 0.057 respectively. The **INDIAN OVERSEAS BANK** achieved higher value from HCE (4.155) than SCE (0.910) and CEE (0.479). The mean value of HCE (4.155) was more than the mean value of physical assets, i.e., CEE (0.479), implying that the **INDIAN OVERSEAS BANK** created more value from human capital than from physical capital. The aggregate value of VAIC (5.545) indicated that the sample bank produced an average value of INR 5.545, for each one INR utilized. In other words, **INDIAN OVERSEAS BANK** realized the efficiency of intellectual capital during the study period.

With respect to the efficiency of financial performance, no sample variable, out of four variables, namely, ROA, ROE NPM and EPS of **INDIAN OVERSEAS BANK**, attained the desired efficiency. Therefore, the null hypothesis (**NH-1**): **There is no efficiency of Intellectual Capital Performance and Financial Performance of INDIAN OVERSEAS BANK**, was accepted.

3.5 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of CANARA BANK

Table-3.5 shows the results of descriptive statistics, for determining the efficiency of intellectual capital and financial performance of **CANARA BANK**, during the study period from 1st April 2010 to 31st March 2019. It is to be noted that four variables such as HCE, SCE, CEE and VAIC were included as independent variables for assessing the intellectual capital performance while four variables, namely, ROA, ROE, NPM and EPS were used as dependent variables, to ascertain the nature of financial performance of **CANARA BANK** and two variables, namely, Size and DER were treated as control variables. The mean value reflected the nature of variables set and the value of standard deviation indicated the measure of dispersion from its mean value, in respect of intellectual capital performance variables and financial performance ratios. The minimum and maximum values identified the range of tested variables during the study period.

The results of descriptive statistics on the intellectual capital variables for **CANARA BANK** revealed that the values of intellectual capital performance variables ranged from minimum of 2.045 (HCE), 0.870 (SCE), 0.429 (CEE), 3.000 (VAIC), 0.060 (ROA), 0.000 (ROE), 0.000 (NPM), 0.000 (EPS), 11.701 (Size) and 0.000 (DER) and to the maximum of 2.709 (HCE), 0.933 (SCE), 0.891 (CEE), 4.168 (VAIC), 1.420 (ROA) 1.000 (ROE), 2.000 (NPM), 1.000 (EPS), 12.747 (Size) and 1.000 (DER) during the study period. The values of mean and standard deviation of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER recorded were at 2.364, 0.904, 0.678, 3.816, 0.706, 0.100, 1.000, 0.900, 12.339, 0.700 and 0.200, 0.019, 0.150, 0.433, 0.433, 0.316, 0.471, 0.316, 0.351, 0.483 respectively.

Table-3.5: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of CANARA BANK during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	2.045	2.709	2.364	0.200
SCE	10	0.870	0.933	0.904	0.019
CEE	10	0.429	0.891	0.678	0.150
VAIC	10	3.000	4.168	3.816	0.433
Financial Performance (Dependent) Variables					
ROA	10	0.060	1.420	0.706	0.433
ROE	10	0.000	1.000	0.100	0.316
NPM	10	0.000	2.000	1.000	0.471
EPS	10	0.000	1.000	0.900	0.316
Control Variables					
Size	10	11.701	12.747	12.339	0.351
DER	10	0.000	1.000	0.700	0.483
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

It is evident that **CANARA BANK** had generated more value for HCE (2.364) than that of SCE (0.904) and CEE (0.678). The mean value of HCE was more than the mean value of physical asset, indicating that **CANARA BANK** synergized more value from intangible component of VAIC than from physical components. The aggregate value of VAIC (3.816) revealed that the sample bank produced an average value of INR 3.816 for each one INR invested on human capital.

It is evident from the efficiency of financial performance (the value of NPM indicated) that **CANARA BANK** earned neither profit nor suffered loss. ROA (0.706) ROE (0.100) and EPS (0.900) failed to achieve the desired returns. Hence, null the hypothesis **(NH-1): There is no efficiency of Intellectual Capital Performance and Financial Performance of CANARA BANK** was partially rejected.

3.6 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of UNION BANK OF INDIA

Table-3.6 presents the results of the descriptive statistics on the intellectual capital variables. It is clear that the values of intellectual capital performance variables ranged between minimum of 2.037 for HCE, 0.869 for SCE, -1.196 for CEE, 1.709 for VAIC, 0.130 for ROA, 0.066 for ROE, 1.066 for NPM, 0.012 for EPS, 5.006 for Size, and 0.021 for DER and maximum of 2.635 for HCE, 0.928 for SCE, 0.629 for CEE, 4.164 for VAIC, 1.250 for ROA, 0.504 for ROE, 1.499 for NPM, 0.184 for EPS, 5.472 for Size, and 0.699 for DER during the study period. According to the minimum and maximum values, the capital employed efficiency recorded the lowest value and valued added intellectual coefficient registered the highest value, among the intellectual capital variables, considered for the study. Regarding the financial performance variables, ROE reported the lowest minimum value and ROA recorded the highest maximum value.

Table-3.6: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of UNION BANK OF INDIA during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	2.037	2.635	2.426	0.222
SCE	10	0.869	0.928	0.909	0.022
CEE	10	-1.196	0.629	-0.056	0.774
VAIC	10	1.709	4.164	3.279	0.990
Financial Performance (Dependent) Variables					
ROA	10	0.130	1.250	0.703	0.351
ROE	10	0.066	0.504	0.385	0.133
NPM	10	1.066	1.499	1.303	0.134
EPS	10	0.012	0.184	0.111	0.054
Control Variables					
Size	10	5.006	5.472	5.243	0.185
DER	10	0.021	0.699	0.250	0.189
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

The values of mean and standard deviation of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER were recorded at 2.426, 0.909, -0.056, 3.279, 0.703, 0.385, 1.303, 0.111, 5.243, 0.250 and 0.222, 0.022, 0.774, 0.990, 0.351, 0.133, 0.134, 0.054, 0.185, 0.189 respectively. Among the components of VAIC, HCE recorded higher value of 2.426 than SCE (0.909) and CEE (-0.056) for **UNION BANK OF INDIA**. Since Human Capital Efficiency registered a value, which was more than the mean value of physical assets, it is evident that the sample bank generated higher value from its intangible resources than from the physical resources. In other words, the intellectual capital produced an average value of INR 3.279, for each one INR of intangible assets held by the bank. Hence, it is evident that the efficiency of intellectual capital was realized by **UNION BANK OF INDIA**. As per the efficiency of financial performance, the value of NPM was at 1.303 (highest mean value), implying that the **UNION BANK OF INDIA** earned huge profits. The ROA, ROE and EPS failed to achieve the efficiency of financial performance. On the basis of the overall analysis from **Table-3.6**, the null hypothesis (NH-1): **There is no efficiency of Intellectual Capital Performance and Financial Performance of UNION BANK OF INDIA**, was partially rejected.

3.7. Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of THE JAMMU & KASHMIR BANK LIMITED

The results of descriptive statistics, for analyzing the efficiency of intellectual capital and financial performance of **THE JAMMU & KASHMIR BANK LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are given in **Table-3.7**.

Table-3.7: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of THE JAMMU & KASHMIR BANK LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	2.998	4.840	3.943	0.584
SCE	10	0.120	1.348	1.035	0.365
CEE	10	-0.568	0.784	0.282	0.363
VAIC	10	3.785	6.209	5.260	0.728
Financial Performance (Dependent) Variables					
ROA	10	0.079	0.817	0.328	0.212
ROE	10	0.715	1.276	0.933	0.220
NPM	10	1.813	3.215	2.610	0.496
EPS	10	0.715	1.358	0.994	0.246
Control Variables					
Size	10	11.714	12.719	12.391	0.366
DER	10	-0.075	0.646	0.301	0.218
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

The variables such as HCE, SCE, CEE and VAIC were adopted as independent variables for estimating the efficiency of intellectual capital while four variables, namely, ROA, ROE, NPM and EPS were employed as dependent variables to assess the efficiency of financial performance of **THE JAMMU & KASHMIR BANK LIMITED** and Size and DER were used as control variables. The mean value reflected the nature of variables set and the value of standard deviation indicated the measure of dispersion from its mean value, in respect of intellectual capital performance variables and financial performance ratios. The minimum and maximum values identified the range of tested variables during the study period.

According to the **Table-3.7**, the values of intellectual capital performance variables ranged from minimum of 2.998 (HCE), 0.120 (SCE), -0.568 (CEE), 3.785 (VAIC), 0.079 (ROA), 0.715 (ROE), 1.813 (NPM), 0.715 (EPS), 11.714 (Size) and -0.075 (DER) to maximum of 4.840 (HCE), 1.348 (SCE), 0.784 (CEE), 6.209 (VAIC), 0.817 (ROA), 1.276 (ROE), 3.215 (NPM), 1.358 (EPS), 12.719 (Size) and 0.646 (DER). The mean values and standard deviation values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size, DER were recorded at 3.943, 1.035, 0.282, 5.260, 0.328, 0.933, 2.610, 0.994, 12.391, 0.301 and 0.584, 0.365, 0.363, 0.728, 0.212, 0.220, 0.496, 0.246, 0.366, 0.218 respectively, during the study period. **THE JAMMU & KASHMIR BANK LIMITED** created more value from HCE at 3.943 than from SCE (1.035) and CEE (0.282). The sum of mean values of HCE and SCE, also known as intellectual coefficient, was more than the mean value of physical assets, i.e., CEE (0.282), implying that **THE JAMMU & KASHMIR BANK LIMITED** generated higher value from intangible components of VAIC than from physical components. The aggregate value of VAIC (5.260) clearly indicated that the sample bank produced an average value

of INR 5.260 for each one INR employed and enjoyed the efficiency of intellectual capital during the study period.

The value of NPM (2.610), being the highest mean value among the dependent variables, demonstrated that **THE JAMMU & KASHMIR BANK LIMITED** earned huge profits, followed by EPS with a mean value of 0.994. But ROA and ROE, with the lowest mean values of 0.328 and 0.933, indicated that **THE JAMMU & KASHMIR BANK LIMITED** faced difficulties in generating optimum return and earnings during the study period. In this context, it was found that out of four variables, three variables (ROA, ROE and EPS) did not find any efficiency for **THE JAMMU & KASHMIR BANK LIMITED** during the study period. Hence, the null hypothesis (NH-1): **There is no efficiency of Intellectual Capital Performance and Financial Performance of THE JAMMU & KASHMIR BANK LIMITED**, was partially accepted.

3.8 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of INDIAN BANK

Table-3.8 shows the results of Descriptive Statistics, for analyzing the efficiency of intellectual capital and financial performance of the **INDIAN BANK**, during the study period from 1st April 2010 to 31st March 2019. The sample variables such as HCE, SCE, CEE and VAIC were employed as independent variables, to determine the efficiency of intellectual capital while ROA, ROE, NPM and EPS were used as dependent variables, for assessing the efficiency of financial performance of **INDIAN BANK** and control variables were size and DER.

Table-3.8: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of INDIAN BANK during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	3.127	4.312	3.864	0.491
SCE	10	0.757	0.910	0.870	0.051
CEE	10	0.411	0.988	0.715	0.168
VAIC	10	4.588	5.999	5.450	0.533
Financial Performance (Dependent) Variables					
ROA	10	0.160	2.330	0.825	0.670
ROE	10	0.072	1.703	0.504	0.454
NPM	10	0.075	0.613	0.380	0.187
EPS	10	0.019	0.045	0.029	0.009
Control Variables					
Size	10	4.808	5.182	5.067	0.130
DER	10	0.080	0.374	0.244	0.110
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

According to descriptive statistics, the values for intellectual capital performance variables ranged from a minimum of 3.127 for HCE, 0.757 for SCE, 0.411 for CEE, 4.588 for VAIC, 0.160 for ROA, 0.072 for ROE, 0.075 for NPM, 0.019 for EPS, 4.808 for Size, and 0.080 for DER to the maximum of 4.312 for HCE, 0.910 for SCE, 0.988 for CEE, 5.999 for VAIC, 2.330 for ROA, 1.703 for ROE, 0.613 for NPM, 0.045 for EPS, 5.182 for Size, and 0.374 for DER during the study period. The mean values and standard deviation values were registered for HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER, at 3.864, 0.870, 0.715, 5.450, 0.825, 0.504, 0.380, 0.029, 5.067, 0.244 and 0.491, 0.051, 0.168, 0.533, 0.670, 0.454, 0.187, 0.009, 0.130, 0.110 respectively. It is interesting to note that among the three components of VAIC, the HCE recorded higher value of 3.864 than SCE (0.870) and CEE (0.715) for **INDIAN BANK**.

As Human Capital Efficiency recorded a value which was more than the mean value of physical assets, i.e., CEE (0.715), it is inferred that the **INDIAN BANK** recorded higher value from its intangible resources than from the physical resources. With a value of 5.450, being achieved by VAIC of **INDIAN BANK**, it is clear that intellectual capital produced an average value of INR 5.450 for each one INR of intangible assets held by **INDIAN BANK**. With regard to efficiency of financial performance, it was shocking to observe that the mean value of ROA at 0.825, ROE at 0.504, NPM at 0.380 and EPS at 0.029 did not realize any efficiency of financial performance during the study period. Hence, the null hypothesis (**NH-1**): **There is no efficiency of Intellectual Capital Performance and Financial Performance of INDIAN BANK**, was not accepted.

3.9 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of CENTRAL BANK OF INDIA

The results of descriptive statistics for identifying the efficiency of intellectual capital and financial performance of the **CENTRAL BANK OF INDIA**, during the study period from 1st April 2010 to 31st March 2019, are displayed in **Table-3.9**. As stated earlier, variables such as HCE, SCE, CEE and VAIC were considered as independent variables for measuring the efficiency of intellectual capital performance while ROA, ROE, NPM and EPS were used as dependent variables to assess the efficiency of financial performance of **CENTRAL BANK OF INDIA** and Size and DER were employed as control variables. The mean value reflected the nature of variables set and the value of standard deviation indicated the measure of dispersion from its mean value, in respect of intellectual capital performance variables and financial performance ratios. The minimum and maximum values identified the range of tested variables during the study period.

The results of descriptive statistics showed that during the study period, the values of intellectual capital performance variables ranged from minimum values of 3.029 (HCE), 3.487 (SCE), 3.814 (CEE), 10.372 (VAIC), 0.450 (ROA), 0.186 (ROE), -0.165 (NPM), 0.018 (EPS), 3.903 (Size) and 0.530 (DER) to maximum values of 4.140 (HCE), 4.027 (SCE), 4.350 (CEE), 12.397 (VAIC), 1.620 (ROA), 0.566 (ROE), 0.629 (NPM), 0.063 (EPS), 4.550 (Size) and 1.670 (DER).

The mean values and standard deviation values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size, and DER recorded at 3.797, 3.761, 4.062, 11.621, 1.143, 0.372, 0.361, 0.032, 4.238, 1.011 and 0.412, 0.183, 0.218, 0.559, 0.331, 0.143, 0.273, 0.015, 0.220, 0.380 respectively.

Table-3.9: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of CENTRAL BANK OF INDIA during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	3.029	4.140	3.797	0.412
SCE	10	3.487	4.027	3.761	0.183
CEE	10	3.814	4.350	4.062	0.218
VAIC	10	10.372	12.397	11.621	0.559
Financial Performance (Dependent) Variables					
ROA	10	0.450	1.620	1.143	0.331
ROE	10	0.186	0.566	0.372	0.143
NPM	10	-0.165	0.629	0.361	0.273
EPS	10	0.018	0.063	0.032	0.015
Control Variables					
Size	10	3.903	4.550	4.238	0.220
DER	10	0.530	1.670	1.011	0.380
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

The **CENTRAL BANK OF INDIA** achieved higher value from CEE (4.062) than from HCE (3.797) and SCE (3.761). The mean value of CEE (4.062) was more than the mean value of human capital, i.e., HCE (3.797), implying that the **CENTRAL BANK OF INDIA** created more value from physical capital than from human capital. But the aggregate value of VAIC (11.621) revealed that the sample bank produced an average value of INR 11.621 for each one INR utilized during the study period.

From the analysis of financial performance variables, it was found that the value of ROA (1.143) reported the highest mean value, among the dependent variables, indicating that the **CENTRAL BANK OF INDIA** earned huge net profits. On the other hand, the ROE, NPM and EPS had recorded the lowest mean values at 0.372, 0.361 and 0.032 respectively, suggesting that the sample bank faced difficulties in generating optimum returns from its assets and equity. Hence, the null hypothesis (**NH-1**): **There is no efficiency of Intellectual Capital Performance and Financial Performance of CENTRAL BANK OF INDIA** was partially rejected.

3.10 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of UCO BANK

The results of descriptive statistics for **UCO BANK**, given in **Table-3.10**, present the values of IC performance variables, that ranged between minimum of 1.698 (HCE), 0.817 (SCE), 0.170 (CEE), 3.532 (VAIC), 0.330 (ROA), 0.332 (ROE), 0.700 (NPM), 0.392 (EPS), 11.020 (Size) and 0.392 (DER) and maximum of 3.752 (HCE), 0.976 (SCE), 1.235 (CEE), 5.651 (VAIC), 1.880 (ROA), 0.611 (ROE), 1.194 (NPM), 1.135 (EPS), 11.791 (Size) and 1.135 (DER). The minimum and maximum values revealed that CEE recorded the lowest value and VAIC registered the highest value among the IC variables.

While comparing the financial performance variables, ROA reported the lowest minimum value as well as the highest maximum value. The mean and SD values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER were recorded at 2.615, 0.913, 0.613, 4.141, 0.945, 0.465, 0.979, 0.850, 11.547, 0.850 and 0.621, 0.054, 0.396, 0.644, 0.538, 0.082, 0.155, 0.234, 0.265, 0.234 respectively during the study period. It is clear that **UCO BANK** had generated more value from HCE, with a value of 2.615 than that of SCE (0.913) and CEE (0.613). The mean value of HCE was more than the mean value of physical asset, indicating that **UCO BANK** was able to generate more value from intangible components of VAIC than from physical components. The aggregate value of VAIC was at 4.141, implying that sample bank produced an average value of INR 4.141 for each one INR invested on human capital. In other words, there was efficiency of IC of **UCO BANK** during the study period.

With respect to efficiency of financial performance of **UCO BANK**, it is surprising to note that no financial variable (ROA, ROE, NPM and EPS) achieved the desired efficiency. Hence, the sample bank should strive to generate more value. Therefore, the null hypothesis **(NH-1): There is no efficiency of Intellectual Capital Performance and Financial Performance of UCO BANK**, was accepted.

Table-3.10: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of UCO BANK during the Study Period from 1st April 2010 to 31st March 2019

	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	1.698	3.752	2.615	0.621
SCE	10	0.817	0.976	0.913	0.054
CEE	10	0.170	1.235	0.613	0.396
VAIC	10	3.532	5.651	4.141	0.644
Financial Performance (Dependent) Variables					
ROA	10	0.330	1.880	0.945	0.538
ROE	10	0.332	0.611	0.465	0.082
NPM	10	0.700	1.194	0.979	0.155
EPS	10	0.392	1.135	0.850	0.234
Control Variables					
Size	10	11.020	11.791	11.547	0.265
DER	10	0.392	1.135	0.850	0.234
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

Section-B

Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of sample IT Companies

The sample IT Companies from Nifty service sector covered Tata Consultancy Services Limited, Infosys Limited, Wipro Limited, Tech Mahindra Limited, Larsen & Toubro Limited, Mindtree Limited, Oracle Financial Services Software Limited and HCL Technologies Limited. The detailed analysis of descriptive statistics for the eight IT companies is given as follows.

- 3.11 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of TATA CONSULTANCY SERVICES LIMITED
- 3.12 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of INFOSYS LIMITED
- 3.13 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of WIPRO LIMITED
- 3.14 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of TECH MAHINDRA LIMITED
- 3.15 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of LARSEN & TOUBRO INFOTECH LIMITED
- 3.16 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of MINDTREE LIMITED
- 3.17 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of ORACLE FINANCIAL SERVICES SOFTWARE LIMITED, and
- 3.18 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of HCL TECHNOLOGIES LIMITED

3.11 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of TATA CONSULTANCY SERVICES LIMITED

The results of descriptive statistics for analyzing intellectual capital and financial performance of the **TATA CONSULTANCY SERVICES LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are provided in **Table-3.11**. The descriptive statistics clearly revealed that the values for intellectual capital performance variables ranged from a minimum of 5.074 for HCE, 2.887 for SCE, 1.979 for CEE, 5.077 for VAIC, 1.433 for ROA, 1.515 for ROE, 0.310 for NPM, 1.514 for EPS, 0.980 for Size, and 0.010 for DER to the maximum of 5.773 for HCE, 5.771 for SCE, 3.230 for CEE, 6.013 for VAIC, 1.574 for ROA, 1.694 for ROE, 0.426 for NPM, 1.692 for EPS, 1.292 for Size, and 1.770 for DER during the study period. The mean values and standard deviation values for the sample variables, namely, HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER were recorded at 5.478, 3.910, 2.427, 5.570, 1.489, 1.616, 0.361, 1.614, 1.113, 0.601 and 0.240, 1.113, 0.378, 0.286, 0.047, 0.061, 0.046, 0.061, 0.129, 0.590 respectively.

Among the components of VAIC, the HCE recorded a value of 5.478, which was higher than that of SCE (3.910) and CEE (2.427) for **TATA CONSULTANCY SERVICES LIMITED**. In other words, Human Capital Efficiency registered a value more than the mean value of physical assets, i.e., CEE (2.427). Hence it is inferred that the **TATA CONSULTANCY SERVICES LIMITED** synergized higher value from its intangible resources than from the physical resources. A value of 5.570, achieved by VAIC of **TATA CONSULTANCY SERVICES LIMITED**, indicated the fact that the intellectual capital produced an average value of INR 5.570 for each one INR invested on intangible assets of **TATA CONSULTANCY SERVICES LIMITED**.

Table-3.11: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of TATA CONSULTANCY SERVICES LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	5.074	5.773	5.478	0.240
SCE	10	2.887	5.711	3.910	1.113
CEE	10	1.979	3.230	2.427	0.378
VAIC	10	5.077	6.013	5.570	0.286
Financial Performance (Dependent) Variables					
ROA	10	1.433	1.574	1.498	0.047
ROE	10	1.515	1.694	1.616	0.061
NPM	10	0.310	0.426	0.361	0.046
EPS	10	1.514	1.692	1.614	0.061
Control Variables					
Size	10	0.980	1.292	1.113	0.129
DER	10	0.010	1.770	0.601	0.590
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

Regarding the efficiency of financial performance, it was found that the value of ROE at 1.616, was the highest mean value among the other dependent variables, indicating that the **TATA CONSULTANCY SERVICES LIMITED** earned huge returns. EPS also recorded a mean value of 1.614, indicating higher earnings, followed by ROA (1.498). But the NPM (0.361) did not achieve any efficiency. In other words, three variables acquired efficiency of financial performance while one variable did not achieve efficiency. Hence, the null hypothesis **(NH-1): There is no efficiency of Intellectual Capital Performance and Financial Performance of TATA CONSULTANCY SERVICES LIMITED** was partially accepted.

3.12 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of INFOSYS LIMITED

Table-3.12 provides the results of descriptive statistics, for assessing the efficiency of intellectual capital and financial performance of the **INFOSYS LIMITED**, during the study period from 1st April 2010 to 31st March 2019. The variables such as HCE, SCE, CEE and VAIC were used as independent variables, to measure the efficiency of intellectual capital while ROA, ROE, NPM and EPS were employed as dependent variables, to determine the efficiency of financial performance of **INFOSYS LIMITED**. The control variables consisted of size and DER.

According to the results of descriptive statistics, the values of intellectual capital performance variables moved from minimum of 5.014 for HCE, 3.545 for SCE, -0.096 for CEE, 5.033 for VAIC, 1.249 for ROA, 1.326 for ROE, 0.292 for NPM, 1.326 for EPS, 0.965 for Size, and 0.320 for DER to the maximum of 5.583 for HCE, 5.511 for SCE, 2.631 for CEE, 5.812 for VAIC, 1.414 for ROA, 1.494 for ROE, 0.462 for NPM, 1.494 for EPS, 1.296 for Size, and 2.530 for DER respectively during the study period.

It is pertinent to note that minimum and maximum values of relational capital efficiency and value added intellectual coefficient were reported to be the lowest and the highest respectively, for intellectual capital performance variables. The minimum and maximum values of NPM and ROE and EPS were reported as the lowest and the highest respectively, regarding the financial performance. The mean and standard deviation values of measurement variables of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size, DER were recorded at 5.342, 4.192, 1.596, 5.440, 1.327, 1.412, 0.418, 1.412, 1.105, 1.367 and 0.188, 0.819, 0.811, 0.239, 0.050, 0.047, 0.052, 0.047, 0.109, 0.739 respectively.

Among the components of VAIC, the HCE recorded a higher value of 5.342 than SCE (4.192) and CEE (1.596) for **INFOSYS LIMITED**. The Human Capital Efficiency earned a value that was more than the mean value of physical assets (CEE-1.596). In other words, **INFOSYS LIMITED** synergized higher value from its intangible resources than from physical resources. Given the value of 5.440 for VAIC of **INFOSYS LIMITED**, it is evident that the intellectual capital produced an average value of INR 5.440 for each one INR invested on intangible assets, held by **INFOSYS LIMITED**. In short, the efficiency of intellectual capital was achieved by the sample company during the study period.

Concerning the efficiency of financial performance, it is clear that the value of ROE and EPS at 1.412 was the highest mean value among the other dependent variables. This indicated that the **INFOSYS LIMITED** earned huge returns by its equity and its profit, followed by ROA (1.327). However, it is observed that NPM did not attain any efficiency. It is inferred that all the financial performance variables reported efficiency, except NPM (0.418).

Table-3.12: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of INFOSYS LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	5.014	5.583	5.342	0.188
SCE	10	3.545	5.511	4.192	0.819
CEE	10	-0.096	2.631	1.596	0.811
VAIC	10	5.033	5.812	5.440	0.239
Financial Performance (Dependent) Variables					
ROA	10	1.249	1.414	1.327	0.050
ROE	10	1.326	1.494	1.412	0.047
NPM	10	0.292	0.462	0.418	0.052
EPS	10	1.326	1.494	1.412	0.047
Control Variables					
Size	10	0.965	1.296	1.105	0.109
DER	10	0.320	2.530	1.367	0.739
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation		ROA – Return on Assets			
HCE – Human Capital Efficiency		ROE – Return on Equity			
SCE – Structural Capital Efficiency		NPM – Net Profit Margin			
CEE – Capital Employed Efficiency		EPS-Earning Per Share			
VAIC –Value-Added Intellectual Coefficient		DER-Debt Equity Ratio			

Therefore, the null hypothesis (NH-1): **There is no efficiency of Intellectual Capital Performance and Financial Performance of INFOSYS LIMITED**, was partially accepted.

3.13 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of WIPRO LIMITED

Table-3.13 shows the results of descriptive statistics, to estimate the efficiency of intellectual capital and financial performance of the **WIPRO LIMITED**, during the study period from 1st April 2010 to 31st March 2019. As mentioned earlier, four variables namely HCE, SCE, CEE and VAIC were adopted as independent variables to measure the efficiency of intellectual capital. Similarly, four variables, namely, ROA, ROE, NPM and EPS were observed as dependent variables, to understand the efficiency of financial performance of **WIPRO LIMITED**. Size and DER were considered as control variables. According to the results of descriptive statistics, the values of intellectual capital performance variables ranged from minimum of 3.261 (HCE), 1.931 (SCE), 2.708 (CEE), 3.458 (VAIC), 1.098 (ROA), 0.082 (ROE), 1.240 (NPM), 1.184 (EPS), 1.035 (Size) and 0.140 (DER) to the maximum of 3.875 (HCE), 3.875 (SCE), 3.192 (CEE), 4.219 (VAIC), 1.241 (ROA), 0.974 (ROE), 1.506 (NPM), 1.376 (EPS), 1.055 (Size) and 0.310 (DER) respectively, during the study period.

The mean values and standard deviation values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER were recorded at 3.620, 2.596, 2.967, 3.799, 1.153, 0.283, 1.345, 1.266, 1.047, 0.193 and 0.220, 0.738, 0.174, 0.235, 0.054, 0.259, 0.089, 0.072, 0.006 and 0.056 respectively. More importantly, the **WIPRO LIMITED** earned more value from HCE (3.620) than from SCE (2.596) and CEE (2.967).

Table-3.13: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of WIPRO LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	3.261	3.875	3.620	0.220
SCE	10	1.931	3.875	2.596	0.738
CEE	10	2.708	3.192	2.967	0.174
VAIC	10	3.458	4.219	3.799	0.235
Financial Performance (Dependent) Variables					
ROA	10	1.098	1.241	1.153	0.054
ROE	10	0.082	0.974	0.283	0.259
NPM	10	1.240	1.506	1.345	0.089
EPS	10	1.184	1.376	1.266	0.072
Control Variables					
Size	10	1.035	1.055	1.047	0.006
DER	10	0.140	0.310	0.193	0.056
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

The mean value of HCE was also more than the mean value of physical assets (CEE), revealing the fact that **WIPRO LIMITED** created more value from intangible assets than from physical assets. The compound value of VAIC at 3.799, clearly demonstrated that **WIPRO LIMITED** generated an average value of INR 3.799 for each one INR invested on intangible assets. It is inferred from the efficiency of financial performance that the value of NPM at 1.345 was the highest mean value among the dependent variables and this indicated that the **WIPRO LIMITED** acquired huge profits, followed by ROA and EPS with mean values of 1.153 and 1.266 respectively.

It is to be noted that ROE had reported the lowest mean value at 0.283, suggesting that the **WIPRO LIMITED** ought to concentrate on mobilizing more from equity investors. Though three financial performance variables did achieve efficiency, ROE did not do so. Hence, the null hypothesis (**NH-1**): **There is no efficiency of Intellectual Capital Performance and Financial Performance of WIPRO LIMITED** was partially rejected.

3.14 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of TECH MAHINDRA LIMITED

Table-3.14 shows the results of descriptive statistics, in respect of efficiency of intellectual capital and financial performance of the **TECH MAHINDRA LIMITED**, during the study period from 1st April 2010 to 31st March 2019. The mean value reflected the nature of variables set while the value of standard deviation indicated the measure of dispersion from its mean value, in respect of efficiency intellectual capital and financial performance variables. The minimum and maximum values identified the range of tested variables during the study period.

Table-3.14: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of TECH MAHINDRA LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	1.108	1.433	1.247	0.100
SCE	10	1.000	1.489	1.199	0.148
CEE	10	0.808	1.556	1.137	0.248
VAIC	10	1.530	1.973	1.683	0.136
Financial Performance (Dependent) Variables					
ROA	10	0.943	1.525	1.196	0.197
ROE	10	1.280	3.006	2.325	0.613
NPM	10	1.012	1.514	1.232	0.135
EPS	10	0.985	1.447	1.206	0.159
Control Variables					
Size	10	4.606	5.517	5.094	0.325
DER	10	0.010	0.450	0.129	0.168
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

It is noted that the minimum and maximum values revealed that the capital employed efficiency recorded the lowest value and valued added intellectual coefficient registered the highest maximum value, among the intellectual capital variables, considered for the study. According to the results of **Table-3.14**, the values of efficiency of intellectual capital and financial performance variables ranged from the minimum of 1.108 (HCE), 1.000(SCE), 0.808 (CEE), 1.530 (VAIC), 0.943 (ROA), 1.280 (ROE), 1.012 (NPM), 0.985(EPS), 4.606 (Size) and 0.010 (DER) to the maximum of 1.433 (HCE), 1.489 (SCE), 1.556 (CEE), 1.973 (VAIC), 1.525 (ROA), 3.006 (ROE), 1.514 (NPM), 1.447 (EPS), 5.517 (Size) and 0.450 (DER) respectively.

Regarding the financial performance variables, return on assets reported the lowest minimum value and return on equity recorded the highest maximum value. The mean values and standard deviation values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER were recorded at 1.247, 1.199, 1.137, 1.683, 1.196, 2.325, 1.232, 1.206, 5.094, 0.129 and 0.100, 0.148, 0.248, 0.136, 0.197, 0.613, 0.135, 0.159, 0.325 and 0.168 respectively during the study period. The sample firm namely **TECH MAHINDRA LIMITED** created more value from HCE (1.247) than from SCE (1.199) and CEE (1.137). The mean values of HCE, also known as intellectual coefficient, was more than the mean value of physical assets (CEE-1.137), implying that the **TECH MAHINDRA LIMITED** created more value from intangible components of VAIC than from physical components. The cumulative value of VAIC (1.683) clearly indicated the fact that the sample company produced an average value of INR 1.683 for each one INR employed. In short, the efficiency of intellectual capital was achieved by the sample firm during the study period.

Regarding the efficiency of financial performance, the value of ROE was at 2.325, (highest mean value among the dependent variables), which revealed that the **TECH MAHINDRA LIMITED** mobilized huge returns, followed by NPM, ROA and EPS with mean values of 1.232, 1.196 and 1.206 respectively. It is to be noted that all the financial performance variables did attain the efficiency for **TECH MAHINDRA LIMITED**. Hence, the null hypothesis (NH-1): **There is no efficiency of Intellectual Capital Performance and Financial Performance of TECH MAHINDRA LIMITED** was rejected.

3.15 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of LARSEN & TOUBRO INFOTECH LIMITED

The results of descriptive statistics, for assessing the efficiency of intellectual capital and financial performance of the **LARSEN & TOUBRO INFOTECH LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are presented in **Table-3.15**. As mentioned earlier, HCE, SCE, CEE and VAIC were adopted as independent variables to measure the efficiency of intellectual capital while ROA, ROE, NPM and EPS were treated as dependent variables to identify the efficiency of financial performance of **LARSEN & TOUBRO INFOTECH LIMITED**. The Size and DER were considered as control variables.

According to the results of descriptive statistics, the values of intellectual capital performance variables ranged from a minimum of 1.050 (HCE), 0.060 (SCE), 0.010 (CEE), 1.463 (VAIC) ,0.022 (ROA), 0.550 (ROE), 0.937 (NPM), 1.053 (EPS), 6.000 (Size) and 0.000 (DER) to the maximum of 1.457 (HCE), 1.568 (SCE), 1.080 (CEE), 1.698 (VAIC), 1.568 (ROA), 1.655 (ROE), 1.594 (NPM), 1.503 (EPS), 7.000 (Size) and 2.000 (DER) respectively, during the study period.

Table-3.15: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of LARSEN & TOUBRO INFOTECH LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	1.050	1.457	1.266	0.144
SCE	10	0.060	1.568	1.136	0.478
CEE	10	0.010	1.080	0.218	0.330
VAIC	10	1.463	1.698	1.581	0.101
Financial Performance (Dependent) Variables					
ROA	10	0.022	1.568	1.151	0.521
ROE	10	0.550	1.655	1.264	0.372
NPM	10	0.937	1.594	1.355	0.230
EPS	10	1.053	1.503	1.347	0.143
Control Variables					
Size	10	6.000	7.000	6.700	0.483
DER	10	0.000	2.000	1.000	0.816
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation		ROA – Return on Assets			
HCE – Human Capital Efficiency		ROE – Return on Equity			
SCE – Structural Capital Efficiency		NPM – Net Profit Margin			
CEE – Capital Employed Efficiency		EPS-Earning Per Share			
VAIC –Value-Added Intellectual Coefficient		DER-Debt Equity Ratio			

The mean values and standard deviation values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER were recorded at 1.266, 1.136, 0.218, 1.581, 1.151, 1.264, 1.355, 1.347, 6.700, 1.000 and 0.144, 0.478, 0.330, 0.101, 0.521, 0.372, 0.230, 0.143, 0.483, 0.816 respectively. **LARSEN & TOUBRO INFOTECH LIMITED** earned more value from HCE (1.266) than from SCE (1.136) and CEE (0.218). In other words, the human capital generated more value than the mean value of physical capital (CEE). The compound value of VAIC, at 1.581, demonstrated that **LARSEN & TOUBRO INFOTECH LIMITED** created an average value of INR 1.581 for each one INR invested on intangible assets, during the study period.

The analysis of efficiency of financial performance indicated that the value of NPM, at 1.355, was the highest mean value among the dependent variables and it indicated that the **LARSEN & TOUBRO INFOTECH LIMITED** earned huge profits followed by ROA, ROE and EPS with mean values of 1.151, 1.264 and 1.347. In other words, all four variables, namely, ROE, ROE, NPM and EPS promoted the efficiency of financial performance of sample firm. Hence, the null hypothesis **(NH-1): There is no efficiency of Intellectual Capital Performance and Financial Performance of LARSEN & TOUBRO INFOTECH LIMITED** was rejected.

3.16 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of MINDTREE LIMITED

Table-3.16 depicts the results of descriptive statistics, for measuring the efficiency of intellectual capital and financial performance of the **MINDTREE LIMITED**, during the study period from 1st April 2010 to 31st March 2019.

Table-3.16: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of MINDTREE LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	3.877	4.530	4.266	0.234
SCE	10	2.495	4.530	3.453	0.780
CEE	10	0.301	2.281	1.393	0.777
VAIC	10	4.016	4.832	4.407	0.245
Financial Performance (Dependent) Variables					
ROA	10	1.096	1.374	1.251	0.105
ROE	10	0.976	1.433	1.222	0.132
NPM	10	1.236	1.540	1.384	0.111
EPS	10	1.224	1.486	1.365	0.109
Control Variables					
Size	10	5.370	27.340	13.762	7.761
DER	10	0.010	0.110	0.043	0.038
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation		ROA – Return on Assets			
HCE – Human Capital Efficiency		ROE – Return on Equity			
SCE – Structural Capital Efficiency		NPM – Net Profit Margin			
CEE – Capital Employed Efficiency		EPS-Earning Per Share			
VAIC –Value-Added Intellectual Coefficient		DER-Debt Equity Ratio			

The mean value reflected the nature of variables set while the value of standard deviation indicated the measure of dispersion from its mean value, in respect of intellectual capital performance variables and financial performance ratios. The minimum and maximum values identified the range of tested variables during the study period.

The descriptive statistics, used for sample variables, revealed that during the study period, the values of intellectual capital performance variables ranged between a minimum of 3.877 (HCE), 2.495 (SCE), 0.301 (CEE), 4.016 (VAIC), 1.096 (ROA), 0.976 (ROE), 1.236 (NPM), 1.224 (EPS), 5.370 (Size) and 0.010 (DER) and a maximum of 4.530 (HCE), 4.530 (SCE), 2.281 (CEE), 4.832 (VAIC), 1.374 (ROA), 1.433 (ROE), 1.540 (NPM), 1.486 (EPS), 27.340 (Size) and 10.110 (DER) respectively.

The mean values and standard deviation values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER were recorded at 4.266, 3.453, 1.393, 4.407, 1.251, 1.222, 1.384, 1.365, 13.762, 0.043 and 0.234, 0.780, 0.777, 0.245, 0.105, 0.132, 0.111, 0.109, 7.761 and 0.038 respectively.

The **MINDTREE LIMITED** created more value from HCE (4.266) than from SCE (3.453) and CEE (1.393). The mean value of HCE (4.266) was more than the mean value of physical assets (CEE, 1.393), implying that the **MINDTREE LIMITED** created more value from human capital than from physical capital. The aggregate value of VAIC, at 4.407, indicated that sample firm produced an average value of INR 4.407 for each one INR employed. In other words, **MINDTREE LIMITED** benefited from its intellectual capital during the study period.

Regarding the efficiency of financial performance, the value of NPM (1.365), being the highest mean value among the dependent variables, implied that the **MINDTREE LIMITED** earned huge profits. Three variables, namely, ROA and ROE and EPS, with the mean values of 1.251, 1.222 and 1.365, enjoyed better return from their assets of intellectual capital. The overall analysis demonstrated that financial performance variables achieved efficiency. Hence, the **NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of MINDTREE LIMITED**, was rejected.

3.17 Efficiency (Descriptive Statistics) of Intellectual Capital Performance and Financial Performance of ORACLE FINANCIAL SERVICES SOFTWARE LIMITED

The results of descriptive statistics, for measuring the efficiency of intellectual capital and financial performance of the **ORACLE FINANCIAL SERVICES SOFTWARE LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are provided in **Table-3.17**. The results of descriptive statistics showed that the values of intellectual capital variables ranged between from a minimum of 4.025 (HCE), 2.321 (SCE), 2.708 (CEE), 4.072 (VAIC), 1.019 (ROA), -0.408 (ROE), 1.151 (NPM), 0.030 (EPS), 8.319, (Size) and -0.186 (DER) and to the maximum of 4.269 (HCE), 4.269 (SCE), 3.192 (CEE), 4.588 (VAIC), 1.310 (ROA), 0.737 (ROE), 1.503 (NPM), 2.680 (EPS), 18.267(Size) and 1.238 (DER), during the study period. The mean values and standard deviation values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size, DER, were recorded at 4.174, 3.492, 2.967, 4.322, 1.162, 0.396, 1.329, 0.917, 12.956, 0.757 and 0.093, 0.589, 0.174, 0.161, 0.113, 0.309, 0.133, 0.828, 3.762 and 0.480 respectively.

Table-3.17: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of ORACLE FINANCIAL SERVICES SOFTWARE LIMITED during the Study Period from 1st April 2010 to 31st March 2019

	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	4.025	4.269	4.174	0.093
SCE	10	2.321	4.269	3.492	0.589
CEE	10	2.708	3.192	2.967	0.174
VAIC	10	4.072	4.588	4.322	0.161
Financial Performance (Dependent) Variables					
ROA	10	1.019	1.310	1.162	0.113
ROE	10	-0.408	0.737	0.396	0.309
NPM	10	1.151	1.503	1.329	0.133
EPS	10	0.030	2.680	0.917	0.828
Control Variables					
Size	10	8.319	18.267	12.956	3.762
DER	10	-0.186	1.238	0.757	0.480
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation		ROA – Return on Assets			
HCE – Human Capital Efficiency		ROE – Return on Equity			
SCE – Structural Capital Efficiency		NPM – Net Profit Margin			
CEE – Capital Employed Efficiency		EPS-Earning Per Share			
VAIC –Value-Added Intellectual Coefficient		DER-Debt Equity Ratio			

The HCE (a key component of intellectual coefficient) at 4.174 recorded a value, which was more than the mean value for physical assets (CEE-2.967), implying that the **ORACLE FINANCIAL SERVICES SOFTWARE LIMITED** earned more value from intangible assets than from physical assets. The total value of VAIC, at 4.322, demonstrated that **ORACLE FINANCIAL SERVICES SOFTWARE LIMITED** yielded an average value of INR 4.322 for each one INR invested on intangible assets held by it. In other words, the efficiency of intellectual capital was achieved by the sample firm during the study period.

Regarding the efficiency of financial performance, it is clear that the value of NPM at 1.329, was the highest mean value among the other dependent variables and this indicated that sample firm earned huge profits during the study period. ROA also recorded a mean value of 1.162, reflecting higher return. It is to be noted that ROE and EPS of sample firm had reported the lowest mean value at 0.396 and 0.917 and hence, the **ORACLE FINANCIAL SERVICES SOFTWARE LIMITED** needs to focus on mobilizing the equity. The overall analysis confirmed that all the two financial performance variables attained efficiency at the desired level except ROE and EPS. Therefore, the null hypothesis **(NH-1): There is no efficiency of Intellectual Capital Performance and Financial Performance of ORACLE FINANCIAL SERVICES SOFTWARE LIMITED**, was partially accepted.

3.18 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of HCL TECHNOLOGIES LIMITED

Table-3.18 exhibits the results of descriptive statistics, for examining the efficiency of intellectual capital and financial performance of **HCL TECHNOLOGIES LIMITED**, during the study period from 1st April 2010 to 31st March 2019.

Table-3.18: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of HCL TECHNOLOGIES LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	4.343	4.867	4.689	0.166
SCE	10	2.607	4.867	3.539	0.840
CEE	10	2.301	2.990	2.724	0.255
VAIC	10	4.370	5.168	4.792	0.229
Financial Performance (Dependent) Variables					
ROA	10	1.101	1.432	1.289	0.116
ROE	10	-0.538	0.149	-0.201	0.229
NPM	10	1.346	1.659	1.478	0.107
EPS	10	1.256	1.640	1.443	0.122
Control Variables					
Size	10	0.897	1.296	1.100	0.155
DER	10	0.020	0.280	0.087	0.090
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation		ROA – Return on Assets			
HCE – Human Capital Efficiency		ROE – Return on Equity			
SCE – Structural Capital Efficiency		NPM – Net Profit Margin			
CEE – Capital Employed Efficiency		EPS-Earning Per Share			
VAIC –Value-Added Intellectual Coefficient		DER-Debt Equity Ratio			

It is to be noted that HCE, SCE, CEE and VAIC were adopted as independent variables for measuring the efficiency of intellectual capital while ROA, ROE, NPM and EPS were employed as dependent variables to study the efficiency of financial performance of **HCL TECHNOLOGIES LIMITED**. Two variables, namely, Size and DER were considered control variables. The mean value reflected the nature of variables set and the value of standard deviation measured the dispersion from its mean value, in respect of intellectual capital performance variables and financial performance ratios.

The minimum and maximum values identified the range of tested variables, during the study period. The results of descriptive statistics for **HCL TECHNOLOGIES LIMITED**, revealed that the values of intellectual capital performance variables ranged between minimum of 4.343 (HCE), 2.607 (SCE), 2.301 (CEE), 4.370 (VAIC), 1.101 (ROA), -0.538 (ROE), 1.346 (NPM), 1.256 (EPS), 0.897 (Size) and 0.020 (DER) and maximum of 4.867 (HCE), 4.867 (SCE), 2.990 (CEE), 5.168 (VAIC), 1.432 (ROA), 0.149 (ROE), 1.659 (NPM), 1.640 (EPS), 1.296 (Size) and 0.280 (DER), during the study period. The mean values and standard deviation values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER were recorded at 4.689, 3.539, 2.724, 4.792, 1.289, -0.201, 1.478, 1.443, 1.100, 0.087 and 0.166, 0.840, 0.255, 0.229, 0.116, 0.229, 0.107, 0.122, 0.155 and 0.090 respectively.

HCL TECHNOLOGIES LIMITED generated more value from HCE, at 4.689, than from SCE (3.539) and CEE (2.724). The mean value of HCE was more than the mean value of physical assets, i.e., CEE (2.724), indicating that **HCL TECHNOLOGIES LIMITED** synergized more value from intangible components of VAIC than from physical components. The aggregate value of VAIC (4.792) revealed

that the sample company produced an average value of INR 4.792 for each one INR employed. In other words, **HCL TECHNOLOGIES LIMITED** achieved efficiency of intellectual capital during the study period. The value of NPM at 1.478, was the highest mean value among the dependent variables, implying that **HCL TECHNOLOGIES LIMITED** reaped huge profit margin, followed by EPS and ROA, with the mean values of 1.443 and 1.289. According to the overall analysis of efficiency of financial performance, as given in **Table-3.18**, it is revealed that one variable, namely, ROE (-0.201) reported negative efficiency during the study period. Hence, the null hypothesis **(NH-1): There is no efficiency of Intellectual Capital Performance and Financial Performance of HCL TECHNOLOGIES LIMITED** was partially rejected.

Section-C

Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of sample pharmaceutical Companies

The sample pharmaceutical firms from Nifty service index included Sun Pharmaceutical Industries Limited, Divi's Laboratories Limited, Dr. Reddy's Laboratories Limited, Cipla Limited, Cadila Healthcare Limited, Torrent Pharmaceuticals Limited, Lupin Limited, Biocon Limited and Aurobindo Pharma Limited. The detailed analysis of descriptive statistics for nine pharmaceutical companies is given as follows.

- 3.19 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of SUN PHARMACEUTICAL INDUSTRIES LIMITED
- 3.20 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of DIVI'S LABORATORIES LIMITED
- 3.21 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of DR. REDDY'S LABORATORIES LIMITED
- 3.22 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of CIPLA LIMITED
- 3.23 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of CADILA HEALTHCARE LIMITED
- 3.24 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of TORRENT PHARMACEUTICALS LIMITED
- 3.25 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of LUPIN LIMITED
- 3.26 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of BIOCON LIMITED, and
- 3.27 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of AUROBINDO PHARMA LIMITED

3.19 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of SUN PHARMACEUTICAL INDUSTRIES LIMITED

Table-3.19 presents the results of descriptive statistics, for examining the efficiency of intellectual capital and financial performance of the **SUN PHARMACEUTICAL INDUSTRIES LIMITED**, during the study period from 1st April 2010 to 31st March 2019. It is to be noted that HCE, SCE, CEE and VAIC were considered as independent variables for measuring the efficiency of intellectual capital while ROA, ROE, NPM and EPS were used as dependent variables to determine the efficiency of financial performance of **SUN PHARMACEUTICAL INDUSTRIES LIMITED** and Size and DER were adopted as control variables. The mean value reflected the nature of variable set and the value of standard deviation indicated the measure of dispersion from its mean value, in respect of intellectual capital performance variables and financial performance ratios. The minimum and maximum values identified the range of tested variables during the study period. The results of descriptive statistics clearly revealed that during the study period, the values of intellectual capital performance variables moved from the minimum values of 3.212 (HCE), 3.158 (SCE), 0.113 (CEE), 3.504 (VAIC), -0.397 (ROA), 0.814 (ROE), -0.200 (NPM), -0.267 (EPS), 0.877 (Size) and 0.010 (DER) to the maximum values of 4.112 (HCE), 4.024 (SCE), 3.589 (CEE), 4.473 (VAIC), 1.372 (ROA), 1.398 (ROE), 1.437 (NPM), 1.434 (EPS), 1.278 (Size) and 0.350(DER).

Table-3.19: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of SUN PHARMACEUTICAL INDUSTRIES LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	3.212	4.112	3.693	0.423
SCE	10	3.158	4.024	3.627	0.363
CEE	10	0.113	3.589	2.168	1.511
VAIC	10	3.504	4.473	3.999	0.420
Financial Performance (Dependent) Variables					
ROA	10	-0.397	1.372	1.482	0.670
ROE	10	0.814	1.3985	1.274	0.168
NPM	10	-0.200	1.437	0.647	0.606
EPS	10	-0.267	1.434	0.583	0.645
Control Variables					
Size	10	0.877	1.278	1.100	0.114
DER	10	0.010	0.350	0.193	0.159
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation		ROA – Return on Assets			
HCE – Human Capital Efficiency		ROE – Return on Equity			
SCE – Structural Capital Efficiency		NPM – Net Profit Margin			
CEE – Capital Employed Efficiency		EPS-Earning Per Share			
VAIC –Value-Added Intellectual Coefficient		DER-Debt Equity Ratio			

The values of mean and standard deviation for HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size, DER were recorded at 3.693, 3.627, 2.168, 3.999, 1.482, 1.274, 0.647, 0.583, 1.100 and 0.423, 0.363, 1.511, 0.420, 0.670, 0.168, 0.606, 0.645, 0.114 and 0.159 respectively. The **SUN PHARMACEUTICAL INDUSTRIES LIMITED** achieved higher value from HCE (3.693) than from SCE (3.626) and CEE (2.168). The mean value of HCE (3.693) was more than the mean value of physical assets, i.e., CEE (2.168), implying that the **SUN PHARMACEUTICAL INDUSTRIES LIMITED** created more value from human capital than from physical capital. The aggregate value of VAIC (3.999) revealed that the sample bank produced an average value of INR 3.999 for each one INR utilized. In other words, **SUN PHARMACEUTICAL INDUSTRIES LIMITED** did achieve the efficiency of intellectual capital during the study period.

With respect to the efficiency of financial performance, two sample variables, out of four variables, namely, ROA (1.482) and ROE (1.274) of **SUN PHARMACEUTICAL INDUSTRIES LIMITED** attained the desired efficiency while NPM (0.647) and EPS (0.583) failed to achieve the same. Therefore, the null hypothesis (NH-1): **There is no efficiency of Intellectual Capital Performance and Financial Performance of SUN PHARMACEUTICAL INDUSTRIES LIMITED**, was partially accepted.

3.20 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of DIVI'S LABORATORIES LIMITED

The results of Descriptive Statistics, for measuring the efficiency of intellectual capital and financial performance of the **DIVI'S LABORATORIES LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are provided in **Table-3.20**.

Table-3.20: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of DIVI'S LABORATORIES LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	2.980	3.662	3.374	0.250
SCE	10	2.052	3.628	2.684	0.518
CEE	10	0.740	1.409	1.024	0.256
VAIC	10	3.033	3.930	3.497	0.274
Financial Performance (Dependent) Variables					
ROA	10	1.041	1.336	1.241	0.111
ROE	10	2.265	0.493	0.394	0.096
NPM	10	1.180	1.452	1.366	0.100
EPS	10	1.183	1.448	1.360	0.099
Control Variables					
Size	10	0.757	1.267	0.983	0.138
DER	10	0.010	0.030	0.013	0.006
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

The variables such as HCE, SCE, CEE and VAIC were engaged as independent variables to measure the efficiency of intellectual capital while ROA, ROE, NPM and EPS were adopted as dependent variables to identify the efficiency of financial performance of **DIVI'S LABORATORIES LIMITED** and control variables were size and DER.

The analysis of descriptive statistics, on the variables of intellectual capital, clearly revealed that the values for intellectual capital performance variables ranged from a minimum of 2.980 for HCE, 2.052 for SCE, 0.740 for CEE, 3.033 for VAIC, 1.041 for ROA, 2.265 for ROE, 1.180 for NPM, 1.183 for EPS, 0.757 for Size, and 0.010 for DER to the maximum of 3.662 for HCE, 3.628 for SCE, 1.409 for CEE, 3.930 for VAIC, 1.336 for ROA, 0.493 for ROE, 1.452 for NPM, 1.448 for EPS, 1.267 for Size, and 0.030 for DER, during the study period. The mean values and standard deviation values for the sample variables, namely, HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER, were recorded at 3.374, 2.684, 1.024, 3.497, 1.241, 0.394, 1.366, 1.360, 0.983, 0.013 and 0.250, 0.518, 0.256, 0.274, 0.111, 0.096, 0.100, 0.099, 0.138, 0.006 respectively. As HCE (3.374) earned a value, which was more than the mean value of physical assets (CEE-1.024), the **DIVI'S LABORATORIES LIMITED** derived higher value from its intangible resources than from the physical resources. Since a value of 3.497 was achieved by VAIC of **DIVI'S LABORATORIES LIMITED**, it is implied that the intellectual capital produced an average value of INR 3.497 for each one INR invested on intangible assets held by **DIVI'S LABORATORIES LIMITED**. In other words, **DIVI'S LABORATORIES LIMITED** achieved efficiency in respect of intellectual capital.

In respect of efficiency of financial performance, the values of ROA, NPM and EPS were at 1.241, 1.366 and 1.360 (highest mean value) among other dependent variables, indicating that the **DIVI'S LABORATORIES LIMITED** earned huge profits. But ROE recorded a mean value of 0.394, accounting for a lesser return from equity. Therefore, it is concluded that the null hypothesis **(NH-1): There is no efficiency of Intellectual Capital Performance and Financial Performance of DIVI'S LABORATORIES LIMITED** was partially accepted.

3.21 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of DR. REDDY'S LABORATORIES LIMITED

Table-3.21 shows the results of descriptive statistics, for measuring the efficiency of intellectual capital and financial performance of the **DR. REDDY'S LABORATORIES LIMITED**, during the study period from 1st April 2010 to 31st March 2019. The sample variables such as HCE, SCE, CEE and VAIC were used as independent variables for measuring the efficiency of intellectual capital performance whereas ROA, ROE, NPM and EPS were adopted as dependent variables to assess the efficiency of financial performance of **DR. REDDY'S LABORATORIES LIMITED**. Two variables, namely, Size and DER were considered as control variables. The mean value reflected the nature of variables set and the value of standard deviation indicated the measure of dispersion from its mean value, in respect of intellectual capital performance variables and financial performance ratios. The minimum and maximum values identified the range of tested variables during the study period.

Table-3.21: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of DR. REDDY'S LABORATORIES LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	3.060	4.009	3.645	0.341
SCE	10	2.663	4.009	3.378	0.440
CEE	10	2.479	3.280	2.863	0.317
VAIC	10	3.416	4.349	3.905	0.318
Financial Performance (Dependent) Variables					
ROA	10	0.671	1.250	0.964	0.205
ROE	10	0.844	2.922	2.524	0.661
NPM	10	0.935	1.477	1.184	0.195
EPS	10	0.730	1.436	1.077	0.241
Control Variables					
Size	10	1.052	1.108	1.084	0.018
DER	10	0.080	0.580	0.264	0.153
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

According to the results of descriptive statistics for **DR. REDDY'S LABORATORIES LIMITED**, the values of intellectual capital variables ranged between a minimum of 3.060 (HCE), 2.663 (SCE), 2.479 (CEE), 3.416 (VAIC), 0.671 (ROA), 0.844 (ROE), 0.935 (NPM), 0.730 (EPS), 1.052 (Size) and 0.080 (DER) and a maximum of 4.009 (HCE), 4.009 (SCE), 3.280 (CEE), 4.349 (VAIC), 1.250 (ROA), 2.922 (ROE), 1.477 (NPM), 1.436 (EPS), 1.108 (Size) and 0.580 (DER). As stated earlier, the minimum and maximum values revealed that the capital employed efficiency recorded the lowest value and valued added intellectual coefficient registered the highest maximum value, among the intellectual capital variables, considered for the study. Regarding financial performance variables, the Return on Assets reported the lowest minimum value and return on equity recorded the highest maximum value. The mean and standard deviation values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER were recorded at 3.645, 3.378, 2.863, 3.905, 0.964, 2.524, 1.184, 1.077, 1.084, 0.264 and 0.341, 0.440, 0.317, 0.318, 0.205, 0.661, 0.195, 0.241, 0.018 and 0.153 respectively.

The **DR. REDDY'S LABORATORIES LIMITED** created more value from HCE, at 3.645, than from SCE (3.378) and CEE (2.863). The mean value of HCE (2.679) is more than the mean value of physical assets, i.e., CEE (2.863), indicating that the **DR. REDDY'S LABORATORIES LIMITED** yielded more value from human capital than from physical and financial capital.

The aggregate value of VAIC, at 3.905, revealed that the sample company produced an average value of INR 3.905 for each one INR employed. In other words, the sample company reported more efficiency of intellectual capital during the study period.

Regarding the efficiency of financial performance, the value of ROE at 2.524, being the highest mean value among the dependent variables, showed that the **DR. REDDY'S LABORATORIES LIMITED** enjoyed more returns from its equity, followed by NPM and EPS, with the mean values of 1.184 and 1.077 respectively. It is worth noting that ROA, at 0.964, (financial performance variable), did not attain efficiency. Therefore, the null hypothesis **(NH-1): There is no efficiency of Intellectual Capital Performance and Financial Performance of DR. REDDY'S LABORATORIES LIMITED**, was partially rejected.

3.22 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of CIPLA LIMITED

The details of descriptive statistics, for examining the efficiency of intellectual capital and financial performance of the **CIPLA LIMITED** during the study period from 1st April 2010 to 31st March 2019, are given in **Table-3.22**. It is evident that the values of intellectual capital variables ranged from minimum of 3.503 for HCE, 3.399 for SCE, 1.711 for CEE, 3.772 for VAIC, 0.878 for ROA, 1.148 for ROE, 1.007 for NPM, 0.982 for EPS, 0.931 for Size, and 0.010 for DER to maximum of 4.251 for HCE, 4.251 for SCE, 3.167 for CEE, 4.554 for VAIC, 1.143 for ROA, 1.353 for ROE, 1.279 for NPM, 1.241 for EPS, 1.000 for Size, and 0.130 for DER respectively, during the study period.

It was found that minimum and maximum values of capital employed efficiency and value added intellectual coefficient, recorded the lowest and highest respectively, for intellectual capital performance variables while return on assets and return on equity were reported to be the lowest and the highest respectively, upon financial performance of **CIPLA LIMITED**.

Table-3.22: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of CIPLA LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	3.503	4.251	4.023	0.267
SCE	10	3.399	4.251	3.827	0.284
CEE	10	1.711	3.167	2.367	0.404
VAIC	10	3.772	4.554	4.251	0.262
Financial Performance (Dependent) Variables					
ROA	10	0.878	1.143	0.999	0.089
ROE	10	1.148	1.353	1.237	0.076
NPM	10	1.007	1.279	1.135	0.098
EPS	10	0.982	1.241	1.108	0.097
Control Variables					
Size	10	0.931	1.000	0.971	0.022
DER	10	0.010	0.130	0.056	0.047
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

The mean and standard deviation values were recorded by the measurement variables, namely, HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size, DER, at 4.023, 3.827, 2.367, 4.251, 0.999, 1.237, 1.135, 1.108, 0.971, 0.056 and 0.267, 0.284, 0.404, 0.262, 0.089, 0.076, 0.098, 0.097, 0.022 and 0.047 respectively. Among the components of VAIC, the HCE recorded higher value of 4.023 than SCE (3.827), and CEE (2.367) for **CIPLA LIMITED**. As Human Capital Efficiency registered a value, that was more than the mean value of physical assets, i.e., CEE (2.367), it is inferred that the **CIPLA LIMITED** generated higher value from its intangible resources than from physical resources. The value of 4.251, achieved by VAIC of **CIPLA LIMITED**, revealed that intellectual capital produced an average value of INR 4.251 for each one INR being invested on intangible assets, held by **CIPLA LIMITED**.

Regarding the efficiency of financial performance, the value of ROE at 1.237, was the highest mean value among the other dependent variables, implying that the **CIPLA LIMITED** earned huge returns from equity. NPM also recorded a mean value of 1.135, indicating a higher profit, followed by EPS (1.108). Since all the three financial performance variables performed well, the null hypothesis (**NH-1**): **There is no efficiency of Intellectual Capital Performance and Financial Performance of CIPLA LIMITED**, was partially accepted.

3.23 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance Variables of CADILA HEALTHCARE LIMITED

The results of descriptive statistics, for assessing the efficiency of intellectual capital and financial performance of the **CADILA HEALTHCARE LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are presented in **Table-3.23**.

Table-3.23: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of CADILA HEALTHCARE LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	3.504	3.869	3.718	0.125
SCE	10	3.246	3.835	3.661	0.197
CEE	10	2.245	2.869	2.630	0.214
VAIC	10	3.726	4.155	4.016	0.146
Financial Performance (Dependent) Variables					
ROA	10	0.786	1.369	1.109	0.188
ROE	10	0.448	1.152	0.956	0.208
NPM	10	1.013	1.577	1.364	0.190
EPS	10	0.891	1.481	1.218	0.195
Control Variables					
Size	10	1.088	1.294	1.186	0.086
DER	10	1.520	2.320	1.946	0.263
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

As stated earlier, four variables, namely, HCE, SCE, CEE and VAIC were taken as independent variables for measuring the efficiency of intellectual capital while ROA, ROE, NPM and EPS were adopted as dependent variables to identify the efficiency of financial performance of **CADILA HEALTHCARE LIMITED** and Size and DER were considered as control variables. The mean value revealed the nature of variables set, and the value of standard deviation indicated the measure of dispersion from its mean value, in respect of intellectual capital performance variables and financial performance ratios. The minimum and maximum values identified the range of tested variables during the study period.

The results of descriptive statistics, on the intellectual capital variables, clearly revealed that during the study period, the values of intellectual capital performance variables moved within the range between the minimum of 3.504 (HCE), 3.246 (SCE), 2.245 (CEE), 3.726 (VAIC), 0.786 (ROA), 0.448 (ROE), 1.013 (NPM), 0.891 (EPS), 1.088 (Size) and 1.520 (DER) and the maximum of 3.869 (HCE), 3.835 (SCE), 2.869 (CEE), 4.155 (VAIC), 1.369 (ROA), 1.152 (ROE), 1.577(NPM), 1.481 (EPS), 1.294 (Size) and 2.320 (DER).

Mean values and standard deviation values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER were recorded at 3.718, 3.661, 2.630, 4.016, 1.109, 0.956, 1.364, 1.218, 1.186, 1.946 and 0.125, 0.197, 0.214, 0.146, 0.188, 0.208, 0.190, 0.195, 0.086 and 0.263 respectively. The **CADILA HEALTHCARE LIMITED** generated more value from HCE, at 3.718, than from SCE (3.661) and CEE (2.630). The mean value of HCE (3.718) was more than the mean value of physical assets, (i.e., CEE, 2.630), indicating that the **CADILA HEALTHCARE LIMITED** created more value from human capital than from the physical capital. The value of VAIC (4.016)

clearly established that the sample healthcare unit produced an average value of INR 4.016 for each one INR employed. In other words, there was efficiency of intellectual capital variables, in respect of **CADILA HEALTHCARE LIMITED**.

According to the analysis of efficiency of financial performance, the mean value of NPM, at 1.364, was the highest among the dependent variables, indicating that the **CADILA HEALTHCARE LIMITED** earned huge profits, followed by ROA, NPM and EPS, with a mean value of 1.109, 1.364 and 1.218. But ROE had reported the lowest mean value at 0.956, suggesting that the sample bank faced difficulties in generating optimum return from its equity. In this context, it is clear that except ROE, the remaining financial performance variables had created the desired efficiency. In view of the overall analysis of **Table-3.23**, the null hypothesis (NH-1): **There is no efficiency of Intellectual Capital Performance and Financial Performance of CADILA HEALTHCARE LIMITED**, was partially rejected.

3.24 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of TORRENT PHARMACEUTICALS LIMITED

Table-3.24 exhibits the results of Descriptive Statistics, for measuring the efficiency of intellectual capital and financial performance of the **TORRENT PHARMACEUTICALS LIMITED**, during the study period from 1st April 2010 to 31st March 2019. It is understood that HCE, SCE, CEE and VAIC were used as independent variables to analyze the efficiency of intellectual capital while ROA, ROE, NPM and EPS were identified as dependent variables, to measure the efficiency of financial performance of **TORRENT PHARMACEUTICALS LIMITED**. Size and DER were employed as control variables.

Table-3.24: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of TORRENT PHARMACEUTICALS LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	3.174	3.646	3.425	0.185
SCE	10	2.558	3.646	3.049	0.360
CEE	10	2.898	4.063	3.581	0.440
VAIC	10	3.433	4.269	3.925	0.277
Financial Performance (Dependent) Variables					
ROA	10	-0.119	1.502	0.452	0.515
ROE	10	1.016	1.249	1.172	0.068
NPM	10	0.060	1.686	0.763	0.512
EPS	10	0.029	1.656	0.574	0.527
Control Variables					
Size	10	0.985	1.069	1.029	0.028
DER	10	0.020	1.290	0.652	0.463
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

The mean value reflects the nature of variables set and the value of standard deviation indicates the measure of dispersion from its mean value, in respect of intellectual capital performance variables and financial performance ratios. The minimum and maximum values help to identify the range of tested variables, during the study period.

According to the **Table-3.24**, the values of intellectual capital performance variables ranged between minimum of 3.174 (HCE), 2.558 (SCE), 2.898 (CEE), 3.433 (VAIC), -0.119 (ROA), 1.016 (ROE), 0.060 (NPM), 0.029 (EPS), 0.985 (Size) and 0.020 (DER) and maximum of 3.646 (HCE) 3.646 (SCE) 4.063 (CEE) 4.269 (VAIC) 1.502 (ROA) 1.249 (ROE) 1.686 (NPM) 1.656 (EPS) 1.069 (Size) and 1.290 (DER).

It is noted that the negative minimum value for Return On Assets exposed the inefficiency of **TORRENT PHARMACEUTICALS LIMITED**, on intellectual capital performance and financial performance, during the study period. However, the maximum values of financial performance recorded positive figures, indicating recovery from inefficiency throughout the study period. The mean values and standard deviation values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER were recorded at 3.425, 3.049, 3.581, 3.925, 0.452, 1.172, 0.763, 0.574, 1.029, 0.652 and 0.185, 0.360, 0.440, 0.277, 0.515, 0.068, 0.512, 0.527, 0.028 and 0.463 respectively during the study period. The **TORRENT PHARMACEUTICALS LIMITED** created more value from CEE (which is of 3.581) than from HCE (3.425) and SCE (3.049). The value of VAIC (3.925) demonstrated that the sample firm produced an average value of INR 3.925 for each one INR employed. Hence, it is proved that there was efficiency of intellectual capital in **TORRENT PHARMACEUTICALS LIMITED**.

Upon the analysis of efficiency of financial performance of this sample firm, it is to be noted that ROA, NPM and EPS reported the lowest mean values at 0.452, 0.763 and 0.574, suggesting that the **TORRENT PHARMACEUTICALS LIMITED** faced difficulties in generating optimum profitability during the study period. Besides, it is evident that the value of ROE, at 1.172 (highest mean value among the dependent variables), revealed that **TORRENT PHARMACEUTICALS LIMITED** earned huge returns from its assets. In contrast, the ROA (0.452), NPM (0.763) and EPS (0.574) did not report any efficiency. Hence, the null hypothesis **(NH-1): There is no efficiency of Intellectual Capital Performance and Financial Performance of TORRENT PHARMACEUTICALS LIMITED** was partially rejected.

3.25 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of LUPIN LIMITED

The results of Descriptive Statistics, for examining the efficiency of intellectual capital and financial performance of the **LUPIN LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are shown in **Table-3.25**. Four variables such as HCE, SCE, CEE, and VAIC were employed as independent variables, to measure the efficiency of intellectual capital performance whereas ROA, ROE, NPM and EPS were employed as dependent variables, to assess the efficiency of financial performance and control variables were size and DER.

Table-3.25: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of LUPIN LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	3.575	4.163	3.940	0.211
SCE	10	3.552	4.363	3.981	0.269
CEE	10	1.123	2.453	1.977	0.425
VAIC	10	3.881	4.572	4.268	0.237
Financial Performance (Dependent) Variables					
ROA	10	0.855	1.463	1.201	0.203
ROE	10	1.769	2.665	2.369	0.297
NPM	10	0.937	1.594	1.355	0.230
EPS	10	0.928	1.565	1.299	0.211
Control Variables					
Size	10	0.998	1.049	1.024	0.016
DER	10	0.010	0.940	0.273	0.301
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

The descriptive statistics, used to measure the efficiency of intellectual capital, revealed that the values of intellectual capital performance variables ranged between minimum of 3.575 for HCE, 3.552 for SCE, 1.123 for CEE, 3.881 for VAIC, 0.855 for ROA, 1.769 for ROE, 0.937 for NPM, 0.928 for EPS, 0.998 for Size, and 0.010 for DER and maximum of 4.163 for HCE, 4.363 for SCE, 2.453 for CEE, 4.572 for VAIC, 1.463 for ROA, 2.665 for ROE, 1.594 for NPM, 1.565 for EPS, 1.049 for Size, and 0.940 for DER during the study period. The minimum and maximum values of capital employed efficiency and value added intellectual coefficient were the lowest and highest respectively, for intellectual capital performance variables. The mean values and standard deviation values were recorded by the sample measurement variables, namely, HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size, DER, at 3.940, 3.981, 1.977, 4.268, 1.201, 2.369, 1.355, 1.99, 1.204, 0.273 and 0.211, 0.269, 0.425, 0.237, 0.203, 0.297, 0.230, 0.211, 0.016 and 0.301 respectively. Among the components of VAIC, the HCE recorded higher value of 3.940 than SCE (3.981) and CEE (1.977) for **LUPIN LIMITED**.

As Human Capital Efficiency recorded a value, that was of more than the mean value of physical assets i.e., CEE (1.977), it is evident that the **LUPIN LIMITED** generated high value from its intangible resources than from physical resources. From a value of 4.268, achieved by VAIC of **LUPIN LIMITED**, it implied that its intellectual capital produced an average value of INR 4.268 for each one INR on intangible assets, held by **LUPIN LIMITED**. In short, intellectual capital produced efficiency for **LUPIN LIMITED**.

The examination of efficiency of financial performance of **LUPIN LIMITED** revealed that the value of ROE (2.369) was the highest among the other dependent variables and it implied that the **LUPIN LIMITED** earned huge returns. NPM also recorded a mean value of 1.355, indicating high profit, followed by ROA (1.201) and EPS (1.299). It is interesting to observe that all four variables, namely, ROA, ROE, NPM and EPS variables did witness positive efficiency during the study period. In view of the overall analysis of **Table-3.25**, the null hypothesis (**NH-1**): **There is no efficiency of Intellectual Capital Performance and Financial Performance of LUPIN LIMITED** was not accepted.

3.26. Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of BIOCON LIMITED

Table-3.26 shows the results of descriptive statistics, to analyze the efficiency of intellectual capital and financial performance of **BIOCON LIMITED**, during the study period from 1st April 2010 to 31st March 2019. The variables such as HCE, SCE, CEE and VAIC were adopted as independent variables, to estimate the efficiency of intellectual capital while four variables namely ROA, ROE, NPM and EPS were identified as dependent variables, for assessing the efficiency of financial performance of **BIOCON LIMITED** and Size and DER were treated as control variables. The mean value reflected the nature of variables set and the value of standard deviation indicated the measure of dispersion from its mean value, in respect of intellectual capital performance variables and financial performance ratios.

Table-3.26: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of BIOCON LIMITED during the Study Period from 1st April 2010 to 31st March 2019

	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	2.922	3.588	3.362	0.219
SCE	10	2.795	3.588	3.154	0.244
CEE	10	0.903	1.579	1.077	0.198
VAIC	10	3.168	3.890	3.582	0.210
Financial Performance (Dependent) Variables					
ROA	10	0.487	1.268	0.900	0.249
ROE	10	0.848	1.157	1.058	0.094
NPM	10	0.550	1.412	1.009	0.280
EPS	10	0.539	1.370	0.983	0.270
Control Variables					
Size	10	0.990	1.074	1.033	0.028
DER	10	0.020	0.120	0.057	0.033
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

According to the **Table-3.26**, the values of intellectual capital performance variables ranged from minimum of 2.922 (HCE), 2.795 (SCE), 0.903 (CEE), 3.168 (VAIC), 0.487 (ROA), 0.848 (ROE), 0.550 (NPM), 0.539 (EPS), 0.990 (Size) and 0.020 (DER) to maximum of 3.588 (HCE), 3.214 (SCE), 1.579 (CEE), 3.890 (VAIC), 1.268 (ROA), 1.157 (ROE), 1.412 (NPM), 1.370 (EPS), 1.074 (Size) and 0.120 (DER). The mean values and standard deviation values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size, DER were recorded at 3.362, 3.154, 1.077, 3.582, 0.900, 1.058, 1.009, 0.983, 1.033, 0.057 and 0.219, 0.244, 0.198, 0.210, 0.249, 0.094, 0.280, 0.270, 0.028 and 0.033 respectively, during the study period. **BIOCON LIMITED** created more value from HCE, at 3.362, than from SCE (3.154) and CEE (1.077).

The sum of mean values of HCE and SCE (also known as intellectual coefficient) was more than the mean value of physical assets, i.e., CEE (1.077), implying that **BIOCON LIMITED** generated higher value from intangible components of VAIC than from physical components. The aggregate value of VAIC (3.582) clearly indicated that the sample company produced an average value of INR 3.582 for each one INR employed and enjoyed the efficiency of intellectual capital during the study period.

The value of ROE (1.058), being the highest mean value among the dependent variables, demonstrated that **BIOCON LIMITED** earned huge profits, followed by NPM (1.009). But ROA and EPS, with the lowest mean values of 0.900 and 0.983, indicated that **BIOCON LIMITED** faced difficulties in generating optimum returns during the study period. In this context, it was found that out of four variables, two variables (ROA and EPS) did not report any efficiency for **BIOCON LIMITED**, during the study period. Hence, the null hypothesis (**NH-1**): **There is no efficiency of**

Intellectual Capital Performance and Financial Performance of BIOCON LIMITED was partially accepted.

3.27 Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of AUROBINDO PHARMA LIMITED

The results of Descriptive Statistics, for analyzing the efficiency of intellectual capital and financial performance of the **AUROBINDO PHARMA LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are given in **Table-3.27**. Four variables such as HCE, SCE, CEE and VAIC were used as independent variables, for measuring the efficiency of intellectual capital whereas ROA, ROE, NPM and EPS were adopted as dependent variables, to assess the efficiency of financial performance of **AUROBINDO PHARMA LIMITED** and Size and DER were considered as control variables. As stated earlier, the mean value reflected the nature of variables set and the value of standard deviation indicated the measure of dispersion from its mean value, in respect of intellectual capital performance variables and financial performance ratios. The minimum and maximum values identified the range of tested variables during the study period.

The results of descriptive statistics, on intellectual capital variables for **AUROBINDO PHARMA LIMITED**, revealed that during the study period, the values of intellectual capital performance variables ranged between the minimum of 3.366 (HCE), 2.988 (SCE), 2.571 (CEE), 3.584 (VAIC), 0.686 (ROA), 1.186 (ROE), 1.064 (NPM), 0.760 (EPS), 11.499 (Size) and 0.570 (DER) and the maximum of 3.994 (HCE), 3.994 (SCE), 2.996 (CEE), 4.305 (VAIC), 1.206 (ROA), 1.277 (ROE), 1.520 (NPM), 1.289 (EPS), 13.266 (Size) and 1.170 (DER). The mean value and standard deviation values of HCE, SCE, CEE, VAIC, ROA, ROE, NPM, EPS, Size and DER

were recorded at 3.732, 3.530, 2.749, 3.981, 1.051, 1.230, 1.364, 1.125, 12.412, 0.846 and 0.217, 0.303, 0.132, 0.225, 0.155, 0.027, 0.142, 0.156, 0.591 and 0.202. Regarding the efficiency of intellectual capital, the **AUROBINDO PHARMA LIMITED** created more value from HCE (3.732) than from other intellectual capital variables of SCE (3.530) and CEE (2.749). Besides, the mean value of HCE (3.732) was more than the mean value of physical assets, i.e., CEE (2.749), indicating that the **AUROBINDO PHARMA LIMITED** yielded more returns from human capital than from the physical capital. The aggregate value of VAIC (3.981) clearly established that the sample company produced an average value of INR 3.981 for each one INR employed. In other words, there was efficiency of intellectual capital of **AUROBINDO PHARMA LIMITED** during the study period.

On analyzing the efficiency of financial performance of the sample firm, it was found that the value of NPM (1.364) was the highest among the dependent variables, indicating that the **AUROBINDO PHARMA LIMITED** earned huge profits followed by ROA, ROE and EPS with the mean values of 1.051, 1.230 and 1.125. Therefore, the null hypothesis (NH-1): **There is no efficiency of Intellectual Capital Performance and Financial Performance of AUROBINDO PHARMA LIMITED**, was rejected.

Table-3.27: Results of Descriptive Statistics for Intellectual Capital Performance and Financial Performance of AUROBINDO PHARMA LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
	N	Minimum	Maximum	Mean	Std. Deviation
Intellectual Capital (Independent) Variables					
HCE	10	3.366	3.994	3.732	0.217
SCE	10	2.988	3.994	3.530	0.303
CEE	10	2.571	2.996	2.749	0.132
VAIC	10	3.584	4.305	3.981	0.225
Financial Performance (Dependent) Variables					
ROA	10	0.686	1.206	1.051	0.155
ROE	10	1.186	1.277	1.230	0.027
NPM	10	1.064	1.520	1.364	0.142
EPS	10	0.760	1.289	1.125	0.156
Control Variables					
Size	10	11.499	13.266	12.412	0.591
DER	10	0.570	1.170	0.846	0.202
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0					
N – Number of Observation			ROA – Return on Assets		
HCE – Human Capital Efficiency			ROE – Return on Equity		
SCE – Structural Capital Efficiency			NPM – Net Profit Margin		
CEE – Capital Employed Efficiency			EPS-Earning Per Share		
VAIC –Value-Added Intellectual Coefficient			DER-Debt Equity Ratio		

3.28. Efficiency (Descriptive Statistics) of Intellectual Capital and Financial Performance of sample firms

The null sub-hypotheses of (NH-1): **There is no efficiency of intellectual capital performance and financial performance of sample firms** were tested individually for the sample companies and the results are displayed in **Table-3.1 to 3.27**. The null hypotheses were partially rejected for twenty-one sample companies. But for six sample firms, the null hypotheses were fully rejected. Thus, the efficiency of intellectual capital and financial performance of the sample firms was present, at varying degrees, during the study period.

Table-3.28: Consolidated Results (Descriptive Statistics) on the Testing of Sub-Hypotheses of Sample Firms in India							
S. No	Hypotheses	Efficiency of Intellectual Capital (VAIC)	Efficiency of Financial Performance Variables				Results
			ROA	ROE	NPM	EPS	
I. Banking Sector Firms							
1.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of STATE BANK OF INDIA	10.622	1.069	0.372	1.246	0.968	Partially Rejected
2.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of BANK OF BARODA	3.938	0.585	0.345	1.059	1.132	Partially Rejected

3.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of PUNJAB NATIONAL BANK	3.828	0.979	0.409	1.209	0.948	Partially Rejected
4.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of INDIAN OVERSEAS BANK	5.545	0.730	0.377	0.394	0.058	Partially Rejected
5.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of CANARA BANK	3.816	0.706	0.100	1.000	0.900	Partially Rejected
6.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of UNION BANK OF INDIA	3.279	0.703	0.385	1.303	0.111	Partially Rejected
7.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of THE JAMMU & KASHMIR BANK LIMITED	5.260	0.328	0.933	2.610	0.994	Partially Rejected

8.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of INDIAN BANK	5.450	0.825	0.504	0.380	0.029	Partially Rejected
9.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of CENTRAL BANK OF INDIA	11.621	1.143	0.372	0.361	0.032	Partially Rejected
10.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of UCO BANK	4.141	0.945	0.465	0.979	0.850	Partially Rejected
II. Information Technology Sector Firms							
11.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of TATA CONSULTANCY SERVICES LIMITED	5.570	1.498	1.616	1.361	1.614	Rejected
12.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of INFOSYS LIMITED	5.440	1.327	1.412	0.418	1.412	Partially Rejected

13.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of WIPRO LIMITED	3.799	1.153	0.283	1.345	1.266	Partially Rejected
14.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of TECH MAHINDRA LIMITED	1.683	1.196	2.325	1.232	1.206	Rejected
15.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of LARSEN & TOUBRO INFOTECH LIMITED	1.581	1.151	1.264	1.355	1.347	Rejected
16.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of MINDTREE LIMITED	4.407	1.251	1.222	1.384	1.365	Rejected
17.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of ORACLE FINANCIAL SERVICES SOFTWARE LIMITED	4.322	1.162	0.396	1.329	0.917	Partially Rejected

18.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of HCL TECHNOLOGIES LIMITED	4.792	1.289	-0.201	1.478	1.443	Partially Rejected
III. Pharmaceutical Sector Firms							
19.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of SUN PHARMACEUTICAL INDUSTRIES LIMITED	3.999	1.482	1.274	0.647	0.583	Partially Rejected
20.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of DIVI'S LABORATORIES LIMITED	3.497	1.241	0.394	1.366	1.360	Partially Rejected
21.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of DR. REDDY'S LABORATORIES LIMITED	3.905	0.964	2.524	1.184	1.077	Partially Rejected

22.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of CIPLA LIMITED	4.251	0.999	1.237	1.135	1.108	Partially Rejected
23.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of CADILA HEALTHCARE LIMITED	4.016	1.109	0.956	1.364	1.218	Partially Rejected
24.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of TORRENT PHARMACEUTICALS LIMITED	3.925	0.452	1.172	0.763	0.574	Partially Rejected
25.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of LUPIN LIMITED	4.268	1.201	2.369	1.355	1.299	Rejected
26.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of BIOCON LIMITED	3.582	0.900	1.058	1.009	0.983	Partially Rejected

27.	NH-1: There is no efficiency of Intellectual Capital Performance and Financial Performance of AUROBINDO PHARMA LIMITED	3.981	1.051	1.230	1.364	1.125	Rejected
Source: Compiled from Table 3.1 to 3.27							

Chapter-IV

*Relationship between
Intellectual Capital
Performance and Financial
Performance*

Pearson Correlation Analysis indicates the extent to which two variables are related to sample variables (**Kamath, 2007; Ku Nor Izah Ku IsmailMahfoudh Abdul Karem, 2011 and Murugesan Selvam, 2020**). In the same way, the linear correlation is also used to find out the relationship between two sample variables, namely, dependent variables (Financial Performance) and independent variables (Intellectual Capital) of the sample firms.

For the purpose of this study, the analysis of Pearson correlation is given in three sections, as follows.

Section-A: Relationship between Intellectual Capital Performance Variables and Financial Performance Variables of BANKING SECTOR FIRMS

Section-B: Relationship between Intellectual Capital Performance Variables and Financial Performance Variables of INFORMATION TECHNOLOGY SECTOR FIRMS, and

Section-C: Relationship between Intellectual Capital Performance Variables and Financial Performance Variables of PHARMACEUTICAL SECTOR FIRMS

SECTION-A

Relationship between Intellectual Capital Performance and Financial Performance of BANKING SECTOR FIRMS

As stated earlier, all firms, belonging to NSE service sector index, were selected for this study and banking firms, information technology sector firms and pharmaceutical sector firms were analysed. The banking sector firms consisted of State Bank of India, Bank of Baroda, Punjab National Bank, Indian Overseas Bank, Canara Bank, Union Bank of India, The Jammu Kashmir Bank Limited, Indian Bank, Central Bank of India, and

UCO Bank. The detailed analysis of Pearson Correlation, for ten banking sector firms, is given as follows.

- 4.1 Relationship between Intellectual Capital Performance and Financial Performance of STATE BANK OF INDIA
- 4.2 Relationship between Intellectual Capital Performance and Financial Performance of BANK OF BARODA
- 4.3 Relationship between Intellectual Capital Performance and Financial Performance of PUNJAB NATIONAL BANK
- 4.4 Relationship between Intellectual Capital Performance and Financial Performance of INDIAN OVERSEAS BANK
- 4.5 Relationship between Intellectual Capital Performance and Financial Performance of CANARA BANK
- 4.6 Relationship between Intellectual Capital Performance and Financial Performance of UNION BANK OF INDIA
- 4.7 Relationship between Intellectual Capital Performance and Financial Performance of THE JAMMU KASHMIR BANK
- 4.8 Relationship between Intellectual Capital Performance and Financial Performance of INDIAN BANK
- 4.9 Relationship between Intellectual Capital Performance and Financial Performance of CENTRAL BANK OF INDIA, and
- 4.10 Relationship between Intellectual Capital Performance and Financial Performance of UCO BANK

4.1 Relationship between Intellectual Capital Performance and Financial Performance of STATE BANK OF INDIA

Table-4.1 displays the results of correlation analysis, for intellectual capital performance and financial performance of **STATE BANK OF INDIA**, during the study period from 1st April 2010 to 31st March 2019. The Value Added Intellectual Coefficient (VAIC) and its components like Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE) were employed as a proxy variables, for assessing the performance of intellectual capital (independent variable) while Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM and Earning Per Share (EPS) were employed to examine the financial performance (dependent variable). At the same time, Size and DER acted as control variables for this study.

The results of correlation analysis, for intellectual capital performance and financial performance of the **STATE BANK OF INDIA**, during the study period from 1st April 2010 to 31st March 2019, are shown in **Table-4.1**. The results of Pearson Correlation Matrix analysis revealed that the values of correlation coefficient were at 0.854 for SCE-HCE, at 0.813 for CEE-HCE, at 0.809 for CEE-SCE, at 0.999 for VAIC-HCE, at 0.871 for VAIC-SCE, at 0.836 for VAIC-CEE, at 0.812 for ROA-HCE, at 0.910 for ROA-SCE, at 0.823 for ROA-VAIC and at 0.903 for NPM-VAIC and all the values were significantly and positively correlated at 99% confidence level (i.e., p value was less than 0.01). It is interesting to note that ROA was positively affected by all intellectual capital variables while VAIC impacted the NPM. The strong correlation, among the intellectual capital variables, indicated that the variables such as SCE, HCE and CEE could explain the VAIC in a significant manner. Further, some sets of variables (ROA-CEE at 0.703 and EPS-HCE at 0.668) recorded positive relationship at 95% confidence level (i.e., p value was less than 0.05).

Table-4.1: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of STATE BANK OF INDIA during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.854**	1								
	Sig. (2-tailed)	0.002									
CEE	Pearson Correlation	0.813**	0.809**	1							
	Sig. (2-tailed)	0.004	0.005								
VAIC	Pearson Correlation	0.999**	0.871**	0.836**	1						
	Sig. (2-tailed)	0.000	0.001	0.003							
ROA	Pearson Correlation	0.812**	0.910**	0.703*	0.823**	1					
	Sig. (2-tailed)	0.004	0.000	0.023	0.003						
ROE	Pearson Correlation	0.029	-0.329	0.249	0.027	0.271	1				
	Sig. (2-tailed)	0.936	0.354	0.488	0.941	0.449					
NPM	Pearson Correlation	0.390	0.088	0.395	0.903**	-0.204	0.628	1			
	Sig. (2-tailed)	0.265	0.809	0.259	0.000	0.572	0.052				
EPS	Pearson Correlation	0.668*	-0.005	0.276	0.235	-0.112	0.613	0.383	1		
	Sig. (2-tailed)	0.035	0.989	0.441	0.513	0.757	0.060	0.274			
Size	Pearson Correlation	-0.334	-0.361	0.240	-0.359	0.108	-0.404	-0.343	-0.447	1	
	Sig. (2-tailed)	0.345	0.305	0.504	0.308	0.766	0.246	0.331	0.195		
DER	Pearson Correlation	0.377	0.308	0.251	0.373	-0.467	-0.028	0.244	0.146	0.089	1
	Sig. (2-tailed)	0.282	0.387	0.485	0.288	0.173	0.939	0.497	0.687	0.806	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

The analysis of correlation clearly confirmed moderate correlation between the intellectual capital variables (such as HCE, SCE, CEE and VAIC) and financial performance variables (namely ROA). Hence the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of STATE BANK OF INDIA**, was partially rejected.

According to the Table, the variable sets like ROE-HCE, ROE-SCE, ROE-CEE, ROE-VAIC, NPM-HCE, NPM-SCE, NPM-CEE, EPS-SCE, EPS-CEE and EPS-VAIC did not report any association with each other, at two confidence levels (i.e., p value of 0.01 and 0.05). Besides, the Size and DER (control variables) did not correlate with any financial performance variables, for **STATE BANK OF INDIA**, during the study period. In other words, VAIC and its components had exercised long-term effect on the growth of **STATE BANK OF INDIA**, a top public sector bank. It is important to note that regarding the **STATE BANK OF INDIA**, the strong correlation, among intellectual capital variables, indicated that the variables, namely, SCE, HCE and CEE could explain the VAIC in a significant manner. Further, some sets of variables like ROA-CEE and EPS-HCE recorded positive relationship at 95% confidence level. The analysis of correlation confirmed moderate correlation between the intellectual capital variables such as HCE, SCE and VAIC. In other words, VAIC and its components had exercised long-term effect on the growth of **STATE BANK OF INDIA**.

4.2 Relationship between Intellectual Capital Performance and Financial Performance of BANK OF BARODA

The results of correlation analysis for intellectual capital performance and financial performance of the **BANK OF BARODA**, during the study period from 1st April 2010 to 31st March 2019, are presented in **Table-4.2**. It is clear from the results of Pearson Correlation Matrix that sample variables, with the values of 0.998 for HCE with SCE, 0.718

for VAIC with CEE, 0.874 for ROA with CEE, 0.877 for ROE with VAIC 0.908 for NPM with SCE, 0.733 for EPS with VAIC, 0.848 for Size with CEE and 0.851 for Size with ROE, had reported significant relationship positively, at 99% confidence level (i.e., p value was less than 0.01).

In other words, the correlation coefficient value, nearing 0.0, between VAIC and intellectual capital performance variables, explained better intellectual capital performance on all aspects. Few samples variable sets (ROE-HCE at 0.665, EPS-HCE at 0.658 and EPS-SCE at 0.649) registered positive relationship at 95% confidence level (i.e., p value was less than 0.05). The positive correlation between ROE and EPS with intellectual capital performance variables, indicated the increase in intellectual capital performance, leading to increase in financial performance. Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of BANK OF BARODA**, was partially rejected.

From the Table of correlation matrix, it is found that CEE-HCE, CEE-SCE, VAIC-HCE, VAIC-SCE, ROA-HCE, ROA-SCE, ROA-VAIC, ROE-SCE, ROE-CEE, NPM-HCE, NPM-CEE, NPM-VAIC, EPS-CEE recorded insignificant correlations among the same sets of variables, in relation to intellectual capital performance and financial performance and this proved the absence of multicollinearity among the sets of independent variables. But size, as control variable, did correlate with CEE and ROE of **BANK OF BARODA**, during the study period. The overall results, as given in the Table, revealed that increase in the values of HCE, SCE, CEE and VAIC caused the appreciation of ROA, ROE, NPM and EPS of **BANK OF BARODA**, in the long run. Therefore, the sample bank needs to induct more skilled employees to increase better performance of employees.

Table-4.2: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of BANK OF BARODA during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.998**	1								
	Sig. (2-tailed)	0.000									
CEE	Pearson Correlation	-0.102	-0.130	1							
	Sig. (2-tailed)	0.778	0.721								
VAIC	Pearson Correlation	0.619	0.596	0.718**	1						
	Sig. (2-tailed)	0.057	0.069	0.019							
ROA	Pearson Correlation	0.454	0.483	0.874**	-0.373	1					
	Sig. (2-tailed)	0.188	0.157	0.001	0.289						
ROE	Pearson Correlation	0.665*	0.478	0.459	0.877**	-0.204	1				
	Sig. (2-tailed)	0.036	0.162	0.182	0.001	0.572					
NPM	Pearson Correlation	0.351	0.908**	0.440	0.592	-0.257	-0.283	1			
	Sig. (2-tailed)	0.320	0.000	0.203	0.071	0.473	0.429				
EPS	Pearson Correlation	0.658*	0.649*	0.345	0.733**	-0.122	-0.187	0.610	1		
	Sig. (2-tailed)	0.039	0.042	0.329	0.016	0.736	0.605	0.061			
Size	Pearson Correlation	-0.433	-0.447	0.848**	0.367	0.330	0.851**	0.288	0.142	1	
	Sig. (2-tailed)	0.211	0.196	0.002	0.296	0.351	0.002	0.420	0.696		
DER	Pearson Correlation	0.032	0.017	-0.319	-0.231	0.409	0.493	0.200	-0.237	-0.534	1
	Sig. (2-tailed)	0.930	0.963	0.369	0.520	0.240	0.148	0.579	0.509	0.111	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

4.3 Relationship between Intellectual Capital Performance and Financial Performance of PUNJAB NATIONAL BANK

Table-4.3 provides the results of correlation analysis, for intellectual capital performance and financial performance of the **PUNJAB NATIONAL BANK**, during the study period from 1st April 2010 to 31st March 2019. As stated already, the Value Added Intellectual Coefficient (VAIC) and its three components (Human Capital Efficiency, Structural Capital Efficiency and Capital Employed Efficiency) were identified as proxy variables, to estimate the performance of intellectual capital (independent variable) while Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM) and Earning Per Share (EPS) were employed for examining the financial performance (dependent variable). Size and DER acted as control variables for this study.

The results of Pearson Correlation Matrix analysis yielded the values of correlation coefficient at 0.874 for CEE-HCE, 0.869 for CEE-SCE, 0.730 for VAIC-HCE, 0.796 for ROA-VAIC, 0.872 for ROE-HCE, 0.991 for ROE-VAIC and 0.723 for EPS-HCE and these variables had significant and positive relationship with each other, at 99% confidence level (i.e., p value was less than 0.01). In other words, correlation coefficient values were greater than 0.1, between ROA and ROE. VAIC indicated increase in ROA and ROE, which were associated with increase in intellectual capital. A set of variables (NPM-VAIC) at 0.635, had earned positive relationship at 95% confidence level (i.e., p value was less than 0.05) with each other. The analysis found that the increase in ROE was associated with increase in VAIC, demonstrated by the coefficient value of more than 0.5. The control variable sets, namely, Size-HCE (-0.646) recorded negative relationship, at 95 % confidence level, during the study period. The negative correlation was recorded between size and HCE, indicating that the increase in size was associated with decrease in human capital.

Table-4.3: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of PUNJAB NATIONAL BANK during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.127	1								
	Sig. (2-tailed)	0.726									
CEE	Pearson Correlation	0.874**	0.869**	1							
	Sig. (2-tailed)	0.001	0.001								
VAIC	Pearson Correlation	0.730**	0.111	-0.305	1						
	Sig. (2-tailed)	0.017	0.761	0.391							
ROA	Pearson Correlation	-0.289	-0.338	0.173	0.796**	1					
	Sig. (2-tailed)	0.418	0.340	0.632	0.006						
ROE	Pearson Correlation	0.872**	0.247	-0.519	0.991**	0.006	1				
	Sig. (2-tailed)	0.001	0.491	0.124	0.000	0.988					
NPM	Pearson Correlation	0.326	0.331	-0.422	0.635*	-0.469	0.461	1			
	Sig. (2-tailed)	0.359	0.351	0.225	0.049	0.171	0.180				
EPS	Pearson Correlation	0.723**	0.145	-0.312	-0.213	-0.316	0.322	0.317	1		
	Sig. (2-tailed)	0.018	0.689	0.380	0.555	0.374	0.364	0.373			
Size	Pearson Correlation	-0.646*	0.046	-0.336	-0.145	-0.364	-0.517	-0.140	-0.147	1	
	Sig. (2-tailed)	0.044	0.899	0.342	0.690	0.302	0.126	0.701	0.686		
DER	Pearson Correlation	-0.244	-0.182	0.193	-0.191	-0.220	-0.440	0.391	0.616	0.305	1
	Sig. (2-tailed)	0.497	0.614	0.593	0.597	0.541	0.204	0.264	0.058	0.391	
N		10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of PUNJAB NATIONAL BANK**, was partially rejected. It is interesting to record from the analysis that the variable sets such as SCE-HCE, ROA-HCE, ROA-DCE, ROA-CEE, ROE-SCE, ROE-CEE, NPM-HCE, NPM-SCE, NPM-CEE, EPS-SCE, EPS-CEE, EPS-VAIC of **PUNJAB NATIONAL BANK** recorded neither positive nor negative relationship, during the study period. **PUNJAB NATIONAL BANK** was able to succeed in achieving the efficiency of intellectual capital during the study period. Hence, it is suggested to **PUNJAB NATIONAL BANK** to invest more on human capital because increase of VAIC could boost the value of NPM.

4.4 Relationship between Intellectual Capital Performance and Financial Performance of INDIAN OVERSEAS BANK

The results of correlation analysis, in respect of intellectual capital performance and financial performance of the **INDIAN OVERSEAS BANK**, during the study period from 1st April 2010 to 31st March 2019, are exhibited in **Table-4.4**. According to the results of Pearson Correlation Matrix analysis, the values of correlation coefficient were at 0.968 for VAIC-HCE, 0.931 for ROE-CEE, 0.807 for NPM-VAIC, 0.899 for NPM-ROA, 0.884 for EPS-HCE, 0.822 for EPS-VAIC and 0.754 for DER-SCE and seven sample variable sets had reported significant and positive association with each other, at 99% confidence levels (i.e., p value was less than 0.01). Other nine sets of variables like ROA-SCE at 0.645, ROA-CEE at 0.654, ROE-SCE at 0.634, ROE-ROA at 0.674, NPM-SCE at 0.647, EPS-ROA at 0.688, Size-CEE at 0.661 and Size-ROE at 0.634, Size-EPS at 0.691 registered positive correlation, at 95% confidence level (i.e., p value was less than 0.05).

Table-4.4: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of INDIAN OVERSEAS BANK during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	-0.594	1								
	Sig. (2-tailed)	0.070									
CEE	Pearson Correlation	-0.199	0.466	1							
	Sig. (2-tailed)	0.581	0.175								
VAIC	Pearson Correlation	0.968*	-0.457	0.049	1						
	Sig. (2-tailed)	0.000	0.184	0.892							
ROA	Pearson Correlation	-0.370	0.645*	0.654*	-0.199	1					
	Sig. (2-tailed)	0.293	0.044	0.040	0.581						
ROE	Pearson Correlation	-0.218	0.634*	0.931*	0.023	0.674*	1				
	Sig. (2-tailed)	0.545	0.049	0.000	0.949	0.033					
NPM	Pearson Correlation	-0.405	0.647*	0.358	0.807**	0.899*	0.411	1			
	Sig. (2-tailed)	0.246	0.043	0.310	0.005	0.000	0.238				
EPS	Pearson Correlation	0.884**	0.450	0.452	0.822*	0.688*	0.501	0.510	1		
	Sig. (2-tailed)	0.001	0.192	0.189	0.004	0.028	0.140	0.132			
Size	Pearson Correlation	0.050	-0.277	0.661*	-0.116	0.038	0.634*	-0.706*	0.691*	1	
	Sig. (2-tailed)	0.890	0.438	0.037	0.749	0.917	0.049	0.022	0.027		
DER	Pearson Correlation	0.474	0.754**	-0.304	0.266	-0.565	0.170	-0.452	-0.196	0.342	1
	Sig. (2-tailed)	0.167	0.012	0.393	0.457	0.089	0.638	0.189	0.587	0.333	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

The positive association between VAIC and NPM as well as EPS clearly confirmed that the increase in intellectual capital was associated with increase in financial performance whereas Size, a control variable, recorded negative relationship with NPM, at -0.706. Thirteen variable sets like SCE-HCE, CEE-HCE, CEE-SCE, VAIC-SCE, VAIC-CEE, ROA-HCE, ROAVAIC, ROE-HCE, ROE-VAIC, NPM-HCE, NPM-CEE, EPS-SCE and EPS-CEE did not experience any relationship with each other, during the study period. But the increase in size was associated with decrease in NPM. Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of INDIAN OVERSEAS BANK**, was partially rejected. The overall results clearly revealed that VAIC and its components encouraged the growth of NPM and EPS. However, ROA and ROE did have association with SCE and CEE component of value-added intellectual coefficient of **INDIAN OVERSEAS BANK**. Hence the bank should put forth more efforts to increase the effective use of employees' skills. It is good for the bank to reduce the investment on capital employed since it has not produced any efficiency.

4.5 Relationship between Intellectual Capital Performance and Financial Performance of CANARA BANK

Table-4.5 shows the results of correlation analysis, for intellectual capital performance and financial performance of the **CANARA BANK**, during the study period from 1st April 2010 to 31st March 2019. The values of correlation calculated at 99% confidence level (i.e., p value was less than 0.01) were earned by SCE-HCE with 0.994, CEE-HCE with 0.781, CEE-SCE with 0.809, VAIC-HCE with 0.747, VAIC-SCE with 0.807, VAIC-CEE with 0.809, ROA-VAIC with 0.745, Size-CEE with 0.783 and Size-ROA with 0.893, during the study period.

Three sets of variables (ROE-CEE with 0.619, NPM-HCE with 0.716 and NPM-SCE with 0.683) recorded positive relationship at 95% confidence level (i.e., p value was less than 0.05). Further, the increase in financial performance was associated with an increase in the intellectual capital performance, in the case of ROA and NPM. Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of CANARA BANK**, was partially rejected.

It was evident from the above Table that twelve sets of variables like ROA-HCE, ROA-SCE, ROA-CEE, ROE-HCE, ROE-SCE, ROE-VAIC, NPM-CEE, NPM-VAIC, EPS-HCE, EPS-SCE, EPS-CEE and EPS-VAIC, had witnessed no association with each other at 99% and 95% confidence levels (i.e., p value of 0.01 and 0.05). It is to be noted that size (control variable) did correlate with CEE and VAIC (intellectual capital) and ROA (financial performance) for the **CANARA BANK** whereas DER did not record any relationship with intellectual capital variables and financial performance variables of the sample bank, during the study period.

It is interesting to note that the structural capital efficiency (SCE) was at good level and improved the NPM. In the long run, the positive growth of intellectual coefficient would be achieved by the ROA of **CANARA BANK** and hence VAIC could be employed as a tool for generating wealth because investment on intellectual capital would certainly increase the financial performance of this bank.

Table-4.5: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of CANARA BANK during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.994**	1								
	Sig. (2-tailed)	0.000									
CEE	Pearson Correlation	0.781**	0.809**	1							
	Sig. (2-tailed)	0.008	0.005								
VAIC	Pearson Correlation	0.747**	0.807**	0.809**	1						
	Sig. (2-tailed)	0.013	0.005	0.005							
ROA	Pearson Correlation	0.467	0.466	0.570	0.745**	1					
	Sig. (2-tailed)	0.173	0.174	0.085	0.013						
ROE	Pearson Correlation	0.208	0.223	0.619*	0.148	0.579	1				
	Sig. (2-tailed)	0.565	0.536	0.056	0.683	0.079					
NPM	Pearson Correlation	0.716*	0.683*	-0.503	-0.543	-0.484	0.000	1			
	Sig. (2-tailed)	0.020	0.030	0.139	0.104	0.156	1.000				
EPS	Pearson Correlation	-0.604	-0.530	-0.306	-0.148	-0.198	0.111	0.415	1		
	Sig. (2-tailed)	0.064	0.115	0.389	0.683	0.584	0.760	0.233			
Size	Pearson Correlation	-0.599	-0.617	0.783*	0.025	0.893**	-0.429	0.445	0.256	1	
	Sig. (2-tailed)	0.067	0.058	0.007	0.945	0.001	0.216	0.197	0.475		
DER	Pearson Correlation	-0.347	-0.340	-0.520	-0.381	-0.346	0.218	0.488	0.509	0.429	1
	Sig. (2-tailed)	0.326	0.337	0.123	0.278	0.327	0.545	0.153	0.133	0.216	
N		10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

4.6 Relationship between Intellectual Capital Performance and Financial Performance of UNION BANK OF INDIA

The results of correlation analysis, in respect of intellectual capital performance and financial performance of the **UNION BANK OF INDIA**, during the study period from 1st April 2010 to 31st March 2019, are displayed in **Table-4.6**. According to the Pearson Correlation Matrix analysis, the values of correlation coefficient were at 0.997 for SCE-HCE, 0.846 for CEE-HCE, 0.836 for CEE-SCE, 0.909 for VAIC-HCE, 0.991 for VAIC-CEE, 0.856 for ROA-VAIC and 0.901 for EPS-HCE and these variable sets had significant association with each other variables positively, at 99% confidence level (i.e., p value was less than 0.01). The values of these variable sets indicated strong correlation among them. The analysis of correlation, among intellectual capital variables, revealed that two variables, HCE and VAIC, correlated with ROA and EPS. But only one set of variables (EPS-ROA with 0.687) registered positive correlation at 95% confidence level (i.e., p value was less than 0.05). Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of UNION BANK OF INDIA**, was partially rejected.

From the results of Correlation Matrix, it is clear that fifteen sets of variables, namely, VAIC-SCE, ROA-HCE, ROA-SCE, ROA-CEE, ROE-HCE, ROE-SCE, ROE-CEE, ROE-VAIC, NPM-HCE, NPM-SCE, NPM-CEE, NPM-VAIC, EPS-SCE, EPS-CEE and EPS-VAIC had witnessed no association with each other, at two confidence levels (i.e., p value of 0.01 and 0.05). Similarly, ROE and NPM were not associated with four intellectual capital variables (HCE, SCE, CEE and VAIC). However, ROA and EPS had association with VAIC and HCE of **UNION BANK OF INDIA**, during the study period, revealing that variables like HCE and VAIC were correlated with ROA and EPS, demonstrating that investment on employees simulated the financial performance.

Table-4.6: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of UNION BANK OF INDIA during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.997**	1								
	Sig. (2-tailed)	0.000									
CEE	Pearson Correlation	0.846**	0.836**	1							
	Sig. (2-tailed)	0.002	0.003								
VAIC	Pearson Correlation	0.909**	0.438	0.991**	1						
	Sig. (2-tailed)	0.000	0.206	0.000							
ROA	Pearson Correlation	-0.216	-0.223	0.238	0.856**	1					
	Sig. (2-tailed)	0.549	0.536	0.509	0.002						
ROE	Pearson Correlation	0.418	0.430	0.588	0.564	0.136	1				
	Sig. (2-tailed)	0.229	0.215	0.074	0.090	0.708					
NPM	Pearson Correlation	-0.562	-0.570	-0.243	-0.329	0.439	-0.250	1			
	Sig. (2-tailed)	0.091	0.086	0.500	0.354	0.205	0.487				
EPS	Pearson Correlation	0.901**	0.424	0.080	0.168	0.687*	0.335	0.132	1		
	Sig. (2-tailed)	0.000	0.222	0.826	0.643	0.028	0.344	0.716			
Size	Pearson Correlation	0.056	0.017	0.212	0.179	0.248	0.480	-0.182	0.150	1	
	Sig. (2-tailed)	0.877	0.962	0.556	0.620	0.489	0.161	0.615	0.679		
DER	Pearson Correlation	0.207	0.208	0.099	0.129	0.155	-0.078	0.062	-0.289	0.083	1
	Sig. (2-tailed)	0.567	0.564	0.785	0.723	0.669	0.831	0.866	0.418	0.821	
N		10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

4.7 Relationship between Intellectual Capital Performance and Financial Performance of THE JAMMU AND KASHMIR BANK LIMITED

Table-4.7 displays the results of correlation analysis, for intellectual capital performance and financial performance of **THE JAMMU AND KASHMIR BANK LIMITED**, during the study period from 1st April 2010 to 31st March 2019. According to the Pearson Correlation Matrix analysis, the values of correlation coefficient were at 0.745 for VAIC with SCE, 0.952 for NPM with VAIC, 0.937 for EPS with HCE, 0.958 for EPS with SCE and these variables had significant and positive relationship at 99% confidence level (i.e., p value was less than 0.01). As stated earlier, the correlation coefficient values, being close to 0.0 between NPM and VAIC, explained better performance during the study period.

It is noted that the coefficient value at 0.636 for CEE with SCE, indicated positive relationship at 95% confident level. Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of THE JAMMU AND KASHMIR BANK LIMITED**, was partially rejected. It is evident from the analysis that seventeen variable sets, namely, SCE-HCE, CEE-HCE, VAIC-HCE, VAIC-CEE, ROA-HCE, ROA-SCE, ROA-CEE, ROA-VAIC, ROE-HCE, ROE-SCE, ROE-CEE, ROE-VAIC, NPM-HCE, NPM-SCE, NPM-CEE, EPS-CEE and EPS-VAIC were not associated with each other variables, either positively or negatively. Similarly, Size and DER also did not record any relationship with intellectual capital and financial performance of sample bank during the study period. The overall results of the Table demonstrated that whenever the values of HCE, SCE and VAIC increased, there was corresponding increase in the values of NPM and EPS of **THE JAMMU AND KASHMIR BANK LIMITED** during the study period. Hence, investing on research and innovation would certainly increase the share price and accumulate more capital to the bank. Similarly, concentrating on human capital would also help the bank to acquire more earnings.

Table-4.7: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of THE JAMMU & KASHMIR BANK LIMITED during the Study Period from 1st April 2010 to March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	-0.091	1								
	Sig. (2-tailed)	0.802									
CEE	Pearson Correlation	-0.486	0.636*	1							
	Sig. (2-tailed)	0.154	0.048								
VAIC	Pearson Correlation	0.514	0.745**	0.428	1						
	Sig. (2-tailed)	0.128	0.013	0.218							
ROA	Pearson Correlation	0.597	-0.023	-0.500	0.218	1					
	Sig. (2-tailed)	0.069	0.949	0.141	0.545						
ROE	Pearson Correlation	-0.036	-0.030	0.408	0.159	-0.103	1				
	Sig. (2-tailed)	0.921	0.934	0.242	0.661	0.777					
NPM	Pearson Correlation	0.157	0.125	0.022	0.952**	0.156	-0.306	1			
	Sig. (2-tailed)	0.665	0.731	0.951	0.000	0.667	0.389				
EPS	Pearson Correlation	0.937**	0.958**	-0.429	-0.230	0.379	-0.004	0.115	1		
	Sig. (2-tailed)	0.001	0.000	0.216	0.523	0.281	0.992	0.751			
Size	Pearson Correlation	-0.119	0.300	0.425	0.267	-0.220	0.148	-0.070	0.077	1	
	Sig. (2-tailed)	0.743	0.400	0.221	0.456	0.542	0.683	0.848	0.832		
DER	Pearson Correlation	0.494	0.484	-0.183	0.548	0.546	-0.600	0.324	0.198	-0.017	1
	Sig. (2-tailed)	0.147	0.157	0.614	0.101	0.103	0.067	0.361	0.584	0.962	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

4.8 Relationship between Intellectual Capital Performance and Financial Performance of INDIAN BANK

The results of correlation analysis, for intellectual capital performance and financial performance of the **INDIAN BANK**, during the study period from 1st April 2010 to 31st March 2019, are shown in **Table-4.8**. As stated earlier, the Value Added Intellectual Coefficient (VAIC) and its three components, namely, Human Capital Efficiency, Structural Capital Efficiency and Capital Employed Efficiency were treated as a proxy variables, to evaluate the performance of intellectual capital (independent variable) while Return on Assets, Return on Equity, Net Profit Margin and Earning Per Share were employed for assessing the financial performance (dependent variable). But Size and DER acted as control variables for this study. According to the results of Pearson Correlation Matrix analysis, the values of correlation coefficient were at 0.956 for VAIC-HCE, 0.962 for ROA-SCE, 0.724 for NPM-SCE, 0.847 for NPM-ROA and 0.734 for Size-EPS, at 99% confidence level (i.e., p value was less than 0.01). These values indicated strong correlation among these variables during the study period. It is observed that VAIC failed to record relationship with financial performance variables of sample bank, during the study period. Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of INDIAN BANK**, was accepted.

It is noted from the Table of Correlation Matrix that there was no association between each variable of twenty one sets such as SCE-HCE, CEE-HCE, CEE-SCE, VAIC-SCE, VAIC-CEE, VAIC-SCE, VAIC-CEE, ROA-HCE, ROA-CEE, ROA-VAIC, ROE-HCE, ROE-SCE, ROE-CEE, ROE-VAIC, NPM-HCE, NPM-CEE, NPM-VAIC, EPS-HCE, EPS-SCE, EPS-CEE and EPS-VAIC, at 99% and 95% confidence levels (i.e., p value of 0.01 and 0.05). The overall results, as provided at the Table, indicated that financial performance variables were not increased by the VAIC of **INDIAN BANK**. Therefore, the sample bank must pay attention towards investing on intellectual capital, to attain the efficiency of financial performance and reduce the investment on tangible assets.

Table-4.8: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of INDIAN BANK during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.162	1								
	Sig. (2-tailed)	0.654									
CEE	Pearson Correlation	0.063	-0.354	1							
	Sig. (2-tailed)	0.864	0.316								
VAIC	Pearson Correlation	0.956**	0.134	0.339	1						
	Sig. (2-tailed)	0.000	0.713	0.338							
ROA	Pearson Correlation	-0.132	0.962**	0.510	-0.053	1					
	Sig. (2-tailed)	0.716	0.000	0.132	0.884						
ROE	Pearson Correlation	0.147	0.060	0.003	0.142	-0.089	1				
	Sig. (2-tailed)	0.685	0.869	0.993	0.695	0.807					
NPM	Pearson Correlation	0.164	0.724**	0.574	0.263	0.847**	-0.094	1			
	Sig. (2-tailed)	0.650	0.018	0.083	0.464	0.002	0.796				
EPS	Pearson Correlation	-0.256	0.025	-0.016	-0.238	-0.031	0.124	0.146	1		
	Sig. (2-tailed)	0.476	0.944	0.965	0.508	0.933	0.733	0.687			
Size	Pearson Correlation	0.299	-0.403	-0.114	0.201	0.294	-0.121	0.012	0.734**	1	
	Sig. (2-tailed)	0.402	0.248	0.755	0.579	0.410	0.740	0.975	0.016		
DER	Pearson Correlation	0.501	0.286	0.329	0.592	-0.276	0.121	0.050	0.133	-0.261	1
	Sig. (2-tailed)	0.141	0.424	0.354	0.071	0.441	0.740	0.891	0.714	0.466	
N		10	10	010	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

4.9 Relationship between Intellectual Capital Performance and Financial Performance of CENTRAL BANK OF INDIA

Table-4.9 shows the results of correlation analysis, for intellectual capital performance and financial performance of the **CENTRAL BANK OF INDIA**, during the study period from 1st April 2010 to 31st March 2019. The values of correlation coefficient were at 0.720 for VAIC-HCE, 0.782 for ROA-VAIC, 0.974, for ROE-VAIC, 0.924 for NPM-HCE, 0.793, for NPM-CEE, 0.935 for NPM-VAIC, 0.864 for EPS-HCE, and 0.872 for EPS-VAIC, which were significant at 99% confidence level (i.e., p value was less than 0.01). Therefore, the growth of financial performance followed the effective management of intellectual capital. Only two sets of variables such as VAIC-SCE (0.707) and ROA-HCE (0.677) registered positive correlation at 95% confidence level (i.e., p value was less than 0.05). Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of CENTRAL BANK OF INDIA**, was partially rejected.

It is clear from the Table of Correlation Matrix that eleven sets of variables like SCE-HCE, CEE-HCE, CEE-SCE, VAIC-CEE, ROA-SCE, ROA-CEE, ROE-HCE, ROE-CEE, NPM-SCE, EPS-SCE and EPS-CEE had reported no association with each other, at any confidence level (i.e., p value of 0.01 and 0.05). Similarly, size and DER also did not record any relationship with intellectual variable and financial performance variables of the sample bank. From this, it is observed that there were insignificant correlations among a few sets of variables relating to intellectual capital performance and financial performance, which indicated the absence of multicollinearity among the set of independent variables. The overall results, as provided at the Table, indicated that the increasing values of HCE and VAIC increased the appreciation of ROA, ROE, NPM and EPS of **CENTRAL BANK OF INDIA**. Therefore, it is possible to conclude that the coefficient of the VAC is an important predictor of the financial performance and the valued-added of the businesses and hence the management of bank should strengthen the competitive advantages, improve the organizational efficiency and increase the development and growth of the business by innovation processes.

Table-4.9: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of CENTRAL BANK OF INDIA during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.056	1								
	Sig. (2-tailed)	0.878									
CEE	Pearson Correlation	-0.088	0.134	1							
	Sig. (2-tailed)	0.808	0.712								
VAIC	Pearson Correlation	0.720**	0.707*	0.609	1						
	Sig. (2-tailed)	0.019	0.022	0.062							
ROA	Pearson Correlation	0.677*	-0.552	-0.335	0.782**	1					
	Sig. (2-tailed)	0.032	0.098	0.345	0.019						
ROE	Pearson Correlation	0.006	0.713*	0.631	0.974**	-0.283	1				
	Sig. (2-tailed)	0.987	0.021	0.050	0.000	0.428					
NPM	Pearson Correlation	0.924**	0.238	0.793**	0.935**	0.045	0.339	1			
	Sig. (2-tailed)	0.008	0.508	0.006	0.000	0.903	0.337				
EPS	Pearson Correlation	0.864**	0.377	0.467	0.872**	0.060	0.628	0.400	1		
	Sig. (2-tailed)	0.001	0.283	0.173	0.001	0.869	0.052	0.252			
Size	Pearson Correlation	-0.006	0.387	0.087	0.621	-0.161	0.216	0.243	0.408	1	
	Sig. (2-tailed)	0.988	0.269	0.812	0.055	0.657	0.548	0.499	0.242		
DER	Pearson Correlation	-0.252	0.041	0.358	-0.032	0.551	0.239	0.222	0.111	0.572	1
	Sig. (2-tailed)	0.483	0.910	0.309	0.931	0.099	0.506	0.538	0.760	0.084	
	N	10	10	010	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

4.10 Relationship between Intellectual Capital Performance and Financial Performance of UCO BANK

The results of correlation analysis, for intellectual capital performance and financial performance of the **UCO BANK** during the study period from 1st April 2010 to 31st March 2019, are presented in **Table-4.10**. As pointed out already, the Value Added Intellectual Coefficient (VAIC) and its three components like Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE) were employed as a proxy variables, to quantify the performance of intellectual capital (independent variable) while Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM) and Earning Per Share (EPS) were used for calculating the financial performance (dependent variable). The Size and DER acted as control variables for this study.

The Pearson Correlation Matrix analysis clearly revealed that the values of correlation coefficient were at 0.951 for SCE with HCE, 0.833 for VAIC with HCE, 0.786 for ROA with HCE, 0.874 for ROA with CEE, 0.782 for ROE with HCE, 0.767 for ROE with VAIC, 0.826 for NPM with VAIC, 0.826 for DER with NPM and 1.000 for DER with EPS and these variables had recorded significant and positive relationship, at 99% confidence level (i.e., p value was less than 0.01). The correlation coefficient values of intellectual capital variables and financial performance variables indicated that increase in financial performance variables was associated with an increase in the intellectual capital.

Three variable sets such as VAIC-SCE (0.641), ROE-SCE (0.717) and Size-CEE (0.688) had registered positive relationship, at 95% confidence level (i.e., p value was less than 0.05) whereas eleven sets of variables, namely, CEE-HCE, CEE-SCE, VAIC-CEE, ROA-SCE, ROA-VAIC, ROE-CEE, NPM-HCE, NPM-SCE, NPM-CEE, EPS-HCE, EPS-SCE, EPS-CEE and EPS-VAIC did not witness any relationship with each other during the study period.

It is evident that the positive correlation between DER and financial performance variables demonstrated that the increase in DER was associated with an increase in financial performance. Eventually, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of UCO BANK**, was partially rejected. It is to be noted that EPS did not correlate with any intellectual capital variables of **UCO BANK**, during the study period. Therefore, it is the need of the hour for this bank to reduce the investment on capital employed as it depended more on physical assets.

Table-4.10: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of UCO BANK during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.951**	1								
	Sig. (2-tailed)	0.000									
CEE	Pearson Correlation	-0.344	-0.585	1							
	Sig. (2-tailed)	0.330	0.076								
VAIC	Pearson Correlation	0.833**	0.641*	0.233	1						
	Sig. (2-tailed)	0.003	0.046	0.517							
ROA	Pearson Correlation	0.786**	-0.575	0.874**	-0.083	1					
	Sig. (2-tailed)	0.007	0.082	0.001	0.819						
ROE	Pearson Correlation	0.782**	0.717*	0.077	0.767**	0.327	1				
	Sig. (2-tailed)	0.008	0.020	0.833	0.010	0.357					
NPM	Pearson Correlation	0.219	0.045	0.060	0.826**	0.218	-0.117	1			
	Sig. (2-tailed)	0.543	0.901	0.869	0.003	0.545	0.747				
EPS	Pearson Correlation	0.073	-0.048	-0.099	0.006	0.223	0.198	0.252	1		
	Sig. (2-tailed)	0.840	0.896	0.785	0.987	0.535	0.583	0.482			
Size	Pearson Correlation	0.056	-0.127	0.688*	0.466	0.352	-0.142	-0.203	-0.339	1	
	Sig. (2-tailed)	0.879	0.728	0.028	0.175	0.318	0.695	0.575	0.338		
DER	Pearson Correlation	0.073	-0.048	-0.099	0.006	0.223	0.198	0.826**	1.000**	-0.339	1
	Sig. (2-tailed)	0.840	0.896	0.785	0.987	0.535	0.583	0.003	0.000	0.338	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

SECTION-B

Relationship between Intellectual Capital Performance and Financial Performance of INFORMATION TECHNOLOGY SECTOR FIRMS

The sample of eight information technology firms included Tata Consultancy Services Limited, Infosys Limited, Wipro Limited, Tech Mahindra Limited, Larsen & Toubro Infotech Limited, Mindtree Limited, Oracle Financial Services Software Limited and HCL Technologies Limited. The detailed analysis of Pearson Correlation, for eight Information Technology Firms, is given as follows.

- 4.11 Relationship between Intellectual Capital Performance and Financial Performance of TATA CONSULTANCY SERVICES LIMITED
- 4.12 Relationship between Intellectual Capital Performance and Financial Performance of INFOSYS LIMITED
- 4.13 Relationship between Intellectual Capital Performance and Financial Performance of WIPRO LIMITED
- 4.14 Relationship between Intellectual Capital Performance and Financial Performance of TECH MAHINDRA LIMITED
- 4.15 Relationship between Intellectual Capital Performance and Financial Performance of LARSEN & TOUBRO INFOTECH LIMITED
- 4.16 Relationship between Intellectual Capital Performance and Financial Performance of MINDTREE LIMITED
- 4.17 Relationship between Intellectual Capital Performance and Financial Performance of ORACLE FINANCIAL SERVICES SOFTWARE LIMITED, and
- 4.18 Relationship between Intellectual Capital Performance and Financial Performance of HCL TECHNOLOGIES LIMITED

4.11 Relationship between Intellectual Capital Performance and Financial Performance of TATA CONSULTANCY SERVICES LIMITED

The results of correlation analysis, for intellectual capital performance and financial performance of the **TATA CONSULTANCY SERVICES LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are shown in **Table-4.11**. The variables like HCE, SCE, CEE and VAIC were employed as independent variables while ROA, ROE, NPM and EPS were considered as dependent variables. Two variables, namely, Size and DER were the control variables for this analysis.

The Pearson Correlation Matrix analysis revealed that the values of correlation coefficients were at 0.865 for VAIC-HCE, 0.861 for ROA-HCE, 0.809 for ROA-VAIC, 0.870 for ROE-VAIC, 0.943 for NPM-HCE, 0.958 for NPM-VAIC, 0.877 for EPS-VAIC, 1.000 for EPS-ROE and 0.755 for DER-VAIC and these nine variable sets had significant and positive correlation at 99% confidence level (i.e., p value was less than 0.01). It is a well-known fact that the ability of this revenue generation depends on the performing loans, which is based on the efficiency of employees. This was evident from the strong positive correlation but four sets of variables like VAIC-SCE at 0.691, EPS-CEE at 0.687, Size-SCE at 0.675 and DER-HCE at 0.693 had recorded negative relationship, at 95% confidence level (i.e., p value was less than 0.05). Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of TATA CONSULTANCY SERVICES LIMITED**, was rejected.

It is seen from the Table that thirteen sets of variables, namely, SCE-HCE, CEE-HCE, CEE-SCE, VAIC-CEE, ROA-SCE, ROA-CEE, ROE-HCE, ROE-SCE, ROE-CEE, NPM-SCE, NPM-CEE, EPS-HCE and EPS-SCE found no association with each other, at two confidence levels (i.e., p value of 0.01 and 0.05).

Table-4.11: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of TATA CONSULTANCY SERVICES LIMITED during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.234	1								
	Sig. (2-tailed)	0.515									
CEE	Pearson Correlation	0.563	-0.034	1							
	Sig. (2-tailed)	0.090	0.926								
VAIC	Pearson Correlation	0.865**	0.691*	0.407	1						
	Sig. (2-tailed)	0.001	0.027	0.243							
ROA	Pearson Correlation	0.861**	0.345	0.162	0.809**	1					
	Sig. (2-tailed)	0.000	0.328	0.655	0.015						
ROE	Pearson Correlation	-0.468	0.090	-0.012	0.870**	-0.295	1				
	Sig. (2-tailed)	0.173	0.805	0.974	0.001	0.408					
NPM	Pearson Correlation	0.943**	-0.237	0.052	0.958**	0.457	0.612	1			
	Sig. (2-tailed)	0.000	0.509	0.886	0.000	0.185	0.060				
EPS	Pearson Correlation	-0.453	0.095	0.687*	0.877**	-0.282	1.000**	0.609	1		
	Sig. (2-tailed)	0.188	0.794	0.031	0.001	0.431	0.000	0.062			
Size	Pearson Correlation	-0.173	0.675*	-0.173	0.218	0.338	0.268	-0.044	0.269	1	
	Sig. (2-tailed)	0.632	0.032	0.633	0.544	0.339	0.455	0.905	0.453		
DER	Pearson Correlation	0.693*	0.463	0.331	0.755**	0.244	-0.112	-0.525	-0.099	0.178	1
	Sig. (2-tailed)	0.026	0.178	0.350	0.012	0.497	0.758	0.120	0.786	0.622	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

The insignificant correlation among nine sets of variables, relating to intellectual capital performance and financial performance, demonstrated the absence of multicollinearity among the sets of independent variables of **TATA CONSULTANCY SERVICES LIMITED** while VAIC and its components had long-term effect on **TATA CONSULTANCY SERVICES LIMITED**'s growth. It is clear that **TATA CONSULTANCY SERVICES LIMITED** had generated more value from HCE than from SCE and CEE. Hence, the firm is advised to reduce the investment on physical and structural capital and strengthen the human capital, which would ensure the enhancement of profitability of the firm.

4.12 Relationship between Intellectual Capital Performance and Financial Performance of INFOSYS LIMITED

Table-4.12 displays the results of correlation analysis, for intellectual capital performance and financial performance of the **INFOSYS LIMITED**, during the study period from 1st April 2010 to 31st March 2019. As stated already, the Value Added Intellectual Coefficient (VAIC) and its components like Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE) were used as proxy variables, to measure the performance of intellectual capital (independent variable) while Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM) and Earning Per Share (EPS) were employed, to evaluate the financial performance (dependent variable). Size and DER acted as control variables for this study.

The results of Pearson Correlation Matrix revealed that the values of correlation coefficient were at 0.812 for VAIC-HCE, 0.744 for ROA-HCE, 0.895 for ROA-VAIC, 0.977 for ROE-VAIC, 0.849 for NPM-HCE, 0.731 for NPM-VAIC, 0.977 for EPS-VAIC and 1.000 for EPS-ROE and these seven variable sets had significant and positive relationship, at 99% confidence level (i.e., p value was less than 0.01).

Table-4.12: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of INFOSYS LIMITED during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.078	1								
	Sig. (2-tailed)	0.831									
CEE	Pearson Correlation	0.307	0.140	1							
	Sig. (2-tailed)	0.388	0.699								
VAIC	Pearson Correlation	0.812**	0.639*	0.297	1						
	Sig. (2-tailed)	0.004	0.047	0.405							
ROA	Pearson Correlation	0.744**	0.395	-0.130	0.895**	1					
	Sig. (2-tailed)	0.014	0.259	0.720	0.003						
ROE	Pearson Correlation	0.696*	0.392	-0.159	0.977**	-0.318	1				
	Sig. (2-tailed)	0.026	0.263	0.661	0.000	0.370					
NPM	Pearson Correlation	0.849**	0.156	0.282	0.731**	-0.570	-0.483	1			
	Sig. (2-tailed)	0.002	0.668	0.429	0.016	0.085	0.157				
EPS	Pearson Correlation	0.696*	0.392	-0.159	0.977**	-0.318	1.000**	-0.483	1		
	Sig. (2-tailed)	0.026	0.263	0.661	0.000	0.370	0.000	0.157			
Size	Pearson Correlation	0.679*	0.009	0.453	0.482	-0.478	-0.348	-0.754**	-0.348	1	
	Sig. (2-tailed)	0.031	0.980	0.189	0.158	0.162	0.325	0.012	0.325		
DER	Pearson Correlation	-0.609	0.056	-0.215	-0.459	-0.856**	-0.831**	-0.444	-0.829**	-0.350	1
	Sig. (2-tailed)	0.062	0.878	0.552	0.182	0.002	0.003	0.198	0.004	0.321	
N		10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

Besides, the VAIC was positively related to the return on equity. Four sets of variables like VAIC-SCE (0.639), ROE-HCE (0.696) and EPS-HCE (0.696) had realized positive relationship, at 95% confidence level (i.e., p value was less than 0.05). Hence, the null hypothesis (NH-2) namely **there is no relationship between intellectual capital performance and financial performance of INFOSYS LIMITED**, was rejected. But other variable sets like Size-NPM (-0.754), DER-ROA (-0.856), DER-ROE (-0.831) and DER-EPS (-0.829) recorded negative relationship, at 99% confidence levels, during the study period. The negative values indicated that larger values of control variables of the sample firm did not mean higher values of intellectual capital and financial performance variables.

The overall results of the Table also demonstrated that whenever the values of HCE and VAIC had increased, there was corresponding increase in the values of ROA, ROE, NPM and EPS. It is interesting to note that HCE reported association with all financial performance variables of **INFOSYS LIMITED**, during the study period. It is clear that Size and DER (Control variables) had reported negative association with dependent and independent variables of this sample firm in the long run. Therefore, it is suggested to **INFOSYS LIMITED** that pumping more money on HCE, SCE and VAIC is necessary, to enhance the value of ROA, ROE and NPM and for attracting the investors.

4.13 Relationship between Intellectual Capital Performance and Financial Performance of WIPRO LIMITED

The results of correlation analysis, in respect of intellectual capital performance and financial performance of the **WIPRO LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are given in **Table-4.13**. According to the results of Pearson Correlation Matrix, the values of correlation coefficient stood at 0.858 for VAIC with HCE, 0.991 for ROA with HCE, 0.849 for ROA with VAIC, 0.776 for NPM with HCE, 0.720 for NPM with VAIC, 0.955 for NPM with 0.986 for EPS-VAIC, 0.981 for EPS-NPM and these variables

had recorded significant and positive association with each other, at 99% confidence level (i.e., p value was less than 0.01) while VAIC-SCE at 0.705, NPM-CEE at 0.667, EPS-HCE at 0.654, Size-NPM at 0.713, DER-ROE at 0.663 and DER-NPM at 0.717 registered positive correlation at 95% confidence level (i.e., p value was less than 0.05). The results relating to return on net worth further confirmed the effective influence of intellectual capital on the financial performance. But five variable sets like EPS-CEE (-0.693), Size-ROE (-0.649), DER-HCE (-0.891) DER-VAIC (-0.830) and DER-Size (-0.908) recorded negative relationship, both at 99% and 95 % confidence levels, during the study period. Hence, the null hypothesis (NH-2) namely **there is no relationship between intellectual capital performance and financial performance of WIPRO LIMITED**, was partially rejected.

The analysis of Correlation Matrix indicated that sixteen sets of variables, namely, SCE-HCE, CEE-HCE, CEE-SCE, VAIC-CEE, ROA-SCE, ROA-CEE, ROE-HCE, ROE-SCE, ROE-CEE, ROE-VAIC, NPM-SCE, EPS-SCE, EPS-VAIC had witnessed no association with each other, at any confidence levels (i.e., p value of 0.01 and 0.05), for the sample IT firm. The insignificant correlation between ROE and three variables of intellectual capital established the absence of multicollinearity among the variables. The overall results clearly revealed that VAIC and its components encouraged the growth ROA, NPM and EPS. However, the investment on tangible assets must be curtailed to avoid the decrease in the growth of NPM since the firm's CEE negatively impacted the NPM.

Table-4.13: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of WIPRO LIMITED during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.261	1								
	Sig. (2-tailed)	0.466									
CEE	Pearson Correlation	0.599	0.176	1							
	Sig. (2-tailed)	0.067	0.627								
VAIC	Pearson Correlation	0.858**	0.705*	0.618	1						
	Sig. (2-tailed)	0.001	0.023	0.057							
ROA	Pearson Correlation	0.991**	-0.257	-0.607	0.849**	1					
	Sig. (2-tailed)	0.000	0.473	0.062	0.002						
ROE	Pearson Correlation	-0.567	-0.300	0.098	-0.512	0.490	1				
	Sig. (2-tailed)	0.088	0.400	0.787	0.130	0.151					
NPM	Pearson Correlation	0.776**	-0.281	0.667*	0.720**	0.955**	0.561	1			
	Sig. (2-tailed)	0.008	0.432	0.035	0.019	0.000	0.092				
EPS	Pearson Correlation	0.654*	-0.233	-0.693*	0.986**	-0.620	0.451	0.981**	1		
	Sig. (2-tailed)	0.040	0.516	0.026	0.000	0.056	0.190	0.000			
Size	Pearson Correlation	-0.601	0.278	0.505	-0.561	-0.488	-0.649*	0.713*	-0.574	1	
	Sig. (2-tailed)	0.066	0.437	0.137	0.091	0.152	0.042	0.021	0.083		
DER	Pearson Correlation	-0.891**	-0.398	-0.400	-0.830**	0.505	0.663*	0.717*	0.583	-0.908**	1
	Sig. (2-tailed)	0.001	0.254	0.252	0.003	0.136	0.037	0.020	0.077	0.000	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

4.14 Relationship between Intellectual Capital Performance and Financial Performance of TECH MAHINDRA LIMITED

Table-4.14 displays the results of correlation analysis, for intellectual capital performance and financial performance of the **TECH MAHINDRA LIMITED**, during the study period from 1st April 2010 to 31st March 2019. The values of correlation coefficients, achieved by VAIC-HCE, were at 0.794, for VAIC-SCE at 0.873, for VAIC-CEE were at 0.899, for ROA-CEE at 0.900, for ROA-VAIC at 0.843 and for NPM-HCE at 0.759 and they had realized significant and positive correlation at 99% confidence level (i.e., p value was less than 0.01).

As pointed out earlier, the correlation coefficient values being close to 0.0, between VAIC and financial performance variables, explained better intellectual capital performance on all aspects. The three variable sets like CEE-SCE (0.658), ROE-VAIC (0.660) and DER-ROA (0.715) also recorded positive relationship, at 95% confidence level (i.e., p value was less than 0.05). It is to be noted that a variable set, namely, Size with ROE at -0.855 recorded negative relationship, at 99% confidence level. The negative values indicated that higher values of control variable of the firm did not mean higher values of financial performance. Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of TECH MAHINDRA LIMITED**, was partially rejected.

From the results of Correlation Matrix for **TECH MAHINDRA LIMITED**, it is noted that VAIC was good at improving the ROA and ROE of sample firm during the study period. In the long run of ten years of study period, the growth of intellectual coefficient positively increased the financial performance (ROA and ROE) of the firm, with the support of all the three of its components in general and human capital in particular.

Table-4.14: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of TECH MAHINDRA LIMITED during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.603	1								
	Sig. (2-tailed)	0.065									
CEE	Pearson Correlation	0.564	0.658*	1							
	Sig. (2-tailed)	0.090	0.039								
VAIC	Pearson Correlation	0.794**	0.873**	0.899**	1						
	Sig. (2-tailed)	0.006	0.001	0.000							
ROA	Pearson Correlation	0.544	0.614	0.900**	0.843**	1					
	Sig. (2-tailed)	0.104	0.059	0.000	0.002						
ROE	Pearson Correlation	-0.107	0.193	0.510	0.660*	0.503	1				
	Sig. (2-tailed)	0.769	0.593	0.132	0.038	0.139					
NPM	Pearson Correlation	0.759**	0.385	0.410	0.592	0.487	-0.150	1			
	Sig. (2-tailed)	0.011	0.272	0.239	0.071	0.154	0.678				
EPS	Pearson Correlation	0.242	0.216	0.479	0.404	0.372	0.122	0.303	1		
	Sig. (2-tailed)	0.501	0.549	0.161	0.247	0.290	0.738	0.394			
Size	Pearson Correlation	-0.003	-0.039	-0.606	-0.321	-0.603	-0.855**	0.036	-0.266	1	
	Sig. (2-tailed)	0.993	0.914	0.064	0.366	0.065	0.002	0.922	0.458		
DER	Pearson Correlation	0.260	0.016	0.541	0.373	0.715*	0.440	0.456	0.308	-0.522	1
	Sig. (2-tailed)	0.468	0.964	0.107	0.288	0.020	0.204	0.185	0.386	0.121	
N		10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

By contrast, fourteen variable sets, namely, SCE-HCE, CEE-SCE, ROA-HCE, ROA-SCE, ROE-HCE, ROE-SCE, ROE-CEE, NPM-SCE, NPM-CEE, NPM-VAIC, EPS-HCE, EPS-SCE, EPS-CEE and EPS-VAIC of **TECH MAHINDRA LIMITED**, did not record any relationship. From this, it is observed that EPS did not record any relationship with any intellectual capital variables, at any level of confidence. Hence, the sample firm needs to maintain the consistent investment on the intellectual capital, especially on human capital, which recorded positive effect on ROA, NPM and EPS.

4.15 Relationship between Intellectual Capital Performance and Financial Performance of LARSEN & TOUBRO INFOTECH LIMITED

The results of correlation analysis, in respect of intellectual capital performance and financial performance of the **LARSEN & TOUBRO INFOTECH LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are presented in **Table-4.15**. As stated previously, the Value Added Intellectual Coefficient (VAIC) and its three components, namely, Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE) were treated as proxy variables, for assessing the performance of intellectual capital (independent variable) while Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM) and Earning Per Share (EPS) were employed for examining the financial performance (dependent variable). Two control variables, namely, Size and DER were also used in this study. According to the results of Pearson Correlation Matrix analysis, the values of correlation coefficient were recorded at 0.732 for VAIC-SCE and 0.971 for ROE-VAIC, which had registered significant and positive association with each other, at 99% confidence level (i.e., p value was less than 0.01).

DER with ROE at 0.671, registered positive correlation, at 95% confidence level (i.e., p value was less than 0.05). These variables demonstrated a strong relationship among themselves. But it is clear that one variable set, namely, SCE-HCE at -0.681, earned negative relationship at 95 % confidence level, during the study period. The negative values of variables indicated that larger structural capital of the firm did not mean higher human capital. Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of LARSEN & TOUBRO INFOTECH LIMITED**, was partially rejected.

From the Table, which shows the results of Correlation Matrix, it is clear that seventeen sets of variables, namely, CEE-HCE, CEE-SCE, VAIC-HCE, VAIC-CEE, ROA-HCE, ROA-SCE, ROA-CEE, ROA-VAIC, ROE-HCE, ROE-SCE, ROE-CEE, NPM-HCE, NPM-SCE, NPM-CEE, NPM-VAIC, EPS-HCE, EPS -SCE, EPS -CEE and EPS had witnessed no association with each other, at any confidence levels (i.e., p value of 0.01 and 0.05). It is interesting to note that ROA, NPM and EPS did not have relationship with any intellectual capital variable of the sample firm as that of Size (control variable). The overall results, as provided at the Table, clearly established the fact that the investment on human capital was insufficient towards increasing the financial performance of the sample firm and to facilitate the appreciation of ROA, NPM and EPS. VAIC did have association with ROE of **LARSEN & TOUBRO INFOTECH LIMITED**. In order to stimulate the appreciation of ROA and ROE, it is imperative for **LARSEN & TOUBRO INFOTECH LIMITED**, to allot some additional funds on intellectual capital.

Table-4.15: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of LARSEN & TOUBRO INFOTECH LIMITED during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	-0.681*	1								
	Sig. (2-tailed)	0.030									
CEE	Pearson Correlation	-0.607	0.286	1							
	Sig. (2-tailed)	0.063	0.423								
VAIC	Pearson Correlation	-0.201	0.732**	-0.114	1						
	Sig. (2-tailed)	0.577	0.016	0.754							
ROA	Pearson Correlation	0.065	0.223	0.155	0.023	1					
	Sig. (2-tailed)	0.857	0.535	0.669	0.949						
ROE	Pearson Correlation	-0.114	0.334	0.265	0.971**	0.051	1				
	Sig. (2-tailed)	0.754	0.346	0.459	0.000	0.888					
NPM	Pearson Correlation	0.223	-0.264	-0.080	-0.309	-0.242	-0.401	1			
	Sig. (2-tailed)	0.535	0.460	0.826	0.385	0.501	0.251				
EPS	Pearson Correlation	-0.325	0.431	-0.288	0.464	-0.242	-0.222	-0.049	1		
	Sig. (2-tailed)	0.360	0.213	0.420	0.177	0.501	0.538	0.892			
Size	Pearson Correlation	-0.069	-0.106	0.218	0.123	-0.297	-0.206	-0.290	-0.478	1	
	Sig. (2-tailed)	0.851	0.770	0.545	0.735	0.404	0.569	0.416	0.162		
DER	Pearson Correlation	-0.440	0.214	0.411	-0.251	0.572	0.671*	-0.262	-0.150	0.000	1
	Sig. (2-tailed)	0.204	0.553	0.238	0.484	0.084	0.034	0.464	0.679	1.000	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

4.16 Relationship between Intellectual Capital Performance and Financial Performance of MINDTREE LIMITED

Table-4.16 displayed the results of correlation analysis, for intellectual capital performance and financial performance of the **MINDTREE LIMITED**, during the study period from 1st April 2010 to 31st March 2019. The Value Added Intellectual Coefficient and its three components such as Human Capital Efficiency, Structural Capital Efficiency and Capital Employed Efficiency, were employed as proxy variables, to estimate the performance of intellectual capital (independent variable) while Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM) and Earning Per Share (EPS) were covered for assessing the financial performance (dependent variable). The Size and DER acted as control variables for this study.

The results of Pearson Correlation Matrix revealed that the values of correlation coefficient were at 0.752 for CEE with HCE, 0.862 for VAIC-HCE, 0.968 for NPM-ROA, 0.986 for EPS-ROA and 0.991 for EPS and NPM and these variables had registered positive and significant association at 99% confidence level (i.e., p value was less than 0.01) during the study period. It is surprising to note that no sample variable of intellectual capital reported relationship with financial performance variables, during the study period. The insignificant values of intellectual capital variables of the sample firm indicated that there was no relationship between intellectual capital and financial performance variables. Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of MINDTREE LIMITED**, was accepted.

Table-4.16: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of MINDTREE LIMITED during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	-0.176	1								
	Sig. (2-tailed)	0.626									
CEE	Pearson Correlation	0.752**	-0.399	1							
	Sig. (2-tailed)	0.012	0.253								
VAIC	Pearson Correlation	0.862**	0.327	0.522	1						
	Sig. (2-tailed)	0.001	0.356	0.122							
ROA	Pearson Correlation	-0.324	0.469	-0.328	-0.084	1					
	Sig. (2-tailed)	0.361	0.171	0.355	0.817						
ROE	Pearson Correlation	-0.204	0.259	-0.461	-0.099	-0.001	1				
	Sig. (2-tailed)	0.572	0.471	0.180	0.786	0.997					
NPM	Pearson Correlation	-0.476	0.432	-0.328	-0.248	0.968**	-0.061	1			
	Sig. (2-tailed)	0.164	0.213	0.355	0.490	0.000	0.867				
EPS	Pearson Correlation	-0.457	0.433	-0.384	-0.231	0.986**	0.023	0.991**	1		
	Sig. (2-tailed)	0.184	0.212	0.273	0.522	0.000	0.950	0.000			
Size	Pearson Correlation	0.424	-0.202	0.191	0.262	0.224	0.410	0.074	0.162	1	
	Sig. (2-tailed)	0.222	0.575	0.597	0.465	0.535	0.240	0.839	0.656		
DER	Pearson Correlation	0.607	0.029	0.577	0.617	-0.528	-0.370	-0.549	-0.603	-0.375	1
	Sig. (2-tailed)	0.063	0.936	0.081	0.057	0.117	0.292	0.100	0.065	0.286	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

The overall results given, in the Table, clearly revealed that the investment on human capital was not sufficient to increase the financial performance of the firm and to facilitate the appreciation of ROA, ROE, NPM and EPS. In other words, human capital failed to work well with the **MINDTREE LIMITED** during the study period. The structural capital of **MINDTREE LIMITED**, in the form of SCE, positively affected the ROA and EPS. Therefore, investing on research and innovation may be enhanced to retain the profitability of the firm.

4.17 Relationship between Intellectual Capital Performance and Financial Performance of ORACLE FINANCIAL SERVICES SOFTWARE LIMITED

The results of correlation analysis, for intellectual capital performance and financial performance of the **ORACLE FINANCIAL SERVICES SOFTWARE LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are shown in **Table-4.17**. As stated earlier, the Value Added Intellectual Coefficient (VAIC) and its three components namely Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE) were adopted as proxy variables, for appraising the performance of intellectual capital (independent variable) while Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM) and Earning Per Share (EPS) were employed to assess the financial performance (dependent variable). The Size and DER acted as control variables for this study.

As per the Pearson Correlation Matrix analysis, the values of correlation coefficient at 0.921 for VAIC-SCE, 0.782 for ROA-CEE, 0.797 for ROE-HCE, 0.736 for NPM-CEE and 0.884 for NPM-VAIC, had recorded positive and significant relationship, at 99% confidence level (i.e., p value was less than 0.01). One set of variables, namely, VAIC-HCE (0.710) had earned positive relationship at 95% confidence level (i.e., p value was less than 0.05).

Table-4.17: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of ORACLE FINANCIAL SERVICES SOFTWARE LIMITED during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.508	1								
	Sig. (2-tailed)	0.134									
CEE	Pearson Correlation	0.541	0.062	1							
	Sig. (2-tailed)	0.106	0.864								
VAIC	Pearson Correlation	0.710*	0.921**	0.372	1						
	Sig. (2-tailed)	0.022	0.000	0.290							
ROA	Pearson Correlation	0.235	-0.102	0.782**	0.085	1					
	Sig. (2-tailed)	0.513	0.779	0.008	0.815						
ROE	Pearson Correlation	0.797**	-0.225	0.252	-0.002	0.387	1				
	Sig. (2-tailed)	0.006	0.533	0.483	0.996	0.270					
NPM	Pearson Correlation	0.531	-0.022	0.736**	0.884**	0.196	0.474	1			
	Sig. (2-tailed)	0.114	0.951	0.015	0.001	0.587	0.166				
EPS	Pearson Correlation	0.194	0.105	0.098	0.041	0.075	-0.201	0.249	1		
	Sig. (2-tailed)	0.591	0.773	0.787	0.910	0.837	0.578	0.489			
Size	Pearson Correlation	0.051	-0.107	0.019	0.077	-0.110	0.620	0.044	-0.181	1	
	Sig. (2-tailed)	0.889	0.768	0.958	0.833	0.763	0.056	0.904	0.617		
DER	Pearson Correlation	-0.746**	-0.088	-0.805**	-0.393	-0.688*	-0.358	0.051	0.171	-0.058	1
	Sig. (2-tailed)	0.013	0.810	0.005	0.261	0.028	0.310	0.889	0.637	0.873	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

In contrast, DER (control variable) recorded negative relationship with HCE at -0.746, CEE at -0.805 and ROA at -0.688. Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of ORACLE FINANCIAL SERVICES SOFTWARE LIMITED**, was partially rejected.

But sixteen variable sets such as SCE-HCE, CEE-HCE, CEE-SCE, VAIC-CEE, ROA-HCE, ROA-SCE, ROA-VAIC, ROE-SCE, ROE-CEE, ROE-VAIC, NPM-HCE, NPM-SCE, EPS-HCE, EPS-SCE, EPS-CEE and EPS-VAIC did not realize any positive or negative relationship with each other, during the study period. It is clear that all predictor variables of **ORACLE FINANCIAL SERVICES SOFTWARE LIMITED** played a negative role in the creation of ROA, ROE, NPM and EPS of the sample firm, as shown in the analysis. Hence, the firm need to pay special attention towards the framing of its investment strategy, to yield better results in financial performance.

4.18 Relationship between Intellectual Capital Performance and Financial Performance of HCL TECHNOLOGIES LIMITED

Table-4.18 displays the results of correlation analysis, on the intellectual capital performance and financial performance of the **HCL TECHNOLOGIES LIMITED**, during the study period from 1st April 2010 to 31st March 2019. It is understood that the values of correlation coefficient of 0.800 for VAIC with HCE, 0.830 for VAIC with SCE, 0.798 for ROA with HCE, 0.764 for ROA with VAIC, 0.895 for ROE with HCE, 0.884 for ROE with CEE, 0.778 for NPM with HCE, 0.961 for EPS with HCE, 0.904 for EPS with VAIC, 0.720 for DER with CEE and 0.890 for DER with ROE, had registered significant and positive relationship, at 99% confidence level (i.e., p value was less than 0.01). The correlation coefficient values (closer to 0.0) between intellectual capital variables and performance values, could explain financial performance in all aspects.

Table-4.18: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of HCL TECHNOLOGIES LIMITED during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.336	1								
	Sig. (2-tailed)	0.343									
CEE	Pearson Correlation	-0.807**	-0.181	1							
	Sig. (2-tailed)	0.005	0.616								
VAIC	Pearson Correlation	0.800**	0.830**	-0.604	1						
	Sig. (2-tailed)	0.005	0.003	0.064							
ROA	Pearson Correlation	0.798**	0.478	-0.473	0.764**	1					
	Sig. (2-tailed)	0.006	0.162	0.167	0.010						
ROE	Pearson Correlation	0.895**	-0.136	0.884**	0.684*	-0.628	1				
	Sig. (2-tailed)	0.000	0.708	0.001	0.029	0.052					
NPM	Pearson Correlation	0.778**	0.434	0.111	0.410	0.275	-0.128	1			
	Sig. (2-tailed)	0.008	0.210	0.760	0.240	0.442	0.724				
EPS	Pearson Correlation	0.961**	0.444	-0.122	0.904**	0.553	-0.386	0.502	1		
	Sig. (2-tailed)	0.000	0.198	0.738	0.000	0.097	0.271	0.139			
Size	Pearson Correlation	-0.140	-0.226	0.236	-0.286	-0.240	0.294	-0.013	-0.056	1	
	Sig. (2-tailed)	0.699	0.530	0.511	0.423	0.505	0.409	0.972	0.878		
DER	Pearson Correlation	-0.944**	-0.284	0.720**	-0.727**	-0.815**	0.890**	-0.361	-0.589	0.029	1
	Sig. (2-tailed)	0.000	0.427	0.019	0.017	0.004	0.001	0.306	0.073	0.936	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

It is noted that only one set of variables (ROE-VAIC with 0.684) registered positive relationship, at 95% confidence level (i.e., p value was less than 0.05). Other variable sets like CEE-HCE at -0.807, DER-HCE at -0.944, DER-VAIC at -0.727, DER-ROA at -0.815 recorded negative relationship, at 99% confidence level during the study period. The negative values indicated that larger DER of the sample firm did not mean higher performance. Also, the positive coefficient values confirmed that larger DER implied higher financial performance. Hence, the null hypothesis (NH-2) namely **there is no relationship between intellectual capital performance and financial performance of HCL TECHNOLOGIES LIMITED** was partially rejected.

From the Table of Correlation Matrix, it is clear that eleven sets of variables, namely, SCE-HCE, CEE-SCE, VAIC-CEE, ROA-SCE, ROA-CEE, ROE-SCE, NPM-SCE, NPM-CEE, NPM-VAIC, EPS-SCE and EPS-CEE had reported no association with each other, at both confidence levels (i.e., p value of 0.01 and 0.05). The overall results demonstrated that every increase in the values of HCE and VAIC enhanced the appreciation of ROA, ROE, NPM and EPS. But the control variable, namely, size had no effect on the financial performance (ROA, ROE, NPM and EPS) of **HCL TECHNOLOGIES LIMITED**.

The ROE of the sample firm had reported a negative mean value, demonstrating that the sample firm faced difficulties in generating optimum returns from its equity. Therefore, it should mobilize more funds from investors to optimize its returns. The sum of mean value of HCE, which was more than the mean value of physical assets, should convince the **HCL TECHNOLOGIES LIMITED** to create more human capital to accelerate the financial performance of the firm.

SECTION-C

Relationship between Intellectual Capital Performance and Financial Performance of PHARMACEUTICAL SECTOR FIRMS

The sample pharmaceutical sector firms were Sun Pharmaceutical Industries Limited, Divi's Laboratories Limited, Dr. Reddy's Laboratories Limited, Cipla Limited, Cadila Healthcare Limited, Torrent Pharmaceuticals Limited, Lupin Limited, Biocon Limited and Aurobindo Pharma Limited. The detailed analysis of Pearson Correlation, for nine pharmaceutical sector firms, is given as follows.

- 4.19 Relationship between Intellectual Capital Performance and Financial Performance of SUN PHARMACEUTICAL INDUSTRIES LIMITED
- 4.20 Relationship between Intellectual Capital Performance and Financial Performance of DIVI'S LABORATORIES LIMITED
- 4.21 Relationship between Intellectual Capital Performance and Financial Performance of DR. REDDY'S LABORATORIES LIMITED
- 4.22 Relationship between Intellectual Capital Performance and Financial Performance of CIPLA LIMITED
- 4.23 Relationship between Intellectual Capital Performance and Financial Performance of CADILA HEALTHCARE LIMITED
- 4.24 Relationship between Intellectual Capital Performance and Financial Performance of TORRENT PHARMACEUTICALS LIMITED
- 4.25 Relationship between Intellectual Capital Performance and Financial Performance of LUPIN LIMITED
- 4.26 Relationship between Intellectual Capital Performance and Financial Performance of BIOCON LIMITED, and
- 4.27 Relationship between Intellectual Capital Performance and Financial Performance of AUROBINDO PHARMA LIMITED

4.19 Relationship between Intellectual Capital Performance and Financial Performance of SUN PHARMACEUTICAL INDUSTRIES LIMITED

The results of correlation analysis, for intellectual capital performance and financial performance of the **SUN PHARMACEUTICAL INDUSTRIES LIMITED**, during the study period from 1st April 2010 to 31st March 2019 are presented in **Table-4.19**. Four variables, namely, HCE, SCE, CEE and VAIC were employed as independent variables while another four variables, namely, ROA, ROE, NPM and EPS were considered dependent variables. Two other variables, namely, Size and DER were used as control variables for this analysis. According to the Table, the values of correlation coefficient, recorded by SCE-HCE were at 0.959, CEE-HCE at 0.911, CEE-SCE at 0.882, VAIC-HCE at 0.992, VAIC-SCE at 0.986, VAIC-CEE at 0.914, ROA-VAIC at 0.998, ROE-VAIC at 0.834, NPM-HCE at 0.943, NPM-VAIC at 0.996, EPS-CEE at 0.745, EPS-VAIC at 0.864, EPS-ROA at 1.000, DER-HCE at 0.775, DER-SCE at 0.758 and DER-VAIC a 0.782 and these variables had recorded positive and significant correlation, at 99% confidence level (i.e., p value was less than 0.01).

These correlation values were further probed by considering their direction of correlation and its significant level. Two variable sets, namely, ROA-CEE (-0.759) and DER-ROA (-0.876) registered negative relationship with each other, at 99% confidence level. But one variable set, namely, NPM-CEE (0.704) recorded positive relationship, at 95% confidence level (i.e., p value was less than 0.05). Hence, the null hypothesis (NH-2) namely **there is no relationship between intellectual capital performance and financial performance of SUN PHARMACEUTICAL INDUSTRIES LIMITED**, was rejected. It is found from the Table that eight sets of variables of ROA-HCE, ROA-SCE, ROE-HCE, ROE-SCE, ROE-CEE, NPM-SCE, EPS-HCE and EPS-SCE had realized no association with each other variables, at any confidence level (i.e., p value of 0.01 and 0.05).

Table-4. 19: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of SUN PHARMACEUTICAL INDUSTRIES LIMITED during the Study Period from 1stApril 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.959**	1								
	Sig. (2-tailed)	0.000									
CEE	Pearson Correlation	0.911**	0.882**	1							
	Sig. (2-tailed)	0.000	0.001								
VAIC	Pearson Correlation	0.992**	0.986**	0.914**	1						
	Sig. (2-tailed)	0.000	0.000	0.000							
ROA	Pearson Correlation	-0.511	-0.565	-0.759**	0.998**	1					
	Sig. (2-tailed)	0.131	0.089	0.011	0.000						
ROE	Pearson Correlation	-0.529	-0.446	-0.470	0.834**	0.392	1				
	Sig. (2-tailed)	0.116	0.197	0.170	0.003	0.263					
NPM	Pearson Correlation	0.943**	-0.508	0.704*	0.996**	-0.486	0.374	1			
	Sig. (2-tailed)	0.000	0.133	0.023	0.000	0.154	0.286				
EPS	Pearson Correlation	-0.497	-0.553	0.745**	0.864**	1.000**	0.392	-0.548	1		
	Sig. (2-tailed)	0.144	0.097	0.013	0.001	0.000	0.263	0.101			
Size	Pearson Correlation	0.345	0.268	0.208	0.315	0.152	0.031	0.191	0.160	1	
	Sig. (2-tailed)	0.329	0.454	0.564	0.375	0.674	0.933	0.597	0.659		
DER	Pearson Correlation	0.775**	0.758**	-0.446	0.782**	-0.876**	-0.433	-0.507	-0.535	0.125	1
	Sig. (2-tailed)	0.008	0.011	0.196	0.007	0.001	0.212	0.135	0.111	0.731	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

The insignificant correlation, among some sets of variables, relating to intellectual capital performance and financial performance established the absence of multicollinearity among the sets of independent variables. It is to be noted that Size (control variables) did not correlate with any dependent variable of **SUN PHARMACEUTICAL INDUSTRIES LIMITED**, during the study period. But DER (control variables) had secured an association with HCE, SCE, VAIC and ROA. It is inferred that DER had long-term effect on **SUN PHARMACEUTICAL INDUSTRIES LIMITED**'s growth. Therefore, investing on employees should be increased to enhance the human assets of the firm. It is to be noted that CEE of **SUN PHARMACEUTICAL INDUSTRIES LIMITED** had reported the lowest mean value and hence, the firm needs to cut down the expenses on tangible assets, to maintain the sustainable growth of sample firm.

4.20 Relationship between Intellectual Capital Performance and Financial Performance of DIVI'S LABORATORIES LIMITED

Table-4.20 shows the results of correlation analysis, for intellectual capital performance and financial performance of the **DIVI'S LABORATORIES LIMITED**, during the study period from 1st April 2010 to 31st March 2019. The values of correlation coefficient stood at 0.892 for VAIC-HCE, 0.757 for VAIC-SCE, 0.887 for ROA-VAIC, 0.792 for ROE-HCE, 0.765 for ROE-VAIC, 0.978 for NPM-ROA, 0.871 for NPM-ROE, 0.974 for EPS-HCE, 0.858 for EPS-SCE, 1.000 for EPS-VAIC, at 99% confidence level (i.e., p value was less than 0.01). But one variable set, namely, ROA-CEE (-0.713) earned a negative relationship at 95% confidence levels. Two sets of variables namely ROA-HCE (0.639) and ROE-CEE (0.657) secured relationship, at 95% confidence level (i.e., p value was less than 0.05). The intellectual capital variables were positively related to the return on equity during the study period. Hence, the null hypothesis (NH-2) namely **there is no relationship between intellectual capital performance and financial performance of DIVI'S LABORATORIES LIMITED**, was rejected.

Table-4. 20: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of DIVI'S LABORATORIES LIMITED during the Study Period from 1st April 2010 to 31stMarch 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.381	1								
	Sig. (2-tailed)	0.278									
CEE	Pearson Correlation	-0.566	-0.191	1							
	Sig. (2-tailed)	0.088	0.598								
VAIC	Pearson Correlation	0.892**	0.757**	-0.488	1						
	Sig. (2-tailed)	0.001	0.011	0.153							
ROA	Pearson Correlation	0.639*	-0.337	-0.713*	0.887**	1					
	Sig. (2-tailed)	0.047	0.341	0.021	0.001						
ROE	Pearson Correlation	0.792**	-0.415	0.657*	0.765**	0.916**	1				
	Sig. (2-tailed)	0.006	0.234	0.039	0.010	0.000					
NPM	Pearson Correlation	-0.568	-0.261	0.588	-0.530	0.978**	0.871**	1			
	Sig. (2-tailed)	0.087	0.467	0.074	0.115	0.000	0.001				
EPS	Pearson Correlation	0.974**	0.858**	0.580	1.000**	-0.545	-0.250	-0.508	1		
	Sig. (2-tailed)	0.000	0.002	0.079	0.000	0.103	0.487	0.134			
Size	Pearson Correlation	0.206	-0.044	-0.577	0.112	-0.284	-0.104	-0.174	-0.167	1	
	Sig. (2-tailed)	0.568	0.903	0.081	0.758	0.427	0.776	0.630	0.645		
DER	Pearson Correlation	-0.539	0.102	0.512	-0.315	0.338	0.471	0.262	0.244	-0.239	1
	Sig. (2-tailed)	0.108	0.778	0.131	0.375	0.339	0.170	0.464	0.497	0.505	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

It is found from the overall results that eleven sets, namely, SCE-HCE, CEE-HCE, CEE-SCE, VAIC-CEE, ROA-SCE, ROE-SCE, NPM-HCE, NPM-SCE, NPM-CEE, NPM-VAIC and EPS-CEE experienced no association. The insignificant correlations, among the same set of variables relating to intellectual capital performance and financial performance, established the absence of multicollinearity among the sets of independent variables. The DER, a control variable of **DIVI'S LABORATORIES LIMITED**, was not associated with any variable either positively or negatively.

The NPM recorded the highest mean value, among the dependent variables, indicating that the **DIVI'S LABORATORIES LIMITED** accumulated more profit followed by EPS and ROA. But ROE had reported the lowest mean value, demonstrating that the sample firm failed to mobilize the required funds. Hence the firm must take steps to issue more shares to the public.

4.21. Relationship between Intellectual Capital Performance and Financial Performance of DR. REDDY'S LABORATORIES LIMITED

The results of correlation analysis, for intellectual capital performance and financial performance of the **DR. REDDY'S LABORATORIES LIMITED**, during the study period from 1st April 2010 to 31st March 2019 are displayed in **Table-4.21**. The Value-Added Intellectual Coefficient (VAIC) and its components, namely, Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE) were adopted as proxy variables, for estimating the performance of intellectual capital (independent variable) while Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM) and Earning Per Share (EPS) were employed, to evaluate the financial performance (dependent variable). Two control variables, Size and DER were also considered in this study.

Table-4.21: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of DR. REDDY'S LABORATORIES LIMITED during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.899**	1								
	Sig. (2-tailed)	0.000									
CEE	Pearson Correlation	0.237	0.188	1							
	Sig. (2-tailed)	0.509	0.604								
VAIC	Pearson Correlation	0.976**	0.959**	0.320	1						
	Sig. (2-tailed)	0.000	0.000	0.367							
ROA	Pearson Correlation	0.422	0.296	-0.549	0.297	1					
	Sig. (2-tailed)	0.225	0.406	0.100	0.404						
ROE	Pearson Correlation	-0.555	-0.467	0.646*	-0.583	0.425	1				
	Sig. (2-tailed)	0.096	0.174	0.043	0.077	0.221					
NPM	Pearson Correlation	0.988**	0.310	-0.505	0.328	0.994**	0.397	1			
	Sig. (2-tailed)	0.000	0.383	0.136	0.355	0.000	0.256				
EPS	Pearson Correlation	0.527	0.396	-0.516	0.449	0.408	0.322	0.991**	1		
	Sig. (2-tailed)	0.117	0.257	0.126	0.193	0.242	0.364	0.000			
Size	Pearson Correlation	0.990**	0.892**	0.286	0.970**	0.340	-0.633*	0.360	0.446	1	
	Sig. (2-tailed)	0.000	0.001	0.423	0.000	0.336	0.049	0.306	0.196		
DER	Pearson Correlation	-0.516	-0.585	0.586	-0.481	-0.644*	-0.085	-0.630	-0.705*	-0.482	1
	Sig. (2-tailed)	0.126	0.076	0.075	0.160	0.045	0.816	0.051	0.023	0.158	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

The results of Pearson Correlation Matrix clearly revealed that the values of correlation coefficient were at 0.899 for SCE-HCE, 0.976 for VAIC-HCE, 0.959 for VAIC-SCE, 0.988 for NPM-HCE, 0.994 for NPM-ROA, 0.991 for EPS-NPM, 0.990 for Size-HCE, 0.892 for Size-SCE and 0.970 for Size-VAIC, at 99% confidence level (i.e., p value was less than 0.01). The results of net profit margin further confirmed the effective influence of human capital on the financial performance. The intellectual capital variables recorded positive correlation with few sets of variables, namely, ROE-CEE (0.646) stood at 95% confidence level (i.e., p value was less than 0.05). But three variable sets, namely, Size-ROE (-0.633), DER-ROA (-0.644) and DER-EPS (-0.705) recorded negative relationship, at 95 % confidence level, during the study period. The insignificant correlations among the sample sets of variables, relating to intellectual capital performance, established the absence of multicollinearity. Hence, the null hypothesis (NH-2), **there is no relationship between intellectual capital performance and financial performance of DR. REDDY'S LABORATORIES LIMITED**, was accepted.

The overall results, as given in the Table, showed that seventeen sets of variables, namely, CEE-HCE, CEE-SCE, VAIC-CEE, ROA-HCE, ROA-SCE, ROA-CEE, ROA-VAIC, ROE-HCE, ROE-SCE, ROE-VAIC, NPM-SCE, NPM-CEE, NPM-VAIC, EPS-HCE, EPS-SCE, EPS-CEE and EPS-VAIC had witnessed no relationship with each other at any confidence level (i.e., p-value of 0.01 and 0.05). But DER (Control Variable) was negatively correlated with ROA and EPS, for **DR. REDDY'S LABORATORIES LIMITED**, during the study period. Nevertheless, human capital of **DR. REDDY'S LABORATORIES LIMITED** witnessed positive effect on all financial performance variables. In this connection, it is suggested that further contribution to human capital would certainly promote the value of **DR. REDDY'S LABORATORIES LIMITED**.

4.22. Relationship between Intellectual Capital Performance and Financial Performance of CIPLA LIMITED

Table-4.22 presented the results of correlation analysis, for intellectual capital performance and financial performance of the **CIPLA LIMITED**, during the study period from 1st April 2010 to 31st March 2019. According to the Pearson Correlation Matrix analysis, its value, recorded by SCE-HCE was at 0.838, VAIC-HCE at 0.974, VAIC-SCE at 0.939, ROE-ROA at 0.822, NPM-HCE at 0.804, NPM-VAIC at 0.780, NPM-ROA at 0.951, NPM-ROE at 0.839, EPS-HCE at 0.798, EPS-VAIC at 0.770, EPS-ROA at 0.978, EPS-ROE at 0.819, EPS-NPM at 0.988, Size-HCE at 0.978, Size-SCE at 0.820 and Size-VAIC at 0.948 and they had registered significant and positive correlation, at 99% confidence level (i.e., p value was less than 0.01).

Three sets of variables, namely, ROA-VAIC (0.649), NPM-SCE (0.698) and EPS-SCE (0.678) recorded positive relationship at 95% confidence level (i.e., p value was less than 0.05). At the same time, four variable sets like Size-ROA at -0.714, Size-ROE at -0.703, Size-NPM at -0.850 and Size-EPS at -0.826 recorded negative relationship with each other. The negative values indicated that larger size (a control variable) did not mean higher financial performance of firms. Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of CIPLA LIMITED**, was partially rejected.

It is found from the Table that eleven sets of variables, namely, CEE-HCE, CEE-SCE, VAIC-CEE, ROA-SCE, ROA-CEE, ROE-HCE, ROE-SCE, ROE-CEE, ROE-VAIC, NPM-CEE and EPS-CEE had witnessed no association with each other, at any confidence level (i.e., p value of 0.01 and 0.05). The insignificant correlations among the sample sets of variables, relating to intellectual capital performance and financial performance, confirmed the absence of multicollinearity among the sets of independent variables.

Table-4.22: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of CIPLA LIMITED during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.838**	1								
	Sig. (2-tailed)	0.002									
CEE	Pearson Correlation	0.428	0.228	1							
	Sig. (2-tailed)	0.217	0.527								
VAIC	Pearson Correlation	0.974**	0.939**	0.385	1						
	Sig. (2-tailed)	0.000	0.000	0.273							
ROA	Pearson Correlation	0.674*	-0.572	-0.327	0.649*	1					
	Sig. (2-tailed)	0.033	0.084	0.356	0.042						
ROE	Pearson Correlation	-0.612	-0.517	-0.183	-0.591	0.822*	1				
	Sig. (2-tailed)	0.060	0.126	0.613	0.072	0.004					
NPM	Pearson Correlation	0.804**	0.698*	-0.207	0.780**	0.951**	0.839**	1			
	Sig. (2-tailed)	0.005	0.025	0.566	0.008	0.000	0.002				
EPS	Pearson Correlation	0.798**	0.678*	-0.328	0.770**	0.978**	0.819**	0.988**	1		
	Sig. (2-tailed)	0.006	0.031	0.355	0.009	0.000	0.004	0.000			
Size	Pearson Correlation	0.978**	0.820**	0.306	0.948**	-0.714*	-0.703*	-0.850**	-0.826**	1	
	Sig. (2-tailed)	0.000	0.004	0.390	0.000	0.020	0.023	0.002	0.003		
DER	Pearson Correlation	0.133	-0.143	0.464	0.032	-0.080	0.314	0.033	-0.065	0.019	1
	Sig. (2-tailed)	0.715	0.693	0.176	0.931	0.825	0.376	0.927	0.858	0.959	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

DER (control variable) was not correlated with any dependent and independent variables of **CIPLA LIMITED**, during the study period. It is inferred that VAIC and its components had exercised long-term effect on **CIPLA LIMITED**'s growth. In addition, it is noted that the aggregate value of VAIC clearly indicated the fact that **CIPLA LIMITED** produced more value for each one INR employed. Hence investment on tangible assets may be reduced and there must be more investment on intangible assets for its better financial performance.

4.23. Relationship between Intellectual Capital Performance and Financial Performance of CADILA HEALTHCARE LIMITED

The results of correlation analysis, in respect of intellectual capital performance and financial performance of the **CADILA HEALTHCARE LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are given in **Table-4.23**. According to the results of Pearson Correlation Matrix, the values of correlation coefficient were at 0.899 for SCE-HCE, 0.959 for VAIC-HCE, 0.985 for VAIC-SCE, 0.989 for NPM-VAIC, 0.988 for EPS-VAIC and EPS-NPM and these variables had registered significant and positive association with each other, at 99% confidence level (i.e., p value was less than 0.01). ROE with HCE (0.637) registered positive correlation, at 95% confidence level (i.e., p value was less than 0.05). These values indicated strong correlation among these variables.

The strong correlation, among intellectual capital variables, implied that the intellectual capital variables could explain the VAIC in a significant manner. In other words, intellectual capital variables were correlated with financial performance variables, especially with NPM and EPS. Hence, the null hypothesis (NH-2), namely **there is no relationship between intellectual capital performance and financial performance of CADILA HEALTHCARE LIMITED**, was partially rejected.

Table-4. 23: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of CADILA HEALTHCARE LIMITED during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.899**	1								
	Sig. (2-tailed)	0.000									
CEE	Pearson Correlation	-0.152	-0.010	1							
	Sig. (2-tailed)	0.675	0.977								
VAIC	Pearson Correlation	0.959**	0.985**	0-.031	1						
	Sig. (2-tailed)	0.000	0.000	0.933							
ROA	Pearson Correlation	-0.175	-0.442	-0.313	-0.357	1					
	Sig. (2-tailed)	0.629	0.200	0.378	0.311						
ROE	Pearson Correlation	0.637*	-0.075	-0.178	-0.123	0.389	1				
	Sig. (2-tailed)	0.048	0.837	0.623	0.736	0.267					
NPM	Pearson Correlation	-0.275	-0.529	-0.208	0.989**	-0.447	0.396	1			
	Sig. (2-tailed)	0.441	0.116	0.565	0.000	0.195	0.258				
EPS	Pearson Correlation	-0.214	-0.477	-0.326	0.998**	-0.395	0.380	0.988**	1		
	Sig. (2-tailed)	0.554	0.163	0.357	0.000	0.259	0.278	0.000			
Size	Pearson Correlation	0.432	0.403	-0.061	0.420	0.460	0.429	0.400	0.433	1	
	Sig. (2-tailed)	0.213	0.248	0.866	0.227	0.181	0.216	0.253	0.211		
DER	Pearson Correlation	-0.247	-0.220	0.276	-0.230	0.593	0.705*	-0.164	0.584	0.551	1
	Sig. (2-tailed)	0.491	0.541	0.441	0.522	0.071	0.023	0.651	0.076	0.099	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

According to the Table, sixteen sets of variables, namely, CEE-HCE, CEE-SCE, VAIC-CEE, ROA-HCE, ROA-SCE, ROA-CEE, ROA-VAIC, ROE-SCE, ROE-CEE, ROE-VAIC, NPM-HCE, NPM-SCE, NPM-CEE, EPS-HCE, EPS-SCE and EPS-CEE had registered no association with each other, at both the confidence levels (i.e., p value of 0.01 and 0.05). The overall results, as provided at the Table, clearly revealed that two control variables namely Size and DER of **CADILA HEALTHCARE LIMITED** were associated with neither intellectual capital variables nor financial performance variables, during the study period. Hence, it is inferred that Size and DER reduced the value of intellectual capital performance and financial performance of **CADILA HEALTHCARE LIMITED**, which generated higher value from its intangible resources than from the physical and financial resources. Hence, the firm should reduce investment on the tangible sources and increase investment on intangible assets, to increase the financial performance of **CADILA HEALTHCARE LIMITED**.

4.24. Relationship between Intellectual Capital Performance and Financial Performance of TORRENT PHARMACEUTICALS LIMITED

Table-4.24 presents the results of correlation analysis, for intellectual capital performance and financial performance of the **TORRENT PHARMACEUTICALS LIMITED**, during the study period from 1st April 2010 to 31st March 2019. As stated earlier, the Value Added Intellectual Coefficient (VAIC) and its components, namely, Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE) were considered as proxy variables, for measuring the performance of intellectual capital (independent variable) while Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM) and Earning Per Share (EPS) were employed, to assess the financial performance (dependent variable). The Size and DER acted as control variables for this study.

Table-4.24: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of TORRENT PHARMACEUTICALS LIMITED during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	-0.037	1								
	Sig. (2-tailed)	0.919									
CEE	Pearson Correlation	0.775**	0.268	1							
	Sig. (2-tailed)	0.008	0.453								
VAIC	Pearson Correlation	0.814**	0.361	0.983**	1						
	Sig. (2-tailed)	0.004	0.305	0.000							
ROA	Pearson Correlation	0.850**	0.672*	-0.444	0.905**	1					
	Sig. (2-tailed)	0.002	0.033	0.198	0.000						
ROE	Pearson Correlation	0.883**	0.331	0.058	0.903**	-0.289	1				
	Sig. (2-tailed)	0.001	0.350	0.873	0.000	0.418					
NPM	Pearson Correlation	0.053	0.675*	-0.314	0.987**	-0.382	-0.356	1			
	Sig. (2-tailed)	0.884	0.032	0.376	0.000	0.275	0.313				
EPS	Pearson Correlation	0.979**	0.664*	-0.484	0.999**	-0.554	-0.286	-0.143	1		
	Sig. (2-tailed)	0.000	0.036	0.156	0.000	0.097	0.423	0.694			
Size	Pearson Correlation	0.754**	0.327	-0.293	-0.515	-0.504	0.256	-0.398	-0.546	1	
	Sig. (2-tailed)	0.012	0.357	0.411	0.128	0.137	0.476	0.254	0.103		
DER	Pearson Correlation	0.873**	0.166	0.886**	0.009	-0.334	-0.005	-0.201	-0.378	-0.097	1
	Sig. (2-tailed)	0.001	0.647	0.001	0.979	0.346	0.990	0.578	0.281	0.789	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

The values of correlation coefficients were at 0.775 for CEE with HCE, 0.814 for VAIC with HCE, 0.983 for VAIC-CEE, 0.850 for ROA-HCE, 0.905 for ROA with VAIC, 0.883 for ROE with HCE, 0.903 for ROE with VAIC, 0.987 for NPM with VAIC, 0.979 for EPS with HCE, 0.999 for EPS with VAIC, 0.754 for Size with HCE, 0.873 for DER with HCE and 0.886 for DER with CEE and they had registered significant and positive relationship, at 99% confidence level (i.e., p value was less than 0.01). ROA-SCE (0.672), NPM-SCE (0.675) and EPS-SCE (0.664) had registered positive relationship with each other, at 95% confidence level (i.e., p value was less than 0.05). Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of TORRENT PHARMACEUTICALS LIMITED**, was partially rejected.

It was evident from the analysis that the following nine sets of variables such as SCE-HCE, CEE-SCE, VAIC-SCE, ROA-CEE, ROE-SCE, ROE-CEE, NPM-HCE, NPM-CEE and EPS-CEE, had not realized correlation with each other, at both the confidence levels (i.e., p value of 0.01 and 0.05). Size and DER (control variables), recording positive values, supported the growth of financial performance of **TORRENT PHARMACEUTICALS LIMITED** in the long run. In this regard, it is essential for **TORRENT PHARMACEUTICALS LIMITED** to monitor the intellectual capital and promote its performance.

4.25. Relationship between Intellectual Capital Performance and Financial Performance of LUPIN LIMITED

The results of correlation analysis, for intellectual capital performance and financial performance of the **LUPIN LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are displayed in **Table-4.25**.

Table-4.25: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of LUPIN LIMITED during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.976**	1								
	Sig. (2-tailed)	0.000									
CEE	Pearson Correlation	-0.649*	-0.542	1							
	Sig. (2-tailed)	0.042	0.105								
VAIC	Pearson Correlation	0.990**	0.997**	-0.581	1						
	Sig. (2-tailed)	0.000	0.000	0.078							
ROA	Pearson Correlation	-0.285	-0.227	0.082	0.957**	1					
	Sig. (2-tailed)	0.425	0.528	0.822	0.000						
ROE	Pearson Correlation	0.929**	-0.605	0.143	0.907**	0.531	1				
	Sig. (2-tailed)	0.000	0.064	0.693	0.000	0.114					
NPM	Pearson Correlation	-0.612	-0.549	0.336	0.931**	-0.578	0.609	1			
	Sig. (2-tailed)	0.060	0.100	0.343	0.000	0.080	0.062				
EPS	Pearson Correlation	0.737**	-0.336	0.148	0.993**	-0.363	0.575	0.966**	1		
	Sig. (2-tailed)	0.015	0.342	0.682	0.000	0.303	0.082	0.000			
Size	Pearson Correlation	0.975**	0.939**	-0.645*	-0.254	-0.445	-0.555	-0.393	-0.542	1	
	Sig. (2-tailed)	0.000	0.000	0.044	0.479	0.197	0.096	0.262	0.105		
DER	Pearson Correlation	0.146	0.044	-0.071	0.086	-0.507	-0.333	0.826**	-0.577	0.296	1
	Sig. (2-tailed)	0.688	0.904	0.846	0.813	0.134	0.347	0.003	0.081	0.406	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

It is evident that the values of correlation coefficient were at 0.976 for SCE-HCE, 0.990 for VAIC-HCE, 0.997 for VAIC-SCE, 0.957 for ROA-VAIC, 0.929 for ROE-HCE, 0.907 for ROE-VAIC, 0.931 for NPM -VAIC, 0.737 for EPS-HCE, 0.993 for EPS-VAIC, 0.966 for EPS-NPM, 0.975 for Size-HCE, 0.939 for Size-SCE and 0.826 for DER-NPM. They had recorded significant and positive relationship, at 99% confidence level (i.e., p value was less than 0.01). It was found that the correlation coefficient values were close to 0.0, and hence VAIC could explain better the financial performance on all aspects. Variable sets, namely, CEE-HCE (-0.649) and Size-CEE (-0.645) registered negative relationship, at 95% confidence level (i.e., p value was less than 0.05). The positive correlation between ROA, ROE, NPM, EPS and VAIC indicated increase in intellectual capital performance, leading to increase in the financial performance during the study period. Hence, the null hypothesis (NH-2), namely **there is no relationship between intellectual capital performance and financial performance of LUPIN LIMITED**, was rejected.

From the Table of Correlation Matrix, it is clear that twelve sets of variables, namely, CEE-SCE, VAIC-CEE, ROA-HCE, ROA-SCE, ROA-CEE, ROE-SCE, ROE-CEE, NPM-HCE, NPM-SCE, NPM-CEE, EPS-SCE and EPS-CEE had witnessed no association with each other, at both the confidence values (i.e., p value of 0.01 and 0.05). It is noted that insignificant correlations, among some sets of variables, relating to intellectual capital performance and financial performance, established the absence of multicollinearity among the sets of independent variables. One control variable, namely, Size was correlated with HCE, SCE and CEE of intellectual capital variables of **LUPIN LIMITED** and it contributed to the improvement of financial performance (ROA, ROE, NPM and EPS) of **LUPIN LIMITED**. Further, capital employed by **LUPIN LIMITED**, had recorded minimum value, demonstrating that spending on tangible assets was not sufficient to develop the wealth of the firm. Hence, **LUPIN LIMITED** is advised to increase its assets and reduce its liabilities.

4.26. Relationship between Intellectual Capital Performance and Financial Performance of BIOCON LIMITED

Table-4.26 shows the results of correlation analysis, for intellectual capital performance and financial performance of the **BIOCON LIMITED**, during the study period from 1st April 2010 to 31st March 2019. The Pearson Correlation Matrix analysis showed that its values achieved by VAIC-HCE were at 0.945, VAIC-SCE at 0.878, NPM-ROA at 0.998, EPS-ROA at 0.999, EPS-NPM at 1.000, Size-HCE at 0.958 and Size-VAIC at 0.907 and these variable sets had registered significant and positive correlation, at 99% confidence level (i.e., p value was less than 0.01). Few other variable sets like ROA with HCE (-0.763), ROA with VAIC (-0.780), NPM with HCE (-0.786), NPM with VAIC (-0.797), EPS with HCE (-0.769), EPS with VAIC (-0.783), Size with ROA (-0.875), Size with NPM (-0.897) Size with EPS (-0.886) and DER with HCE (-0.933), DER with VAIC (-0.879) and DER with Size (-0.894) recorded negative relationship, at 99 % confidence level, during the study period.

The negative association between intellectual capital performance variables and financial performance variables, revealed the decrease in intellectual capital leading to decrease in financial performance. But, three sets of variables, namely, ROA-SCE (-0.660), NPM-SCE (0.666) and EPS-SCE (-0.658) also recorded negative relationship at 95% confidence level (i.e., p value was less than 0.05). These correlation values were further analysed by considering their direction of negative association and its significant level. Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of BIOCON LIMITED**, was accepted.

Table-4. 26: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of BIOCON LIMITED during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.674*	1								
	Sig. (2-tailed)	0.033									
CEE	Pearson Correlation	0.063	-0.051	1							
	Sig. (2-tailed)	0.863	0.888								
VAIC	Pearson Correlation	0.945**	0.878**	0.021	1						
	Sig. (2-tailed)	0.000	0.001	0.954							
ROA	Pearson Correlation	-0.763**	-0.660*	-0.029	-0.780**	1					
	Sig. (2-tailed)	0.010	0.038	0.938	0.008						
ROE	Pearson Correlation	0.395	0.389	-0.492	0.439	-0.026	1				
	Sig. (2-tailed)	0.258	0.267	0.149	0.205	0.944					
NPM	Pearson Correlation	-0.786**	-0.666*	-0.054	-0.797**	0.998**	-0.023	1			
	Sig. (2-tailed)	0.007	0.036	0.881	0.006	0.000	0.949				
EPS	Pearson Correlation	-0.769**	-0.658*	-0.059	-0.783**	0.999**	-0.006	1.000**	1		
	Sig. (2-tailed)	0.009	0.038	0.872	0.007	0.000	0.987	0.000			
Size	Pearson Correlation	0.958**	0.662*	0.090	0.907**	-0.875**	0.178	-0.897**	-0.886**	1	
	Sig. (2-tailed)	0.000	0.037	0.804	0.000	0.001	0.622	0.000	0.001		
DER	Pearson Correlation	-0.933**	-0.616	-0.054	-0.879**	0.693*	-0.327	0.713*	0.693*	-0.894**	1
	Sig. (2-tailed)	0.000	0.058	0.881	0.001	0.026	0.357	0.021	0.026	0.000	
	N	10	10	10	10	10	10	10	10	10	10

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

The correlation matrix analysis revealed that ten sets of variables, namely, CEE-HCE, CEE-SCE, VAIC-CEE, ROA-CEE, ROE-HCE, ROE-SCE, ROE-CEE, ROE-VAIC, NPM-CEE and EPS-CEE had witnessed no association with each other, at all the two confidence levels (i.e., p value of 0.01 and 0.05). ROE (financial performance variable) did not correlate with any variables of intellectual capital for **BIOCON LIMITED**. It is surprising to note that HCE and VAIC failed at improving the financial performance, during the study period. The Human Capital Efficiency of **BIOCON LIMITED** earned a value which was more than the mean value of physical assets. In other words, the sample firm earned high value from its intangible resources than from physical and financial resources. It is suggested to **BIOCON LIMITED** to consider the intangible assets for higher investment than tangible assets.

4.27. Relationship between Intellectual Capital Performance and Financial Performance of AUROBINDO PHARMA LIMITED

The results of correlation analysis, in respect of intellectual capital performance and financial performance of the **AUROBINDO PHARMA LIMITED**, are provided in **Table-4.27** during the study period from 1st April 2010 to 31st March 2019. According to the results of Pearson Correlation Matrix analysis, the values of correlation coefficient standing at 0.887 for SCE-HCE, 0.968 for VAIC-HCE, 0.973 for VAIC-SCE, 0.843 for NPM-ROA, 0.998 for EPS-ROA, 0.872 for EPS-NPM, 0.992 for Size-HCE, 0.874 for Size-SCE and 0.957 for Size-VAIC, had registered significant and positive association with each other, at 99% confidence level (i.e., p value was less than 0.01). Further, DER with SCE at 0.713 and DER with VAIC at 0.707 registered positive correlation, at 95% confidence level (i.e., p value was less than 0.05). These values indicated strong correlation, among these variables. But intellectual capital and its components failed to earn positive relationship, at both 99% and 95% confidence levels, during the study period. Hence, the null hypothesis (NH-2), namely, **there is no relationship between intellectual capital performance and financial performance of AUROBINDO PHARMA LIMITED**, was accepted.

Table-4. 27: Results of Pearson Correlation showing the Relationship between Intellectual Capital Performance and Financial Performance of AUROBINDO PHARMA LIMITED during the Study Period from 1st April 2010 to 31st March 2019

		HCE	SCE	CEE	VAIC	ROA	ROE	NPM	EPS	Size	DER
HCE	Pearson Correlation	1									
	Sig. (2-tailed)										
SCE	Pearson Correlation	0.887**	1								
	Sig. (2-tailed)	0.001									
CEE	Pearson Correlation	-0.226	-0.039	1							
	Sig. (2-tailed)	0.530	0.916								
VAIC	Pearson Correlation	0.968**	0.973**	-0.098	1						
	Sig. (2-tailed)	0.000	0.000	0.788							
ROA	Pearson Correlation	0.432	0.197	-0.483	0.307	1					
	Sig. (2-tailed)	0.212	0.585	0.158	0.388						
ROE	Pearson Correlation	-0.037	0.020	0.508	0.006	0.203	1				
	Sig. (2-tailed)	0.920	0.956	0.134	0.987	0.574					
NPM	Pearson Correlation	-0.095	-0.280	-0.259	-0.205	0.843**	0.382	1			
	Sig. (2-tailed)	0.794	0.433	0.470	0.570	0.002	0.276				
EPS	Pearson Correlation	0.388	0.161	-0.451	0.266	0.998**	0.247	0.872**	1		
	Sig. (2-tailed)	0.268	0.657	0.191	0.457	0.000	0.492	0.001			
Size	Pearson Correlation	0.992**	0.874**	-0.242	0.957**	0.414	-0.126	-0.122	0.366	1	
	Sig. (2-tailed)	0.000	0.001	0.501	0.000	0.235	0.729	0.736	0.298		
DER	Pearson Correlation	0.629	0.713*	0.301	0.707*	0.115	0.242	-0.181	0.091	0.602	1
	Sig. (2-tailed)	0.051	0.021	0.399	0.022	0.752	0.500	0.617	0.803	0.066	

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

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) database and computed using IBM SPSS 16.0

The results of Correlation Matrix, given in the Table, revealed that ROA, ROE, NPM and DER had witnessed no association with HCE, SCE, CEE and VAIC, at both confidence levels (i.e., p value of 0.01 and 0.05). The insignificant correlation among some sets of variables, relating to intellectual capital performance and financial performance, established the absence of multicollinearity among the sets of independent variables of **AUROBINDO PHARMA LIMITED** whereas Size and DER (control variables) boosted the values of intellectual capital in a positive manner, during the study period. It is inferred that there was insufficient investment on intellectual capital, which had caused minimal performance of financial status of sample pharmaceutical firm.

4.28 Measurement of Efficiency of Intellectual Capital and Financial Performance of Commercial Banks in India

Sub-hypotheses of the null hypothesis, “**there is no relationship between intellectual capital performance and financial performance of sample firms**”, was tested individually for the twenty-seven sample firms and the results are summarized in **Table-4.28**. Regarding Banking Sector Firms, the null hypotheses were partially rejected for eight sample banks and partially accepted for one sample bank and rejected for one sample bank. Regarding Information Technology Sector Firms, the null hypotheses were rejected for two IT firms. For one firm the hypotheses were accepted whereas for five firms, the null hypotheses were partially rejected. In the case of Pharmaceutical Sector Firms, the null hypotheses were accepted for two firms and rejected for three firms and for four firms, the null hypotheses were partially rejected. Thus, the relationship between intellectual capital performance and financial performance of sample firms existed, at varying degrees, for various sample firms.

**4.28: Consolidated Results (Correlation Analysis) on the
Testing of Sub-Hypotheses of Sample Firms in India**

S. No	Hypotheses	Financial Performance Variables				Results
		ROA	ROE	NPM	EPS	
I. Banking Sector Firms						
1.	NH-2: There is no relationship between intellectual capital performance and financial performance of STATE BANK OF INDIA	0.823** 0.003	0.027 0.941	0.903** 0.000	0.235 0.513	Partially Rejected
2.	NH-2: There is no relationship between intellectual capital performance and financial performance of BANK OF BARODA	-0.373 0.289	0.877** 0.001	0.592 0.071	0.733** 0.016	Partially Rejected
3.	NH-2: There is no relationship between intellectual capital performance and financial performance of PUNJAB NATIONAL BANK	0.796** 0.006	0.991** 0.000	0.635* 0.049	-0.213 0.555	Partially Rejected
4.	NH-2: There is no relationship between intellectual capital performance and financial performance of INDIAN OVERSEAS BANK	-0.199 0.581	0.023 0.949	0.807** 0.005	0.822** 0.004	Partially Rejected
5.	NH-2: There is no relationship between intellectual capital performance and financial performance of CANARA BANK	0.745** 0.013	0.148 0.683	-0.543 0.104	-0.148 0.683	Partially Rejected

6.	NH-2: There is no relationship between intellectual capital performance and financial performance of UNION BANK OF INDIA	0.856** 0.002	0.564 0.090	-0.329 0.354	0.168 0.643	Partially Rejected
7.	NH-2: There is no relationship between intellectual capital performance and financial performance of THE JAMMU KASHMIR BANK LIMITED	0.218 0.545	0.159 0.661	0.952** 0.000	-0.230 0.523	Partially Rejected
8.	NH-2: There is no relationship between intellectual capital performance and financial performance of INDIAN BANK	-0.053 0.884	0.142 0.695	0.263 0.464	-0.238 0.508	Accepted
9.	NH-2: There is no relationship between intellectual capital performance and financial performance of CENTRAL BANK OF INDIA	0.782** 0.019	0.974** 0.001	0.935** 0.000	0.872** 0.001	Rejected
10.	NH-2: There is no relationship between intellectual capital performance and financial performance of UCO BANK	-0.083 0.819	0.767** 0.010	0.826** 0.003	0.006 0.987	Partially Rejected

II. Information Technology Sector Firms						
11.	NH-2: There is no relationship between intellectual capital performance and financial performance of TATA CONSULTANCY SERVICES LIMITED	0.809** 0.015	0.870** 0.001	0.958** 0.000	0.877** 0.001	Rejected
12.	NH-2: There is no relationship between intellectual capital performance and financial performance of INFOSYS LIMITED	0.895** 0.003	0.977** 0.000	0.731** 0.016	0.977** 0.000	Rejected
13.	NH-2: There is no relationship between intellectual capital performance and financial performance of WIPRO LIMITED	0.849** 0.002	-0.512 0.130	0.720** 0.019	0.986** 0.000	Partially Rejected
14.	NH-2: There is no relationship between intellectual capital performance and financial performance of TECH MAHINDRA LIMITED	0.843** 0.002	0.660* 0.038	0.592 0.071	0.404 0.247	Partially Rejected
15.	NH-2: There is no relationship between intellectual capital performance and financial performance of LARSEN & TOUBRO INFOTECH LIMITED	0.023 0.949	0.971** 0.000	-0.309 0.385	0.464 0.177	Partially Rejected
16.	NH-2: There is no relationship between intellectual capital performance and financial performance of MINDTREE LIMITED	-0.084 0.817	-0.099 0.786	-0.248 0.490	-0.231 0.522	Accepted

17.	NH-2: There is no relationship between intellectual capital performance and financial performance of ORACLE FINANCIAL SERVICES SOFTWARE LIMITED	0.085 0.815	-0.002 0.996	0.884** 0.001	0.041 0.910	Partially Rejected
18.	NH-2: There is no relationship between intellectual capital performance and financial performance of HCL TECHNOLOGIES LIMITED	0.764** 0.010	0.684* 0.029	0.410 0.240	0.904** 0.000	Partially Rejected
III. Pharmaceutical Sector Firms						
19.	NH-2: There is no relationship between intellectual capital performance and financial performance of SUN PHARMACEUTICAL INDUSTRIES LIMITED	0.998** 0.000	0.834** 0.003	0.996** 0.000	0.864** 0.001	Rejected
20.	NH-2: There is no relationship between intellectual capital performance and financial performance of DIVI'S LABORATORIES LIMITED	0.887** 0.001	0.765** 0.010	-0.530 0.115	1.000** 0.000	Partially Rejected
21.	NH-2: There is no relationship between intellectual capital performance and financial performance of DR. REDDY'S LABORATORIES LIMITED	0.297 0.404	-0.583 0.077	0.328 0.355	0.449 0.193	Accepted

22.	NH-2: There is no relationship between intellectual capital performance and financial performance of CIPLA LIMITED	0.649* 0.042	-0.591 0.072	0.780** 0.008	0.770** 0.009	Partially Rejected
23.	NH-2: There is no relationship between intellectual capital performance and financial performance of CADILA HEALTHCARE LIMITED	-0.357 0.311	-0.123 0.736	0.989** 0.000	0.998** 0.000	Partially Rejected
24.	NH-2: There is no relationship between intellectual capital performance and financial performance of TORRENT PHARMACEUTICALS LIMITED	0.905** 0.000	0.903** 0.000	0.987** 0.000	0.999** 0.000	Rejected
25.	NH-2: There is no relationship between intellectual capital performance and financial performance of LUPIN LIMITED	0.957** 0.000	0.907** 0.000	0.931** 0.000	0.993** 0.000	Rejected
26.	NH-2: There is no relationship between intellectual capital performance and financial performance of BIOCON LIMITED	-0.780** 0.008	0.439 0.205	-0.797** 0.006	-0.783** 0.007	Partially Rejected
27.	NH-2: There is no relationship between intellectual capital performance and financial performance of AUROBINDO PHARMA LIMITED	0.307 0.388	0.006 0.987	-0.205 0.570	0.266 0.457	Accepted
Source: Compiled from Table 4.1 to 4.27						

Chapter-V

*Impact of Intellectual
Capital Performance on
Financial Performance*

The regression analysis uses several explanatory variables, to predict the outcome of response variables (**Barathi Kamath, 2007; Jian Xu and Bingham Wang, 2019; Murugesan Selvam et al., 2020 and Vadivel Thanikachalam et al., 2021**). The analysis of regression was employed to regress the impact of intellectual capital on the financial performance variables of sample firms. For the purpose of this study, the impact of Intellectual Capital Performance on Financial Performance is presented as follows, in three sections

Section-A: Impact of Intellectual Capital Performance on Financial Performance of BANKING SECTOR FIRMS

Section-B: Impact of Intellectual Capital Performance on Financial Performance of INFORMATION TECHNOLOGY SECTOR FIRMS and

Section-C: Impact of Intellectual Capital Performance on Financial Performance of PHARMACEUTICAL SECTOR FIRMS

Section-A

Impact of Intellectual Capital Performance on Financial Performance of BANKING SECTOR FIRMS

Ten sample public sector commercial banks from Nifty service index included State Bank of India, Bank of Baroda, Punjab National Bank, Indian Overseas Bank, Canara Bank, Union Bank of India, The Jammu Kashmir Bank Limited, Indian Bank, Central Bank of India, and UCO Bank. The detailed regression analysis for ten sample bank is given as follows.

- 5.1 Impact of Intellectual Capital Performance on Financial Performance of STATE BANK OF INDIA
- 5.2 Impact of Intellectual Capital Performance on Financial Performance of BANK OF BARODA
- 5.3 Impact of Intellectual Capital Performance on Financial Performance of PUNJAB NATIONAL BANK
- 5.4 Impact of Intellectual Capital Performance on Financial Performance of INDIAN OVERSEAS BANK
- 5.5 Impact of Intellectual Capital Performance on Financial Performance of CANARA BANK
- 5.6 Impact of Intellectual Capital Performance on Financial Performance of UNION BANK OF INDIA
- 5.7 Impact of Intellectual Capital Performance on Financial Performance of THE JAMMU KASHMIR BANK LIMITED
- 5.8 Impact of Intellectual Capital Performance on Financial Performance of INDIAN BANK
- 5.9 Impact of Intellectual Capital Performance on Financial Performance of CENTRAL BANK OF INDIA and
- 5.10 Impact of Intellectual Capital Performance on Financial Performance of UCO BANK

5.1. Impact of Intellectual Capital Performance on Financial Performance of STATE BANK OF INDIA

Table-5.1 presents the results of regression analysis, showing the impact of intellectual capital on the financial performance of the **STATE BANK OF INDIA**, during the study period from 1st April 2010 to 31st March 2019. Four variables - HCE, SCE, CEE and VAIC, were employed as independent variables, to study the impact of intellectual capital performance while another four variables, namely, ROA, ROE, NPM and EPS were adopted as dependent variables, to understand the financial performance of **STATE BANK OF INDIA**. This study also used two control variables, namely, Size and DER. It is found from the Table that the coefficient values of HCE, SCE and VAIC against ROA were recorded at 0.812, 0.910 and 0.823, with the corresponding t-statistic values of 3.939, 6.202 and 4.097 respectively. The coefficient values of ROE were recorded at 1.838 for HCE, 1.216 for CEE and 0.836 for VAIC, with the t-statistic values of 7.681, 2.289 and 4.303 respectively. The EPS registered the coefficient values for HCE at 0.854, for SCE at -0.910 and for VAIC at 0.871, with the t-values of 4.639, -6.202 and 5.008 respectively.

It is learnt from the analysis of impact of intellectual capital performance on the financial performance, in respect of **STATE BANK OF INDIA**, that all the four independent variables, namely, HCE, SCE, CEE and VAIC reported significant impact on ROA and ROE and EPS positively, at 99% confident level (i.e., p value was less than 0.01), during the study period. In other words, the intellectual capital of the SBI did contribute significantly to the financial performance. The improvement of bank performance would generate wealth of the stakeholders and country.

Table-5.1: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of STATE BANK OF INDIA during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.000**	0.014**	0.481	0.001**
	<i>B</i>	-	-	-	-
	<i>T</i>	(5.621)	(3.151)	(0.776)	(5.425)
Intellectual Capital Variables					
HCE	<i>P</i>	0.004**	0.002**	0.321	0.002**
	<i>B</i>	0.812	1.838	0.885	0.854
	<i>T</i>	(3.939)	(7.681)	(1.131)	(4.639)
SCE	<i>P</i>	0.000**	0.084	0.021	0.000**
	<i>B</i>	0.910	0.583	-1.123	-0.910
	<i>T</i>	(6.202)	(2.289)	(-1.527)	(-6.202)
CEE	<i>P</i>	0.488	0.017**	0.684	0.175
	<i>B</i>	0.249	1.216	0.413	0.440
	<i>T</i>	(0.727)	(3.958)	(0.437)	(1.472)
VAIC	<i>P</i>	0.003**	0.003**	0.274	0.001**
	<i>B</i>	0.823	0.836	0.383	0.871
	<i>T</i>	(4.097)	(4.303)	(1.174)	(5.008)
Control Variables					
Size	<i>P</i>	0.661	0.749	0.747	0.273
	<i>B</i>	0.151	-0.630	-0.192	-0.392
	<i>T</i>	(0.457)	(-0.343)	0.169)	(-1.189)
DER	<i>P</i>	0.189	0.889	0.686	0.332
	<i>B</i>	0.481	0.019	0.169	0.343
	<i>T</i>	(1.455)	(0.148)	(0.434)	(1.041)
Adjust R ²		0.806	0.855	-0.088	0.778
N		10	10	10	10

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0

Note: ** indicates 99% statistically significant and * indicates 95% statistically significant
P=Significant value; β =Standardized coefficients value; *t*= *t* statistic value

This result was in line with the resource-based theory and organization learning theory, which explain the effective use of bank's internal resources through employee creativity, devoted staff, training and education, experience, attitude and innovative employees, resulting in innovation. The positive impact of VAIC on financial performance indicators, demonstrated the role of knowledge and skill of employees, towards the financial performance of **STATE BANK OF INDIA**. Hence **NH-3: There is no impact of intellectual capital performance on financial performance of STATE BANK OF INDIA** was partially rejected since VAIC impacted only three variables, namely, ROA, ROE and EPS, out of four financial performance variables. Hence substantial attention needs to be paid to enhance the growth of NPM over the intellectual capital. The control variables, namely, Size and DER impacted neither positively nor negatively. The adjusted R-square values being adopted to check the robustness, were at 0.806 for ROA, 0.855 for ROE and 0.778 for EPS, reporting that the model perfectly fitted to ROA, ROE and EPS.

5.2. Impact of Intellectual Capital Performance on Financial Performance of BANK OF BARODA

The results of regression analysis, explaining the impact of intellectual capital performance on the financial performance of the **BANK OF BARODA**, during the study period from 1st April 2010 to 31st March 2019, are presented in **Table-5.2**. The Table portrays the values of coefficient with statistics values for CEE at 0.874 (5.088) against ROA, for VAIC at 0.956 (5.702) against ROA, for VAIC at 0.733 (3.046) against EPS, for Size at 0.966 (5.291) against ROA, for Size at -0.823 (-3.563), at 99% confident level (i.e., p value was less than 0.01), in respect of **BANK OF BARODA**, during the study period.

Table-5.2: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of BANK OF BARODA during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.000**	0.887	0.726	0.057*
	<i>B</i>	-	-	-	-
	<i>T</i>	(5.621)	(-0.161)	0.368)	(2.217)
Intellectual Capital Variables					
HCE	<i>P</i>	0.188	0.995	0.706	0.039*
	<i>B</i>	0.454	0.035	2.565	0.658
	<i>T</i>	(1.439)	(0.007)	(0.365)	(2.468)
SCE	<i>P</i>	0.246	0.865	0.703	0.042*
	<i>B</i>	2.219	0.896	-2.540	0.649
	<i>T</i>	(1.286)	(0.177)	(-0.401)	(2.412)
CEE	<i>P</i>	0.001**	0.088	0.310	0.329
	<i>B</i>	0.874	-0.760	0.520	0.345
	<i>T</i>	(5.088)	(-2.036)	(1.110)	(1.040)
VAIC	<i>P</i>	0.001**	0.036*	0.203	0.016**
	<i>B</i>	0.956	0.665	0.440	0.733
	<i>T</i>	(5.702)	(2.520)	(1.386)	(3.046)
Control Variables					
Size	<i>P</i>	0.001**	0.010**	0.194	0.696
	<i>B</i>	0.966	-0.823	0.553	0.142
	<i>T</i>	(5.291)	(-3.563)	(1.435)	(0.405)
DER	<i>P</i>	0.576	0.828	0.239	0.509
	<i>B</i>	-0.107	0.053	0.496	0.237
	<i>T</i>	(-0.586)	(0.226)	(1.287)	(0.609)
Adjust R ²		0.878	0.112	0.052	0.479
N		10	10	10	10
<p>Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0</p> <p>Note: ** indicates 99% statistically significant and * indicates 95% statistically significant <i>P</i>=Significant value; β=Standardized coefficients value; <i>t</i>= <i>t</i> statistic value</p>					

It is clear that the coefficient values and t statistics values were recorded for EPS at 0.658 (2.468) by HCE, at 0.649 (2.412) by SCE and for ROE at 0.665 (2.520) by VAIC, in respect of **BANK OF BARODA**, at 95% confident level (i.e., p value was less than 0.05). But Size (a control variable) had negatively influenced ROE. The value added intellectual coefficient was able to positively impact the three financial performance indicators (ROA, ROE and EPS) of **BANK OF BARODA**. It is evident that HCE, SCE, CEE and VAIC did not impact NPM (financial performance variable) of **BANK OF BARODA**, asserting that the intellectual capital variables failed to contribute towards generating required profit for **BANK OF BARODA**. Therefore, the sample bank needs to induct more skilled employees, to increase the performance of employees.

The adjusted R-squared value was used to test the fitness of the regression model, with values of 0.878 for ROA and 0.479 for EPS. The adjusted R-squared model did not fit with ROE and NPM as it recorded insignificant values of 0.112 and 0.052. But the regression model perfectly fitted only for ROA and EPS. The results, as given in the Table, clearly explained that the model of intellectual capital performance created significant impact on the financial performance variables like ROA, ROE and EPS. Hence **NH-3: There is no impact of intellectual capital performance on financial performance of BANK OF BARODA**, was partially rejected.

5.3. Impact of Intellectual Capital Performance on Financial Performance of PUNJAB NATIONAL BANK

It is found from the **Table-5.3** that the coefficient values and t statistics values were reported at 0.646 (2.394) for ROA, at 0.769 (3.127) for NPM and at 0.236 (2.487) for EPS by HCE.

Table-5.3: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of PUNJAB NATIONAL BANK during the Study Period from 1st April 2010 to 31st March 2019					
Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.000**	0.208	0.000**	0.057*
	<i>B</i>	-	-	-	-
	<i>T</i>	(7.800)	(1.500)	(4.406)	(2.217)
Intellectual Capital Variables					
HCE	<i>P</i>	0.044*	0.373	0.002**	0.015**
	<i>B</i>	0.646	0.317	0.769	0.236
	<i>T</i>	(2.394)	(0.944)	(3.127)	(2.487)
SCE	<i>P</i>	0.391	0.291	0.016**	0.025*
	<i>B</i>	0.395	-3.410	0.722	0.215
	<i>T</i>	(0.906)	(-1.215)	(2.434)	(2.280)
CEE	<i>P</i>	0.001**	0.225	0.166	0.329
	<i>B</i>	0.869	-2.986	0.788	0.345
	<i>T</i>	(4.964)	(-1.435)	(1.576)	(1.040)
VAIC	<i>P</i>	0.001**	0.403	0.001**	0.006**
	<i>B</i>	0.921	1.380	0.738	0.757
	<i>T</i>	(5.695)	(0.934)	(3.315)	(3.817)
Control Variables					
Size	<i>P</i>	0.006**	0.226	0.517	0.010**
	<i>B</i>	0.796	-0.423	0.355	0.176
	<i>T</i>	(3.716)	(-1.326)	(0.689)	(2.633)
DER	<i>P</i>	0.593	0.362	0.221	0.051*
	<i>B</i>	0.193	-0.311	0.435	0.101
	<i>T</i>	0.556)	(-0.975)	(1.366)	(1.905)
Adjust R²		0.734	0.201	0.585	0.461
N		10	10	10	10
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0					
Note: ** indicates 99% statistically significant and * indicates 95% statistically significant <i>P</i> =Significant value; β =Standardized coefficients value; <i>t</i> = <i>t</i> statistic value					

Similarly, the coefficient value by SCE was at 0.722 for NPM and at 0.215 for EPS with the t-statistic values of 2.434 and 2.280 respectively while CEE earned the coefficient values against ROA at 0.869, with the t-statistic value of 4.964. The VAIC reported the coefficient value of 0.921 for ROA, 0.738 for NPM and 0.757 for EPS, with t-statistic values of 5.695, 3.315 and 3.817 respectively, during the study period from 1st April 2010 to 31st March 2019.

It is learnt from the analysis of the impact of intellectual capital performance on the financial performance of **PUNJAB NATIONAL BANK** that VAIC created significant impact on ROA, NPM and EPS positively, at 99% confidence level (i.e., p value was less than 0.01) during the study period. The other components of HCE and SCE did influence the ROA and EPS respectively, at 95% confidence level (i.e., p value was less than 0.05). It is interesting to note that the positive impact of HCE proved that better the investment in intangible assets higher the financial performance of the sample bank. Besides, SCE created positive impact on financial performance indicators, proving the organization learning theory. Therefore, it is advisable for the sample bank to spend much more on physical structure of bank, operating systems, information technology, capabilities, culture, empowerment and service quality, to draw out creative skills from the employees. The positive impact of VAIC (core variable of IC) implied that the efficiency of sample bank employees improved its financial performance. The control variable, namely, Size positively influenced ROA and EPS whereas DER impacted EPS of **PUNJAB NATIONAL BANK** during the study period. The adjusted R-square value was at 0.734 for ROA, 0.201 for ROE, 0.585 for NPM and 0.461 for EPS. Therefore, **NH-3: There is no impact of intellectual capital performance on financial performance of PUNJAB NATIONAL BANK**, was partially rejected.

5.4. Impact of Intellectual Capital Performance on Financial Performance of INDIAN OVERSEAS BANK

The results of regression analysis, explaining the impact of intellectual capital performance on financial performance of **INDIAN OVERSEAS BANK**, during the study period from 1st April 2010 to 31st March 2019, are presented in **Table-5.4**. As stated earlier, HCE, SCE, CEE and VAIC were employed as independent variables while ROA, ROE, NPM and EPS were used as dependent variables and Size and DER were treated as control variables.

According to the Table, the values of coefficients were recorded by VAIC against ROA at 0.891, with t statistics value of 7.001 and against ROE at 0.879 with t values of 6.268 whereas the values of coefficients values were reported by CEE against NPM at 0.986, with t statistics value of 2.597. Coefficients values were by VAIC against NPM at 0.899 with t statistics value of 5.811 and against EPS at 1.106, with t statistics value of 2.906, in respect of **INDIAN OVERSEAS BANK**. It is noted that VAIC had created impact, on ROA, ROE and NPM (at 99%). Similarly, the HCE and SCE on EPS, CEE on NPM and VAIC on EPS created impact at 95% confidence level, during the study period.

Sample variables, such as HCE, SCE and CEE, did not register any effect on ROA and ROE of **INDIAN OVERSEAS BANK**, during the study period. In other words, the performance of human capital, structural capital and capital employed failed to contribute much to the financial performance. Therefore, the sample bank should add a huge and efficient work force to enhance the financial performance of and employees for HC and latest technologies for SC and tangible assets for CE need to be strengthened. However, VAIC positively affected all dependent variables, namely ROA, ROE, NPM and EPS of **INDIAN OVERSEAS BANK**.

Table-5.4: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of INDIAN OVERSEAS BANK during the Study Period from 1st April 2010 to 31st March 2019					
Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.326	0.142	0.000**	0.12**
	<i>B</i>	-	-	-	-
	<i>T</i>	(-1.118)	(1.827)	(7.865)	(3.212)
Intellectual Capital Variables					
HCE	<i>P</i>	0.545	0.373	0.020	0.027*
	<i>B</i>	-0.218	0.317	0.706	0.691
	<i>T</i>	(-0.632)	(0.944)	(2.621)	(2.703)
SCE	<i>P</i>	0.187	0.096	0.399	0.025*
	<i>B</i>	0.384	0.347	0.256	0.215
	<i>T</i>	(1.589)	(2.167)	2.434)	(2.280)
CEE	<i>P</i>	0.095	0.496	0.048*	0.246
	<i>B</i>	0.820	-0.187	0.986	0.806
	<i>T</i>	(2.179)	(-0.748)	(2.597)	(1.359)
VAIC	<i>P</i>	0.009**	0.003**	0.000**	0.040*
	<i>B</i>	0.891	0.879	0.899	1.106
	<i>T</i>	(7.001)	(6.268)	(5.811)	(2.906)
Control Variables					
Size	<i>P</i>	0.990	0.394	0.741	0.462
	<i>B</i>	-0.003	-0.100	-0.063	-0.271
	<i>T</i>	(-0.013)	(-0.955)	(-0.354)	(-0.813)
DER	<i>P</i>	0.821	0.656	0.169	0.104
	<i>B</i>	0.096	-0.127	-0.749	1.313
	<i>T</i>	(0.241)	(-0.481)	(-1.667)	(2.100)
Adjust R²		0.850	0.934	0.785	0.628
N		10	10	10	10
<p>Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0</p> <p>Note: ** indicates 99% statistically significant and * indicates 95% statistically significant</p> <p><i>P</i>=Significant value; <i>β</i>=Standardized coefficients value; <i>t</i>= <i>t</i> statistic value</p>					

This implied that the intellectual capital created value for this bank during the study period. Two control variables (Size and DER) neither negatively nor positively affected the financial performance of **INDIAN OVERSEAS BANK**. Hence **NH-3: There is no impact of intellectual capital performance on financial performance of INDIAN OVERSEAS BANK**, was rejected. It is to be noted that adjusted R-squared values of 0.850 for ROA, 0.934 for ROE, 0.785 for NPM and 0.628 for EPS were perfectly fitted to all financial performance variables.

5.5. Impact of Intellectual Capital Performance on Financial Performance of CANARA BANK

Table 5.5 exhibits the results of regression analysis, for understanding the Intellectual Capital Performance on Financial Performance of **CANARA BANK**, during the study period from 1st April 2010 to 31st March 2019. The values of coefficient were recorded against ROA by HCE at 0.893, by VAIC at 0.712, by Size at 0.621, against ROE by HCE at 0.617, by SCE at 0.783, by CEE at 0.619, by VAIC at 0.893, against NPM by HCE at 0.962, by SCE at 0.870, VAIC at 0.823, against EPS by HCE at 0.604, by CEE at 0.519 and VAIC at 0.864, in respect of **CANARA BANK**, with the t-statistics values of 5.597, 3.379, 3.169, 2.215, 3.357, 2.231, 5.597, 5.270, 4.964, 4.835, 2.153, 2.725, 5.018 respectively, during the study period. The results of coefficient indicated that the HCE on ROA and NPM, SCE on ROE and NPM and VAIC on ROA, ROE, NPM and EPS reported positive influence, at 99% confidence level (i.e., p value was less than 0.01) whereas the impact by HCE and CEE on ROE and EPS was recorded at of 95% level.

Table-5.5: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of CANARA BANK during the Study Period from 1st April 2010 to 31st March 2019					
Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.031*	0.000**	0.016**	0.017**
	<i>B</i>	-	-	-	-
	<i>T</i>	(2.807)	(5.587)	(4.903)	(2.989)
Intellectual Capital Variables					
HCE	<i>P</i>	0.001**	0.050*	0.013**	0.047*
	<i>B</i>	0.893	0.617	0.962	0.604
	<i>T</i>	(5.597)	(2.215)	(5.270)	(2.153)
SCE	<i>P</i>	0.790	0.007**	0.016**	0.115
	<i>B</i>	-1.695	0.783	0.870	-0.530
	<i>T</i>	(-0.291)	(3.557)	(4.964)	(-1.770)
CEE	<i>P</i>	0.615	0.056*	0.457	0.026*
	<i>B</i>	-0.313	0.619	0.245	0.519
	<i>T</i>	(-0.560)	(2.231)	(0.842)	(2.725)
VAIC	<i>P</i>	0.003**	0.001**	0.017**	0.006**
	<i>B</i>	0.712	0.893	0.823	0.864
	<i>T</i>	(3.379)	(5.597)	(4.835)	(5.018)
Control Variables					
Size	<i>P</i>	0.051*	0.092	0.669	0.902
	<i>B</i>	0.621	-60.641	-0.077	0.046
	<i>T</i>	(3.169)	(-1.959)	(-0.473)	(0.128)
DER	<i>P</i>	0.967	0.177	0.872	0.216
	<i>B</i>	0.014	-0.493	0.032	0.489
	<i>T</i>	(0.045)	(1.500)	(0.175)	(1.361)
Adjust R²		0.559	0.771	0.884	0.733
N		10	10	10	10
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0					
Note: ** indicates 99% statistically significant and * indicates 95% statistically significant					
<i>P</i> =Significant value; <i>β</i> =Standardized coefficients value; <i>t</i> = <i>t</i> statistic value					

It is evident from the analysis that the VAIC (compound variable) and HCE (component of intellectual capital) created positive impact on all financial performance variables, namely, ROA, ROE, NPM and EPS, during the study period. Likewise, the structural capital also made registered significant effect on ROE and NPM, due to the financial performance of **CANARA BANK**. Size and DER (control variables) did not influence any financial performance of this sample bank, due to reasons of poor customer base, huge non-performing assets, incorrect allocation of resources, huge employee costs, unplanned growth and bad investment decisions. Since the expansion of the market capitalization would lead to minimal growth of financial performance, the sample bank needs to postpone mobilizing more capital from the investors. It is to be noted that adjusted R-squared values were at 0.559 for ROA, 0.771 for ROE, 0.884 for NPM and 0.733 for EPS. Therefore, VAIC could be employed as a potential tool for generating wealth. Hence **NH-3: There is no impact of intellectual capital performance on financial performance of CANARA BANK**, was not accepted.

5.6. Impact of Intellectual Capital Performance on Financial Performance of UNION BANK OF INDIA

The results of regression analysis, to examine the impact of intellectual capital performance on **UNION BANK OF INDIA**, during the study period from 1st April 2010 to 31st March 2019, are given **Table-5.6**. It is to be noted that HCE, SCE, CEE and VAIC were represented as independent variables while ROA, ROE, NPM and EPS were adopted as dependent variables for **UNION BANK OF INDIA**. Besides, the analysis used Size and DER as control variables. According to the results of the Table, coefficient values of VAIC against ROA were at 0.029, with the t-statistic value of 3.341. The coefficient values of NPM were at 0.997 for HCE, 0.909 for SCE, and 0.846

for VAIC with the t-statistic value of 6.059, 6.178 and 4.495 respectively. A variable, namely, EPS recorded coefficient value for HCE at 0.689 and for VAIC at 0.856, with the t-statistic value of 2.674 and 4.681 respectively. It is observed that HCE, SCE and VAIC against NPM and VAIC against EPS created significant impact positively, at 99% confidence levels (i.e., p value was less than 0.01) whereas HCE against EPS and VAIC against ROA impacted, at 95% confidence levels (i.e., p value was less than 0.05)

The analysis of impact of intellectual capital performance on the financial performance of **UNION BANK OF INDIA** demonstrated that only three variables, HCE, SCE and VAIC created significant impact on NPM and EPS during the study period, suggesting that the sample bank could enhance its productivity by means of managing its intellectual capital in an appropriate manner. The CEE, by not registering the impact on the financial variables, showed inefficiency of capital employed of the sample banks. Therefore, pumping of money into physical capital of the sample bank needs to be cut down. The positive impact of VAIC established the fact of better investment in intangible assets, resulting in the financial performance of the sample bank, in accordance with the organizational learning theory. The HCE and SCE did not influence ROA and ROE. It is evident from regression analysis that the control variables, namely, Size and DER had not influenced any financial performance variables of sample bank, The adjusted R-square values were at 0.495 for ROA, 0.151 for ROE, 0.805 for NPM and 0.699 for EPS. Hence **NH-3: There is no impact of intellectual capital performance on financial performance of UNION BANK OF INDIA**, was rejected partially.

Table-5.6: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of UNION BANK OF INDIA during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	P	0.996	0.464	0.001**	0.000**
	B	-	-	-	-
	T	(-0.006)	(-0.964)	(4.950)	(6.059)
Intellectual Capital Variables					
HCE	P	0.554	0.381	0.000**	0.029*
	B	-2.285	-3.945	0.997	0.689
	T	(-0.646)	(-0.946)	(6.059)	(2.674)
SCE	P	0.860	0.439	0.000**	0.567
	B	0.658	3.306	0.909	0.207
	T	(0.188)	(0.828)	(6.178)	(0.597)
CEE	P	0.998	0.169	0.877	0.344
	B	0.001	1.174	0.056	0.335
	T	(0.003)	(1.564)	(0.160)	(1.006)
VAIC	P	0.029*	0.074	0.002**	0.002**
	B	1.588	0.588	0.846	0.856
	T	(3.341)	(2.058)	(4.495)	(4.681)
Control Variables					
Size	P	0.250	0.731	0.628	0.638
	B	0.332	-0.118	-0.188	0.175
	T	(1.344)	(-0.358)	(-0.507)	(0.491)
DER	P	0.708	0.181	0.842	0.423
	B	0.136	-0.490	0.077	-0.304
	T	(0.388)	(1.485)	(0.207)	(-0.850)
Adjust R ²		0.495	0.151	0.805	0.699
N		10	10	10	10
<p>Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0</p> <p>Note: ** indicates 99% statistically significant and * indicates 95% statistically significant</p> <p><i>P=Significant value; β=Standardized coefficients value; t= t statistic value</i></p>					

5.7. Impact of Intellectual Capital Performance on Financial Performance of THE JAMMU AND KASHMIR BANK LIMITED

Table-5.7 deals with the results of regression analysis, for intellectual capital performance and financial performance of **THE JAMMU AND KASHMIR BANK LIMITED**, during the study period from 1st April 2010 to 31st March 2019. According to the Table, the values of coefficients and t statistics values were reported for ROA at 0.630 (6.020), for ROE at 0.636 (2.231), for NPM at 0.873 (7.598), for EPS at 0.467 (4.077) by HCE, for ROA at 0.170 (2.210), for NPM at 0.909 (6.178) by SCE, for NPM at 0.578 (2.604) by CEE, for ROA at 0.430 (3.510), for NPM at 0.767 (5.657) and 0.112 (2.351) by VAIC respectively, in respect of **THE JAMMU AND KASHMIR BANK LIMITED**. Further, the results of coefficients showed that HCE against ROA, NPM and EPS, SCE against NPM, VAIC against NPM and EPS registered significant impact, at 99% confidence level. It is clear that HCE against ROE, SCE against ROA, CEE against NPM and VAIC against ROA recorded significant influence, at 95% level. The analysis clearly revealed that the intellectual capital, especially HC of the sample bank, did contribute significantly to the financial performance, especially for ROA, NPM and EPS. The efficiency of HC did play a major role in enhancing the returns of sample banks. In other words, an increase in HC investment enhanced the bank's financial performance. The improvement in bank performance would generate the wealth of the nation and hence this result was in consonance with the resource-based theory. The intangible assets contributed much to the financial performance, as evident from the positive association between VAIC and financial performance variables. But negative impact was witnessed by Size on NPM during the study period. It is clear that HCE, considered as the proxy of human capital, played a vital role in improving the financial performance of the sample bank.

Table-5.7: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of THE JAMMU AND KASHMIR BANK LIMITED during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.000**	0.899	0.001**	0.000**
	<i>B</i>	-	-	-	-
	<i>T</i>	(3.990)	(-0.964)	(4.474)	(4.028)
Intellectual Capital Variables					
HCE	<i>P</i>	0.000**	0.048*	0.000**	0.000**
	<i>B</i>	0.630	0.636	0.873	0.467
	<i>T</i>	(6.020)	(2.331)	(7.598)	(4.077)
SCE	<i>P</i>	0.020*	0.131	0.000**	0.020
	<i>B</i>	0.170	0.663	0.909	-0.274
	<i>T</i>	(2.210)	(1.897)	(6.178)	(-2.393)
CEE	<i>P</i>	0.209	0.665	0.030*	0.247
	<i>B</i>	0.130	0.264	0.578	-0.058
	<i>T</i>	(1.040)	(0.466)	(2.604)	(-1.160)
VAIC	<i>P</i>	0.001*	0.497	0.000**	0.019**
	<i>B</i>	0.430	0.398	0.767	0.112
	<i>T</i>	(3.510)	(0.745)	(5.657)	(2.351)
Control Variables					
Size	<i>P</i>	0.970	0.904	0.041*	-0.130
	<i>B</i>	0.003	-0.038	-0.188	0.175
	<i>T</i>	(0.360)	(-0.129)	(2.209)	(0.491)
DER	<i>P</i>	0.400	0.109	0.099	0.698
	<i>B</i>	0.160	-0.963	0.191	0.308
	<i>T</i>	(0.830)	(-2.057)	(1.675)	(0.418)
Adjust R ²		0.514	0.359	0.614	0.522
N		10	10	10	10
<p>Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0</p> <p>Note: ** indicates 99% statistically significant and * indicates 95% statistically significant <i>P</i>=Significant value; <i>β</i>=Standardized coefficients value; <i>t</i>= <i>t</i> statistic value</p>					

The adjusted R-squared value was used to test the fitness of the regression model, with values of 0.514 for ROA, 0.359 for ROE, 0.614 for NPM and 0.522 for EPS. Therefore, **NH-3: There is no impact of intellectual capital performance on financial performance of THE JAMMU AND KASHMIR BANK LIMITED**, was partially rejected.

5.8. Impact of Intellectual Capital Performance on Financial Performance of INDIAN BANK

The results of regression analysis, for intellectual capital performance and the financial performance of the **INDIAN BANK**, during the study period from 1st April 2010 to 31st March 2019, are shown in **Table-5.8**. The coefficients values of ROA were at 0.375, 0.182 and 0.245, with the corresponding t-statistics values of 7.003, 3.274 and 4.187 for HCE, VAIC and Size respectively, in respect of **INDIAN BANK**. Further, the coefficient values of SCE and VAIC were at 0.319 and 0.685 against ROE, with t-values of 6.103 and 4.903 respectively, during the study period. The coefficient values of -0.901 with t-value of -3.440 were negatively recorded by SCE against NPM and Size with coefficient value at -1.009 and t statistics value of -2.767 has influenced the EPS during the study period.

It is clear that ROA and ROE were positively influenced by HCE, SCE, VAIC and Size, at 99% confidence level while NPM and EPS were negatively affected by SCE and Size (control variable). As stated earlier, the positive effect of VAIC and its components on ROA and ROE demonstrated that the positive change would lead to the enhancement of financial performance of this bank. This was in line with the organization learning theory, which explains the effective use of resources in employee training and its resultant effect on innovation. Financial performance variables like NPM and EPS, were not influenced by intellectual capital variables, followed by DER (control variable) of **INDIAN BANK**.

Table-5.8: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on INDIAN BANK during the Study Period from 1st April 2010 to 31st March 2019					
Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.000**	0.022*	0.056*	0.040*
	<i>B</i>	-	-	-	-
	<i>T</i>	(4.526)	(2.297)	(2.669)	(3.010)
Intellectual Capital Variables					
HCE	<i>P</i>	0.000**	0.896	0.111	0.776
	<i>B</i>	0.375	0.008	0.546	0.113
	<i>T</i>	(7.003)	(0.130)	(2.037)	(0.306)
SCE	<i>P</i>	0.315	0.000**	0.026*	0.202
	<i>B</i>	0.052	0.319	-0.901	-0.554
	<i>T</i>	(1.007)	(6.103)	(-3.440)	(-1.526)
CEE	<i>P</i>	0.141	0.742	0.418	0.340
	<i>B</i>	0.076	0.017	0.217	-0.363
	<i>T</i>	(1.474)	(0.330)	(0.902)	(-1.182)
VAIC	<i>P</i>	0.001**	0.000**	0.464	0.508
	<i>B</i>	0.182	0.685	0.263	-0.238
	<i>T</i>	(3.274)	(4.903)	(0.770)	(-0.693)
Control Variables					
Size	<i>P</i>	0.000**	0.535	0.112	0.051*
	<i>B</i>	0.245	0.238	-0.536	-1.009
	<i>T</i>	(4.187)	(0.652)	(-2.036)	(-2.767)
DER	<i>P</i>	0.742	0.577	0.555	0.824
	<i>B</i>	0.017	-0.214	-0.177	0.091
	<i>T</i>	(0.330)	(-0.584)	(-0.644)	(0.237)
Adjust R²		0.446	0.614	0.667	0.360
N		10	10	10	10
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0					
Note: ** indicates 99% statistically significant and * indicates 95% statistically significant <i>P</i> =Significant value; <i>β</i> =Standardized coefficients value; <i>t</i> = <i>t</i> statistic value					

It is surprising to note that CEE was unable to impact any financial performance variable. Hence, the capital adequacy norms require bank management to inject additional amount of capital and the mobilization of additional capital should be undertaken with diligence and the opportunities must be explored to proportionately enhance the value adding. It is to be noted that the adjusted R-squared value of 0.446 for ROA, 0.614 for ROE, 0.667 for NPM and 0.360 for EPS and revealed that the regression model was fitted. The results, as given in the Table, clearly established that the model of intellectual capital performance created significant impact on the financial performance (ROA and ROE) of the bank. Hence **NH-3: There is no impact of intellectual capital performance on financial performance of INDIAN BANK**, was partially rejected.

5.9. Impact of Intellectual Capital Performance on Financial Performance of CENTRAL BANK OF INDIA

Table-5.9 shows the results of regression analysis, for intellectual capital performance and the financial performance of the **CENTRAL BANK OF INDIA**, during the study period from 1st April 2010 to 31st March 2019. It is to be noted that HCE, SCE, CEE and VAIC were adopted as independent variables, for measuring intellectual capital performance while ROA, ROE, NPM and EPS were employed as dependent variables, to assess the financial performance of **CENTRAL BANK OF INDIA**. The present analysis used Size and DER as control variables.

The values of coefficient were recorded for VAIC at 0.941 and for DER at 1.599 against ROA, with t-statistics values of 4.104 and 4.470 respectively, at 99% confidence level i.e., p-value was less than 0.001. It is proved that the changes in intellectual capital of **CENTRAL BANK OF INDIA** would increase its return on assets.

Table-5.9: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on CENTRAL BANK OF INDIA during the Study Period from 1st April 2010 to 31st March 2019					
Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.016**	0.151	0.963	0.504
	<i>B</i>	-	-	-	-
	<i>T</i>	(3.996)	(-1.772)	(-0.023)	(-0.734)
Intellectual Capital Variables					
HCE	<i>P</i>	0.548	0.453	0.541	0.865
	<i>B</i>	0.216	0.781	0.618	-0.226
	<i>T</i>	(0.627)	(0.830)	(0.668)	(-0.181)
SCE	<i>P</i>	0.723	0.560	0.096	0.547
	<i>B</i>	-0.146	-0.802	2.689	1.103
	<i>T</i>	(-0.381)	(-0.634)	(2.164)	(0.658)
CEE	<i>P</i>	0.231	0.793	0.413	0.619
	<i>B</i>	0.724	-0.159	0.507	0.403
	<i>T</i>	(1.409)	(-0.281)	(0.913)	(0.538)
VAIC	<i>P</i>	0.015**	0.661	0.112	0.772
	<i>B</i>	0.941	0.931	-3.935	-0.810
	<i>T</i>	(4.104)	(0.473)	(-2.035)	(-0.310)
Control Variables					
Size	<i>P</i>	0.050*	0.963	0.158	0.871
	<i>B</i>	-2.222	-0.044	1.500	0.201
	<i>T</i>	(-2.779)	(-0.049)	(1.734)	(0.172)
DER	<i>P</i>	0.011**	0.987	0.499	0.252
	<i>B</i>	1.599	0.006	-0.243	0.400
	<i>T</i>	(4.470)	(0.017)	(0.709)	(1.234)
Adjust R²		0.849	-0.125	0.116	-0.608
N		10	10	10	10
<p>Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0</p> <p>Note: ** indicates 99% statistically significant and * indicates 95% statistically significant <i>P</i>=Significant value; <i>β</i>=Standardized coefficients value; <i>t</i>= <i>t</i> statistic value</p>					

But ROE, NPM and EPS were neither negatively nor positively impacted any independent variables like HCE, SCE, CEE and VAIC. It is surprising to note that the performance of intellectual capital did not help the growth of financial performance of the sample bank. Hence, it is suggested that in order to enhance the overall value of intellectual capital, the sample bank must analyze all the constituents of its intellectual capital performance, in order to diagnose the variables hindering their performance. It is suggested that identifying the problematic factors, would facilitate remedial measures and the formulation of suitable strategies, to enable an appropriate level of corporate growth and value creation. But DER had exercised positive impact on ROA, indicating that investors and customers of the sample bank had recognized the importance of debt resources.

It is to be noted that adjusted R-squared values were of 0.849 for ROA, -0.125 for ROE and 0.116 for NPM and -0.608 for EPS. According to the analysis, the regression model was not perfectly fitted for all variables, except ROA, which earned significant values in all cases. It is clear that the model of intellectual capital performance did not create significant impact on the financial performance of the sample bank. Hence **NH-3: There is no impact of intellectual capital performance on financial performance of CENTRAL BANK OF INDIA**, was partially rejected.

5.10. Impact of Intellectual Capital Performance on Financial Performance of UCO BANK

The results of regression analysis of intellectual capital performance on financial performance of **UCO BANK**, are given in **Table-5.10**. The values of coefficient and t statistics were recorded by HCE at 0.782 (3.351) against ROE whereas HCE earned a value of 0.951, VAIC at 0.641 and Size at 0.740 against NPM, with t statistics values of

8.677, 7.229 and 2.589 respectively. The coefficient values for EPS were recorded by HCE at 0.626, SCE at 0.808, CEE at 0.283, VAIC at 0.624 and Size at 0.869, in respect of **UCO BANK**, with the t-statistic values of 4.228, 2.865, 4.163, 4.224 and 3.773 respectively, during the study period. The results of coefficient revealed the fact that HCE on ROE, NPM, EPS created strong impact, at 99% confidence level. It is observed that spending on employee training would enhance the financial performance of the sample bank. As such, CEE on EPS and VAIC on NPM and EPS, witnessed strong impact, at 99% confidence level whereas SCE on EPS Size on NPM and EPS registered impact at 95% confidence level. Therefore, **NH-3: There is no impact of intellectual capital performance on financial performance of UCO BANK**, was partially rejected. It is to be noted that DER (control variable) did not influence the financial performance variables, at 99% or 95% confidence level. Hence it is inferred that the sample bank borrowed more money from outside. The debt must be curtailed and equity must be improved by **UCO BANK**. According to the analysis, SCE and CEE had no impact on NPM, demonstrating that the non-physical infrastructure needs to recognize the importance of SCE (structure, systems, information technology, capabilities, culture, empowerment and service quality) and CEE (property, plant and equipment) thereby producing profit at the expected level.

It is to be noted that adjusted R-squared values were at 0.937 for ROA, 0.711 for ROE, 0.904 for NPM and 0.901 for EPS. The results revealed that regression model was perfectly fitted in all cases. It is clear that the model of intellectual capital performance created significant impact on financial performance of the **UCO BANK**. These findings established that managing the VAIC, at the optimum level, would generate more profit to the sample bank.

Table-5.10: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on UCO BANK during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.800	0.126	0.000**	0.013**
	<i>B</i>	-	-	-	-
	<i>T</i>	(-0.271)	(-1.932)	(7.209)	(4.302)
Intellectual Capital Variables					
HCE	<i>P</i>	0.688	0.008**	0.000**	0.013**
	<i>B</i>	1.663	0.782	0.951	0.626
	<i>T</i>	(0.433)	(3.351)	(8.677)	(4.228)
SCE	<i>P</i>	0.469	0.128	0.517	0.046*
	<i>B</i>	2.372	11.285	0.233	0.808
	<i>T</i>	(0.800)	(1.912)	(0.678)	(2.865)
CEE	<i>P</i>	0.637	0.110	0.330	0.014**
	<i>B</i>	0.724	-13.118	-0.344	0.283
	<i>T</i>	(-1.643)	(-2.047)	(-1.038)	(4.163)
VAIC	<i>P</i>	0.540	0.101	0.000**	0.015**
	<i>B</i>	-0.134	0.846	0.641	0.624
	<i>T</i>	(-0.669)	(2.122)	(7.229)	(4.224)
Control Variables					
Size	<i>P</i>	0.413	0.096	0.036*	0.020*
	<i>B</i>	0.502	2.375	0.740	0.869
	<i>T</i>	(0.904)	2.172)	(2.589)	(3.773)
DER	<i>P</i>	0.008**	0.130	0.612	0.543
	<i>B</i>	-0.575	14.520	0.152	0.219
	<i>T</i>	(-1.986)	(1.899)	(0.531)	(0.636)
Adjust R ²		0.937	0.711	0.904	0.901
N		10	10	10	10

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0

Note: ** indicates 99% statistically significant and * indicates 95% statistically significant
P=Significant value; β=Standardized coefficients value; t= t statistic value

Section-B

Impact of Intellectual Capital Performance on Financial Performance of INFORMATION TECHNOLOGY FIRMS

The sample information technology firms included Tata Consultancy Services Limited, Infosys Limited, Wipro Limited, Tech Mahindra Limited, Larsen & Toubro Infotech Limited, Mindtree Limited, Oracle Financial Services Software Limited and HCL Technologies Limited. The detailed regression analysis for eight Information Technology sector firms is given as follows.

5.11 Impact of Intellectual Capital Performance on Financial Performance of TATA CONSULTANCY SERVICES LIMITED

5.12 Impact of Intellectual Capital Performance on Financial Performance of INFOSYS LIMITED

5.13 Impact of Intellectual Capital Performance on Financial Performance of WIPRO LIMITED

5.14 Impact of Intellectual Capital Performance on Financial Performance of TECH MAHINDRA LIMITED

5.15 Impact of Intellectual Capital Performance on Financial Performance of LARSEN & TOUBRO INFOTECH LIMITED

5.16 Impact of Intellectual Capital Performance on Financial Performance of MINDTREE LIMITED

5.17 Impact of Intellectual Capital Performance on Financial Performance of ORACLE FINANCIAL SERVICES SOFTWARE LIMITED and

5.18 Impact of Intellectual Capital Performance on Financial Performance of HCL TECHNOLOGIES LIMITED

5.11. Impact of Intellectual Capital Performance on Financial Performance of TATA CONSULTANCY SERVICES LIMITED

The results of regression analysis, for intellectual capital performance and the financial performance of the **TATA CONSULTANCY SERVICES LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are given in **Table-5.11**. It is to be noted that HCE, SCE, CEE and VAIC were employed as independent variables while ROA, ROE, NPM and EPS were used as dependent variables of **TATA CONSULTANCY SERVICES LIMITED**. Further, this study adopted Size and Leverage as control variables. It is found from the Table that the coefficient values of HCE, VAIC and DER for ROE were recorded at 0.865, 0.870 and 0.877, with the t-statistic values of 4.867, 4.988 and 5.157 respectively. Similarly, the coefficient values were at 0.698 for HCE, and 0.624 for VAIC against EPS, with their t-statistic values of 6.121 and 4.224 positively, at 99% confidence level (i.e., p value was less than 0.01) whereas SCE recorded coefficient value against ROE at 0.691, with t statistics value of 2.703 positively, at 95% confidence level (i.e., p value was less than 0.05) during the study period.

It is clear from the analysis of the impact of intellectual capital performance on the financial performance of **TATA CONSULTANCY SERVICES LIMITED** that HCE, SCE and VAIC exercised significant impact on ROE and EPS positively. In other words, the intellectual capital of the firm contributed significantly to the financial performance. But it is noted that ROA and NPM were not impacted by any sample variables of intellectual capital. In other words, there was inefficiency of intellectual capital in improving the growth of its returns from assets. Therefore, the sample firm needs to pay special attention towards enhancing the growth of ROA and NPM performance, as evident from non-association between intellectual capital variables (HCE, SCE, CEE and VAIC) and financial performance variables (ROA and NPM) of **TATA CONSULTANCY SERVICES LIMITED**.

Table-5.11: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of TATA CONSULTANCY SERVICES LIMITED during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.096	0.001**	0.356	0.000**
	<i>B</i>	-	-	-	-
	<i>T</i>	(-2.271)	(3.692)	(-1.087)	(5.105)
Intellectual Capital Variables					
HCE	<i>P</i>	0.534	0.000**	0.894	0.000**
	<i>B</i>	-0.516	0.865	0.069	0.698
	<i>T</i>	(-0.681)	(4.867)	(0.144)	(6.121)
SCE	<i>P</i>	0.707	0.020*	0.631	0.968
	<i>B</i>	0.277	0.691	0.308	-0.025
	<i>T</i>	(0.403)	(2.703)	(0.533)	(-0.041)
CEE	<i>P</i>	0.536	0.243	0.706	0.574
	<i>B</i>	0.359	0.407	-0.210	0.363
	<i>T</i>	(0.676)	(1.260)	(-1.455)	(0.612)
VAIC	<i>P</i>	0.929	0.001**	0.188	0.001**
	<i>B</i>	0.063	0.870	-0.848	0.624
	<i>T</i>	(0.095)	(4.988)	(-1.696)	(4.224)
Control Variables					
Size	<i>P</i>	0.633	0.185	0.914	0.365
	<i>B</i>	0.343	0.457	0.047	0.895
	<i>T</i>	(0.516)	(1.451)	(2.589)	(1.022)
DER	<i>P</i>	0.644	0.001**	0.144	0.392
	<i>B</i>	-0.167	0.877	0.710	0.456
	<i>T</i>	(0.480)	(5.157)	(1.966)	(0.978)
Adjust R ²		-0.642	0.748	0.144	0.740
N		10	10	10	10

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0

Note: ** indicates 99% statistically significant and * indicates 95% statistically significant
P=Significant value; β =Standardized coefficients value; *t*= *t* statistic value

The adjusted R-square values were at -0.642 for ROA, 0.748 for ROE, 0.144 for NPM and 0.740 for EPS. Hence, the model was perfectly fitted to ROE and EPS except ROA and NPM. Hence **NH-3: There is no impact of intellectual capital performance on financial performance of TATA CONSULTANCY SERVICES LIMITED**, was partially rejected.

5.12. Impact of Intellectual Capital Performance on Financial Performance of INFOSYS LIMITED

Table-5.12 displays the results of regression analysis, revealing the impact of intellectual capital performance on the financial performance of the **INFOSYS LIMITED**, during the study period from 1st April 2010 to 31st March 2019. The Table portrays the values of coefficients for ROA, recorded by HCE at 0.744, by SCE at 0.618, by CEE at 0.718, by VAIC at 0.598, by Size at 0.756 and by DER at 0.856, with the t values of 3.153, 4.309, 4.551, 4.502, 4.870 and 4.764 respectively. Likewise, the coefficient values were achieved by HCE at 0.696, by VAIC at 0.807 and by DER at 0.669, along with the t values of 2.738, 4.874 and 3.835 respectively with regard to ROE. NPM had realized the coefficient values of 0.849 by HCE, 0.629 by SCE, 0.731 by VAIC and 0.682 by Size, with the t values of 4.552, 3.961, 3.301 and 2.694 respectively. It is observed that HCE, VAIC and DER had registered the coefficient values of 0.696, 0.701 and 0.808, with the t statistic values of 2.738, 4.874 and 3.620, for EPS respectively, in respect of **INFOSYS LIMITED**, during the study period.

The components of VAIC, namely, HCE, SCE, CEE and control variables, namely, Size and DER had influenced ROA, ROE, NPM and EPS, at 99% and 95% confidence levels. The analysis clearly demonstrated that the intellectual capital of the sample firm contributed significantly to its financial performance. The positive impact of HCE on financial performance established that the employees' knowledge and their skill did contribute a lot to the financial performance.

Table-5.12: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of INFOSYS LIMITED during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.000**	0.000**	0.016**	0.000**
	<i>B</i>	-	-	-	-
	<i>T</i>	(4.019)	(6.863)	(3.041)	(6.763)
Intellectual Capital Variables					
HCE	<i>P</i>	0.014**	0.026*	0.002**	0.026*
	<i>B</i>	0.744	0.696	0.849	0.696
	<i>T</i>	(3.153)	(2.738)	(4.552)	(2.738)
SCE	<i>P</i>	0.000**	0.263	0.004**	0.161
	<i>B</i>	0.618	0.392	0.629	-3.363
	<i>T</i>	(4.309)	(1.204)	(3.961)	(-1.848)
CEE	<i>P</i>	0.000**	0.661	0.429	0.875
	<i>B</i>	0.718	-0.159	0.282	-0.024
	<i>T</i>	(4.551)	(-0.465)	0.833)	(-0.171)
VAIC	<i>P</i>	0.002**	0.001**	0.016**	0.001**
	<i>B</i>	0.598	0.807	0.731	0.701
	<i>T</i>	(4.502)	(4.874)	(3.301)	(4.874)
Control Variables					
Size	<i>P</i>	0.000**	0.150	0.031*	0.781
	<i>B</i>	0.756	0.489	0.682	-0.065
	<i>T</i>	(4.870)	(1.926)	(2.694)	(-0.289)
DER	<i>P</i>	0.002**	0.031*	0.445	0.009**
	<i>B</i>	0.856	0.669	-0.205	0.808
	<i>T</i>	(4.674)	(3.835)	(-0.810)	(3.620)
Adjust R ²		0.927	0.862	0.687	0.862
N		10	10	10	10
<p>Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0</p> <p>Note: ** indicates 99% statistically significant and * indicates 95% statistically significant <i>P</i>=Significant value; <i>β</i>=Standardized coefficients value; <i>t</i>= <i>t</i> statistic value</p>					

SCE reported positive impact on financial performance, indicating the significant contribution by research and development activities of **INFOSYS LIMITED**. It is to be noted that adjusted R-squared values were at 0.927 for ROA, 0.862 for ROE, 0.687 for NPM and 0.862 for EPS. The adjusted R-squared model did fit with all the dependent variables. Hence the regression model was perfectly fitted. Hence **NH-3: There is no impact of intellectual capital performance on financial performance of INFOSYS LIMITED**, was rejected.

5.13. Impact of Intellectual Capital Performance on Financial Performance of WIPRO LIMITED

The results of regression analysis, showing the impact of intellectual capital performance on the financial performance of the **WIPRO LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are provided in **Table-5.13**. Four variables such as HCE, SCE, CEE and VAIC were used as independent variables, for measuring the intellectual capital performance while four variables such as ROA, ROE, NPM and EPS were employed as dependent variables, to assess the financial performance and two variables such as Size and Leverage were adopted as control variables. It is found from the Table that the coefficient values of HCE and VAIC for ROA were recorded at 0.489 and 0.806, with the t-statistic values of 2.718 and 4.018 respectively. The coefficient values were recorded at 0.776 for HCE and 0.720 for VAIC, with the t-statistic values of 3.479 and 2.936 respectively, against NPM. But EPS witnessed the coefficient values for HCE at 0.654, for SCE at 0.679, for CEE at 0.617 and for VAIC at 0.604, with the t-statistic values of 2.447, 4.593, 2.720 and 2.231 respectively, during the study period. It is surprising to note that CEE negatively impacted the NPM, with the coefficient value of -0.667. Hence, the investment on tangible assets must be curtailed to the optimum level and plan for the growth of NPM.

Table-5.13: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of WIPRO LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.000**	0.252	0.000**	0.000**
	<i>B</i>	-	-	-	-
	<i>T</i>	(6.315)	(-1.231)	(7.553)	(6.409)
Intellectual Capital Variables					
HCE	<i>P</i>	0.045*	0.304	0.008**	0.040*
	<i>B</i>	0.489	-6.317	0.776	0.654
	<i>T</i>	(2.718)	(-1.238)	(3.479)	(2.447)
SCE	<i>P</i>	0.496	0.508	0.432	0.000**
	<i>B</i>	-0.929	-3.099	-0.281	0.679
	<i>T</i>	(-0.773)	(-0.750)	(-0.871)	(4.593)
CEE	<i>P</i>	0.572	0.949	0.035*	0.026*
	<i>B</i>	0.322	0.114	-0.667	0.617
	<i>T</i>	(0.632)	(0.070)	(-2.531)	(2.720)
VAIC	<i>P</i>	0.000**	0.190	0.019**	0.056*
	<i>B</i>	0.806	0.451	0.720	0.604
	<i>T</i>	(4.018)	(1.431)	(2.936)	(2.231)
Control Variables					
Size	<i>P</i>	0.836	0.738	0.558	0.738
	<i>B</i>	-0.166	1.656	-0.349	-0.253
	<i>T</i>	(-0.214)	(0.356)	(-0.567)	(-0.348)
DER	<i>P</i>	0.662	0.968	0.535	0.642
	<i>B</i>	0.354	0.030	0.401	0.353
	<i>T</i>	(0.454)	(0.043)	(0.652)	(0.486)
Adjust R²		0.661	0.380	0.864	0.810
N		10	10	10	10
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0					
Note: ** indicates 99% statistically significant and * indicates 95% statistically significant					
<i>P</i> =Significant value; <i>β</i> =Standardized coefficients value; <i>t</i> = <i>t</i> statistic value					

It is learnt from the analysis of intellectual capital performance and financial performance of **WIPRO LIMITED** that VAIC exercised significant impact on ROA, NPM and EPS positively, at significant confidence levels (i.e., p value was less than 0.01 and 0.05), during the study period. As stated earlier, the efficiency of intellectual capital of the firm strongly stimulated the financial performance, except ROE of **WIPRO LIMITED**. At this juncture, it is concluded that growth of intellectual capital did not help the firm to improve its return on equity. It is identified from the regression analysis that the adjusted R-square value was at 0.661 for ROA, 0.380 for ROE, 0.864 for NPM and 0.810 for EPS. It is evident that except ROE, ROA, NPM and EPS were found to be fit. Hence **NH-3: There is no impact of intellectual capital performance on financial performance of WIPRO LIMITED**, was partially rejected.

5.14. Impact of Intellectual Capital Performance on Financial Performance of TECH MAHINDRA LIMITED

Table-5.14 shows the results of regression analysis of the impact of intellectual capital performance on the financial performance of **TECH MAHINDRA LIMITED**, during the study period from 1st April 2010 to 31st March 2019. According to the **Table**, the values of coefficient were at 0.503, 0.658 and 0.873 for HCE, CEE and VAIC respectively, against ROA of **TECH MAHINDRA LIMITED**, with the t statistic values of 3.471, 2.473 and 5.054 respectively. Further, coefficient values were reported by HCE at 0.759 and VAIC at 0.871, with the t statistic values of 3.298 and 7.069 respectively against NPM, during the study period. The coefficient values of EPS, along with t-statistics values were at 0.597 (5.501), 0.663 (5.611), 0.583 (5.039), 0.501 (5.515), 0.763 (4.637) and 1.113 (3.739) for HCE, SCE, CEE, VAIC, Size and DER respectively.

Table-5.14: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of TECH MAHINDRA LIMITED during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.004**	0.252	0.055*	0.013**
	<i>B</i>	-	-	-	-
	<i>T</i>	(4.072)	(-1.231)	(2.245)	(4.207)
Intellectual Capital Variables					
HCE	<i>P</i>	0.008**	0.838	0.011**	0.012**
	<i>B</i>	0.503	0.097	0.759	0.597
	<i>T</i>	(3.471)	(0.218)	(3.298)	(5.501)
SCE	<i>P</i>	0.065	0.705	0.272	0.011**
	<i>B</i>	0.603	-0.197	0.385	0.663
	<i>T</i>	(2.140)	(-0.407)	(1.179)	(5.611)
CEE	<i>P</i>	0.039*	0.969	0.239	0.015**
	<i>B</i>	0.658	-0.006	0.410	0.583
	<i>T</i>	(2.473)	(-0.015)	(1.272)	(5.039)
VAIC	<i>P</i>	0.001**	0.151	0.000**	0.012**
	<i>B</i>	0.873	-0.757	0.871	0.501
	<i>T</i>	(5.054)	(-1.772)	(7.069)	(5.515)
Control Variables					
Size	<i>P</i>	0.926	0.870	0.339	0.019**
	<i>B</i>	-0.006	0.067	0.377	0.763
	<i>T</i>	(-0.013)	(0.714)	(1.026)	(4.637)
DER	<i>P</i>	0.990	0.738	0.119	0.033*
	<i>B</i>	-0.043	0.122	0.654	1.113
	<i>T</i>	(-0.096)	(0.347)	(1.777)	(3.739)
Adjust R ²		0.831	0.446	0.523	0.810
N		10	10	10	10

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0

Note: ** indicates 99% statistically significant and * indicates 95% statistically significant
P=Significant value; β =Standardized coefficients value; *t*= *t* statistic value

Three variables, namely, ROA, NPM and EPS had significantly influenced HCE, SCE, CEE and VAIC, at 99% and 95% confidence levels. More importantly, the VAIC had impacted ROA, NPM and EPS strongly during the study period. Therefore, it is urged that investment on employees training and research and development activities must be improved so that the sample firm can yield more returns and profits because ROE failed to achieve the desirable return during the study period. Therefore, necessary steps are to be taken to improve the ROE of **TECH MAHINDRA LIMITED**. The results, as given in the Table, clearly demonstrated that the model of intellectual capital performance created significant impact on the financial performance of the firm since the adjusted R² values were at 0.831 for ROA, 0.446 for ROE, 0.523 for NPM and 0.810 for EPS. Therefore, **NH-3: There is no impact of intellectual capital performance on financial performance of TECH MAHINDRA LIMITED**, was partially accepted.

5.15. Impact of Intellectual Capital Performance on Financial Performance of LARSEN & TOUBRO INFOTECH LIMITED

The results of regression analysis of the sample firm, during the study period from 1st April 2010 to 31st March 2019, are presented in **Table-5.15**. The values of coefficient were recorded by HCE at 0.681 against NPM and by VAIC at 0.844, with the t statistics values of 3.630 and 5.582 respectively. In the case of EPS, the coefficient values were registered by HCE and VAIC at 0.597 and 0.704, with the t statistics values of 5.501 and 5.006 respectively, at 99% confidence level. But ROA and ROE have impacted neither positively nor negatively by any independent variable or control variable. It is observed that the HCE exercised positive impact on financial performance (NPM and EPS), indicating the significant contribution of employees' skill towards the financial performance of **LARSEN & TOUBRO INFOTECH LIMITED**.

Table-5.15: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of LARSEN & TOUBRO INFOTECH LIMITED during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.480	0.624	0.006**	0.013**
	<i>B</i>	-	-	-	-
	<i>T</i>	(-0.804)	(-0.545)	(3.656)	(4.207)
Intellectual Capital Variables					
HCE	<i>P</i>	0.191	0.251	0.003**	0.012**
	<i>B</i>	0.960	0.821	0.681	0.597
	<i>T</i>	(1.683)	(1.418)	(3.630)	(5.501)
SCE	<i>P</i>	0.648	0.581	0.570	0.083
	<i>B</i>	0.463	0.597	-0.473	-0.742
	<i>T</i>	(0.506)	(0.617)	(-0.608)	(2.567)
CEE	<i>P</i>	0.445	0.508	0.695	0.075
	<i>B</i>	0.355	0.307	0.322	-1.160
	<i>T</i>	(0.877)	(0.749)	(0.415)	(-2.675)
VAIC	<i>P</i>	0.857	0.888	0.001**	0.000**
	<i>B</i>	0.065	0.051	0.844	0.704
	<i>T</i>	(0.186)	(0.145)	(5.582)	(5.006)
Control Variables					
Size	<i>P</i>	0.524	0.712	0.773	0.083
	<i>B</i>	-0.274	-0.157	0.309	-0.742
	<i>T</i>	(-0.720)	(-0.406)	(0.304)	(-2.594)
DER	<i>P</i>	0.163	0.171	0.906	0.910
	<i>B</i>	0.778	0.786	-0.026	0.036
	<i>T</i>	(2.025)	(2.104)	(-0.048)	(0.122)
Adjust R ²		0.268	0.247	0.551	0.578
N		10	10	10	10
<p>Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0</p> <p>Note: ** indicates 99% statistically significant and * indicates 95% statistically significant <i>P</i>=Significant value; β=Standardized coefficients value; <i>t</i>= <i>t</i> statistic value</p>					

It is surprising to note that CEE (a proxy of Physical Capital) significantly influenced ROA, ROE and NPM and it indicated that CEE did not contribute towards profitability. It is to be noted that adjusted R-squared values were at 0.268 for ROA, 0.247 for ROE, 0.551 for NPM and 0.578 for EPS. In other words, the regression model was perfectly fitted, except ROA and ROE, which earned insignificant values in all cases. In other words, the model of intellectual capital performance created significant impact on the financial performance (NPM and EPS). Hence **NH-3: There is no impact of intellectual capital performance on financial performance of LARSEN & TOUBRO INFOTECH LIMITED**, was partially accepted. Since ROA and ROE failed to earn positive values through independent variables during the study period, the analysis exposed the inefficiency of intellectual capital variables. Hence, the sample firm is required to pay special attention to improving the financial position, through strengthening the elements of intellectual capital.

5.16. Impact of Intellectual Capital Performance on Financial Performance of MINDTREE LIMITED

Table-5.16 shows the results of regression analysis, for examining the impact of intellectual capital performance on the financial performance of the **MINDTREE LIMITED** during the study period from 1st April 2010 to 31st March 2019. It is to be noted that four variables, HCE, SCE, CEE and VAIC, were adopted as independent variables, for measuring the intellectual capital performance while four variables, ROA, ROE, NPM and EPS, were used as dependent variables, to assess the financial performance of **MINDTREE LIMITED** and two variables, Size and DER, were treated as control variables. It is found from the Table that the coefficient values for HCE, SCE, CEE, VAIC, Size and DER against ROA were at 0.862, 0.591, 0.607,

0.699, 0.574 and 0.832, with the t-statistic values of 4.808, 3.819, 4.110, 5.781, 2.431 and 3.525 respectively. Correspondingly, the coefficient values against EPS were at 0.679 for HCE, 0.592 for SCE, 0.618 for CEE, 0.507 for VAIC, 0.739 for Size and 0.581 for DER, with the t-statistic values of 4.316, 3.006, 4.100, 2.684, 4.916 and 2.967 respectively, during the study period.

It is learnt from the analysis that only two variables like ROA and EPS were influenced by HCE, SCE, CEE, VAIC, Size and DER, at 99% and 95% confidence levels, during the study period. Other financial performance variables such as ROE and NPM were not influenced by intellectual capital and control variables since these variables yielded no significant value. The results of CEE indicated that the physical assets did have an influence on financial performance. The presence of significant impact of SCE and CEE demonstrated that these measures enhanced employee knowledge and research and innovation activities of sample firm. Hence it is suggested to the authorities of **MINDTREE LIMITED**, to invest more on the human resources as well as research activities to earn more profits in the long run. The adjusted R-square values were at 0.711 for ROA, 0.461 for ROE, -0.069 for NPM and 0.778 for EPS. It shows that only two variables, namely ROA and EPS, were fit while ROE and NPM did not fit. Therefore, **NH-3: There is no impact of intellectual capital performance on financial performance of MINDTREE LIMITED**, was partially rejected.

Table-5.16: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of MINDTREE LIMITED during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.001**	0.275	0.332	0.007**
	<i>B</i>	-	-	-	-
	<i>T</i>	(3.794)	(1.332)	(1.149)	(3.622)
Intellectual Capital Variables					
HCE	<i>P</i>	0.001**	0.823	0.768	0.000**
	<i>B</i>	0.862	-0.684	-0.891	0.679
	<i>T</i>	(4.808)	(-0.245)	(-0.322)	(4.316)
SCE	<i>P</i>	0.002**	0.866	0.753	0.001*
	<i>B</i>	0.591	0.245	0.454	0.592
	<i>T</i>	(3.819)	(0.184)	(0.345)	(3.006)
CEE	<i>P</i>	0.001**	0.456	0.367	0.001**
	<i>B</i>	0.607	-0.527	0.646	0.618
	<i>T</i>	(4.110)	(-0.853)	(1.061)	(4.100)
VAIC	<i>P</i>	0.000**	0.927	0.898	0.028*
	<i>B</i>	0.699	-0.261	0.60	0.507
	<i>T</i>	(5.781)	(-0.100)	(0.140)	(2.684)
Control Variables					
Size	<i>P</i>	0.045*	0.218	0.902	0.000**
	<i>B</i>	0.574	0.288	0.109	0.739
	<i>T</i>	(2.431)	(1.588)	(0.133)	(4.916)
DER	<i>P</i>	0.010**	0.371	0.577	0.028*
	<i>B</i>	0.832	0.985	-0.054	0.581
	<i>T</i>	(3.525)	(1.051)	(-0.663)	(2.967)
Adjust R ²		0.711	0.461	-0.069	0.778
N		10	10	10	10
<p>Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0</p> <p>Note: ** indicates 99% statistically significant and * indicates 95% statistically significant <i>P</i>=Significant value; <i>β</i>=Standardized coefficients value; <i>t</i>= <i>t</i> statistic value</p>					

5.17. Impact of Intellectual Capital Performance on Financial Performance of ORACLE FINANCIAL SERVICES SOFTWARE LIMITED

The results of regression analysis, for intellectual capital performance and the financial performance of the **ORACLE FINANCIAL SERVICES SOFTWARE LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are provided in **Table-5.17**. It is to be noted that variables such as HCE, SCE, CEE and VAIC were used as independent variables, for assessing the intellectual capital performance while ROA, ROE, NPM and EPS were used as dependent variables, to study the financial performance of sample firm and Size and DER were employed as control variables. According to the Table, the values of coefficient were at -0.432, -2.285, 1.084, -2.701, -0.309, -0.963 against ROA for HCE, SCE, CEE, VAIC, Size and EPS respectively, in respect of the sample firm. Further, the values of t-statistics were at -1.028, -1.820, 2.374, -1.752, 0.997 and -2.049 for the same sample variables during the study period. The coefficient values of -0.685, -0.772, -0.354, 0.973, 0.457 and -0.813 were recorded for HCE, SCE, CEE, VAIC, Size and DER against ROE, with the t-statistic values of -0.873, -0.303, -0.416, 0.388, 0.791 and -0.926. NPM had recorded the coefficient values of 0.281 for HCE, 2.756 for SCE, 0.934 for CEE, -3.258 for VAIC, 0.507 for Size and -0.844 for DER, with the t statistics values of 0.536, 1.616, 1.640, -1.693, 1.313 and -1.438 respectively, during the study period. The sample variables such as HCE, SCE, CEE, VAIC, Size and DER had reported coefficient values of 1.646, 2.288, -3.198, 0.289, 1.590 and 0.075 for EPS, with the t statistics values of 2.861, 1.224, -1.516, 0.682, 2.470 and 0.213, in respect of **ORACLE FINANCIAL SERVICES SOFTWARE LIMITED**.

It is interesting to record that the sample variable such as HCE, SCE, CEE, VAIC, Size and DER did not exercise positive impact on the ROA, ROE, NPM and EPS, both at 99% and 95% confidence levels. This result was not in line with the resource-based theory. The tangible assets (CEE) also failed to contribute to the financial performance, as evident from the insignificant association between CEE and financial performance. This correlation did not support the organization learning theory, which explains the effective use of organization's internal resources through employee training and its resultant effect on innovation. The insignificant relationship between HCE and financial performance indicators, demonstrated that employees' knowledge and skill were not sufficient to encourage the financial performance of the sample firm. The control variables, namely, size and DER did not exercise any impact on ROA, ROE, NPM and EPS, during the study period. It is clear that all predictor variables played a negative role in the creation of ROA, ROE, NPM and EPS of the sample firm, as shown in the Table. Therefore, the sample firm needs to take special attention towards reconstruction of its investment strategy, to yield better results in the firm's financial performance. It is to be noted that adjusted R-squared values were 0.674 for ROA, -0.134 for ROE, -0.493 for NPM and 0.390 for EPS and as a result no variable was fitted. Therefore, **NH-3: There is no impact of intellectual capital performance on financial performance of ORACLE FINANCIAL SERVICES SOFTWARE LIMITED**, was accepted.

Table-5.17: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of ORACLE FINANCIAL SERVICES SOFTWARE LIMITED during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
	ROA	ROE	NPM	EPS	
Constant	<i>P</i>	0.090	0.775	0.235	0.488
	<i>B</i>	-	-	-	-
	<i>T</i>	(2.469)	(0.312)	(1.462)	(0.789)
Intellectual Capital Variables					
HCE	<i>P</i>	0.380	0.447	0.629	0.065
	<i>B</i>	-0.432	-0.685	0.281	1.646
	<i>T</i>	(-1.028)	(-0.873)	(0.536)	(2.861)
SCE	<i>P</i>	0.166	0.782	0.204	0.308
	<i>B</i>	-2.285	-0.772	2.756	2.288
	<i>T</i>	(-1.820)	(-0.303)	(1.616)	(1.224)
CEE	<i>P</i>	0.098	0.706	0.200	0.227
	<i>B</i>	1.084	-0.354	0.934	-3.198
	<i>T</i>	(2.374)	(-0.416)	(1.640)	(-1.516)
VAIC	<i>P</i>	0.178	0.758	0.189	0.544
	<i>B</i>	-2.701	0.973	-3.258	0.289
	<i>T</i>	(-1.752)	(0.388)	(-1.693)	(0.682)
Control Variables					
Size	<i>P</i>	0.392	0.487	0.281	0.090
	<i>B</i>	-0.309	0.457	0.507	1.590
	<i>T</i>	(0.997)	(0.791)	(1.313)	(2.470)
DER	<i>P</i>	0.133	0.423	0.246	0.837
	<i>B</i>	-0.963	-0.813	-0.844	0.075
	<i>T</i>	(-2.049)	(-0.926)	(-1.438)	(0.213)
Adjust R ²	0.674	-0.134	-0.493	0.390	
N	10	10	10	10	

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0

Note: ** indicates 99% statistically significant and * indicates 95% statistically significant
P=Significant value; β =Standardized coefficients value; *t*= *t* statistic value

5.18. Impact of Intellectual Capital Performance on Financial Performance of HCL TECHNOLOGIES LIMITED

Table-5.18 gives the results of regression analysis, for intellectual capital performance and the financial performance of the **HCL TECHNOLOGIES LIMITED**, during the study period from 1st April 2010 to 31st March 2019. Four variables such as HCE, SCE, CEE and VAIC were treated as independent variables while four variables, namely, ROA, ROE, NPM and EPS were employed as dependent variables of **HCL TECHNOLOGIES LIMITED**. The analysis also added Size and DER as control variables. It is clear that the coefficient values of 0.798 and 0.764, with the t-statistics values of 3.744 and 3.349, were recorded by HCE and VAIC respectively, against ROA of **HCL TECHNOLOGIES LIMITED**. Further, the coefficient values of CEE, VAIC and DER were recorded at 0.884, 0.628 and 0.882 against ROE, with t-values of 5.353, 2.284 and 6.309 respectively, during the study period. The coefficient values of 0.881 and 0.714 were earned by CEE and DER against NPM, with t statistics values of 5.351 and 2.859, during the study period. The independent variables such as HCE and VAIC had registered negative but significant coefficient values of -0.807 and -0.604 for NPM, with t-values of -3.867 and -2.145 respectively, during the study period. Likewise, DER (a control variable) also had negatively influenced ROA by coefficient value at -0.893, with the t statistics value of -3.982 and HCE, at coefficient value of -0.895, also negatively affected the ROE, with t value of -5.666.

It is clear from the Table that ROA was influenced positively by HCE and VAIC, at 99% confidence level and the CEE (a proxy of tangible assets) had exercised significant influence on ROE and NPM. It is surprising to note that the human capital played a negative role in the case of ROE and NPM, as evident from the Table, alerting the sample firm to diversify its investment more to research and innovation activities of **HCL TECHNOLOGIES LIMITED**. The EPS was not impacted by any independent variables of this firm. It is to be noted that adjusted R-squared values were of 0.591 for ROA, 0.917 for ROE, 0.608 for NPM and 0.390 for EPS. It was found that the model of EPS was not to be fit. Hence, **NH-3: There is no impact of intellectual capital performance on financial performance of HCL TECHNOLOGIES LIMITED**, was partially accepted.

Table-5.18: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of HCL TECHNOLOGIES LIMITED during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.091	0.001**	0.000**	0.512
	<i>B</i>	-	-	-	-
	<i>T</i>	(1.894)	(5.465)	(5.682)	(-0.705)
Intellectual Capital Variables					
HCE	<i>P</i>	0.006**	0.000**	0.005**	0.373
	<i>B</i>	0.798	-0.895	-0.807	2.556
	<i>T</i>	(3.744)	(-5.666)	(-3.867)	(0.978)
SCE	<i>P</i>	0.162	0.708	0.167	0.531
	<i>B</i>	0.478	-0.136	--0.473	2.105
	<i>T</i>	(1.540)	(-0.388)	(-1.518)	(0.673)
CEE	<i>P</i>	0.167	0.001**	0.001**	0.306
	<i>B</i>	-1.473	0.884	0.881	0.627
	<i>T</i>	(-1.518)	(5.353)	(5.351)	(1.139)
VAIC	<i>P</i>	0.010**	0.052*	0.004**	0.576
	<i>B</i>	0.764	0.628	-0.604	-2.794
	<i>T</i>	(3.349)	(2.284)	(-2.145)	(-0.598)
Control Variables					
Size	<i>P</i>	0.323	0.096	0.417	0.902
	<i>B</i>	-0.216	0.268	0.215	-0.039
	<i>T</i>	(-1.064)	(1.921)	(2.859)	(-1.127)
DER	<i>P</i>	0.005**	0.000**	0.024*	0.095
	<i>B</i>	-0.893	0.882	0.714	-0.588
	<i>T</i>	(-3.982)	(6.309)	(2.859)	(-1.917)
Adjust R ²	0.591		0.917	0.608	0.390
N	10		10	10	10

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0

Note: ** indicates 99% statistically significant and * indicates 95% statistically significant
P=Significant value; *β*=Standardized coefficients value; *t*= *t* statistic value

Section-C

Impact of Intellectual Capital Performance on Financial Performance of PHARMACEUTICAL SECTOR FIRMS

As stated earlier, nine sample pharmaceutical sector firms were Sun Pharmaceutical Industries Limited, Divi's Laboratories Limited, Dr. Reddy's Laboratories Limited, Cipla Limited, Cadila Healthcare Limited, Torrent Pharmaceuticals Limited, Lupin Limited, Biocon Limited and Aurobindo Pharma Limited. The detailed a regression analysis, for nine pharmaceutical sector firms is given as follows.

5.19 Impact of Intellectual Capital Performance on Financial Performance of SUN PHARMACEUTICAL INDUSTRIES LIMITED

5.20 Impact of Intellectual Capital Performance on Financial Performance of DIVI'S LABORATORIES LIMITED

5.21 Impact of Intellectual Capital Performance on Financial Performance of DR. REDDY'S LABORATORIES LIMITED

5.22 Impact of Intellectual Capital Performance on Financial Performance of CIPLA LIMITED

5.23 Impact of Intellectual Capital Performance on Financial Performance of CADILA HEALTHCARE LIMITED

5.24 Impact of Intellectual Capital Performance on Financial Performance of TORRENT PHARMACEUTICALS LIMITED

5.25 Impact of Intellectual Capital Performance on Financial Performance of LUPIN LIMITED

5.26 Impact of Intellectual Capital Performance on Financial Performance of BIOCON LIMITED and

5.27 Impact of Intellectual Capital Performance on Financial Performance of AUROBINDO PHARMA LIMITED

5.19. Impact of Intellectual Capital Performance on Financial Performance of SUN PHARMACEUTICAL INDUSTRIES LIMITED

The results of regression analysis, showing the impact of Intellectual Capital Performance on Financial Performance of **SUN PHARMACEUTICAL INDUSTRIES LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are reported in **Table-5.19**. The values of coefficient were recorded against ROA by HCE at 0.911, by SCE at 0.882, by CEE at 0.914, by VAIC at 0.791 and by DER at 0.931, with t-statistics values of 6.244, 5.293, 6.392, 4.002 and 7.603 respectively. For ROE, the coefficient values were reported by HCE at 0.701, SCE at 0.598, CEE at 0.781, VAIC at 0.809, with t-statistics values of 4.622, 3.784, 5.325 and 4.247 respectively. For NPM, the values were recorded by CEE at 0.699, by VAIC at 0.902 and by DER at 0.871, in respect of the sample firm with the t-statistic values of 4.805, 6.115 and 4.924 respectively, during the study period. The coefficient values of CEE, VAIC and DER were at 0.745, 0.998 and 0.898, with the t statistics values of 3.162, 6.006 and 5.560 against EPS. It is proved that four variables, namely, HCE, SCE, CEE and VAIC had reported positive influence on ROA and ROE, at 99% confidence level (P-value was less than 0.001). Similarly, NPM and EPS were influenced by CEE and VAIC, at 99% confidence level. Besides, DER, the control variable, positively influenced ROA, NPM and EPS. It is interesting to note that the value added intellectual coefficient contributed much to the growth of all dependent variables, during the study period. It is noted that any investment on human capital will appreciate the performance of the sample firm. In terms of ROA and ROE of sample firm, HCE and VAIC had exerted substantive impact. Therefore, the firm by spending more money on employee training, could acquire more profit.

Table-5.19: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of SUN PHARMACEUTICAL INDUSTRIES LIMITED during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.001**	0.000**	0.112	0.807
	<i>B</i>	-	-	-	-
	<i>T</i>	(-5.086)	(8.769)	(1.786)	(1.948)
Intellectual Capital Variables					
HCE	<i>P</i>	0.000**	0.002**	0.196	0.144
	<i>B</i>	0.911	0.701	-0.446	-0.497
	<i>T</i>	(6.244)	(4.622)	(-1.410)	(-1.621)
SCE	<i>P</i>	0.001**	0.005**	0.133	0.097
	<i>B</i>	0.882	0.598	-0.508	-0.553
	<i>T</i>	(5.293)	(3.784)	(-1.670)	(-1.879)
CEE	<i>P</i>	0.000**	0.000**	0.002**	0.013**
	<i>B</i>	0.914	0.781	0.699	0.745
	<i>T</i>	(6.392)	(5.325)	(4.805)	(3.162)
VAIC	<i>P</i>	0.009**	0.003**	0.000**	0.000**
	<i>B</i>	0.791	0.809	0.902	0.998
	<i>T</i>	(4.002)	(4.247)	(6.115)	(6.006)
Control Variables					
Size	<i>P</i>	0.479	0.808	0.134	0.136
	<i>B</i>	0.092	0.086	0.300	0.272
	<i>T</i>	(0.744)	(0.252)	(1.695)	(1.683)
DER	<i>P</i>	0.000**	0.236	0.002**	0.001**
	<i>B</i>	0.931	-0.444	0.871	0.898
	<i>T</i>	(7.603)	(-1.297)	(4.924)	(5.560)
Adjust R ²		0.693	0.706	0.600	0.653
N		10	10	10	10
<p>Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0</p> <p>Note: ** indicates 99% statistically significant and * indicates 95% statistically significant <i>P</i>=Significant value; <i>β</i>=Standardized coefficients value; <i>t</i>= <i>t</i> statistic value</p>					

It is recorded that adjusted R-squared value values were of 0.693 for ROA, 0.706 for ROE and 0.600 for NPM and 0.653 for EPS. It was found that the regression model was perfectly fitted. The model of intellectual capital performance created significant impact on financial performance of the sample firm. These findings established the fact that VAIC could be employed as an important tool for creating wealth. Hence **NH-3: There is no impact of intellectual capital performance on financial performance of SUN PHARMACEUTICAL INDUSTRIES LIMITED,** was rejected.

5.20. Impact of Intellectual Capital Performance on Financial Performance of DIVI'S LABORATORIES LIMITED

Table-5.20 reveals the results of regression analysis, of the impact of Intellectual Capital Performance on Financial Performance of **DIVI'S LABORATORIES LIMITED**, during the study period from 1st April 2010 to 31st March 2019. The values of coefficient for ROA were recorded by CEE at 0.713 and by VAIC at 0.617, with the t-statistics values by CEE at 2.879 and VAIC at 2.217 respectively. The coefficient values (for ROE) were recorded by CEE at 0.639 and VAIC at 0.689 in respect of **DIVI'S LABORATORIES LIMITED**, with the t-statistic values of 2.351 and 3.365 respectively, during the study period. The coefficient value of NPM was recorded by VAIC at 0.767, with the t statistics value of 5.316. But HCE and VAIC had reported coefficient values of 0.682 and 0.799, with the t statistics values of 4.001 and 4.706, in terms of EPS. The human capital (HC) had exercised negative influence on ROA and ROE, both at 95% and 99% confidence levels. It is found that insufficient use of human capital decreased the growth of financial performance of the sample firm.

Table-5.20: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of DIVI'S LABORATORIES LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.001**	0.001**	0.003**	0.010**
	<i>B</i>	-	-	-	-
	<i>T</i>	(5.037)	(5.057)	(5.407)	(3.817)
Intellectual Capital Variables					
HCE	<i>P</i>	0.047*	0.006**	0.001**	0.002**
	<i>B</i>	-0.639	-0.792	0.508	0.682
	<i>T</i>	(-2.351)	(-3.669)	(5.411)	(4.001)
SCE	<i>P</i>	0.341	0.234	0.467	0.487
	<i>B</i>	-0.337	-0.415	-0.261	-0.250
	<i>T</i>	(-1.102)	(-1.288)	(-0.763)	(-0.729)
CEE	<i>P</i>	0.021*	0.047*	0.074	0.079
	<i>B</i>	0.713	0.639	0.588	0.580
	<i>T</i>	(2.879)	(2.351)	(2.055)	(2.102)
VAIC	<i>P</i>	0.057*	0.010**	0.001**	0.004**
	<i>B</i>	0.617	0.689	0.767	0.799
	<i>T</i>	(2.217)	(3.365)	(5.316)	(4.706)
Control Variables					
Size	<i>P</i>	0.808	0.978	0.760	0.768
	<i>B</i>	-0.215	0.010	-0.188	-0.115
	<i>T</i>	(-0.602)	(0.028)	(-0.317)	(-0.307)
DER	<i>P</i>	0.448	0.211	0.550	0.582
	<i>B</i>	0.287	0.473	0.234	0.217
	<i>T</i>	(-0.803)	(1.377)	(0.627)	(0.578)
Adjust R²		0.599	0.581	0.565	0.609
N		10	10	10	10
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0					
Note: ** indicates 99% statistically significant and * indicates 95% statistically significant <i>P</i> =Significant value; β =Standardized coefficients value; <i>t</i> = <i>t</i> statistic value					

Further, Size and leverage (control variables) created neither positive nor negative impact on any dependent variable, during the study period. As per the analysis, the physical assets had influenced the ROA, followed by ROE, showing that the tangible assets of the sample firm yielded higher returns. The absence of significant impact of SCE implied that the measures to enhance employee knowledge of **DIVI'S LABORATORIES LIMITED** did not contribute to the value of **DIVI'S LABORATORIES LIMITED**. Hence the sample firm needs to increase its investment on research and innovation activities, to boost the growth of its financial performance, to attract the investors.

It is to be noted that adjusted R-squared values were at 0.599 for ROA, 0.581 for ROE, 0.565 for NPM and 0.609 for EPS. Hence the model of intellectual capital performance created significant impact on the financial performance of the sample firm. Therefore, **NH-3: There is no impact of intellectual capital performance on financial performance of DIVI'S LABORATORIES LIMITED**, was rejected.

5.21 Impact of Intellectual Capital Performance on Financial Performance of DR. REDDY'S LABORATORIES LIMITED

The results of regression analysis, exhibiting the impact of intellectual capital performance on the financial performance of the **DR. REDDY'S LABORATORIES LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are presented in **Table-5.21**. It is to be noted that four variables, HCE, SCE, CEE and VAIC, were taken as independent variables, for measuring the intellectual capital performance while four variables, ROA, ROE, NPM and EPS, were employed as dependent variables, to appraise the financial performance of **DR. REDDY'S LABORATORIES LIMITED** and two variables, Size and DER, were identified as

control variables. It is found from the Table that the coefficient values of HCE, SCE, CEE, VAIC, Size and DER against ROA, were recorded at 0.899, 0.959, 0.741 and 0.943, with the t-statistic values of 5.816, 7.537, 3.542 and 4.512 respectively. The coefficient values against ROE, were recorded at 0.618 for SCE, 0.646 for CEE and 0.583 for VAIC, with t-statistic values of 3.061, 2.396 and 3.107. NPM recorded coefficient values for SCE at 0.649 and for VAIC at 0.902, with the t-statistic values of 3.566 and 7.561 respectively. The EPS registered coefficient values at 0.705 for HCE and 0.601 for VAIC, with t-statistic values of 2.803 and 3.988 respectively, during the study period.

It is learnt from the analysis of impact of intellectual capital performance on the financial performance of **DR. REDDY'S LABORATORIES LIMITED** that VAIC created significant impact on ROA, ROE, NPM and EPS positively, at 99% confidence level (i.e., p value was less than 0.01), during the study period. It is clear from the analysis that the intellectual capital of the sample firm contributed significantly to its financial performance. This result was in line with the resource-based theory. The tangible assets did contribute to the ROE as evident from the positive association between CEE and ROE. This correlation supported the organization learning theory, which explains the effective use of organization's internal resources through employee training and its resultant effect on tangible assets.

Table-5.21: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of DR. REDDY'S LABORATORIES LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.001**	0.015**	0.000**	0.010**
	<i>B</i>	-	-	-	-
	<i>T</i>	(-4.981)	(3.091)	(7.526)	(3.817)
Intellectual Capital Variables					
HCE	<i>P</i>	0.000**	0.096	0.306	0.023*
	<i>B</i>	0.899	-0.555	0.360	0.705
	<i>T</i>	(5.816)	(-1.887)	(1.903)	(2.803)
SCE	<i>P</i>	0.604	0.016**	0.007**	0.111
	<i>B</i>	0.188	0.618	0.649	6.648
	<i>T</i>	(0.540)	(3.061)	(3.566)	(2.242)
CEE	<i>P</i>	0.367	0.043*	0.103	0.451
	<i>B</i>	0.320	0.646	7.825	1.466
	<i>T</i>	(0.956)	(2.396)	(2.325)	(0.865)
VAIC	<i>P</i>	0.000**	0.015**	0.000**	0.007**
	<i>B</i>	0.959	0.583	0.902	0.601
	<i>T</i>	(7.537)	(3.107)	(7.561)	(3.988)
Control Variables					
Size	<i>P</i>	0.009**	0.015	0.422	0.794
	<i>B</i>	0.741	-0.878	1.756	-0.133
	<i>T</i>	(3.542)	(3.215)	(0.928)	(-0.296)
DER	<i>P</i>	0.003**	0.105	0.765	0.307
	<i>B</i>	0.943	-0.508	0.220	-4.535
	<i>T</i>	(4.512)	(-1.860)	(0.328)	(-1.228)
Adjust R²		0.785	0.471	0.635	0.716
N		10	10	10	10
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0					
Note: ** indicates 99% statistically significant and * indicates 95% statistically significant <i>P</i> =Significant value; <i>β</i> =Standardized coefficients value; <i>t</i> = <i>t</i> statistic value					

The positive relationship among HCE, ROA and EPS established that employees' knowledge and skill did enhance the financial performance of **DR. REDDY'S LABORATORIES LIMITED**. Therefore, investing on employees should be increased to enhance the human assets of the sample firm. The other component of VAIC, namely, SCE also influenced other variables like ROE and NPM since these variables yielded significant values. It is identified from regression analysis that the control variable such as Size and DER positively influenced ROA during the study period. The adjusted R-square value was at 0.785 for ROA, 0.471 for ROE, 0.635 for NPM and 0.716 for EPS. Therefore, **NH-3: There is no impact of intellectual capital performance on financial performance of DR. REDDY'S LABORATORIES LIMITED**, was rejected.

5.22. Impact of Intellectual Capital Performance on Financial Performance of CIPLA LIMITED

Table-5.22 shows the results of regression analysis, for intellectual capital performance and financial performance of the **CIPLA LIMITED**, during the study period from 1st April 2010 to 31st March 2019. Variables such as HCE, SCE, CEE and VAIC were reported as independent variables for assessing the intellectual capital performance while ROA, ROE, NPM and EPS were treated as dependent variables, to identify the financial performance of **CIPLA LIMITED** and Size and DER were used as control variables. It is found from the Table that the coefficient values of HCE and VAIC against ROA, were recorded at 0.674 and 0.801, with the t-statistic values of 3.578 and 4.979 respectively. The coefficient values against NPM were recorded at -15.356 for HCE, -10.229 for SCE, -23.982 for VAIC and -0.851 for Size, with the t-statistic values of -3.238, -3.051, -3.061 and -4.288 respectively.

Table-5.22: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of CIPLA LIMITED during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.001**	0.329	0.670	0.487
	<i>B</i>	-	-	-	-
	<i>T</i>	(5.418)	(1.162)	(-0.452)	(-0.781)
Intellectual Capital Variables					
HCE	<i>P</i>	0.003**	0.360	0.023*	0.017**
	<i>B</i>	0.674	-2.468	-15.356	-16.477
	<i>T</i>	(3.578)	(-1.078)	(-3.238)	(-3.537)
SCE	<i>P</i>	0.084	0.522	0.028*	0.020*
	<i>B</i>	-0.572	0.311	-10.229	-11.098
	<i>T</i>	(-1.972)	(0.723)	(-3.051)	(-3.371)
CEE	<i>P</i>	0.356	0.853	0.125	0.046*
	<i>B</i>	0.327	-2.279	-0.526	-0.738
	<i>T</i>	(-0.980)	(-0.202)	(-1.843)	(-2.633)
VAIC	<i>P</i>	0.001**	0.707	0.028*	0.020*
	<i>B</i>	0.801	-2.835	-23.982	-25.983
	<i>T</i>	(4.979)	(-0.414)	(-3.061)	(-3.376)
Control Variables					
Size	<i>P</i>	0.030*	0.374	0.004**	0.006**
	<i>B</i>	-0.713	-0.584	-0.851	--0.825
	<i>T</i>	(-2.707)	(-1.403)	(-4.288)	(-3.893)
DER	<i>P</i>	0.806	0.704	0.812	0.620
	<i>B</i>	-0.067	6.874	0.049	-0.050
	<i>T</i>	(-0.255)	(0.419)	(0.248)	(-0.236)
Adjust R ²		0.551	0.274	0.793	0.801
N		10	10	10	10

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0

Note: ** indicates 99% statistically significant and * indicates 95% statistically significant
P=Significant value; *β*=Standardized coefficients value; *t*= *t* statistic value

EPS recorded coefficient values for HCE at -16.477, for SCE at -11.098, for CEE at -0.738, for VAIC at -25.983 and for Size at -0.825, with the t-statistic values of -3.537, -3.371, -2.633, -3.376 and -3.893 respectively. The analysis of the impact of intellectual capital performance on the financial performance of the sample firm, demonstrated that VAIC exercised negative impact on NPM and EPS but positive impact on ROA during the study period. In other words, there was ineffective use of intellectual capital by the sample firm. The reason for this was inadequate spending for employees, which decreased the growth of the financial performance since VAIC reported negative impact on the financial performance (NPM and EPS). The other components of VAIC such as SCE also did negatively influence the other variables like, NPM and EPS since these variables yielded negative values followed by Size (control variable) during the study period. On the contrary, the human capital positively impacted the ROA, encouraging the firm for leveraging the investment on human capital to boost the growth of ROA. But ROE was neither positively nor negatively affected by independent and control variables. The adjusted R-square value was at 0.551 for ROA, 0.274 for ROE, 0.793 for NPM and 0.801 for EPS. The model, using regression analysis, was fitted for all variables, except ROE. Hence **NH-3: There is no impact of intellectual capital performance on financial performance of CIPLA LIMITED** was partially rejected.

5.23. Impact of Intellectual Capital Performance on Financial Performance of CADILA HEALTHCARE LIMITED

The results of regression analysis, for intellectual capital performance and financial performance of the **CADILA HEALTHCARE LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are displayed in **Table-5.23**. As stated earlier, HCE, SCE, CEE and VAIC were adopted as independent variables, for evaluating the impact of intellectual capital performance on ROA, ROE, NPM and EPS (dependent variables) of the sample firm. Size and DER were taken as control variables.

Table-5.23: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of CADILA HEALTHCARE LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.117	0.932	0.008**	0.688
	<i>B</i>	-	-	-	-
	<i>T</i>	(-1.717)	(-0.093)	(3.533)	(-0.433)
Intellectual Capital Variables					
HCE	<i>P</i>	0.000**	0.779	0.023*	0.801
	<i>B</i>	0.899	-2.655	0.705	-1.266
	<i>T</i>	(3.790)	(-0.307)	(2.813)	(-0.276)
SCE	<i>P</i>	0.003**	0.867	0.000**	0.554
	<i>B</i>	0.799	-2.294	0.902	-4.449
	<i>T</i>	(4.279)	(-0.182)	(7.825)	(-0.664)
CEE	<i>P</i>	0.001**	0.464	0.006**	0.362
	<i>B</i>	0.903	-0.730	0.690	-0.496
	<i>T</i>	(5.046)	(-0.838)	(3.991)	(-1.072)
VAIC	<i>P</i>	0.000**	0.826	0.010**	0.672
	<i>B</i>	0.985	4.951	0.683	5.121
	<i>T</i>	(5.947)	(0.240)	(3.816)	(0.468)
Control Variables					
Size	<i>P</i>	0.061*	0.784	0.047*	0.272
	<i>B</i>	0.753	-0.157	0.785	0.373
	<i>T</i>	(2.230)	(-0.300)	(2.408)	(1.342)
DER	<i>P</i>	0.102	0.145	0.082	0.224
	<i>B</i>	-0.635	0.972	-0.663	0.403
	<i>T</i>	(-1.880)	(1.956)	(-2.033)	(1.528)
Adjust R²		0.807	0.243	0.811	0.787
N		10	10	10	10
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0					
Note: ** indicates 99% statistically significant and * indicates 95% statistically significant <i>P</i> =Significant value; β =Standardized coefficients value; <i>t</i> = <i>t</i> statistic value					

According to the Table, the coefficient values were earned by HCE at 0.899 for ROA and 0.705 for NPM, with the t values of 3.790 and 2.813 respectively. Similarly, coefficient values were registered by SCE at 0.799 for ROA and at 0.902 for NPM, with t statistic values of 4.279 and 7.825, followed by CEE, with the coefficient and t statistics values of 0.903 (5.046) and 0.690 (3.991). VAIC registered the coefficient values against ROA and NPM at 0.985 and 0.683, with t statistics values of 5.947 and 3.816, followed by Size (control variable) 0.753 (2.230) and 0.785 (2.408). From the above analysis, it is evident that better the intellectual capital, better the financial performance.

The positive impact of HCE implied that the efficiency of bank employees improved the financial performance of **CADILA HEALTHCARE LIMITED**, during the study period. Hence investing on human capital would attract new customers to the sample firm. The adjusted R-squared values were recorded at 0.807 for ROA, 0.243 for ROE, 0.811 for NPM and 0.787 for EPS and this showed that the regression model was perfectly fitted for ROA, NPM and EPS except ROE. Therefore, **NH-3: There is no impact of intellectual capital performance on financial performance of CADILA HEALTHCARE LIMITED**, was partially rejected.

5.24. Impact of Intellectual Capital Performance on Financial Performance of TORRENT PHARMACEUTICALS LIMITED

Table-5.24 exhibits the results of regression analysis, for intellectual capital performance and the financial performance of the **TORRENT PHARMACEUTICALS LIMITED**, during the study period from 1st April 2010 to 31st March 2019.

Table-5.24: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of TORRENT PHARMACEUTICALS LIMITED during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.023*	0.061	0.035*	0.019**
	<i>B</i>	-	-	-	-
	<i>T</i>	(3.234)	(2.413)	(2.875)	(3.429)
Intellectual Capital Variables					
HCE	<i>P</i>	0.016**	0.954	0.014*	0.016**
	<i>B</i>	1.985	0.074	2.138	1.947
	<i>T</i>	(3.551)	(0.060)	(3.674)	(3.566)
SCE	<i>P</i>	0.139	0.428	0.145	0.129
	<i>B</i>	0.689	0.738	0.704	0.696
	<i>T</i>	(1.757)	(0.862)	(1.724)	(-0.664)
CEE	<i>P</i>	0.028*	0.384	0.029*	0.026*
	<i>B</i>	4.933	3.331	5.077	4.884
	<i>T</i>	(3.078)	(0.953)	(3.045)	(3.120)
VAIC	<i>P</i>	0.018**	0.465	0.019**	0.017**
	<i>B</i>	0.726	-3.590	0.719	0.702
	<i>T</i>	(3.472)	(-0.791)	(3.402)	(3.536)
Control Variables					
Size	<i>P</i>	0.231	0.178	0.235	0.214
	<i>B</i>	-0.793	0.933	-0.818	-0.806
	<i>T</i>	(-1.310)	(1.496)	(-1.299)	(-1.368)
DER	<i>P</i>	0.592	0.242	0.458	0.619
	<i>B</i>	0.340	-0.797	0.495	0.306
	<i>T</i>	(0.562)	(-1.278)	(0.785)	(0.520)
Adjust R²		0.766	-0.111	0.747	0.777
N		10	10	10	10

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0

Note: ** indicates 99% statistically significant and * indicates 95% statistically significant
P=Significant value; *β*=Standardized coefficients value; *t*= *t* statistic value

Variables such as HCE, SCE, CEE and VAIC were adopted as independent variables, for assessing intellectual capital performance while ROA, ROE, NPM and EPS were utilized as dependent variables, to evaluate the financial performance of **TORRENT PHARMACEUTICALS LIMITED** and the study took Size and Leverage as control variables. According to the Table, the values of coefficient were 1.985, 4.933 and 0.726 for HCE, CEE and VAIC, with the t statistics values of 3.551, 3.078 and 3.472 respectively, against ROA. The coefficient values of 2.138, 5.077 and 0.719 were recorded by HCE, CEE and VAIC against NPM, with the t-statistic values of 3.674, 3.045 and 3.402 respectively. Regarding EPS, the coefficient values, with t-statistics values, were at 1.947 (3.566), 4.884 (3.120) and 0.702 (3.536) for HCE CEE and VAIC respectively, during the study period.

Regarding the impact of intellectual capital performance on ROA, NPM and EPS, the sample variables such as HCE, CEE and VAIC recorded significant influence, at 99% and 95% confidence levels. A dependent variable, namely, ROE was not influenced by any independent variable. It is learnt that SCE had no impact on ROA, ROE, NPM and EPS. The absence of significant impact of SCE demonstrated the insufficient investment on research and innovation activities by **TORRENT PHARMACEUTICALS LIMITED**. The control variables, Size and DER, had neither positively nor negatively impacted the financial performance of **TORRENT PHARMACEUTICALS LIMITED**. Since HCE positively affected all the financial performance variables, except ROE, is advised the sample firm to concentrate on the employees' skill development and training, in order to improve financial performance of the sample firm.

The adjusted R^2 value was at 0.766 for ROA, -0.111 for ROE, 0.747 for NPM and 0.777 for EPS and this clearly established that the model of intellectual capital performance created significant impact on ROA, NPM and EPS, except ROE. Therefore, **NH-3: There is no impact of intellectual capital performance on financial performance of TORRENT PHARMACEUTICALS LIMITED**, was partially rejected.

5.25. Impact of Intellectual Capital Performance on Financial Performance of LUBIN LIMITED

The results of regression analysis, for intellectual capital performance and financial performance of the **LUBIN LIMITED**, during the study period from 1st April 2010 to 31st March 2019 are presented in **Tables-5.25**. Four sample variables, namely, HCE, SCE, CEE and VAIC were employed as independent variables for estimating the intellectual capital performance while ROA, ROE, NPM and EPS were treated as dependent variables, to evaluate the financial performance of **LUBIN LIMITED** and two variables, namely, Size and Leverage were considered as control variables. It is found from the Table that coefficient values of HCE, CEE and VAIC against ROA, were recorded at 0.976, 0.549 and 0.581, with the t-statistics values of 6.703, 2.411 and 2.109 respectively. The coefficient values were recorded at 0.704 for VAIC with the t-statistics value of 3.150 against ROE. NPM recorded coefficient values for VAIC at 0.966 with the t-statistic value of 7.506 during the study period. It is noted that control variable, namely, Size negatively influenced the financial performance variables and t statistics value of -0.685 (-2.297) and NPM at -0.519 (-5.973). Simultaneously, DER affected negatively NPM at -0.667 (-7.356).

Table-5.25: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of LUBIN LIMITED during the Study Period from 1st April 2010 to 31st March 2019					
Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.045*	0.192	0.053*	0.109
	<i>B</i>	-	-	-	-
	<i>T</i>	(-2.375)	(1.468)	(2.403)	(1.880)
Intellectual Capital Variables					
HCE	<i>P</i>	0.000**	0.203	0.265	0.328
	<i>B</i>	0.976	3.626	-3.370	-3.406
	<i>T</i>	(6.703)	(1.429)	(-1.230)	(-1.604)
SCE	<i>P</i>	0.010	0.807	0.461	0.428
	<i>B</i>	0.599	0.112	-0.374	-0.472
	<i>T</i>	(3.336)	(0.256)	(-0.787)	(-0.850)
CEE	<i>P</i>	0.042*	0.135	0.360	0.396
	<i>B</i>	0.549	-4.102	2.540	2.735
	<i>T</i>	(2.411)	(1.729)	(0.992)	(0.914)
VAIC	<i>P</i>	0.020*	0.004**	0.000**	0.838
	<i>B</i>	0.581	0.704	0.966	-0.133
	<i>T</i>	(2.109)	(3.150)	(7.506)	(-0.214)
Control Variables					
Size	<i>P</i>	0.055*	0.164	0.001**	0.809
	<i>B</i>	-0.685	-0.500	-0.519	-0.164
	<i>T</i>	(-2.297)	(1.554)	(-5.973)	(-0.253)
DER	<i>P</i>	0.671	0.583	0.000**	0.004
	<i>B</i>	0.132	-0.185	-0.667	-0.847
	<i>T</i>	(0.444)	(-0.575)	(-7.356)	(-4.508)
Adjust R²		0.947	0.316	0.589	0.858
N		10	10	10	10
Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0					
Note: ** indicates 99% statistically significant and * indicates 95% statistically significant <i>P</i> =Significant value; β =Standardized coefficients value; <i>t</i> = <i>t</i> statistic value					

It is learnt from the analysis of the impact of intellectual capital performance on the financial performance of **LUBIN LIMITED** that VAIC created positive significant impact on ROA, ROE and NPM, at 99% and 95% confidence levels (i.e., p value was less than 0.01 and 0.05), during the study period. The results of CEE revealed that the physical assets had influenced the ROA but there was absence of significant impact of SCE, which demonstrated that the suitable measures to enhance employee knowledge and research and innovation activities need to be undertaken, to improve the financial performance of **LUBIN LIMITED**. The EPS was impacted by independent and control variables. The adjusted R-square value was at 0.947 for ROA, 0.316 for ROE, 0.589 for NPM and 0.858 for EPS. It implied that regression model was perfectly fit for the analysis. Therefore, **NH-3: There is no impact of intellectual capital performance on financial performance of LUBIN LIMITED**, was rejected partially.

5.26. Impact of Intellectual Capital Performance on Financial Performance of BIOCON LIMITED

Table-5.26 displays the results of regression analysis, for intellectual capital performance and financial performance of the **BIOCON LIMITED**, during the study period from 1st April 2010 to 31st March 2019.

The sample variables such as HCE, SCE, CEE and VAIC were employed as independent variables, to assess the intellectual capital performance while ROA, ROE, NPM and EPS were used as dependent variables, to measure the financial performance of sample firm. This analysis treated Size and Leverage as control variables. According to the results of the Table, the values of coefficient were at 0.763, 0.660, 0.780 and 1.278 for HCE, SCE, VAIC and DER, with t statistics values of 3.340, 2.483, 3.367 and 3.437 respectively, against ROA of this firm.

Table-5.26: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of BIOCON LIMITED during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.002**	0.272	0.718	0.009**
	<i>B</i>	-	-	-	-
	<i>T</i>	(4.363)	(-1.234)	(0.382)	(3.403)
Intellectual Capital Variables					
HCE	<i>P</i>	0.010**	0.141	0.371	0.002**
	<i>B</i>	0.763	-11.114	-5.847	0.806
	<i>T</i>	(3.340)	(-1.748)	(-0.982)	(4.444)
SCE	<i>P</i>	0.038*	0.138	0.391	0.038*
	<i>B</i>	0.660	-7.664	-3.820	-0.658
	<i>T</i>	(2.483)	(-1.766)	(-0.939)	(-2.474)
CEE	<i>P</i>	0.938	0.088	0.834	0.076
	<i>B</i>	-0.029	4.503	-0.055	0.315
	<i>T</i>	(-0.081)	(-2.115)	(-0.221)	(2.037)
VAIC	<i>P</i>	0.008**	0.131	0.419	0.007**
	<i>B</i>	0.780	17.681	0.063	0.783
	<i>T</i>	(3.367)	(1.804)	(0.880)	(3.366)
Control Variables					
Size	<i>P</i>	0.265	0.484	0.006**	0.006**
	<i>B</i>	-0.450	-0.568	-1.299	-1.139
	<i>T</i>	(-1.211)	(-0.738)	(-3.904)	(-3.854)
DER	<i>P</i>	0.001**	0.314	0.219	0.194
	<i>B</i>	1.278	-0.835	-0.449	-0.496
	<i>T</i>	(3.437)	(-1.085)	(-1.350)	(-1.438)
Adjust R ²		0.530	0.384	0.540	0.801
N		10	10	10	10
<p>Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0</p> <p>Note: ** indicates 99% statistically significant and * indicates 95% statistically significant <i>P</i>=Significant value; <i>β</i>=Standardized coefficients value; <i>t</i>= <i>t</i> statistic value</p>					

The coefficient values of 0.806 and 0.783 were recorded by HCE and VAIC against EPS, with the t-statistics values of 4.444 and 3.366 respectively. Further, the coefficient values with t-statistics values were recorded at -1.299 (-3.904) for Size, against NPM, followed by EPS at -1.139 (-3.854), during the study period. The analysis of the impact of intellectual capital performance on ROA and EPS demonstrated that the HCE recorded significant influence, at 99% confidence level, next to VAIC. Besides, intellectual capital enhanced the financial performance of the sample firm. Hence by improving human capital, the firm can be benefitted in the long run whereas NPM and EPS were impacted negatively by Size (control variable) of this firm, at significant level. The adjusted R² values were at 0.530 for ROA, 0.384 for ROE, 0.540 for NPM and 0.801 for EPS. According to this, the regression model was found to be fit for the analysis in the case of ROA and EPS only. The results, as given in the Table, clearly established that the model of intellectual capital performance created significant impact on financial performance (ROA and EPS) of the sample pharmaceutical firm. Therefore, **NH-3: There is no impact of intellectual capital performance on financial performance of BIOCON LIMITED**, was partially rejected.

5.27. Impact of Intellectual Capital Performance on Financial Performance of AROBINDO PHARMACEUTICAL LIMITED

The results of regression analysis, for assessing the intellectual capital performance and financial performance of the **AROBINDO PHARMACEUTICAL LIMITED**, during the study period from 1st April 2010 to 31st March 2019, are given in **Table-5.27**. Four variables such as HCE, SCE, CEE and VAIC were adopted as independent variables, to evaluate the intellectual capital performance while four variables such as ROA, ROE, NPM and EPS were treated as dependent variables, for evaluating the financial performance of sample firm and two variables such as Size and

Leverage were employed as control variables. It is found from the Table that coefficient values for HCE, VAIC and DER against ROE were recorded at 0.887, 0.971 and 0.698, with t-statistic values of 5.522, 6.318 and 3.467 respectively. The coefficient values of NPM were recorded at 0.849 for HCE and 0.872 for VAIC, with t-statistic values of 4.427 and 5.045 respectively. EPS recorded coefficient values for HCE at 0.992, for SCE at 0.874 and for VAIC at 0.957, with t-statistic values of 8.536, 5.093 and 9.260 respectively during the study period.

The analysis of the impact of intellectual capital performance on the financial performance of the sample firm revealed that VAIC created positive and significant impact on ROE, NPM and EPS, at 99% confidence level (i.e., p value was less than 0.01), during the study period. The component of VAIC, namely, HCE did influence ROE, NPM and EPS since these variables yielded significant value. In other words, the intellectual capital of the sample firm did facilitate the growth of financial performance.

The increase of investment on the human capital, would enhance the financial performance of **AROBINDO PHARMACEUTICAL LIMITED**. It was found from regression analysis that the control variable, namely, Size positively influenced ROE during the study period while SCE impacted positively EPS, demonstrating that research and innovation activities certainly increased earnings of shares. The adjusted R-square value was at 0.085 for ROA, 0.767 for ROE, 0.674 for NPM and 0.801 for EPS. It is observed that the model was fit for analysis, excluding ROA. Therefore, **NH-3: There is no impact of intellectual capital performance on financial performance of AROBINDO PHARMACEUTICAL LIMITED**, was partially rejected.

Table-5.27: Results of Regression Analysis showing the Impact of Intellectual Capital Performance on Financial Performance of AROBINDO PHARMA LIMITED during the Study Period from 1st April 2010 to 31st March 2019

Variables	Financial Performance Variables				
		ROA	ROE	NPM	EPS
Constant	<i>P</i>	0.810	0.238	0.017**	0.001**
	<i>B</i>	-	-	-	-
	<i>T</i>	(0.253)	(-1.274)	(3.002)	(5.113)
Intellectual Capital Variables					
HCE	<i>P</i>	0.821	0.001**	0.002**	0.000**
	<i>B</i>	1.628	0.887	0.849	0.992
	<i>T</i>	(0.239)	(5.522)	(4.427)	(8.536)
SCE	<i>P</i>	0.998	0.916	0.276	0.001**
	<i>B</i>	0.018	-0.039	0.382	0.874
	<i>T</i>	(0.003)	(-0.109)	(1.169)	(5.093)
CEE	<i>P</i>	0.721	0.088	0.259	0.501
	<i>B</i>	-0.243	4.503	-0.014	-0.242
	<i>T</i>	(-0.378)	(-2.115)	(1.229)	(-0.705)
VAIC	<i>P</i>	0.923	0.000**	0.001**	0.000**
	<i>B</i>	-1.309	0.971	0.872	0.957
	<i>T</i>	(-0.102)	(6.318)	(5.045)	(9.260)
Control Variables					
Size	<i>P</i>	0.243	0.010**	0.965	0.298
	<i>B</i>	0.540	0.698	-0.021	0.488
	<i>T</i>	(1.275)	(3.467)	(-0.046)	(1.125)
DER	<i>P</i>	0.635	0.189	0.728	0.655
	<i>B</i>	-0.210	0.293	-0.168	-0.203
	<i>T</i>	(-0.496)	(1.457)	(-0.362)	(-0.467)
Adjust R ²		0.085	0.767	0.674	0.801
N		10	10	10	10

Source: Data extracted from CMIE ProwessIQ and CAPITALINE (2019) and computed using IBM SPSS 16.0

Note: ** indicates 99% statistically significant and * indicates 95% statistically significant
P=Significant value; *β*=Standardized coefficients value; *t*= *t* statistic value

5.28 Examination of Impact of Intellectual Capital Performance on Financial Performance of Sample Firms of India

Sub hypotheses of the null hypothesis, namely, **NH-3: There is no impact of intellectual capital performance on financial performance of Sample Firms**, was tested individually for the twenty-seven sample firms in three sectors (Banking, Information Technology and Pharmaceutical). The summarized results led to partial rejection of null hypotheses for twenty sample firms, rejection of null hypothesis for six sample firms and acceptance of null hypothesis for only one sample firm.

5.28: Consolidated Results (Regression Analysis) on the Testing of Sub-Hypotheses of Sample Firms in India							
S. No	Hypotheses		Financial Performance Variables				Results
			ROA	ROE	NPM	EPS	
I. Banking Sector Firms							
1.	NH-3: There is no impact of intellectual capital performance on financial performance of STATE BANK OF INDIA	<i>P</i>	0.003**	0.003**	0.274	0.001**	Partially Rejected
		<i>B</i>	0.823	0.836	0.383	0.871	
		<i>T</i>	4.097	4.303	1.174	5.008	
2.	NH-3: There is no impact of intellectual capital performance on financial performance of BANK OF BARODA	<i>P</i>	0.001**	0.036*	0.203	0.016**	Partially Rejected
		<i>B</i>	0.956	0.665	0.440	0.733	
		<i>T</i>	5.702	2.520	1.386	3.046	
3.	NH-3: There is no impact of intellectual capital performance on financial performance of PUNJAB NATIONAL BANK	<i>P</i>	0.001**	0.403	0.001**	0.006**	Partially Rejected
		<i>B</i>	0.921	1.380	0.738	0.757	
		<i>T</i>	5.695	0.934	3.315	3.817	
4.	NH-3: There is no impact of intellectual capital performance on financial performance of INDIAN OVERSEAS BANK	<i>P</i>	0.009**	0.003**	0.000**	0.040*	Rejected
		<i>B</i>	0.891	0.879	0.899	1.106	
		<i>T</i>	7.001	6.268	5.811	2.906	

5.	NH-3: There is no impact of intellectual capital performance on financial performance of CANARA BANK	<i>P</i>	0.003**	0.001**	0.017**	0.006**	Rejected
		<i>B</i>	0.712	0.893	0.823	0.864	
		<i>T</i>	3.379	5.597	4.835	5.018	
6.	NH-3: There is no impact of intellectual capital performance on financial performance of UNION BANK OF INDIA	<i>P</i>	0.029*	0.074	0.002**	0.002**	Partially Rejected
		<i>B</i>	1.588	0.588	0.846	0.856	
		<i>T</i>	3.341	2.058	4.495	4.681	
7.	NH-3: There is no impact of intellectual capital performance on financial performance of THE JAMMU AND KASHMIR BANK LIMITED	<i>P</i>	0.001*	0.497	0.000**	0.019**	Partially Rejected
		<i>B</i>	0.430	0.398	0.767	0.112	
		<i>T</i>	3.510	0.745	5.657	2.351	
8.	NH-3: There is no impact of intellectual capital performance on financial performance of INDIAN BANK	<i>P</i>	0.001**	0.000**	0.464	0.508	Partially Rejected
		<i>B</i>	0.182	0.685	0.263	-0.238	
		<i>T</i>	3.274	4.903	0.770	-0.693	
9.	NH-3: There is no impact of intellectual capital performance on financial performance of CENTRAL BANK OF INDIA	<i>P</i>	0.015**	0.661	0.112	0.772	Partially Rejected
		<i>B</i>	0.941	0.931	-3.935	-0.810	
		<i>T</i>	4.104	0.473	-2.035	-0.310	
10.	NH-3: There is no impact of intellectual capital performance on financial performance of UCO BANK	<i>P</i>	0.540	0.101	0.000**	0.015**	Partially Rejected
		<i>B</i>	-0.134	0.846	0.641	0.624	
		<i>T</i>	-0.669	2.122	7.229	4.224	

II. Information Technology Sector Firms							
11.	NH-3: There is no impact of intellectual capital performance on financial performance of TATA CONSULTANCY SERVICES LIMITED	<i>P</i>	0.929	0.001**	0.188	0.001**	Partially Rejected
		<i>B</i>	0.063	0.870	-0.848	0.624	
		<i>T</i>	0.095	4.988	-1.696	4.224	
12.	NH-3: There is no impact of intellectual capital performance on financial performance of INFOSYS LIMITED	<i>P</i>	0.002**	0.001**	0.016**	0.001**	Rejected
		<i>B</i>	0.598	0.807	0.731	0.701	
		<i>T</i>	4.502	4.874	3.301	4.874	
13.	NH-3: There is no impact of intellectual capital performance on financial performance of WIPRO LIMITED	<i>P</i>	0.000**	0.190	0.019**	0.056*	Partially Rejected
		<i>B</i>	0.806	0.451	0.720	0.604	
		<i>T</i>	4.018	1.431	2.936	2.231	
14.	NH-3: There is no impact of intellectual capital performance on financial performance of TECH MAHINDRA LIMITED	<i>P</i>	0.001**	0.151	0.000**	0.012**	Partially Rejected
		<i>B</i>	0.873	-0.757	0.871	0.501	
		<i>T</i>	5.054	-1.772	7.069	5.515	
15.	NH-3: There is no impact of intellectual capital performance on financial performance of LARSEN & TOUBRO INFOTECH LIMITED	<i>P</i>	0.857	0.888	0.001**	0.000**	Partially Rejected
		<i>B</i>	0.065	0.051	0.844	0.704	
		<i>T</i>	0.186	0.145	5.582	5.006	
16.	NH-3: There is no impact of intellectual capital performance on financial performance of MINDTREE LIMITED	<i>P</i>	0.000**	0.927	0.898	0.028*	Partially Rejected
		<i>B</i>	0.699	-0.261	0.60	0.507	
		<i>T</i>	5.781	-0.100	0.140	2.684	

17.	NH-3: There is no impact of intellectual capital performance on financial performance of ORACLE FINANCIAL SERVICES SOFTWARE LIMITED	<i>P</i>	0.178	0.758	0.189	0.544	Accepted
		<i>B</i>	-2.701	0.973	-3.258	0.289	
		<i>T</i>	-1.752	0.388	-1.693	0.682	
18.	NH-3: There is no impact of intellectual capital performance on financial performance of HCL TECHNOLOGIES LIMITED	<i>P</i>	0.010**	0.052*	0.004**	0.576	Partially Rejected
		<i>B</i>	0.764	0.628	-0.604	-2.794	
		<i>T</i>	3.349	2.284	-2.145	-0.598	
III. Pharmaceutical Sector Firms							
19.	NH-3: There is no impact of intellectual capital performance on financial performance of SUN PHARMACEUTICAL INDUSTRIES LIMITED	<i>P</i>	0.009**	0.003**	0.000**	0.000**	Rejected
		<i>B</i>	0.791	0.809	0.902	0.998	
		<i>T</i>	4.002	4.247	6.115	6.006	
20.	NH-3: There is no impact of intellectual capital performance on financial performance of DIVI'S LABORATORIES LIMITED	<i>P</i>	0.057*	0.010**	0.001**	0.004**	Rejected
		<i>B</i>	0.617	0.689	0.767	0.799	
		<i>T</i>	2.217	3.365	5.316	4.706	
21.	NH-3: There is no impact of intellectual capital performance on financial performance of DR.REDDY'S LABORATORIES	<i>P</i>	0.000**	0.015**	0.000**	0.007**	Rejected
		<i>B</i>	0.959	0.583	0.902	0.601	
		<i>T</i>	7.537	3.107	7.561	3.988	
22.	NH-3: There is no impact of intellectual capital performance on financial performance of CIPLA LIMITED	<i>P</i>	0.001**	0.707	0.028*	0.020*	Partially Rejected
		<i>B</i>	0.801	-2.835	-23.982	-25.982	
		<i>T</i>	4.979	-0.414	-3.061	-3.376	

23.	NH-3: There is no impact of intellectual capital performance on financial performance of CADILA HEALTHCARE LIMITED	<i>P</i>	0.000**	0.826	0.010**	0.672	Partially Rejected
		<i>B</i>	0.985	4.951	0.683	5.121	
		<i>T</i>	5.947	0.240	3.816	0.468	
24.	NH-3: There is no impact of intellectual capital performance on financial performance of TORRENT PHARMACEUTICALS LIMITED	<i>P</i>	0.018**	0.465	0.019**	0.017**	Partially Rejected
		<i>B</i>	0.726	-3.590	0.719	0.702	
		<i>T</i>	3.472	-0.791	3.402	3.536	
25.	NH-3: There is no impact of intellectual capital performance on financial performance of LUBIN LIMITED	<i>P</i>	0.020*	0.004**	0.000**	0.838	Partially Rejected
		<i>B</i>	0.581	0.704	0.966	-0.133	
		<i>T</i>	2.109	3.150	7.506	-0.214	
26.	NH-3: There is no impact of intellectual capital performance on financial performance BIOCON LIMITED	<i>P</i>	0.008**	0.131	0.419	0.007**	Partially Rejected
		<i>B</i>	0.780	17.681	0.063	0.783	
		<i>T</i>	3.367	1.804	0.880	3.366	
27.	NH-3: There is no impact of intellectual capital performance on financial performance of AROBINDO PHARMA LIMITED	<i>P</i>	0.923	0.000**	0.001**	0.000**	Partially Rejected
		<i>B</i>	-1.309	0.971	0.872	0.957	
		<i>T</i>	-0.102	6.318	5.045	9.260	

Source: Compiled from Table 5.1 to 5.27

Chapter-VI

***Summary of the Major
Findings, Important
Suggestions and Conclusion***

6.1. Findings of the Study

The followings are some of the key findings of the study:

1. The intellectual capital was found to be a major asset of a firm in the service sector, as it provided competitive advantage, which is the fundamental of value creation. The results of this study demonstrated that invisible skilled acquired through knowledge and information technology and different sources were initial backups in the knowledge-based economy.
2. The industry people are supposed to invest significant portion of their money in training the employees, cultivating and promoting the customer relations, research and development, computer and administrative systems processes, etc. This promotes the competing skills of the firms.
3. According to the results of correlation analysis, there was significant relationship between Intellectual Capital Performance Variables and Financial Performance Variables of sample firms during the study period.
4. The regression analysis found that intellectual capital variables exercised impact on the financial performance variables of sample firms during the study period.

6.1.1. Findings regarding Efficiency of Intellectual Capital Performance and Financial Performance of Sample Firms

5. The aggregate value of VAIC of all sample firms earned more value, from each one rupee (1.00) invested on intangible assets, held by the sample firms. In other words, there was efficiency of IC of sample firms, indicating that the firms generated high value from intangible assets than from physical assets.

6. Among the sample banking firms, the Central Bank of India has moved towards first place, with the efficiency value of VAIC at 11.621, followed by SBI at 10.622, Indian Overseas Bank at 5.545, Indian Bank at 5.450, The Jammu & Kashmir Bank Limited at 5.260, UCO Bank at 4.141, Bank of Baroda at 3.938, Punjab National Bank at 3.828, Canara Bank at 3.816 and Union Bank of India at 3.279
7. In the case of information technology firms, the Tata Consultancy Services Limited gained the first rank, with the efficiency value of VAIC at 5.570 while Infosys Limited, HCL Technologies Limited, Mindtree Limited, Oracle Financial Services Software Limited, Wipro Limited, Tech Mahindra Limited and Larsen & Toubro Infotech Limited reported the efficiency of VAIC at 5.440, 4.792, 4.407, 4.322, 3.799, 1.683 and 1.581 respectively, during the study period.
8. Lupin Limited, coming under the pharmaceutical firms, secured the first place, with the efficiency value (VAIC) of 4.268, succeeded by Cipla Limited (4.251), Cadila Healthcare Limited (4.016), Sun Pharmaceutical Industries Limited (3.999), Aurobindo Pharma Limited (3.981), Torrent Pharmaceuticals Limited (3.925), Dr. Reddy's Laboratories Limited (3.905), Biocon Limited (3.582) and Divi's Laboratories Limited (3.497).
9. It is evident from the descriptive statistics that the efficiency of ROA was witnessed by State Bank of India, Central Bank of India, Tata Consultancy Limited, Infosys Limited, Wipro Limited, Tech Mahindra Limited, Larsen & Toubro Infotech Limited, Mindtree Limited, Oracle Financial Services Software Limited, HCL Technologies Limited, Sun Pharmaceutical Industries Limited, Divi's Laboratories Limited, Cadila Healthcare Limited, Lupin Limited and

Aurobindo Pharma Limited since the mean value of ROA crossed the nominal value of 1.00.

10. Subsequently, the ROE of Tata Consultancy Limited, Infosys Limited, Tech Mahindra Limited, Larsen & Toubro Infotech Limited, Mindtree Limited, Sun Pharmaceutical Industries Limited, Dr. Reddy's Laboratories Limited, Cipla Limited, Torrent Pharmaceuticals Limited, Lupin Limited, Biocon Limited and Aurobindo Pharma Limited achieved the desirable efficiency as mean value, higher than the mean value of 1.000, was achieved by ROE during the study period.
11. Further, the efficiency of NPM (more than the mean value of 1.00) was recorded by State Bank of India, Bank of Baroda, Punjab National Bank, Union Bank of India, The Jammu & Kashmir Bank Limited, Tata Consultancy Services Limited, Wipro Limited, Tech Mahindra limited, Larsen & Toubro Infotech Limited, Mindtree Limited, Oracle Financial Services Software Limited, HCL Technologies Limited, Divi's Laboratories Limited, Dr. Reddy's Laboratories Limited, Cipla Limited, Cadila Healthcare Limited, Lupin Limited, Biocon Limited and Aurobindo Pharma Limited.
12. Further, EPS, in the case of Bank of Baroda, Tata Consultancy Services Limited, Infosys Limited, Wipro Limited, Tech Mahindra limited, Larsen & Toubro Infotech Limited, Mindtree Limited, HCL Technologies Limited, Divi's Laboratories Limited, Dr. Reddy's Laboratories Limited, Cipla Limited, Cadila Healthcare Limited, Lupin Limited and Aurobindo Pharma Limited realized the desired level of efficiency.

13. It is interesting to observe that the mean value of capital employed efficiency (4.062) of Central Bank of India was higher than the human capital efficiency (3.797), demonstrating that the tangible assets of the sample bank supported the growth of its financial performance during the study period.
14. It is surprising to note that the ROE (-0.201) of **HCL TECHNOLOGIES LIMITED** had reported negative efficiency. Therefore, the firm faced difficulties in receiving its returns from its equity. Similarly, all the financial performance variables such as ROA (0.945), ROE (0.465), NPM (0.979) and EPS (0.850) of **UCO Bank** reported the inefficiency of the firm during the study period.

6.1.2 Relationship between Intellectual Capital Performance and Financial Performance of Sample Firms

15. It is found that there was relationship between VAIC and ROA for State Bank of India, followed by Punjab National Bank, Canara Bank, Union Bank of India, Central Bank of India, Tata Consultancy Services Limited, Infosys Limited, Wipro Limited, Tech Mahindra Limited, HCL Technologies Limited, Sun Pharmaceutical Industries Limited, Divi's Laboratories Limited, Cipla Limited, Torrent Pharmaceuticals Limited and Lupin Limited.
16. Similarly, positive relationship with ROE was recorded by VAIC of Bank of Baroda, Punjab National Bank, Central Bank of India, UCO Bank, Tata Consultancy Services Limited, Infosys Limited, Tech Mahindra Limited, Larsen & Toubro Technologies Limited, HCL Technologies Limited, Sun Pharmaceutical Industries Limited, Divi's Laboratories Limited, Torrent Pharmaceuticals Limited and Lupin Limited.

17. Further, the correlation analysis revealed that there was association between VAIC and NPM for State Bank of India, succeeded by Punjab National Bank, Indian Overseas Bank, The Jammu and Kashmir Bank Limited, Central Bank of India, UCO Bank, Tata Consultancy Limited, Infosys Limited, Wipro Limited, Oracle Financial Services Software Limited, Sun Pharmaceutical Industries Limited, Cipla Limited, Torrent Pharmaceuticals Limited and Lupin Limited.
18. The VAIC of Bank of Baroda, Indian Overseas Bank, Central Bank of India, Tata Consultancy Limited, Infosys Limited, Wipro Limited, HCL Technologies Limited, Sun Pharmaceutical Industries Limited, Divi's Laboratories Limited, Cipla Limited, Cadila Healthcare Limited, Torrent Pharmaceuticals Limited and Lupin Limited, reported association with EPS.
19. It is surprising to observe from the coefficient values that the VAIC of BIOCON LIMITED recorded negative relationship with ROA (-0.780), NPM (-0.797) and EPS (-0.783), at 99% confidence level (i.e., p value was less than 0.01), during the study period. Hence, the intellectual capital of the sample firm did not support the growth of its financial performance.

6.1.3 Impact of Intellectual Capital Performance on Financial Performance of Sample Firms

20. As per the regression analysis, it is found that the impact of VAIC on ROA was registered by State Bank of India, Bank of Baroda, Punjab National Bank, Indian Overseas Bank, Canara Bank, Union Bank of India, The Jammu and Kashmir Bank, Indian Bank, Central Bank of India, Infosys Limited, Wipro Limited, Tech Mahindra Limited, Mindtree Limited, HCL Technologies Limited, Divi's Laboratories Limited, Dr.Reddy's Laboratories, Cipla Limited, Cadila

Healthcare Limited, Torrent Pharmaceuticals Limited, Lupin Limited and Biocon Limited.

21. In addition, there was impact of VAIC on ROE of State Bank of India, Bank of Baroda, Indian Overseas Bank, Canara Bank, Indian Bank, Tata Consultancy Services Limited, Infosys Limited, HCL Technologies Limited, Sun Pharmaceutical Industries Limited, Divi's Laboratories Limited, Dr.Reddy's Laboratories, Lupin Limited And Biocon Limited and Arobindo Pharma Limited.
22. It is observed that the NPM was influenced by the VAIC of Punjab National Bank, Indian Overseas Bank, Canara Bank, Union Bank of India, The Jammu and Kashmir Bank, UCO Bank, Infosys Limited, Wipro Limited, Tech Mahindra Limited, Larsen & Toubro Infotech Limited, HCL Technologies Limited, Sun Pharmaceutical Industries Limited, Divi's Laboratories Limited, Dr.Reddy's Laboratories, Cadila Healthcare Limited, Torrent Pharmaceuticals Limited, Lupin Limited And Arobindo Pharma Limited.
23. It is evident from the regression analysis that the VAIC impacted the EPS of State Bank of India, followed by Bank of Baroda, Punjab National Bank, Indian Overseas Bank, Canara Bank, Union Bank of India, The Jammu and Kashmir Bank, UCO Bank, Tata Consultancy Services Limited, Infosys Limited, Wipro Limited, Tech Mahindra Limited, Larsen & Toubro Infotech Limited, Mindtree Limited, Sun Pharmaceutical Industries Limited, Divi's Laboratories Limited, Dr.Reddy's Laboratories, Cadila Healthcare Limited, Torrent Pharmaceuticals Limited, Lupin Limited And Arobindo Pharma Limited.

24. It is noted that out of eight information technological firms, only INFOSYS LIMITED' coefficient values of VAIC impacted all the financial performance variables, namely, ROA (0.598), ROE (0.807), NPM (0.731) and EPS (0.701) with the t statistics values of 4.502, 4.874, 3.301 and 4.874 respectively, at 99% confidence level (i.e., p value was less than 0.01)
25. The NPM (-0.604) of HCL Technologies Limited and NPM (-23.982) and EPS (-25.982) of Cipla Limited were negatively impacted by VAIC of these firms, indicating that intangible assets of the firms failed to improve the profitability of the sample firms.

6.2. Suggestions of the Study

As stated earlier, the present work was carried out to study the intellectual capital and to test the interplay between intellectual capital and financial performance of sample firms.

The major aim of the study was to use Value Added Intellectual Coefficient (VAIC) scale, that could play a role in the performance of corporate firm. The finding of this study would be useful to the academicians, practitioners, managers and investors to have clear knowledge on the intellectual capital. The sample firms in Banking Sector, Information Technology Sector and Pharmaceutical Sector should increase the use of human capital to successfully organize their managerial functions. The employees are the source of knowledge, experience and competency that are required to provide services and solutions to their customers (**Murugesan Selvam et al. (2020)**).

Suggestions to BANKING SECTOR FIRMS

1. The financial performance variables of **STATE BANK OF INDIA**, except NPM, were influenced by its intellectual capital. Hence, it is suggested that **SBI** should pay special attention to enhance the growth of NPM, through the intellectual capital.
2. It is clear that HCE, SCE, CEE and VAIC of **BANK OF BARODA** did not impact NPM (financial performance variable), revealing that intellectual capital variables failed to contribute towards generating the required profit. Therefore, the sample bank needs to induct more skilled employees to increase its financial performance.
3. **PUNJAB NATIONAL BANK** was able to succeed in achieving the efficiency of intellectual capital during the study period. However, it is suggested to the bank to invest more on human capital, to keep its efficiency at the present level and increase the value of NPM.
4. It is to be noted that NPM had recorded insignificant mean value, indicating that the **INDIAN OVERSEAS BANK** had incurred loss during the study period. Hence, the bank should put forth more efforts to increase effective use of employees' skills.
5. A positive impact was registered by the VAIC of **CANARA BANK** and therefore, investment on intellectual capital must be increased for generating wealth, thereby stimulating the financial performance of this bank.
6. It is noted that the **UNION BANK OF INDIA** recorded significant correlation with each other and VAIC had produced more value than what was invested on

it. Hence, the investment on tangible assets should be reduced to the extent possible to recover the capital expenditure of the bank.

7. SCE of **THE JAMMU AND KASHMIR BANK LIMITED** had reported positive association with EPS in the long run. Hence, more investment on research and innovation would certainly increase the share price and generate more revenue to the bank.
8. In respect of **INDIAN BANK**, it is suggested to reduce the investment on tangible assets since it had not produced any value for this bank. However, it is advised to increase the investment on structural capital as it created much impact on the financial performance of **INDIAN BANK**.
9. It is recommended from the analysis of **CENTRAL BANK OF INDIA** that effective training to the employees would generate wealth and boost the financial performance of this bank.
10. The **UCO BANK** is urged to pay more attention to the enhancement of its intangible assets held by the bank since CEE had no impact on ROA, ROE and NPM. Therefore, it is the need of the hour for this bank to reduce the investment on tangible assets.

Suggestions to INFORMATION TECHNOLOGY SECTOR FIRMS

11. **TATA CONSULTANCY SERVICES LIMITED** had generated less value from SCE and CEE. Hence the firm is advised to reduce investment on physical and structural capital and increase the human capital, which would ensure the enhancement of profitability of the firm.

12. It is suggested to **INFOSYS LIMITED** that pumping more money into HCE, SCE and VAIC is necessary to enhance the value of ROA, ROE and NPM for attracting the investors.
13. The analysis of capital employed efficiency of **WIPRO LIMITED** revealed that it should focus on investment on tangible assets to keep a sustainable relationship with its investors (foreign and domestic).
14. The ROE showed the highest mean value among the dependent variables, indicating that the **TECH MAHINDRA LIMITED** acquired huge returns, followed by NPM. Hence the firm needs to keep the consistent investment on the intellectual capital, especially on human capital.
15. The investment on human capital of **LARSEN & TOUBRO INFOTECH LIMITED** was insufficient. It is imperative for the firm to allot some additional funds on intellectual capital.
16. The structural capital of **MINDTREE LIMITED** in the form of SCE, positively affected the ROA and EPS. Therefore, investing on research and innovation expenses may be enhanced, to retain the profitability of the firm.
17. All predictor variables of **ORACLE FINANCIAL SERVICES SOFTWARE LIMITED** played a negative role in the creation of ROA, ROE, NPM and EPS of the sample firm. Hence, the firm need to pay special attention towards the reconstruction of its investment strategy, to yield better results in financial performance.

18. The ROE of **HCL TECHNOLOGIES LIMITED** had reported negative mean value, revealing that the sample firm faced difficulties in generating optimum returns from its equity. Therefore, it should mobilize more funds from investors to optimize its returns.

Suggestions to PHARMACEUTICAL SECTOR FIRMS

19. The human capital, in the form of HCE, positively affected ROA and ROE of the **SUN PHARMACEUTICAL INDUSTRIES LIMITED**. Therefore, investing on employees should be increased to enhance the human assets of the firm.
20. The NPM recorded the highest mean value among the dependent variables, indicating that the **DIVI'S LABORATORIES LIMITED** accumulated more profit, followed by EPS and ROA. ROE had reported the lowest mean value, demonstrating that the sample firm faced difficulties in acquiring equities. Hence the firm must issue more shares to the public.
21. Human capital of **DR. REDDY'S LABORATORIES LIMITED** reported effect on all financial performance variables. In this connection, it is suggested that further contribution to human capital would certainly promote its value.
22. The aggregate value of VAIC clearly indicated the fact that **CIPLA LIMITED** produced more value for each one rupee employed. Hence, investment on tangible assets may be reduced and there must be more investment on intangible assets for its better financial performance.

23. **CADILA HEALTHCARE LIMITED** generated high value from its intangible resources than from the physical and financial resources. Hence, the firm should reduce investment on the tangible sources and increase investment on intangible assets to increase its financial performance.
24. Regarding **TORRENT PHARMACEUTICALS LIMITED**, HCE was good at improving the profitability of the sample firm. It is essential for the firm to monitor the intellectual capital and promote its performance.
25. The capital employed by **LUPIN LIMITED** had recorded the minimum value, showing that spending on tangible assets was not sufficient to develop the wealth of the firm. Hence, the firm is advised to increase the assets and reduce the liabilities of the firm.
26. The Human Capital Efficiency of **BIOCON LIMITED** earned a value, which was more than the mean value of physical assets. It is suggested to **BIOCON LIMITED** to consider the intangible assets for high investment than tangible assets.
27. The component of VAIC, namely, HCE of **AROBINDO PHARMACEUTICAL LIMITED** influenced ROE, NPM and EPS since these variables yielded significant value. It is advised to increase the investment on the human capital because it would enhance its financial performance.

6.3. Conclusion

Liberalization, Privatization, Globalization (LPG) and deregulation have changed business scenario and unveils new business opportunities in India. At the same time, there is stiff competition in all sectors, particularly in banking, information technology and pharmaceutical sector. In this competitive environment, relevant growth rate of assets or level of profitability is not sufficient for survival (**Murugesan Selvam et al. 2021**). Hence, the purpose of the present study was to investigate the relationship between intellectual capital performance and financial performance of sample firms. Intellectual capital performance of firms was measured by the application of the VAIC methodology (**Smriti, N., & Das, N, 2017 and Ngoc Phu Tran and Duc Hong Vo, 2020**). The study was conducted, by using data from a sample of 27 banking, information technology and pharmaceutical firms. The overall empirical findings, based on descriptive, correlation and regression analysis of intellectual capital performance and financial performance measures, clearly established the fact that intellectual capital was a vital determinant of financial performance of firms.

Hence, this study suggests that the sample firms could enhance their financial performance by means of managing their intellectual resources in appropriate ways. According to the results of this study, the financial performance of sample firms depended on other factors like research and innovation activities and factors other than human capital and capital employed. The Researcher confirmed the same results in the present work on Indian software and pharmaceutical sector (**Vadivel Thanikachalam et al. 2020**). The major difficulty of this study was the use of intellectual capital measurement model. Besides, the data for banking, information technology and pharmaceutical firms, employed in the model, was a consolidated one. Therefore, the

study was not able to specify the performance of each particular category of firms over others. Therefore, future study could be carried out with several other intellectual capital measurement models and wider range of sample firms' data. However, the results obtained in the present study clearly demonstrated the importance of intellectual capital in increasing the firms' financial performance.

6.4. Scope for Further Study

Future research in this domain might be extended to alternative domestic settings and also to alternative industries in product-oriented settings. Further research may fully be concentrated on the impact of other characteristics of intellectual capital and their association with financial performance and market behavior to present a complete picture of the influence of this dimension. A study like this can be extended to testing the correlation of independent variables adopted in this research and financial performance for a full-fledged examination across a longer period, dividing it into various phases and also analyzing trends across multiple industries. An empirical study could be conducted by using primary data, to obtain a real time result in this area of research.

Bibliography

REFERENCES (End Note)

BOOKS

- Andriessen, D. (2004).** *Making sense of intellectual capital*. Routledge. (ISBN 9780750677745)
- Bounfour, A., & Edvinsson, L. (2012).** *Intellectual capital for communities*. Routledge. (ISBN 9780750677738)
- Choo, C. W., & Bontis, N. (Eds.). (2002).** *The strategic management of intellectual capital and organizational knowledge*. Oxford University Press. (ISBN: 9780195138665)
- Doane, D. P., Seward, L. W., & Seward, L. W. (2007).** *Applied statistics in business and economics*. Boston, MA: McGraw-Hill/Irwin. (ISBN: 978-0077837303)
- Hilton, Ronald W (1999).** *Managerial accounting*. Irwin/McGraw-Hill, (ISBN: 978-1-259-56956-2)
- Koontz, H. (2010).** *Essentials of management*. Tata McGraw-Hill Education. (ISBN: 1259081478, 9781259081477)
- Lind, Douglas A., William G. Marchal, and Samuel Adam Wathen (2019).** *Basic statistics for business and economics*. McGraw-Hill, (ISBN: 1260299317 9781260299311)
- Roos, Göran, Stephen Pike, and Lisa Fernstrom (2007).** *Managing intellectual capital in practice*. Routledge. (ISBN: 9780750679404)
- Roos, Johan, Leif Edvinsson, and Nicola C. Dragonetti (1997).** *Intellectual capital: Navigating the new business landscape*. Springer. (ISBN: 978-1-349-14494-5)
- Sullivan, Patrick H (1998).** *Profiting from intellectual capital: Extracting value from innovation*. John Wiley & Sons. (ISBN: 978-0-471-19302-9)
- Waller, Derek (2010).** *Statistics for business*. Routledge. (ISBN 9781138300002)
- Wild, John J., Ken W. Shaw, Barbara Chiappetta, Khaled Dahawy, and Khaled Samaha (2007).** *Fundamental accounting principles*. McGraw-Hill. (ISBN: 9780077139506 007713950X)

Ph.D THESES

Sriranga Vishnu (2015). **Impact of Intellectual Capital Components on Firm Performance: An Empirical Study on Indian Companies.** Doctoral Dissertation Submitted for the Fellow Programme in Management, Indian Institute of Management (IIM), Indore

Amitava Mondal (2014) **Effectiveness of Investment in Intellectual Capital: Evidence from Indian Knowledge-based Companies.** Thesis Submitted for the Degree of Doctor of Philosophy, University of Burdwan, Burdwan

ARTICLES

Afroze, R. (2011). Intellectual capital and its influence on the financial performance. *ASA University Review*, 5(1), 161-173.

Ahangar, R. G. (2011). The relationship between intellectual capital and financial performance: An empirical investigation in an Iranian company. *African journal of business management*, 5(1), 88-95.

Ajmani, A. K., Agrawal, A., Prasad, B. L. N., Basu, I., Shembalkar, J., Manikanth, N., ... & Shende, S. (2019). Efficacy and safety of evogliptin versus sitagliptin as an add-on therapy in Indian patients with type 2 diabetes mellitus inadequately controlled with metformin: A 24-week randomized, double-blind, non-inferiority, EVOLUTION INDIA study. *Diabetes Research and Clinical Practice*, 157, 107860.

Bayraktaroglu, A. E., Calisir, F., & Baskak, M. (2019). Intellectual capital and firm performance: an extended VAIC model. *Journal of Intellectual Capital*.

Berzkalne, I., & Zelgalve, E. (2014). Intellectual capital and company value. *Procedia-Social and Behavioral Sciences*, 110, 887-896.

Bharathi Kamath, G. (2008), "Intellectual capital and corporate performance in Indian pharmaceutical industry", *Journal of Intellectual Capital*, Vol. 9 No. 4, pp. 684-704.

Bontis, N. (1998). Intellectual capital: an exploratory study that develops measures and models. *Management decision*.

- Bontis, N. (2001)**, Assessing knowledge assets: a review of the models used to measure intellectual capital, *International Journal of Management Reviews*, 3(1), 41-60.
- Bontis, N., Dragonetti, N. C., Jacobsen, K., & Roos, G. (1999)**. The knowledge toolbox: A review of the tools available to measure and manage intangible resources. *European Management Journal*, 17(4), 391-402.
- Bontis, N., Keow, W. C. C., & Richardson, S. (2000)**. Intellectual capital and business performance in Malaysian industries. *Journal of intellectual capital*.
- Brooking, Annie (1996)**, Intellectual Capital: Core Asset for the Third Millennium Enterprise, International Thomson Business Press, New York.
- Buallay, A. M. (2017)**. The relationship between intellectual capital and firm performance. *Corporate Governance and Organizational Behavior Review*, 1(1), 32-41.
- Calisir, F., Gumussoy, C. A., Cirit, F., & Bayraktaroglu, A. E. (2011, January)**. Intellectual capital in development and investment banks of Turkey. In *International Conference on Industrial Engineering and Operations Management, Kuala Lumpur* (pp. 22-24).
- Cenciarelli, V.G., Greco, G. and Allegrini, M. (2018)**, "Does intellectual capital help predict bankruptcy?", *Journal of Intellectual Capital*, Vol. 19 No. 2, pp. 321-337.
- Chakraborty, B., Gupta, S., & CHATTERJEE, T. B. (2015)**. Service Sector, Human Capital Accumulation and Endogenous Growth. *Theoretical & Applied Economics*, 22(4).
- Chaminade, C., & Roberts, H. (2003)**. What it means is what it does: a comparative analysis of implementing intellectual capital in Norway and Spain. *European Accounting Review*, 12(4), 733-751.
- Chang, W. S., & Hsieh, J. J. (2011)**. Intellectual capital and value creation-is innovation capital a missing link?. *International Journal of Business and Management*, 6(2), 3.
- Chen Goh, P. (2005)**, "Intellectual capital performance of commercial banks in Malaysia", *Journal of Intellectual Capital*, Vol. 6 No. 3, pp. 385-396.

- Chen, M., Cheng, S. and Hwang, Y. (2005)**, "An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance", *Journal of Intellectual Capital*, Vol. 6 No. 2, pp. 159-176.
- Clarke, M., Seng, D. and Whiting, R.H. (2011)**, "Intellectual capital and firm performance in Australia", *Journal of Intellectual Capital*, Vol. 12 No. 4, pp. 505-530.
- Cleary, P., & Quinn, M. (2016)**. Intellectual capital and business performance: An exploratory study of the impact of cloud-based accounting and finance infrastructure. *Journal of Intellectual Capital* Vol. 17 No. 7, pp. 255-278.
- Daniel Zéghal, Anis Maaloul. Le traitement comptable des intangibles, ses conséquences et les solutions envisagées. *Capital immatériel : état des lieux et perspectives*, Jun 2010, Montpellier, France. pas de pagination (fichiers sur CD ROM). [{halshs-00525802}](#)
- Deep, R., & Pal Narwal, K. (2014)**. Intellectual capital and its association with financial performance: A study of Indian textile sector. *International Journal of Management and Business Research*, 4(1), 43-54.
- Diyanty, V., Restuti, M. D., Diyanti, V., & Shauki, E. R. (2019, July)**. Intellectual Capital and Firm Performance: Applying a Modified Value-Added Coefficient. In *Asia Pacific Business and Economics Conference (APBEC 2018)* (pp. 114-123). Atlantis Press.
- Dolfsma, W. (2005)**, "Appropriability in services", ERIM report series, Research in Management, ERS.2005-021-ORG, Erasmus Research Institute of Management.
- Dženopoljac, V., Janošević, S. and Bontis, N. (2016)**, "Intellectual capital and financial performance in the Serbian ICT industry", *Journal of Intellectual Capital*, Vol. 17 No. 2, pp. 373-396.
- Edvinsson, L., & Malone, M. S. (1997)**. *Intellectual capital: Realizing your company's true value by finding its hidden brainpower*: HarperBusiness New York.
- Edvinsson, L., & Sullivan, P. (1996)**. Developing a model for managing intellectual capital. *European Management Journal*, 14(4), 356-364.

- Egginton, D. A. (1990).** Towards some principles for intangible asset accounting. *Accounting and Business Research*, 20(79), 193-205.
- Elsetouhi, A., Elbeltagi, I., & Haddoud, M. Y. (2015).** Intellectual capital and innovations: is organisational capital a missing link in the service sector?. *International Journal of Innovation Management*, 19(02), 1550020.
- Erickson, S., & Rothberg, H. (2009).** Intellectual capital in tech industries: A longitudinal study. *Electronic Journal of Knowledge Management*, 7(5), pp559-566.
- Festa, G., Rossi, M., Kolte, A. and Marinelli, L. (2021),** "The contribution of intellectual capital to financial stability in Indian pharmaceutical companies", *Journal of Intellectual Capital*, Vol. 22 No. 2, pp. 337-359.
- Firer, S., & Stainbank, L. (2003).** Testing the relationship between intellectual capital and a company's performance: evidence from South Africa. *Meditari: Research Journal of the School of Accounting Sciences*, 11(1), 25-44.
- Firrer, S. and Williams, M. (2003),** "Intellectual Capital and Traditional Measures of Corporate Performance", *Journal of Intellectual Capital*, 4(3): 348-360.
- Garcia-Parra, M., Simo, P., Sallan, J. M., & Mundet, J. (2009).** Intangible liabilities: Beyond Models of intellectual assets. *Management Decision*, 47(5), 819-830.
- Grant, R. M. (1991).** The resource-based theory of competitive advantage: implications for strategy formulation. *California management review*, 33(3), 114-135.
- Gu, F. and Lev, B. (2001),** "Intangible assets: measurement, drivers, usefulness", working paper, Boston University, Boston, MA.
- Harlow, H. (2008).** The effect of tacit knowledge on firm performance. *Journal of knowledge management*, 12(1), 148-163
- Hong Vo, D., Van, L. T. H., Tran, D. B., Vu, T. N., & Ho, C. M. (2021).** The determinants of gender income inequality in Vietnam: A longitudinal data analysis. *Emerging Markets Finance and Trade*, 57(1), 198-222.

- Hussinki, H., Ritala, P., Vanhala, M., & Kianto, A. (2017).** Intellectual capital, knowledge management practices and firm performance. *Journal of intellectual capital* 18(4), 904-922.
- Iazzolino, G. and Laise, D. (2013),** "Value added intellectual coefficient (VAIC): A methodological and critical review", *Journal of Intellectual Capital*, Vol. 14 No. 4, pp. 547-563.
- Inkinen, H. (2015),** "Review of empirical research on intellectual capital and firm performance", *Journal of Intellectual Capital*, Vol. 16 No. 3, pp. 518-565.
- Ismail, K. N. I. K., & Karem, M. A. (2011).** Intellectual capital and the financial performance of banks in Bahrain. *Journal of Business Management and Accounting*, 1(1), 63-77.
- Ittner, C. D., & Larcker, D. F. (2003).** Coming up short on nonfinancial performance measurement. *Harvard business review*, 81(11), 88-95.
- Joshi, M., Cahill, D., Sidhu, J., & Kansal, M. (2013),** Intellectual capital and financial performance: an evaluation of the Australian financial sector, *Journal of Intellectual Capital*, 14(2), 264-285.
- Kamath, G. B. (2007).** Intellectual capital statements: what do they measure and report?. *The IUP Journal of Accounting Research and Audit Practices*, 6(4), 52-64.
- Kamath, G. B. (2015).** Impact of intellectual capital on financial performance and market valuation of firms in India. *International Letters of Social and Humanistic Sciences*, 48, 107-122.
- Kanchana, N., & Mohan, R. R. (2017).** A review of empirical studies in intellectual capital and firm performance. *Indian Journal of Commerce and Management Studies*, 8(1), 52-58.
- Khan, M. (2014).** Identifying the components and importance of intellectual capital in knowledge-intensive organizations. *Business and Economic Research*, 4(2), 297-307.

- Kianto, A., Hurmelinna-Laukkanen, P. and Ritala, P. (2010)**, "Intellectual capital in service- and product-oriented companies", *Journal of Intellectual Capital*, Vol. 11 No. 3, pp. 305-325.
- Komnencic, B., & Pokrajčić, D. (2012)**. Intellectual capital and corporate performance of MNCs in Serbia. *Journal of intellectual capital*, 13(1),106-119
- Kujansivu, P., & Lönnqvist, A. (2005)**. The value and efficiency of intellectual capital in Finnish companies. In *Workshop papers of 1st Workshop on Visualising, Measuring and Managing Intangibles and Intellectual Capital, Ferrara, Italy, October 18-20, 2005* (p. 14).
- Kwarbai, J., & Akinpelu, M. (2016)**. Human capital efficiency and corporate performance: The Nigerian perspective. *The International Journal of Business & Management*, 4(3), 1-9.
- Lev, B. (2001)**. *Intangibles: Management, measurement, and reporting*: Brookings Inst Pr.
- Lev, B., & Mintz, S. L. (1999)**. Seeing is believing –a better approach to estimating knowledge capital. *CFO magazine*, 15(2), 29–37.
- Li, X., Chu, S. K. W., Ki, W. W., & Woo, M. (2010)**. Students and teacher’s attitudes and perceptions toward collaborative writing with Wiki in a primary four Chinese classroom. In *3rd International Conference on ICT for Language Learning 2010*.
- Li, Y., Song, Y., Wang, J., & Li, C. (2019)**. Intellectual capital, knowledge sharing, and innovation performance: Evidence from the Chinese construction industry. *Sustainability*, 11(9), 2713.
- Lim, L. L., & Dallimore, P. (2004)**. Intellectual capital: management attitudes in service industries. *Journal of intellectual capital*, 5(1), 181-194.
- Lo, C., Wang, C., & Chen, Y. C. (2020)**. The mediating role of intellectual capital in open innovation in the service industries. *Sustainability*, 12(12), 5220.
- Luthy, D. H. (1998, August)**. Intellectual capital and its measurement. In *Proceedings of the Asian Pacific Interdisciplinary Research in Accounting Conference (APIRA), Osaka, Japan* (pp. 16-17).

- Maditinos, D., Chatzoudes, D., Tsairidis, C. and Theriou, G. (2011)**, "The impact of intellectual capital on firms' market value and financial performance", *Journal of Intellectual Capital*, Vol. 12 No. 1, pp. 132-151.
- Maji, S. G., & Goswami, M. (2016)**. Intellectual capital and firm performance in emerging economies: the case of India. *Review of International Business and Strategy*, 26(3), 410-430
- Marr, B. and Moustaghfir, K. (2005)**, "Defining intellectual capital: a three-dimensional approach", *Management Decision*, Vol. 43 No. 9, pp. 1114-1128.
- Mavridis, D.G. (2004)**, "The intellectual capital performance of the Japanese banking sector", *Journal of Intellectual Capital*, Vol. 5 No. 1, pp. 92-115.
- Mehralian, G., Rajabzadeh, A., Sadeh, M. R., & Rasekh, H. R. (2012)**. Intellectual capital and corporate performance in Iranian pharmaceutical industry. *Journal of Intellectual Capital*, 13(1), 138-158.
- Meles, A., Porzio, C., Sampagnaro, G., & Verdoliva, V. (2016)**. The impact of the intellectual capital efficiency on commercial banks performance: Evidence from the US. *Journal of Multinational Financial Management*, 36, 64-74.
- Miles, I., Andersen, B., Boden, M. and Howells, J. (2000)**, "Service production and intellectual property", *International Journal of Technology Management*, Vol. 20 Nos 1/2, pp. 95-115.
- Mitchell van der Zahn, J.W., Singh, I. and Heniro, J. (2007)**, "Is there an association between intellectual capital disclosure, underpricing and long-run performance?", *Journal of Human Resource Costing & Accounting*, Vol. 11 No. 3, pp. 178-213.
- Mohapatra, S., Jena, S. K., Mitra, A., & Tiwari, A. K. (2019)**. Intellectual capital and firm performance: evidence from Indian banking sector. *Applied Economics*, 51(57), 6054-6067.
- Molina-Parra, P. A., Botero-Botero, S., & Montoya-Restrepo, A. (2017)**. Performance studies of family businesses. A new perspective. *Estudios Gerenciales*, 33(142), 76-86.

- Molodchik, M., Shakina, E., & Bykova, A. (2012).** Intellectual capital transformation evaluating model. *Journal of Intellectual Capital*, 13(4), 444-461.
- Mondal, A. (2016).** Measuring the efficiency and value of intellectual capital in Indian knowledge companies. *Journal of Commerce & Accounting Research*, 5(4), 10-17
- Mondal, A. and Ghosh, S.K. (2012),** "Intellectual capital and financial performance of Indian banks", *Journal of Intellectual Capital*, Vol. 13 No. 4, pp. 515-530.
- Murale, V., Jayaraj, R., & Ashrafali, A. (2010).** Impact of intellectual capital on firm performance: A resource based view using VAIC approach. *International Journal of Business Management, Economics and Information Technology*, 2(2), 283-292.
- Murthy, V., & Mouritsen, J. (2011).** The performance of intellectual capital: Mobilising relationships between intellectual and financial capital in a bank. *Accounting, Auditing & Accountability Journal*, 24(June), 622-646
- Murugesan, S., Vadivel, T., Chinnadurai, K., & Dhamotharan, D. (2018).** Intellectual capital: its effect on financial performance of Indian private sector banks. *International journal of advanced scientific research and management*, 3(11), 116-123.
- Nahapiet, J. & Ghoshal, S. (1998).** Social capital, intellectual capital, and the organizational advantage, *Academy of Management Review*, 23(2), 242–266.
- Ng, A.W. (2006),** "Reporting intellectual capital flow in technology-based companies: Case studies of Canadian wireless technology companies", *Journal of Intellectual Capital*, Vol. 7 No. 4, pp. 492-510.
- Nguyen, V. C. (2020).** Human capital, capital structure choice and firm profitability in developing countries: An empirical study in Vietnam. *Accounting*, 6, 127–136.
- Ognjanović, J. (2017).** Relations of intellectual capital components in hotel companies. *Industrija*, 45(2), 181-196.
- Oppong, G.K., Pattanayak, J.K. and Irfan, M. (2019),** "Impact of intellectual capital on productivity of insurance companies in Ghana: A panel data analysis with System GMM estimation", *Journal of Intellectual Capital*, Vol. 20 No. 6, pp. 763-783.

- Örnek, A. Ş., & Ayas, S. (2015).** The relationship between intellectual capital, innovative work behavior and business performance reflection. *Procedia-Social and Behavioral Sciences*, 195, 1387-1395.
- Ozkan, N., Cakan, S., & Kayacan, M. (2017).** Intellectual capital and financial performance: A study of the Turkish Banking Sector. *Borsa Istanbul Review*, 17(3), 190-198.
- Parham, S., & Heling, G. W. (2015).** The relationship between human capital efficiency and financial performance of Dutch production companies. *Research Journal of Finance and Accounting*, 6(8), 188-201.
- Petty, R. and Guthrie, J. (2000),** "Intellectual capital literature review : Measurement, reporting and management", *Journal of Intellectual Capital*, Vol. 1 No. 2, pp. 155-176.
- Pew Tan, H., Plowman, D. and Hancock, P. (2007),** "Intellectual capital and financial returns of companies", *Journal of Intellectual Capital*, Vol. 8 No. 1, pp. 76-95.
- Phusavat, K., Comepa, N., Sitko-Lutek, A. and Ooi, K.B. (2011),** "Interrelationships between intellectual capital and performance: empirical examination", *Industrial Management and Data Systems*, Vol. 111 No. 6, pp. 810-829.
- Pulic, A. (2000).** VAIC - an accounting tool for IC management. *International Journal of Technology Management.*, 20(5–8), 702–714.
- Pulic, A. (2004),** "Intellectual capital – does it create or destroy value?", *Measuring Business Excellence*, Vol. 8 No. 1, pp. 62-68
- Puntillo, P. (2009).** Intellectual capital and business performance. Evidence from Italian banking industry. *Electronic Journal of Corporate Finance*, 4(12), 97-115.
- Rehman, S. U., Elrehail, H., Alsaad, A., & Bhatti, A. (2021).** Intellectual capital and innovative performance: a mediation-moderation perspective. *Journal of Intellectual Capital*, 1469-1930.
- Renaud, K., von Solms, B., & von Solms, R. (2019).** How does intellectual capital align with cyber security? *Journal of Intellectual Capital*, 20(5), 621-641.

- Riahi-Belkaoui, A. (2003)**, "Intellectual capital and firm performance of US multinational firms: A study of the resource-based and stakeholder views", *Journal of Intellectual Capital*, Vol. 4 No. 2, pp. 215-226
- Rivera Godoy, J. A., & Ruiz Acero, D. (2011)**. Financial performance analysis of innovative companies in the food and beverage industry in Colombia. *Pensamiento & Gestión*, (31), 109-136.
- Roos, G., & Roos, J. (1997)**. Measuring your company's intellectual performance. *Long Range Planning*, 30(3), 413-426.
- Roos, G., Pike, S., & Fernstrom, L. (2007)**. *Managing intellectual capital in practice*. Routledge.
- Sardo, F. and Serrasqueiro, Z. (2017)**, "A European empirical study of the relationship between firms' intellectual capital, financial performance and market value", *Journal of Intellectual Capital*, Vol. 18 No. 4, pp. 771-788.
- Selvam, M., Thanikachalam, V, Dhanasekar, D., Amirdhavasani, S (2020)**. Efficiency of Intellectual Capital Performance of Public Sector Banks and Private Sectors Banks in India using MVAIC. *Journal of Advanced Research in Dynamical and Control Systems*, 12(6 Special Issue), 205-211
- Selvam, M., Thanikachalam, V, Dhanasekar, D., Amirdhavasani, S., Saremi, H. (2020)** Intellectual capital and profitability ratios of foreign banks operating in India: A structural equation model approach. *Journal of Advanced Research in Dynamical and Control Systems*, 12(6 Special Issue), 212-219
- Selvam, M., Thanikachalam, V, Kathiravan, C., Sankarkumar, A. V., & Dhamotharan, D. (2019)**. Intellectual Capital Performance and its Impact on Indian Commercial Banking Industry. *Journal of Engineering and Applied Sciences*, 14(8).
- Selvam, M., Thanikachalam, V., Kathiravan, C., Sankarkumar, A. V., & Dhamotharan, D. (2020)**. Intellectual Capital Performance and its Impact on Indian Commercial Banking Industry. *Journal of Engineering and Applied Sciences*, 14(8), 2019.

- Sharabati, A. A. A., Jawad, S. N., & Bontis, N. (2010).** Intellectual capital and business performance in the pharmaceutical sector of Jordan, *Management Decision*, 48(1), 105-131.
- Shiu, H. (2006).** Application of the VAIC™ method to measures of corporate performance: a quantile regression approach. *Journal of American Academy of Business*, 8(2), 156-160.
- Smriti, N. and Das, N. (2018),** "The impact of intellectual capital on firm performance: a study of Indian firms listed in COSPI", *Journal of Intellectual Capital*, Vol. 19 No. 5, pp. 935-964.
- Soriya, S., & Narwal, K. P. (2012).** impact of intellectual capital on performance of Indian corporate sector. *Journal of Commerce & Accounting Research*, 1(2).
- Stewart, T. A. (1994).** Your company most valuable asset-intellectual capital. *Fortune*, 130(7), 68.
- Stewart, T., & Ruckdeschel, C. (1998).** Intellectual capital: The new wealth of organizations. *Performance Improvement*, 37(7), 56-59.
- Stewart, T.A. (1991).** Brainpower: Intellectual Capital is Becoming Corporate America's Most Valuable Asset and Can Be Its Sharpest Competitive Weapon; the Challenge is to Find What You Have – and Use It. *Fortune*, 123, 44-60.
- Sudarsanam, S., Sorwar, G., & Marr, B. (2006).** Real options and the impact of intellectual capital on corporate value. *Journal of intellectual capital*, 7(3), 291-308
- Sveiby, K. E. (2010),** "Methods for measuring intangible assets", available at: <http://www.sveiby.com/articles/IntangibleMethods.htm> (accessed 27 June 2013).
- Taghizadeh Khanqah, V., Akbari Khosroshahi, M., & Ghanavati, E. (2012).** An empirical investigation of the impact of intellectual capital on firms' market value and financial performance: evidence from Iranian companies. *International Journal of Management and Business Research*, 2(1), 1-12.
- Tapsell, Sherrill,** Making Money from Brainpower: The new wealth of nations, Management–Auckland, 45 (6), Jul. 1998

- Tayles, M., Pike, R.H. and Sofian, S. (2007)**, "Intellectual capital, management accounting practices and corporate performance: Perceptions of managers", *Accounting, Auditing & Accountability Journal*, Vol. 20 No. 4, pp. 522-548.
- Thanikachalam, V, Muninarayanappa, M., & Prabakaran, V. (2018)**. Impact of intellectual capital on the financial performance of Indian Pharmaceutical Companies. *SMART Journal of Business Management Studies*, 14(2), 86-98
- Thanikachalam, V, Murugesan, S., Pavithran, A., & Gayathri Jayapal, G. (2019)**. The influence of intellectual capital on firm's performance of Indian automobile industry. *International Journal of Recent Technology and Engineering*, 8, 2277-3878
- Thanikachalam, V, Selvam, M., Maniam, B. (2021)**. Intellectual Capital Efficiency and Financial Performance of S&P BSE Power Index Firms. *Academy of Accounting and Financial Studies Journal*, 25(5)
- Thanikachalam, V, Selvam, M., Maniam, B., Kathiravan, C., & Dhanasekar, D. (2021)**. Effect of Intellectual Capital on Sustainable Corporate Performance of Nifty Financial Services Companies. *Academy of Strategic Management Journal*, 20(S3)
- Thanikachalam, V, Selvam, M., Subramaniam, P., & Maniam, B. (2019)**. The nexus between intellectual capital and value of the firms: A study on BSE S&P IT Firms in India. *Journal of Critical Reviews*, 6(5)
- Thanikachalam, V., Selvam, M., & Maniam, B. (2020)**. Measuring the Intellectual Capital Efficiency of Indian Hotels Listed in National Stock Exchange of India Ltd using E-VAIC Model. *Journal of International Finance and Economics*, 20(1), 65-72
- Thanikachalam, V., Selvam, M., Dhanasekar, D., Raja, M., & Bhuvaneshwari, P. (2020)**. Effect of Intellectual Capital on the Performance Indicators of Indian Metal Firms Listed in National Stock Exchange of India Limited. *International Journal of Advanced Science and Technology*, 29(8), 1757-1765

- Ting, L. W. K., & Lean, H. H. (2009).** Intellectual capital performance of financial institutions in Malaysia. *Journal of Intellectual Capital*, 10(4), 588–599
- Tran, D.B. and Vo, D.H. (2018),** "Should bankers be concerned with Intellectual capital? A study of the Thai banking sector", *Journal of Intellectual Capital*, Vol. 19 No. 5, pp. 897-914.
- Tran, N. P., Van, L. T. H., & Vo, D. H. (2020).** The nexus between corporate governance and intellectual capital in Vietnam. *Journal of Asia Business Studies*.
- Ulum, I., & Jati, A. W. (2016).** Intellectual capital performance: A comparative study between financial and non-financial industry of Indonesian biggest companies. *International Journal of Economics and Financial Issues*, 6(4), 1436-1439.
- Uzliawati, L., Suhardjanto, D., & Djati, K. (2014).** The characteristics of audit committee and intellectual capital disclosure in Indonesia banking industry. *GSTF Journal on Business Review (GBR)*, 3(2).
- Venugopal, D., & Subha, M. V. (2015, May).** Impact of intellectual capital on corporate performance. In *Joint international conference* (pp. 675-687).
- Vishnu, S. and Kumar Gupta, V. (2014),** "Intellectual capital and performance of pharmaceutical firms in India", *Journal of Intellectual Capital*, Vol. 15 No. 1, pp. 83-99.
- Wang, M. S. (2011, January).** Intellectual capital and firm performance. In *Annual Conference on Innovations in Business & Management* (pp. 1-26). The Center for Innovations in Business and Management, Practice London, UK.
- Wang, Q., Sharma, U. and Davey, H. (2016),** "Intellectual capital disclosure by Chinese and Indian information technology companies: A comparative analysis", *Journal of Intellectual Capital*, Vol. 17 No. 3, pp. 507-529.
- Wang, W. and Chang, C. (2005),** "Intellectual capital and performance in causal models: Evidence from the information technology industry in Taiwan", *Journal of Intellectual Capital*, Vol. 6 No. 2, pp. 222-236

- Wiig, K. M. (1997).** Integrating intellectual capital and knowledge management. *Long Range Planning*, 30(3), 399-405.
- Williams, M. (2000).** Is a company's intellectual capital performance and intellectual capital disclosure practices related? Evidence from publicly listed companies from the FTSE 100. Paper presented at *McMasters Intellectual Capital Conference, Toronto*.
- Xu, J. and Li, J. (2022),** "The interrelationship between intellectual capital and firm performance: evidence from China's manufacturing sector", *Journal of Intellectual Capital*, Vol. 23 No. 2, pp. 313-341.
- Xu, J., & Wang, B. (2019).** Intellectual capital performance of the textile industry in emerging markets: A comparison with China and South Korea. *Sustainability*, 11(8), 2354.
- Yang, C. C., & Lin, C. Y. Y. (2009).** Does intellectual capital mediate the relationship between HRM and organizational performance? Perspective of a healthcare industry in Taiwan. *The International Journal of Human Resource Management*, 20(9), 1965-1984.
- Yusuf, I. (2013).** The relationship between human capital efficiency and financial performance: An empirical investigation of quoted Nigerian banks. *Research Journal of Finance and Accounting*, Vol. 4 Nos 4, pp. 148-154.
- Zéghal, D., & Maaloul, A. (2010).** Analysing value added as an indicator of intellectual capital and its consequences on company performance. *Journal of Intellectual Capital*, 11(1), 39-60.

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<https://www.google.co.in/>

<https://www.icssr.org/>

<https://prowessiq.cmie.com/>

<https://www.capitaline.com/>

<https://finance.yahoo.com/>

<https://www.bseindia.com/>

<https://www.nseindia.com/>

<https://www.emerald.com/insight/>

<https://www.sciencedirect.com/>

<https://www.scopus.com/search/form.uri?display=basic&zone=header&origin=#basic>

<https://www.elsevier.com/en-in>

<https://www.moneycontrol.com/>

<https://www.rbi.org.in/>

<https://www.iba.org.in/index.html>

<https://www.researchgate.net/>

<https://onlinelibrary.wiley.com/>

<https://shodhganga.inflibnet.ac.in/>

Annexure

Annexure-I: LIST OF SAMPLE FIRMS LISTED IN NSE NIFTY SERVICE SECTOR

S.No	Name of the Firms
1.	STATE BANK OF INDIA
2.	BANK OF BARODA
3.	PUNJAB NATIONAL BANK
4.	INDIAN OVERSEAS BANK
5.	CANARA BANK
6.	UNION BANK
7.	THE JAMMU AND KASHMIR BANK
8.	INDIAN BANK
9.	CENTRAL BANK OF INDIA
10.	UCO BANK
11.	TATA CONSULTANCY SERVICES LIMITED
12.	INFOSYS LIMITED
13.	WIPRO LIMITED
14.	TECH MAHINDRA LIMITED
15.	LARSEN & TOUBRO INFOTECH LIMITED
16.	MINDTREE LIMITED
17.	ORACLE FINANCIAL SERVICES SOFTWARE LIMITED
18.	HCL TECHNOLOGIES LIMITED
19.	MPHASIS LIMITED
20.	COFORGE LIMITED
21.	SUN PHARMACEUTICAL INDUSTRIES LIMITED
22.	DIVI'S LABORATORIES LIMITED
23.	DR. REDDY'S LABORATORIES LIMITED
24.	CIPLA LIMITED
25.	CADILA HEALTHCARE LIMITED
26.	TORRENT PHARMACEUTICALS LIMITED
27.	LUPIN LIMITED
28.	BIOCON LIMITED
29.	AUROBINDO PHARMA LIMITED
30.	ALKEM LABORATORIES LIMITED

Source: <https://www.nseindia.com/>

Publications

Annexure - II

List of Articles published by the Researcher

This is to certify that **Mr. V. Thanikachalam** has published the following eleven papers relating to his Ph.D Research Work during his research tenure.

1. **Thanikachalam, V**, Selvam, M., Maniam, B. (2021). Intellectual Capital Efficiency and Financial Performance of S&P BSE Power Index Firms. *Academy of Accounting and Financial Studies Journal*, 25(5) (**SCOPUS Indexed**).
2. **Thanikachalam, V**, Selvam, M., Maniam, B., Kathiravan, C., & Dhanasekar, D. (2021). Effect of Intellectual Capital on Sustainable Corporate Performance of Nifty Financial Services Companies. *Academy of Strategic Management Journal*, 20(S3) (**SCOPUS Indexed**).
3. Selvam, M., **Thanikachalam, V**, Dhanasekar, D., Amirdhavasani, S., Saremi, H. (2020) Intellectual capital and profitability ratios of foreign banks operating in India: A structural equation model approach. *Journal of Advanced Research in Dynamical and Control Systems*, 12(6 Special Issue), 212-219 (**SCOPUS Listed**).
4. Selvam, M., **Thanikachalam, V**, Dhanasekar, D., Amirdhavasani, S (2020). Efficiency of Intellectual Capital Performance of Public Sector Banks and Private Sectors Banks in India using MVAIC. *Journal of Advanced Research in Dynamical and Control Systems*, 12(6 Special Issue), 205-211 (**SCOPUS Listed**).
5. **Thanikachalam, V.**, Selvam, M., & Maniam, B. (2020). Measuring the Intellectual Capital Efficiency of Indian Hotels Listed in National Stock Exchange of India Ltd using E-VAIC Model. *Journal of International Finance and Economics*, 20(1), 65-72 (**ABDC Ranking**).
6. **Thanikachalam, V.**, Selvam, M., Dhanasekar, D., Raja, M., & Bhuvaneshwari, P. (2020). Effect of Intellectual Capital on the Performance Indicators of Indian Metal Firms Listed in National Stock Exchange of India Limited. *International Journal of Advanced Science and Technology*, 29(8), 1757-1765 (**SCOPUS Indexed**).

7. **Thanikachalam, V**, Selvam, M., Subramaniam, P., & Maniam, B. (2019). The nexus between intellectual capital and value of the firms: A study on BSE S&P IT Firms in India. *Journal of Critical Reviews*, 6(5) (**SCOPUS Listed**).
8. **Thanikachalam, V**, Murugesan, S., Pavithran, A., & Gayathri Jayapal, G. (2019). The influence of intellectual capital on firm's performance of Indian automobile industry. *International Journal of Recent Technology and Engineering*, 8, 2277-3878 (**SCOPUS Indexed**).
9. Selvam, M., **Thanikachalam, V**, Kathiravan, C., Sankarkumar, A. V., & Dhamotharan, D. (2019). Intellectual Capital Performance and its Impact on Indian Commercial Banking Industry. *Journal of Engineering and Applied Sciences*, 14(8). (**SCOPUS Indexed and UGC Approved-Old**).
10. Murugesan, S., **Thanikachalam, V**, Chinnadurai, K., & Dhamotharan, D. (2018). Intellectual capital: Its effect on financial performance of Indian private sector banks. *International Journal of Advanced Scientific Research and Management*, 3(11), 116-123 (**UGC Approved- Old**).
11. **Thanikachalam, V**, Muninarayanappa, M., & Prabakaran, V. (2018). Impact of intellectual capital on the financial performance of Indian Pharmaceutical Companies. *SMART Journal of Business Management Studies*, 14(2), 86-98 (**Indexed in Web of Science**).



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IMPACT OF INTELLECTUAL CAPITAL ON THE FINANCIAL PERFORMANCE OF INDIAN PHARMACEUTICAL COMPANIES

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Abstract

The objective of this study is to discover the influence of Intellectual Capital (IC) on financial performance of sample pharmaceutical firms in India. Quantitative data of Indian pharmaceutical firms were collected from the audited annual reports for the period from 2007 to 2017. Public (2004) IC model was employed to measure the intellectual capital. Return on Assets, Return on Equity and Return on Sales were used to measure the financial performance. The study found significant and positive impact of IC on financial performance. The findings of the study would be useful for corporate directors and regulators as well as policy makers to invest in IC, thus leading to higher financial performance. This study is a pioneering attempt to measure the relationship between IC and corporate financial performance in Indian pharmaceutical sector.

Keywords: *Intellectual Capital; Financial Performance; Correlation; Standardized Regression Pharmaceutical Sector.*

JEL Code: *034, L25, L65,*

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1. Introduction

In the emerging economy, the valuation and assessment system of business firms need to be changed in accordance with changing environment. The key factors of value creation and productivity of an organization have migrated from its tangible assets (capital, plant and machinery) to intangible assets (knowledge of employees), as the employees are professionally sound and technically proficient. The vital source of value is the human brain and its tacit and explicit revelation (**SriRangaVishnu &Vijaya Kumar Gupta, 2014**).

It is generally observed that the market value of stock, issued by many companies, has been higher than the replacement cost of tangible inputs (**Seveiby, 1997; Dumay, 2009**). An acceptable fact for this overvaluation is the existence of intellectual capital in the assets of the organizations, which are not generally reflected in their accounting report (**Brennan &Connel, 2000**). The intangible values have been ignored in the annual financial statement of almost all firms (**Ming-Chin Chen et al., 2005**).

It is to be noted, from the earlier literature, the connective nexus between brand name, corporate regulations, intellectual property, organizational activities, inventions and patents and they form the present intellectual capital, which does possess vital place in the economic wealth creation of corporates. Hence it is pertinent for the companies to scale and maintain their intellectual capital to manage the competitive advantage (**Bhartesh & Bandopadyay, 2005**).

The pharmaceutical industry generally secludes itself with its prudent and stringent characters. It is being considered as the vibrant industry, with appropriate emphasis on quality of human capital, innovation of products and

processes, research and development activities and intellectual proprietorship. All these features present the pharmaceutical industry a challenging proposition of research on intellectual capital. In India, the pharmaceutical industry manifests similar attributes, with appreciable growth in basic infrastructure, quality of products and technological improvement. It is important to note that situations such as rolling out of advanced manufacturing technologies and advancement of low cost technologies paired with high quality outputs, form the main strength of this industry. Nowadays, an increasing number of pharmaceutical companies are in the stage of seeking permission for drugs from Regulatory Bodies abroad. All these advancements have taken the Indian pharmaceutical industry to be the pioneer of major pharmaceutical players in the Globe (**Sriranga Vishnu &Vijayakumar Kumar Gupta, 2014**).

1.1 Measurement of Intellectual Capital

Intellectual capital measurement is necessary in respect of its management and reporting the value of the firm. The activists and theorists have suggested multiple methods to scale intellectual capital and its components. A compilation of 42 such models, has been categorized into four broad classifications, namely, Direct Intellectual Capital Method (DICM); Market Capitalization Methods (MCM); Return on Assets Method (ROAM); and Balanced Scorecard Methods (BSCM). Among them, MCM and ROA require consolidated inputs to measure intellectual capital at the organizational level. But DICM and BSCM utilize individual (component – wise) inputs, for the evaluation of intellectual capital (**Sveiby, 2010**).

The well known model, namely, Return On Assets Model, studies the influence of intellectual

capital on corporate performance. Besides, the Value Added Intellectual Coefficient Method (VAIC™) was proposed by Ante Pulic in 1993 (Pulic, 2004) and this model measures efficiencies of intellectual capital and physical and financial capital of an entity. More specifically, it values HCE, SCE and CEE. The calculation of VAIC™ is based on widely available data, that make it easy to utilize. It enables quantitative and modernized measurement, thus facilitating cross-sectional analysis. It is a reasonable model seeking no subjective grading or weightage (Abdulsalam et al., 2011). The VAIC™ method facilitates factual investigation of this research. This study examines intellectual capital-linked performance of large pharmaceutical companies in India.

2) Review of Literature

The intellectual capital is the sum of the hidden assets of the company, which are not fully captured on the balance sheet (Roos and Roos, 1997). Defining intellectual capital faces difficulties. Edvinson & Sullivan (1996), Stewart (1997), Bontis et al., (1998) described intellectual capital as something related to knowledge, wealth creation and intangibility. There is significant relationship between human capital efficiency and financial performance of the firm (Maditinos et al., 2011). Multiple components of intellectual capital were identified by Brooking (1996), Sveiby (1997) and Edvinson et al., (1997). However, the concept (intellect-creating activities) developed by Seetharaman et al., (2004) has been employed in many studies. The intellectual capital is divided into broad components such as human capital, structural capital and capital employed and relational capital.

2.1) Intellectual Capital and Corporate Performances

The existing studies have been carried out,

across many service industries, testing the effect of intellectual capital on business performance. The recommended industries are finance industries (Young et al, 2009; Kamath, 2010 and Abdulsalam et al., 2011), software industries (Gan and Saleh, 2008, Chang and Hsieh, 2011) and pharmaceutical industries (Maji, S. G., & Goswami, M. 2015; Kamath, 2008; Chen, Cheng et al., 2005; Karam Pal and Sushila Soriya, 2012). The research on intellectual capital and business performance transcends several geographical boundaries, comprising USA, Australia, Canada, India, Malaysia, Japan, Greece, Pakistan, UK, Taiwan and Netherland. The research studies by Aparna Bhatia & Kushpoo Aggarwal, 2015; Clarke et al., 2011; Mehralian et al., 2012; etc.) identified relationships between intellectual capital and business performance (Firer & Williams, 2003; Gruian, 2011). Besides, Pina Puntillo, (2009) investigated the relationship between the value creation efficiency and firms' market valuation and financial performance. The results did not show any strong association between the studied variables (except for the relation between components of VAIC and the CEE) and the different measures of the firm's performance. Rubina Aroze, (2011) identified the influence of intellectual capital (IC) on the financial performance of 13 private commercial banks (PCB_s) of Bangladesh, listed with Dhaka Stock Exchange Limited. It is found that there was statistically significant correlation between the IC efficiency scores and financial performance indicators. In addition, there was statistically significant influence of IC on the financial indicators.

2.2) Intellectual Capital and Corporate Performance in Pharmaceutical Industry

The pharmaceutical industry is amenable to research on intellectual capital, due to its knowledge-related features. For valuation of

intellectual capital, questionnaire survey method and accounting data-based models were employed in Iran (**Mehralian et al., 2012**). The researchers postulated VAIC™ method and found that the components of intellectual capital recorded positive relationship with just one performance variable, namely, return on assets. The main factor impacting corporate performance is physical capital and not intellectual capital. VAIC™, employed by **Bharathi (2008)**, found that there was in significant influence of VAIC™ on performance of entities. A study by **Bollen et al., (2005)**, reported that the components of intellectual capital exercised positive and significant influence on the business performance. A study by **Chen et al., (2010)** found significant and positive nexus between intellectual capital and corporate performance in US based healthcare industry. A research study by **Tan et al (2007)**, employing data from 150 Singapore companies, asserted a positive relationship between the proficiency of intellectual capital and financial performance measures.

2.3) Research on Intellectual Capital in India

In India, the study on intellectual capital is relatively a new phenomenon. However, earlier studies focused on knowledge management (**Thaker, 2001; Swamy, 2004**), human capital management (**Choudhury et al., 2010**), strategic environment and intellectual capital (**Deol, 2009**), innovation management (**Narvekar et al., 2006**), measurement of intellectual capital (**Kannan & Aulbur, 2004**), intellectual capital reporting and disclosure (**Bharathi, 2008; Sing et al., 2011 Bhatia & Aggarwal, 2015**) and intellectual capital and performance of firms (**Kamath, 2007, 2008 and 2010; Karam Pal and Sushila Soriya (2012); Ghosh and Mondal, 2009, Murale, 2010**). Earlier studies, employing the VAIC™ model, found mixed results.

The essential of intellectual capital varies from firm to firm, depending on the nature of industry. In India, only a limited number of research studies have been conducted to measure the performance of intellectual capital, especially financial reporting of intellectual capital on the firm's profitability and productivity of pharmaceutical sectors (**Karam Pal & Sushila Soriya, 2011**). The research in Indian sectors presented mixed findings. Intellectual capital of a company as well as the individual components of intellectual capital have to be integrated (**Sriranga Vishnu & Vijaya Kumar Gupta, 2014**). Organizations have to invest significant resources to develop their intellectual capital and there is a strategic need to enhance select types of innovative capabilities (**Tushman & O'Reilly, 1997**); (**Mohan Subramaniam, et al, 2005**).

3) Statement of the Problem

The concept of intellectual capital is a vital tool for assessing the consistent absorption of knowledge of employees by the organization. In the present situation, majority of corporates do not disclose intellectual capital, in their financial reporting for better competitiveness of the business. The problem lies with Intellectual Capital Measures. Firstly, the required information is unavailable to those outside the firm. Secondly, the information is often qualitative and based on judgments. Finally, the information cannot be translated into quantitative money values. Under these circumstances, Research in Intellectual Capital helps to understand the roots of a company's value and the measurement of the hidden factors that underlie the visible company. **Bharathi Kamath, G. (2008), Kannan, G., & Aulbur, W. G. (2004). Ghosh, S., & Mondal, A. (2009), (Choudhury, J, 2010) (Sushila Soriya and Karam Pal Narwal, 2012), (Vishnu Sriranga and Kumar Gupta Vijay, 2014)** empirically analyzed the

relationship between a relevant measure of Intellectual Capital and commonly used measures like productivity, profitability and market evaluation in India, using NSE and BSE listed companies. However, the different dimensions of IC have not yet been measured and taken into consideration for measuring their impact on financial performance of pharmaceutical companies in India. Hence this study was undertaken.

4) Significance of the Study

The research on Intellectual Capital in India is significant for a number of reasons. Firstly, India is an emerging country, that is moving towards a knowledge-based economy. The level of voluntary IC disclosure, in annual reports by Indian firms, is low. In India, only few studies investigated the link between Intellectual Capital and firm performance. Thirdly, this study fully used Indian data in the present context. Finally, the availability of published financial data for Indian Pharmaceutical Industry, from a number of databases provided the impetus for this study.

5) Objectives of the Study

The main objective of this study was to analyze the impact of intellectual capital on the performance of sample pharmaceutical companies in India.

6) Hypotheses of the Study

Based on the objective of the study, the following null hypotheses were developed and tested in this study.

NH 1: There is no relationship between intellectual capital performance and the financial performance of sample pharmaceutical firms.

NH 2: There is no impact of intellectual capital performance on the financial performance of sample pharmaceutical firms.

7) Methodology of the Study

7.1) Sample Selection

As stated earlier, the primary aim of this study was to examine the impact of intellectual capital on the financial performance of sample pharmaceutical firms in India. It was proposed to cover all the firms, coming under pharmaceutical industry in India, as on 31.12.2017 but the required data were not available for all the firms. The final selection of sample comprises was restricted to only **389** out of **776** companies in India.

7.2) Sources and Collection of Data

The sample data for this study were obtained from the audited and published annual reports of sample companies, as available at Prowess Database, maintained by the Center for Monitoring Indian Economy. The other required data were collected from reputed Websites, published research reports and journals.

7.3) Study Period

The present study covered a period from 01.01.2007 to 31.12.2017.

7.4.a) Tools to be used

The present study analyzed the impact of intellectual capital on the value of firms in India, by using the following tools.

i) Descriptive Statistics

In the present study, the values for mean and standard deviation (SD) were drawn through descriptive statistics. The nature of the variables in terms of average was arrived at by the result of mean and the percentage of variation in the mean value, using the SD.

ii) Standardized Regression

The major purpose of this present study was to measure the direction of correlation between

the intellectual capital and financial performance of the sample firm. For this purpose, the regression coefficient was used to explain the value of changes in one variable by another variable.

7.4. b) Tools to be used

Eviews 7 was used for analyzing the data.

7.4.c) Variables and Empirical models.

i) Dependent Variables

For the purpose of this study, the measurement of firm performance was considered a dependent variable in the regression equation (Hoskisson et al., 1993; Bharathi, 2008; Junior et al., 2010; Pal & Soriya, 2012; Phusavat et al., 2011 and Irina Berk, 2007). The performance of firm was measured, using the two ratios, namely, ROA (Return on Assets), and ROE (Return on Equity). In addition to this, ROS (Return on Sales) was also used to measure the firm performance.

ii) Independent Variables

In order to measure the relationship between intellectual capital and firm performance, the following equations were used.

$$VAIC = ICE + CEE$$

$$ICE = HCE + SCE$$

Where,

VAIC= Value Added Intellectual Coefficient

ICE=Intellectual Capital Efficiency

CEE= Capital Employed Efficiency

HCE= Human Capital Efficiency

SCE= Structural Capital Efficiency

a) Value Added (VA)

According to Biserka Komnenic and Dragana Pokrajic, (2012), VAIC could be used as proxy of intellectual capital, which influences

the firms' financial performance. The Value Added was used to compute the components of Value Added Intellectual Coefficient (VAIC).

$$\text{Value Added (VA)} = OP+W+D+A$$

Where,

OP = Operating Profit

W = Salaries of Employees;

D = Depreciation

A = Amortization

The Capital Employed (CE), Human Capital (HC) and Structural Capital (SC) were calculated as below.

$$b) CE = \text{Total Assets} - \text{Intangible Assets}$$

$$c) HC = \text{Compensation to Employees}$$

$$d) SC = \text{Value Added} - \text{Human Capital}$$

Capital Employed is an alternative indication of tangible resources. The Human Capital is an indirect measure of intangible resources.

$$f) \text{Capital Employed Efficiency (VACA)} = \frac{VA}{CE}$$

$$g) \text{Human Capital Efficiency (VAHU)} = \frac{VA}{HC}$$

$$h) \text{Structural Capital Efficiency (STVA)} = \frac{VA}{SC}$$

Value added intellectual coefficient is widely used in the assessment of intellectual capital (Fourati & Aers, 2013; Joshi, Cahill Sidhu, & Kansal, 2013).

i) Value Added Intellectual Coefficient (VAIC) Model

Pulic (1998) developed the method of Value Added Intellectual Coefficient (VAICTM) and Manfred Boremann (1999) improved the model further. Pulic's methodology concentrates on value-adding, value-adders, and

value-adding procedures. VAIC™ took into account the whole company as a dynamic system.

ii) Extended Value Added Intellectual Capital (E-VAIC) Model

Sriranga Vishnu & Vijaya Kumar Kupta (2014) developed E-VAIC model using, the Pulic model.

8. 1. Descriptive Statistics for the IC and Profitability of Sample Firms.

Table – 1 shows the results of descriptive statistics, for sample variables of pharmaceutical companies, during the study period from 1st January 2007 to 31st December 2017. For the purpose of this study, the independent variables included HCE, SCE and CEE while dependent variables covered ROA, ROE and ROS. Besides, the study also used one control variable, namely, Firm Size. It is clearly evident from **Table-1** that an independent variable, namely, Structural Capital Efficiency (SEE) scored the lowest mean value of 0.16178, among the six sample variables while Return on Sales (ROS) gained the highest mean value of 67.28235 during the study period. In respect of median value, the Capital Employed Efficiency (CEE) earned a low value at 0.19576 but ROS secured high value at 30.67749 during the study period. Regarding minimum value, Return On Equity (ROE) recorded the low value (minimum) at -99.743 but a control variable, namely, the firm size earned the highest value of 6.234 during the study period. According to the analysis of descriptive statistics, the Return on Sales (ROS) enjoyed a value of 316.5283, which was considered as the highest value under maximum but the Structural Capital Efficiency (SCE) achieved a low value of 0.5152 during the study period. The analysis of standard deviation clearly shows that ROS recorded the highest value of 59.55632 while Capital Employed Efficiency

(CCE) yielded a low value of 0.16334 during the study period. However, it is interesting to know that during the study period, Return On Sales (ROS) remarkably achieved the highest value, in all fields of descriptive statistics, used in this study.

8.2. Impact of Intellectual Capital on the Profitability of Pharmaceutical Industry

The impact of intellectual capital on the performance of pharmaceutical firms in India, was analyzed as follows. The relationship of variables was tested, using the regression analysis.

- a) Regression Coefficient for the ROA and IC components for Sample Indian Pharmaceutical Firms
- b) Regression Coefficient for the ROE and IC components for Sample Indian Pharmaceutical Firms.
- c) Regression Coefficient for the ROS and IC components for Sample Indian Pharmaceutical Firms.

8.2. a) Regression Coefficient for the ROA and IC components for Sample Indian Pharmaceutical Firms

The results of regression, showing relationship between ROA and IC components, during the study period from 01 January 2007 to 31 December 2017, are given in **Table-2**. It is to be noted that sample variables included HCE, SCE, CEE, ROA, ROE, ROS and Firm Size for Indian Pharmaceutical firms. Human Capital Efficiency (HCE), an independent variable, recorded a strong correlation in the first model with profitability performance of pharmaceutical firms during the study period. Another variable, namely, Return On Assets (ROA) as the performance measure, recorded a value of $\beta = 0.329893^*$, at the significant value of

0.000085, the highest regression coefficient value with IC. It is to be noted that the Capital Employed Efficiency (CEE) recorded $\beta = 0.352214^*$ and significant value at 0.000001 during the study period. At the same time, other component of intellectual capital i.e. Structural Capital Efficiency (SCE) did not record any significance under model 1, in which the firm size was also considered. The overall analysis of regression proved the fact that there was negative impact of Return on Assets (ROA), with a value ($\beta = 0.098604$), during the study period.

8.2. b) Regression Coefficient for the ROE and IC components for Sample Indian Pharmaceutical Firms

The analysis of regression for sample variables, namely, HCE, SCE, CEE, ROA, ROE, ROS and Firm Size for Indian Pharmaceutical Firms is clearly exhibited in **Table – 3**. It is clear from the Table that structural capital was found to be a strongly significant predictor, with the value of $\beta = 0.248156$, at 0.000659 significant level. It is to be noted that Return on Equity (ROE), exercised a positive relationship statistically with an independent variable (IC) in the model - 2, among other models. Another component of intellectual capital i.e. human capital efficiency (HCE) earned the value of $\beta = 0.300650$, with statistical significant level of 0.000145 during the study period. Moreover, Capital Employed Efficiency (CEE) recorded the strong correlation with value ($\beta = 0.465324$) at 0.000001 to Return on Equity. Eventually, it can be stated that all the independent variables, namely, Human Capital Efficiency, Structural Capital Efficiency and Capital Employed Efficiency recorded the expected relationship with the Return on Equity (ROE), in respect of sample pharmaceutical firms during the study period.

8.2. c) Regression Coefficient for the ROS and IC components for Sample Indian Pharmaceutical Firms

Table - 4 shows the results of relationship between sample variables, namely, HCE, SCE, CEE, ROA, ROE, ROS and Firm Size, for Indian Pharmaceutical firms during the study period. The intellectual capital recorded significant but negative relationship with profitability measure, namely, Return On Sales (ROS) with the value of $\beta = -0.341958$, at 0.000045 significant level. Thus the ROS has become the control factor in model-3 (relationship between ROS and IC). Its correlation with remaining measures of firm performance was not statistically significant. It is to be noted that variables, namely, Human Capital Efficiency (HCE) and Capital Employed Efficiency (CEE) yielded values of $\beta = 0.229827$ and $\beta = 0.398708$, at 0.005101 and 0.000008 significant level respectively. But the Structural Capital Efficiency (SCE) recorded no relationship with return on sales (ROS), due to absence of significant value.

It is clearly evident from the overall analysis of **Table-4** that Human Capital Efficiency (independent variable) reported strong correlation with all the firm performance measures (ROA, ROE and ROS), as they earned strong statistical significant values under all the three models used in this study. It was found that Capital Employed Efficiency (CEE), as a control variable, obtained statistically significant value, which was considered as the strongest predictor, under all the three models, used for examining the correlation between each intellectual capital component [i.e. Human Capital (HC) and Structural Capital (SC)] and firm performance of selected measures. It was partially confirmed that there was positive correlation between Structural Capital (SC) and Profitability (return on assets) of sample pharmaceutical firms during the study period.

The regression coefficient was strongly significant and statistically positive in its correlation with return on equity (ROE). The hypothesis, relating to the correlation between structural capital and firm performance of select pharmaceutical companies, was somewhat substantiated. The null hypothesis **NH:1**-There is no relationship between intellectual capital performance and the financial performance of sample pharmaceutical firms and the null hypothesis **NH:2**-There is no impact of intellectual capital performance on the financial performance of sample pharmaceutical firms were rejected in this study since components of intellectual capital reported significant association and did exercise impact on the financial performance of sample firms during the study period. It had been debated whether structural capital in the Value Added Intellectual Capital (VAIC) algorithm was deficient (**Biserka Komnencic and Dragana Pokrajic, 2012**). The Structural Capital Efficiency, a component of Intellectual Capital Efficiency (ICE), did earn lower value than Human Capital Efficiency (HCE), in respect of sample pharmaceutical firms during the study period.

The overall results of this research study clearly provided significant support for the framed hypotheses i.e. there has been positive relationship between intellectual capital and financial performance of sample firms. Human Capital Efficiency (HCE) was found to be the strong predictor, with a great value of regression coefficient. (**Huselid, 1995 and 1996; Minbaeva et al., 2003**). The knowledge and skills of workers, employed in sample pharmaceutical companies, clearly revealed that there was significant contribution by them for the competitive performance of sample companies.

It is generally believed that the sample pharmaceutical companies in India do not stress the importance of the progress of structural capital while compared with foreign companies in developed nations (**Kamath, 2008; Zeghal et al, 2010**). This would affect the performance of pharmaceutical firms in the long run.

9. Conclusion

The present study could help the corporate executives, policy makers and regulators, to take stern steps against non-disclosure of intellectual capital of the firm. By concentrating on the key indicators, the intellectual capital performance of the firm can be managed. There was non-availability of data on most of the variables and components of VAIC due to non-reporting by companies. The limitations associated with statistical tools, apply to this study also. All the suggestions and findings were based on sample companies only.

10. Scope for Further Research

Multi-industry data set could be carried out, to arrive at generalization. New researchers may contemplate research by employing other proxies (as new variable) to develop fresh models, to measure the intellectual capital as Indian economy is fast evolving into a skill-based one. Further study is required to observe the best influence of intellectual capital of individual pharmaceutical company on their financial performance.

Research could be undertaken on comparison of different sectors within India and comparison of Indian companies with foreign companies. Moreover, the study of this nature may be carried out, using primary data, using views of different levels of employees of sample firms.

14. References

- Abdulsalam, F., Al-Qaheri, H., & Al-Khayyat, R. (2011).** The intellectual capital performance of Kuwaiti banks: an application of VAIC model. *IBusiness*, 3(1), 88-96.
- Akhavan, P., Mehralian, G., Rasekh, H., & Sadeh, M. (2012).** The impact of intellectual capital efficiency on market value: An Empirical Study from Iranian Pharmaceutical Companies.
- Bharathi Kamath, G. (2008).** Intellectual capital and corporate performance in Indian pharmaceutical industry. *Journal of Intellectual Capital*, 9(4), 684-704.
- Bhartesh, K. R., & Bandyopadhyay, A. K. (2005).** Intellectual capital: concept and its measurement. *Finance India*, 19(4), 1365.
- Bhatia, A., & Agarwal, K. (2015).** Intellectual Capital and Financial Performance of Indian Software Industry: A Panel Data Analysis. *Pacific Business Review International*, 7(8), 33-43.
- Bollen, L., Vergauwen, P., & Schnieders, S. (2005).** Linking intellectual capital and intellectual property to company performance. *Management Decision*, 43(9), 1161-1185.
- Bontis, N. (1998).** Intellectual capital: an exploratory study that develops measures and models. *Management decision*, 36(2), 63-76.
- Bornemann, M., Knapp, A., Schneider, U., & Sixl, K.I. (1999, June).** Holistic measurement of intellectual capital. In *International Symposium Measuring and Reporting Intellectual Capital: Experiences, Issues and Prospects*. June. Amsterdam.
- Brennan, N., & Connell, B. (2000).** Intellectual capital: current issues and policy implications. *Journal of Intellectual capital*, 1(3), 206-2
- Brooking, A. (1996).** *Intellectual capital*. Cengage Learning EMEA.
- Chang, W. S., & Hsieh, J. J. (2011).** Intellectual capital and value creation-is innovation capital a missing link? *International Journal of Business and Management*, 6(2), 3.
- Chen, M. C., Cheng, S. J., & Hwang, Y. (2005).** An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance. *Journal of intellectual capital*, 6(2), 159-176.
- Clarke, M., Seng, D., & Whiting, R. H. (2011).** Intellectual capital and firm performance in Australia. *Journal of Intellectual Capital*, 12(4), 505-530.
- Dumay, J.C. (2009).** Intellectual capital measurement: a critical approach. *Journal of intellectual capital*, 10(2), 190-210.
- Edvinsson, L., & Sullivan, P. (1996).** Developing a model for managing intellectual capital. *European management journal*, 14(4), 356-364.
- Firer, S., & Mitchell Williams, S. (2003).** Intellectual capital and traditional measures of corporate performance. *Journal of intellectual capital*, 4(3), 348-360.
- Fourati, H., & Affes, H. (2013).** Intellectual Capital Investment, Stakeholders' Value, Firm Market Value and Financial Performance: The Case of Tunisia Stock Exchange. *Journal of Information & Knowledge Management*, 12(02), 1350010.
- Gan, K., & Saleh, Z. (2008).** Intellectual capital and corporate performance of technology-intensive companies: Malaysia evidence. *Asian journal of business and Accounting*, 1(1), 113-130.
- Ghosh, S., & Mondal, A. (2009).** Indian software and pharmaceutical sector IC and financial performance. *Journal of Intellectual Capital*, 10(3), 369-388.

- Gruian, C. M. (2011).** The Influence of Intellectual Capital on Romanian Companies' financial Performance. *Annales Universitatis Apulensis: Series Oeconomica*, 13(2), 260.
- Hoskisson, R. E., Hitt, M. A., Johnson, R. A., & Moesel, D. D. (1993).** Construct validity of an objective (entropy) categorical measure of diversification strategy. *Strategic management journal*, 14(3), 215-235.
- Huselid, M. A. (1995).** The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of management journal*, 38(3), 635-672.
- Joshi, M., Cahill, D., Sidhu, J., & Kansal, M. (2013).** Intellectual capital and financial performance: an evaluation of the Australian financial sector. *Journal of intellectual capital*, 14(2), 264-285.
- Kamath, G. B. (2010).** Intellectual capital efficiency analysis of Indian private sector banks. *IUP Journal of Bank Management*, 9(3), 23.
- Kannan, G., & Aulbur, W. G. (2004).** Intellectual capital: measurement effectiveness. *Journal of intellectual capital*, 5(3), 389-413.
- Kim, D. Y., & Kumar, V. (2009).** A framework for prioritization of intellectual capital indicators in R & D. *Journal of Intellectual Capital*, 10(2), 277-293.
- Komnencic, B., & Pokrajčić, D. (2012).** Intellectual capital and corporate performance of MNCs in Serbia. *Journal of Intellectual Capital*, 13(1), 106-119.
- Maditinos, D., Chatzoudes, D., Tsairidis, C., & Theriou, G. (2011).** The impact of intellectual capital on firms' market value and financial performance. *Journal of intellectual capital*, 12(1), 132-151.
- Maji, S. G., & Hazarika, P. (2016).** Does competition influence the financial soundness of banks? Evidence from the Indian banking sector. *Indian Journal of Finance*, 10(10), 27-41.
- Mehralian, G., Rajabzadeh, A., Reza Sadeh, M., & Reza Rasekh, H. (2012).** Intellectual capital and corporate performance in Iranian pharmaceutical industry. *Journal of Intellectual Capital*, 13(1), 138-158.
- Minbaeva, D., Pedersen, T., Björkman, I., Fey, C. F., & Park, H. J. (2003).** MNC knowledge transfer, subsidiary absorptive capacity, and HRM. *Journal of international business studies*, 34(6), 586-599.
- Murale, V., Jayaraj, R., & Ashrafali, A. (2010).** Impact of intellectual capital on firm performance: A resource based view using VAIC approach. *International Journal of Business Management, Economics and Information Technology*, 2(2), 283-292.
- Narvekar, R. S., & Jain, K. (2006).** A new framework to understand the technological innovation process. *Journal of intellectual Capital*, 7(2), 174-186.
- Pew Tan, H., Plowman, D., & Hancock, P. (2007).** Intellectual capital and financial returns of companies. *Journal of Intellectual capital*, 8(1), 76-95.
- Phusavat, K., Comepa, N., Sitko-Lutek, A., & Ooi, K. B. (2011).** Interrelationships between intellectual capital and performance: Empirical examination. *Industrial Management & Data Systems*, 111(6), 810-829.
- Pulic, A. (2004).** Intellectual capital—does it create or destroy value?. *Measuring business excellence*, 8(1), 62-68.
- Puntillo, P. (2009).** Intellectual capital and business performance. Evidence from Italian banking industry. *Electronic Journal of Corporate Finance*, 4(12), 97-115.
- Rehman, W.U., Chaudhary, A.R., Rehman, H.U., & Zahid, A. (2011).** Intellectual capital performance and its impact on corporate performance: An empirical evidence from MODARABA sector of Pakistan. *Australian*

- journal of business and management research*, 1(5), 8.
- Roos, G., & Roos, J. (1997).** Measuring your company's intellectual performance. *Long range planning*, 30(3), 413-426.
- Seetharaman, A., Lock Teng Low, K., & Saravanan, A. S. (2004).** Comparative justification on intellectual capital. *Journal of Intellectual Capital*, 5(4), 522-539.
- Singh Deol, H. (2009).** Strategic environment and intellectual capital of Indian banks. *Journal of Intellectual Capital*, 10(1), 109-120.
- Soriya, S., & Narwal, K. P. (2015).** Intellectual capital performance in Indian banks: a panel data analysis. *International Journal of Learning and Intellectual Capital*, 12(2), 103-121.
- Stewart, T. (1999).** Intellectual capital: The new wealth of nations. *New York: Double Day*.
- Subramaniam, M., & Youndt, M.A. (2005).** The influence of intellectual capital on the types of innovative capabilities. *Academy of Management journal*, 48(3), 450-463.
- Sveiby, K. E. (1997).** *The new organizational wealth: Managing & measuring knowledge-based assets*. Berrett-Koehler Publishers.
- Sveiby, K. E. (2010).** Towards a knowledge perspective on organisation. *Ing-Chung Huang in Service Industries Journal*.
- Swamy, M. K. (2004).** Does non-inclusion of intangible asset values lead to distortion of financial statements and mislead judicious financial decision making? Focus on environmental accounting and estimation of knowledge capital values. *Journal of Financial Management & Analysis*, 17(1), 77.
- Thaker, K. (2001).** Financial management analysis of knowledge capital and earning with reference to selected companies in India. *Journal of Financial Management & Analysis*, 14(2), 67.
- Vishnu, S., & Kumar Gupta, V. (2014).** Intellectual capital and performance of pharmaceutical firms in India. *Journal of Intellectual Capital*, 15(1), 83-99.
- Zeghal, D., & Maaloul, A. (2010).** Analysing value added as an indicator of intellectual capital and its consequences on company performance. *Journal of Intellectual capital*, 11(1), 39-60.

Table-1 : Results of Descriptive Statistics for Sample Variables HCE, SCE, CEE, ROA, ROE, ROS and Firm Size in respect of Indian Pharmaceutical Firms from 1st January 2007 to 31st December 2017

Independent Variables	n	Mean	Median	Minimum	Maximum	SD
HCE	389	1.69796	1.26142	0.043	11.2258	1.06272
SCE	389	0.16178	0.34602	-05.373	0.5162	1.57601
CEE	389	0.27515	0.19576	0.000	1.2964	0.16334
Dependent Variables						
ROA	389	4.94471	1.79506	-6.904	27.5922	7.33674
ROE	389	10.38684	9.52667	-99.743	92.2817	17.35129
ROS	389	67.28235	30.67749	6.234	316.5283	59.55632
Control Variable						
Ln Fsize	389	15.78551	15.73109	14.035	18.3369	0.19645

Source: Collected from <https://prowessiq.cmie.com> and computed using E-Views 7

Table - 2 : The results of regression analysis showing relationship between ROA and IC components for Sample Indian Pharmaceutical Firms from 1st January 2007 to 31st December 2017

Model-1	Coefficient β	Standardized regression t-value	p- value
HCE	0.329893*	4.00857	0.000085
SCE	0.109013	1.39067	0.164839
CEE	0.352214*	4.12719	0.000001
Ln Fsize	-0.098604	-1.390156	0.152854
Adj R ² =0.404 F (4.87) =16.175 *Significant value P<0.00000			

Source: Collected from <https://prowessiq.cmie.com> and computed using E-Views 7

Table-3
The results of regression analysis showing relationship between ROE and IC components for Sample Indian Pharmaceutical Firms from 1st January 2007 to 31st December 2017

Model-2	Coefficient β	Standardized regression t-value	p-value
HCE	0.300650*	3.650682	0.000145
SCE	0.248156*	3.19584	0.000659
CEE	0.465324*	5.59241	0.000001
Ln Fsize	0.070910	0.94568	0.341849
Adj R ² =0.449 F (4.87) =19.287 *Significant value P<0.00000			

Source: Collected from <https://prowessiq.cmie.com> and computed using E-Views 7

Table - 4 : The results of regression analysis showing relationship between ROS and IC components for Sample Indian Pharmaceutical Firms from 1st January 2007 to 31st December 2017

Model-3	Coefficient β	Standardized regression t-value	p- value
HCE	0.0.229827*	2.88927	0.005101
SCE	0.029818	0.26508	0.698145
CEE	0.398708*	4.69865	0.000008
Ln Fsize	-0.341958	-4.17637	0.000045
Adj R ² =0.430 F (4.87) =18.138 *Significant value P<0.00000			

Source: Collected from <https://prowessiq.cmie.com> and computed using E-Views 7



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The Influence of Intellectual Capital on Firms Performance of Indian Automobile Industry

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Abstract: *The aim of the paper was to investigate, the effect of intellectual capital on the financial performance of automobile companies in India. The required information was gathered from Indian automobile companies, between 2009 and 2018 and the (MVAIC) was employed for measuring the intellectual capital. Indian automobile firms efficiently utilized their IC. MVAIC created the effect on financial performance of sample firms. The contribution of IC to financial performance has been consistently recorded in the firms' performance of Indian automobile companies. The present research would provide the knowledge on IC to academicians and managers, by highlighting its contributions to value creation of sample firms. The results would help the stakeholders and policymakers, in emerging automobile industry in India, by properly reallocating intellectual resources for effective use.*

Keywords: *Automobile Industry, Modified Value Added Intellectual Coefficient, and Financial Performance.*

I. INTRODUCTION

In this globalized era, the growth of technologically advanced companies has increased the necessity for the use of intellectual capital. Due to the development of knowledge-driven firms, the determinants of production and value creation have moved from tangible resources (capital, plant and machinery) to knowledge-embedded workers of the firms (Vishnu and Gupta, 2014). It is essential for the firms to be aware of different components of intellectual capital that would provide value creation to firms. It is inevitable fact that traditional financial mechanism did not disclose all the factors for creating new values and report them to the stakeholders of firms. Hence, there is an urgent need for an effective and standard reporting (Jamal A. Nazari and Irene M. Herremans, 2007). Several studies have attempted to find out valid methods, so as to measure the intellectual capital of firms. Failure of traditional performance measures prompted the management to adopt a fresh approach to the contributions of intellectual capital, that directly or indirectly, influenced the financial performance of the firms (Mondal and Ghosh, 2015). Neoclassical economies

emphasized utilization of physical capital (Pek Chen Goh, 2005). At present, the intangible resources have become drivers of successful corporations. Companies, with vision, have already realized the need for measuring and managing these assets as carefully as they treat their tangible assets (Jyotirmayee Choudhury, 2010). There is an urgent need for adoption and execution of suitable manufacturing suggestion along with low cost technologies, resulting in high quality products. Hence, the need for appropriate measurement of intellectual capital is to be developed for its management and preparation of corporate reporting. Academicians and practitioners have already recommended various models, to measure IC and its components (Vishnu and Gupta, 2014). There are different methods, developed by leading researchers, to measure intellectual capital, the most familiar method is the Skandia Navigator method, created by Edvinsson and Malone (1997). Sveiby's (1997) recommended the Intangible Assets Monitor. Kaplan and Norton (1996) preferred the Balanced Scorecard approach. Pulic (2000) designed the Value-Added Intellectual Coefficient (VAIC). Clarke et al. (2011) listed out the difficulties of measuring intellectual capital such as the non-availability of required information. The main trouble with intellectual capital is that it cannot be perfectly converted into financial term (Neha Smriti and Niladri Das, 2018). Against this background, researchers have predominantly employed the VAIC model, to assess the impact of intellectual capital on the financial performance of firms (Ahangar, 2011; Bontis et al., 2000; Chen et al., 2005; Selvam Murugesan et al., 2018; Murugesan Selvam et al., 2019). Automobile industry in India has emerged as one of the rapid growing industries in India and it would become one of the global leaders in the near future. It attracted huge foreign investments in the past few years. It is to be noted that automobile exports grew by 20.78 per cent, during 2018, in India. Automobile industry in India is likely to reach 8-12 per cent hike, in its hiring, during FY19 (India Brand Equity Foundation, 2019). This study aims to examine the financial performance of sample industry, using the widely practised traditional measure of performance. This study has proposed to use four indicators like Return On Assets, Asset Turnover Ratio, Return On Equity and Return On Net Worth. The paper was designed into five sections. Section-2 deals with the literature review in connection with intellectual capital, measurement of firm performance. Section-3 discusses the sample variables and research methodology, adopted in this study. Section-4 and 5 deal with the findings of the empirical analysis and discussion of the results respectively, followed by

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limitations and future implications in the last section.

A. Problem Statement

The measurement of intellectual capital successfully, in terms of monetary values, is a tough task. The accounting standards, adhered by corporate firms across the globe, did not mandate disclosure practice about intellectual capital. In emerging countries such as India, the disclosure of intellectual capital is in their infancy stage. The quality of personnel resources has been an inevitable and proactive concern in developing countries because a skillful workforce can enhance the sustainable development of firm through its competitiveness. Against this background, this current study investigated the influence of intellectual capital on the financial performance of automobile sector in India, which is an important sector amid most capital and knowledge-required and rapid-growing sectors in India and it contributes a substantial portion of the foreign exchange income to India.

B. Need of the Study

The present study tries to fill the research gap found in the literature, by exploring the effect of intellectual capital on financial performance of automobile companies in India. The results of this research study would be fruitful for sample companies, seeking to measure the intellectual capital performance and would also offer insights into critical issues faced by sample firms. Besides, the stakeholders of sample firms could obtain valuable insights into the factors leveraging the performance of firms in the future.

C. Objective of the Study

The prime motto of this current study was to reveal the efficiency of intellectual capital of automobile industry in India and to test the correlation and regression of the scale in respect of relationship and impact, through an empirical study.

D. Null-Hypotheses of the Study

NH-1: No relationship between Modified Value Added Intellectual Coefficient and the financial performance of Automobile Industry in India

NH-2: No impact of Modified Value Added Intellectual Coefficient on the financial performance of Automobile Industry in India

II. LITERATURE REVIEW

Definitions and classifications on intellectual capital differ with each researcher. Intellectual capital is an intangible resource, with a capacity to promote values for the firms in particular and the society in general (Mouritsen et al., 2001). According to Roos et al., 1997, VAIC is quantifiable and amenable to quantitative measurements, without being tainted by any subjective assessment. Human capital is the collective value, resulting from experience and training. Structural Capital could be fragmented into two categories. The first category consists of databases, patents, copyrights and trademarks. The next category covers infrastructural resources (Keong Choong, 2008). Effective management on customer relationships of a firm is called as relational capital (Tether and Tajar, 2008). It is found from the annual

reports of the company, listed at Lahore Stock Exchange (Pakistan) that the companies had witnessed the best intellectual capital performance Makki et al. (2009). According to, Clarke et al. (2011), there was a correlation between Value-Added Intellectual Coefficient (VAIC) and firms’ performance. Bramhandkar et al. (2007) showed that the firms, with more intangible assets, performed better than those with mere quantity of intellectual capital. There is growing realization of the significance of intangible assets and its role in enhancing market values (Dzenopoljac et al., 2016). Developing countries shape their strategies taking the findings of previous studies on intellectual capital by the previous researchers. The study by Chen and Hwang (2005) examined the effect of intellectual capital on market value, and the financial performances of the sample companies in Taiwan. Morariu (2014) identified that companies in Romania, creating value by their intangible resources, did not perform well in the stock market. It is to be noted that intellectual capital enhances firm performance (Nadeem et al., 2017). Kamath (2008) found that human capital has created a tremendous impact only on ROA in the Indian pharmaceutical sector. Ranjith Appuhami (2007) found that investors’ capital gain on shares was positively affected by intellectual capital. Hong Pew Tan et al., (2007) have witnessed a significant association between intellectual capital and financial performance of sample firms through the empirical study.

III. METHOD

The investments from India and abroad have been hugely attracted by automobile sector in India. The arrival of FDI was US\$ 19.29 billion, to automobiles sector, from 2000 to 2018. Besides, adoption of innovations are perhaps essential for every firm to intensify among technology and alternative fuels. Thus, automobile industry has been playing an active role in the Indian economy. Against this background, it was decided to select NSE Nifty automobile industry as sample for this study, which has selected top 15 automobile firms. The data was collected from PROWESS. This study covered a span of ten years, from 01-01-2009 to 31-12-2018 since during period the Indian Automobile sector had achieved tremendous growth. For the purpose of analysis, MVAIC was used as follows.

$$MVAIC = HCE + SCE + CEE + RCE \dots \dots \dots (1)$$

$$\text{Value Added} = \text{Operating Profit} + \text{Employee Cost} + \text{Depreciation} + \text{Amortization}$$

$$HCE = (VA / HC)$$

$$HC = (\text{salaries employee are considered an investment})$$

$$SCE = (SC / VA)$$

$$SC = (VA - HC)$$

$$CEE = (VA / CE)$$

$$CE = \text{capital employed in the business}$$

$$RCE = (RC / VA)$$

$$RC = \text{advertising expenses and marketing expenses}$$

Dependent variables included ATO, ROA, ROE and RONW.



$$\text{Model 1: ATO} = \beta_0 + \beta_1\text{HC} + \beta_2\text{SC} + \beta_3\text{CE} + \beta_4\text{RC} + \beta_5\ln\text{FSize} + \beta_6\text{Lev} + \varepsilon \dots (2)$$

$$\text{Model 2: ROA} = \beta_0 + \beta_1\text{HC} + \beta_2\text{SC} + \beta_3\text{ICE} + \beta_4\text{RC} + \beta_5\ln\text{FSize} + \beta_6\text{Lev} + \varepsilon \dots (3)$$

$$\text{Model 3: ROE} = \beta_0 + \beta_1\text{HC} + \beta_2\text{SC} + \beta_3\text{ICE} + \beta_4\text{RC} + \beta_5\ln\text{FSize} + \beta_6\text{Lev} + \varepsilon \dots (4)$$

$$\text{Model 4: RONW} = \beta_0 + \beta_1\text{HC} + \beta_2\text{SC} + \beta_3\text{CE} + \beta_4\text{RC} + \beta_5\ln\text{FSize} + \beta_6\text{Lev} + \varepsilon \dots (5)$$

V. RESULTS AND DISCUSSION

The results of Normality test, for intellectual capital performance and firm performance of the Indian Automobile Industry, are provided in **Table-1**. It is noted that HCE, SCE, CEE, RCE and MVAIC were used as independent variables, to assess the intellectual capital performance while ROA, ROE, RONW and ATO were used as dependent variables, to understand the nature of firm performance of Automobile Industry in India while Size and Leverage were considered as control variables, during the study period. The descriptive statistics, showing the results of Indian Automobile Industry, revealed that the value generated by intellectual capital performance variables, moved, during the study period, between minimum values of 1.340 (HCE) 0.738 (SCE) 0.489 (CEE) 0.001 (RCE) 2.568 (MVAIC) -1.70 (ROA) -28.38 (ROE) -60.310 (RONW) 0.011 (ATO) 6.552 (Size) and 0.330 (Leverage) to the maximum values of 2.354 (HCE) 0.905 (SCE) 1.141 (CEE) 0.007 (RCE) 4.232 (MVAIC) 0.70 (ROA) 24.25 (ROE) 25.700 (RONW) 0.047 (ATO) 1.800 (Size) and 2.360 (Leverage) during the study period. Simultaneously, the mean values of HCE, SCE, CEE, RCE, MVAIC, ROA, ROE, RONW, ATO, Size, Leverage were at 2.050, 0.864, 0.714, 0.002, 3.630, -0.212, 3.435, 8.124, 0.032, 1346, 1.376 and standard deviation values of HCE, SCE, CEE, RCE, MVAIC, ROA, ROE, RONW, ATO, Size, Leverage were at 0.317, 0.051, 0.193, 0.001, 0.463, 0.866, 17.115, 30.505, 0.011, 4.048, 0.735 accordingly. It is clear the highest mean value was recorded by HCE (2.050) followed by SCE (0.864) CEE (0.714) and RCE (0.002), for Indian Automobile Industry. It is to be noted from the mean values that Capital Employed Efficiency recorded a value of 0.714, lesser than HCE. In other words, CEE of Indian Automobile Industry was unable to create more value, from its physical assets, as HCE did.

The results of correlation analysis, for intellectual capital performance and firm performance of the Automobile Industry in India, during the study period, are displayed in **Table-2**. The analysis of Pearson Correlation Matrix reveals that values of correlation coefficient were at 0.991 for SCE with HCE, 0.915 for MVAIC with HCE, 0.927 for MVAIC with SCE, 0.649 for MVAIC with CEE, 0.905 for ROA with HCE, 0.884 for ROA-SCE, 0.884 for ROA-MVAIC, 0.789 for ROE with HCE, 0.794 for ROE with SCE, 0.839 for ROE with MVAIC, 0.832 for ROE with ROA, 0.886 for RONW with HCE, 0.865 for RONW-SCE, 0.868 for RONW-MVAIC, -0.635 for Size with HCE, -0.614 for Size with SCE, -0.654 for Size with CEE, -0.777 for Size with MVAIC, -0.826 for Size with ROA, -0.847 for Size with ROE, -0.854 for Size with RONW, 0.627 for Size with ATO, 0.820 for Leverage with HCE, 0.789 for Leverage with SCE, 0.694 for Leverage with MVAIC, 0.881 for Leverage with ROA, 0.804 for Leverage with ROE, 0.908 for Leverage with

RONW, -0.765 for Leverage with Size. It is clear that twenty one sets (SCE-HCE, MVAIC-HCE, MVAIC-SCE, ROA-HCE, ROA-SCE, ROA-MVAIC, ROE-HCE, ROE-SCE, ROE-MVAIC, ROE-ROA, RONW-HCE, RONW-SCE, RONW-MVAIC, RONW-ROA, RONW-ROE, Leverage-HCE, Leverage-SCE, Leverage-MVAIC, Leverage-ROA, Leverage-ROE, Leverage-RONW, Leverage-Size) had recorded significant relationship positively, at 99% confidence level (i.e., p value was less than 0.01). Some sets of sample variables, namely, MVAIC-CEE Size-ATO and Leverage- MVAIC registered positive relationship, at 95% confidence level (i.e., p value was less than 0.05). It is to be noted that a variable set, namely, Size with HCE, SCE, CEE and MVAIC, ROA, ROE and RONW witnessed negative association at 95 and 99 % confidence level respectively. It is found that Leverage was also negatively associated with Size at 99 % confidence level. Hence the null hypothesis (NH-2), namely, **NH-1: No Relationship between Modified Value Added Intellectual Coefficient and the financial performance of Automobile Industry in India**, was partially rejected.

Table-3 shows the outcome of regression analysis, for intellectual capital performance and firm performance of the Automobile Industry in India, during the study period. It is clear that coefficient values of HCE, SCE, CEE, RCE, MVAIC, Size and Leverage of ROA were at 0.905, -2.233, -1.293 0.291, 3.763, -0.365 and 0.603 with the t-statistic values of 6.369 -2.461, -2.923, 2914, 3,356, -1.624 and 2.682 in respect of Automobile Industry in India. Regarding ROE, coefficient values were at 3.847 (HCE) -1.129 (SCE) -0.509 (CEE) 0.418 (RCE) 2.173 (MVAIC) -0.559 (Size) 0.377 (Leverage) with the t-statistic values of 3.847, -0.800 -0.739, 2.695, 1.246, -2.155 and 1.453 respectively. For RONW, the coefficient values were recorded by HCE at 0.886, SCE at -2.277, CEE at -1.300, RCE at 0.291, MVAIC at 3.792, Size at -0.384 and Leverage at 0.614 with the t-statistic values of 5.719, -1.999, -2.340, 2.694, -2.066 and 3.300. In case of ATO, coefficient values were recorded for HCE (-0.434) SCE (5.625) CEE (2.622) RCE (-0.011) MVAIC (-7.388) Size (0.643) Leverage (0.021), with the t-statistic values of -1.447, 2.256, 2.157, -0.040, -2.398 1.503 and 0.049 respectively. Further, the probability values of significantly influenced variables (ROA) were at 0.000 for HCE, 0.027 for RCE, 0.015 for MVAIC and 0.603 for Leverage. Considering ROE, the p-values were at 0.004 for HCE, 0.036 for RCE. RONW was positively caused by the variables namely, SCE (0.093) RCE (0.059) MVAIC (0.036) and Leverage (0.011). SCE and CEE positively impacted the value of the bank (ATO), at the p-value of 0.065 and 0.074, with the confidence level of 95% and 99%, during the study period. SCE negatively influenced ROA and RONW, followed by Size and the CEE also had reported negative impact on RONW. ATO was influenced negatively by MVAIC. It is clear that RCE, known as the proxy of relational capital, acted a role in creation of profitability (financial performance) of sample firms Automobile Industry, as shown in the Table. It is to be noted that Adjusted R-squared value was used to test the fitness of the regression model, with values of 0.909 for ROA, 0.780 for ROE, 0.857 for

RONW and 0.313 for ATO. The test for measuring the impact of intellectual capital on firm performance of Indian Automobile Industry revealed that the regression model was perfectly fitted. Hence, the null hypothesis “NH-2 – No impact of Modified Value Added Intellectual Coefficient on the financial performance of Automobile Industry in India” was rejected.

D. Findings

The MVAIC recorded a value of 3.834, which implied that Indian Automobile Industry produced an average value of Indian rupee 3.834, for each one Indian rupee spent by firms on intangible assets. The total value of RONW recorded the highest mean value among the sample variables like ROA, ROE and ATO, indicating that the Indian Automobile Industry mobilized high profits. ROE also recorded a high mean value, next to RONW, creating a higher profit. It is shocking to note, from the results of statistics that ROA of the sample firms had recorded the lowest mean values, revealing that the Indian Automobile Industry faced difficulties in earning profit over its ROA, unlike RCE, which reported the lowest standard deviation value, causing low variation in relational capital among other variables. On high standard deviation, it is inferred that RONW recorded high value. It is to be noted that there was high variation in the return on net worth, during the study period.

E. Suggestions

It is significant that these findings are important for different stakeholders because it would make them realize the significance of human capital, and necessary strategies, regarding training and development of employees, working in Automobile Industry in India. The managers of sample firms should use the findings, to increase the investments on intangible assets (intellectual capital), to build sustainable and competitive advantages. Moreover, rating agencies may learn from the results, to measure the efficiency of human capital also for the sample firms of automobile industry. The policy makers in India, should provide tax respite and incentives, to encourage automobile industry.

F. Limitations

For the purpose of this study, only two control variables, namely (Size and Leverage), were used due to lack of sufficient data available with the database.

V. CONCLUSION

The very purpose of the research was to examine, the effect of intellectual capital and its components on the financial performance of automobile industry in India, during the study period. The overall results clearly showed that the increase in values of all the sub components of MVAIC, except capital employed and relational capital, drove the increase in value of ROA, ROE and RONW. It is found that the relational capital did not contribute to firm performance in automobile industry in India, during the study period. A control variable (Size) decreased the values of financial performance (ROA, ROE, RONW, ATO) of sample firms. Modified Intellectual capital performance of automobile industry in India was associated with the values of the sample firms. The financial performance variables (ROA and

RONW) of sample firms, were greatly influenced by MVAIC, during the study period.

A. Scope for further research

The finding of this study may be useful to the business people, belonging to service industries (Information Technology, Pharmaceutical, and Financial Services, including Banking). Hence, future research could be conducted, using proxy variables with firm performance variables. Other measurement models like E-VAIC can be employed, to provide consistent results.

REFERENCES

1. Ahangar, (2011). The relationship between intellectual capital and financial performance: An empirical investigation in an Iranian company. *African journal of business management*, 5(1), 88-95.
2. Appuhami, (2007). The impact of intellectual capital on investors' capital gains on shares: an empirical investigation of Thai banking, finance and insurance sector. *International Management Review*, 3(2), 14-25.
3. Bharathi Kamath, (2008). Intellectual capital and corporate performance in Indian pharmaceutical industry. *Journal of Intellectual Capital*, 9(4), 684-704.
4. Bollen, Vergauwen, and Schnieders, (2005). Linking intellectual capital and intellectual property to company performance. *Management Decision*, 43(9), 1161-1185.
5. Bramhandkar, Erickson, and Applebee, (2007). Intellectual capital and organizational performance: An empirical study of the pharmaceutical industry. In *ECKM2007-Proceedings of the 8th European Conference on Knowledge Management: ECKM* (p. 147). Academic Conferences Limited.
6. Canibano, Garcia-Ayuso and Sanchez, (1999a), “The value relevance and managerial implications of intangibles: a literature review”, paper presented at the International Symposium Measuring and Reporting Intellectual Capital: Experiences, Issues and Prospects, June, Amsterdam.
7. Chen, (2005). Intellectual capital performance of commercial banks in Malaysia. *Journal of intellectual capital*, 6(3), 385-396.
8. Chen Cheng, and Hwang, (2005). An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance. *Journal of intellectual capital*, 6(2), 159-176.
9. Choudhury, (2010). Performance impact of intellectual capital: a study of Indian IT sector. *International journal of business and management*, 5(9), 72
10. Clarke, Seng and Whiting, (2011). Intellectual capital and firm performance in Australia. *Journal of Intellectual Capital*, 12(4), 505-530.
11. Dženopoljac, Janošević, and Bontis, (2016). Intellectual capital and financial performance in the Serbian ICT industry. *Journal of Intellectual Capital*, 17(2), 373-396.
12. Edvinsson and Malone, (1997), *Intellectual Capital: The Proven Way to Establish Your Company's Real Value by Measuring Its Hidden Brain Power*, Piatkus, London.
13. Kaplan and David, (1996). Norton. 1996. *The balanced scorecard: translating strategy into action*.
14. Keong Choong, (2008). Intellectual capital: definitions, categorization and reporting models. *Journal of intellectual capital*, 9(4), 609-638.
15. Makki and Lodhi (2009). Impact of intellectual capital on return on investment in Pakistani corporate sector. *Australian Journal of Basic and Applied Sciences*, 3(3), 2995-3007.
16. Maria Morariu, (2014). Intellectual capital performance in the case of Romanian public companies. *Journal of Intellectual Capital*, 15(3), 392-410.
17. Mondal and Ghosh, (2015). A Study on Effectiveness of Investment in Intellectual Capital of Indian Knowledge Companies. *International Journal of Business Analytics and Intelligence*, 3(2), 65.
18. Mouritsen, Larsen and Bukh (2001). Intellectual capital and the 'capable firm': narrating, visualising and numbering for managing knowledge. *Accounting, organizations and society*, 26(7-8), 735-762.
19. Murugesan Vadivel Chinnadurai and Dhamotharan, (2018). Intellectual Capital: Its Effect on Financial Performance of Indian Private Sector Banks.

20. Nadeem, Gan, and Nguyen, (2017). Does intellectual capital efficiency improve firm performance in BRICS economies? A dynamic panel estimation. *Measuring Business Excellence*, 21(1), 65-85.
21. Nazari, and Herremans, (2007). Extended VAIC model: measuring intellectual capital components. *Journal of Intellectual Capital*, 8(4), 595-609.
22. Pew Tan, Plowman, and Hancock, (2007). Intellectual capital and financial returns of companies. *Journal of Intellectual capital*, 8(1), 76-95.
23. Roos, Edvinsson, and Dragonetti, (1997). Intellectual capital: *Navigating the new business landscape*. Springer.
24. Smriti and Das, (2018). The impact of intellectual capital on firm performance: a study of Indian firms listed in COSPI. *Journal of Intellectual Capital*, 19(5), 935-964.
25. Steward, Intellectual Capital, Bantam Doubleday Dell Publishing Group, New York 1997
26. Sveiby, (1997), The intangible asset monitor, *Journal of Human Resource Costing and Accounting*, Vol. 2 No. 1, pp. 73-97.
27. Tether and Tajar, (2008). The organisational-cooperation mode of innovation and its prominence amongst European service firms. *Research policy*, 37(4), 720-739.
28. Vishnu and Kumar Gupta, (2014). Intellectual capital and performance of pharmaceutical firms in India. *Journal of Intellectual Capital*, 15(1), 83-99.

Table-1: Results of Descriptive Statistics for Intellectual Capital Performance and Firms' Financial Performance of Automobile Industry in India

Independent Variables	N	Minimum	Maximum	Mean	S.D
HCE	15	1.340	2.354	2.050	0.317
SCE	15	0.738	0.905	0.864	0.051
CEE	15	0.489	1.141	0.714	0.193
RCE	15	0.001	0.007	0.002	0.001
MVAIC	15	2.568	4.232	3.630	0.463
Dependent Variables					
ROA	15	-1.70	0.70	-0.212	0.866
ROE	15	-28.38	24.25	3.435	17.115
RONW	15	-60.310	25.700	8.124	30.505
ATO	15	0.011	0.047	0.032	0.011
Control Variables					
Size	15	6.552	1.800	1.346	4.048
Leverage	15	0.330	2.360	1.376	0.735

Source: Data extracted from CMIE ProwessIQ database and computed using IBM SPSS 16.0

The Influence Of Intellectual Capital On Firms Performance Of Indian Automobile Industry

Table-2: Results of Relationship between Intellectual Capital Performance and Firms' Financial Performance of Automobile Industry in India

Variables	HCE	SCE	CEE	RCE	MVAIC	ROA	ROE	RONW	ATO	Size	Leverage
HCE Pearson Correlation Sig. (2-tailed)	1 0.000										
SCE Pearson Correlation Sig. (2-tailed)	0.991*** 0.000	1 0.000									
CEE Pearson Correlation Sig. (2-tailed)	0.286 0.393	0.328 0.324	1 0.000								
RCE Pearson Correlation Sig. (2-tailed)	0.158 0.643	0.182 0.592	-0.070 0.838	1 0.000							
MVAIC Pearson Correlation Sig. (2-tailed)	0.915*** 0.000	0.927*** 0.000	0.649** 0.031	0.103 0.764	1 0.000						
ROA Pearson Correlation Sig. (2-tailed)	0.905*** 0.000	0.884*** 0.000	0.396 0.228	0.361 0.275	0.884*** 0.000	1 0.000					
ROE Pearson Correlation Sig. (2-tailed)	0.789*** 0.004	0.794*** 0.004	0.501 0.116	0.472 0.143	0.839*** 0.001	0.832*** 0.001	1 0.000				
RONW Pearson Correlation Sig. (2-tailed)	0.886*** 0.000	0.865*** 0.001	0.393 0.231	0.357 0.281	0.868*** 0.001	0.992*** 0.000	0.835*** 0.001	1 0.000			
ATO Pearson Correlation Sig. (2-tailed)	-0.434 0.182	-0.365 0.269	-0.326 0.328	0.070 0.837	-0.474 0.141	-0.418 0.201	-0.552* 0.078	-0.441 0.174	1 0.000		
Size Pearson Correlation Sig. (2-tailed)	-0.635** 0.036	-0.614** 0.044	-0.654** 0.029	-0.322 0.334	-0.777*** 0.005	-0.826*** 0.002	-0.847*** 0.001	-0.854*** 0.001	0.627** 0.039	1 0.000	
Leverage Pearson Correlation Sig. (2-tailed)	0.820*** 0.002	0.789*** 0.004	0.103 0.764	0.438 0.178	0.694** 0.018	0.881*** 0.000	0.804*** 0.003	0.908*** 0.000	-0.470 0.144	-0.765*** 0.006	1 0.000
N	15	15	15	15	15	15	15	15	15	15	15

Source: Data extracted from CMIE ProwessIQ database and computed using IBM SPSS 16.0

Note: * indicates statistically significant.



Table-3: Results for the Impact of Intellectual Capital on Firm Performance of Automobile Industry in India.

Variables	ROA	ROE	RONW	ATO
Constant	0.181 - (1.511)	0.788 - (0.282)	0.256 - (1.255)	0.099 - (-1.954)
HCE	0.000*** 0.905 (6.369)	0.004*** 0.789 (3.847)	0.000*** 0.886 (5.719)	0.182 -0.434 (-1.447)
SCE	0.049** -2.233 (-2.461)	0.454 -1.129 (-0.800)	0.093* -2.277 (-1.999)	0.065* 5.625 (2.256)
CEE	0.027** -1.293 (-2.923)	0.488 -0.509 (-0.739)	0.058** -1.300 (-2.340)	0.074* 2.622 (2.157)
RCE	0.027** 0.291 (2.914)	0.036** 0.418 (2.695)	0.059** 0.291 (2.323)	0.970 -0.011 (-0.040)
MVAIC	0.015*** 3.763 (3.356)	0.259 2.173 (1.246)	0.036** 3.792 (2.694)	0.053** -7.388 (-2.398)
Size	0.143 -0.365 (-1.624)	0.063* -0.559 (-2.155)	0.073* -0.384 (-2.066)	0.171 0.643 (1.503)
Lev	0.028** 0.603 (2.686)	0.184 0.377 (1.453)	0.011*** 0.614 (3.300)	0.962 0.021 (0.049)
Adjust R²	0.909	0.780	0.857	0.313
N	15	15	15	15

Source: Data extracted from CMIE ProwessIQ database and computed using IBM SPSS 16.0

Note: * indicates statistically significant.