CHAPTER ONE
INTRODUCTION

1.1 BACKGROUND OF THE STUDY

In recent times, a new high technology, information, and innovation based environment has gradually taken the centre stage in the global economy particularly in the service sector. The service sector has responded appropriately to the introduction of these new technologies and innovation. Under this new dispensation, knowledge, ability, skills, experience and attitude of workers, assume greater significance even as organizations use intellectual capital as a critical resource to enhance their performances (Ekwe, 2013).

In modern economics, Intellectual Capital (IC) is described as an intangible asset which can be used as a source of sustainable competitive advantage. However, intellectual capital components have to interact in themselves to create value. Intellectual Capital consists of all assets that are not shown in the company's statement of financial position and it includes those intangible assets such as trademarks, patents and human advantages, structure and the communication environment. Intangible assets of a company guarantee to ensure competitiveness and sustainable development (Jafari, 2013).

Intellectual Capital (IC) can be defined as the knowledge based equity of organization which has attracted during the last decade, a significant amount of practical interest (Campisi & Costa, 2008; Petty & Guthrie, 2000). Although, the importance of Intellectual Capital (IC) is constantly increasing, many organizations face problems with its management, mostly due to measurement difficulties (Andrikopoulos, 2005; Kim, Kumar & Kumar 2009; Nazari & Herremans, 2007).

Intellectual Capital represents a collection of intangible assets also known as knowledge assets. These assets distinguished from physical assets such as property, plant and equipment (PPE) or stock and financial assets such as receivable, investment and cash have become increasingly important as key resources of firms in their competitive strategies. In today's complex and turbulent business environment, companies are required to be flexible, highly innovative and able to develop pro-active strategic approaches. To reach these aims, many organizations have realized that knowledge (underlying capabilities) represents the most important factor in creating economic value that underpins a firm's value creation performance (Marr, Schiuma & Neely, 2002).

Paul (2009) argues that in the past, businesses primarily invested in the tangible means of production, for example, buildings and machines. The value of a company was at least somewhat related to the value of its physical capital. But now businesses increasingly invest in intangibles. The intangibility of a company's most important asset makes it extremely hard to figure out what that company really worth. That may partly explain the nauseating volatility of stock prices (New York Times, 2000).

Paul's observation reflects the phenomenal growth in the market values of some knowledge driven internet companies in the second half of the 1990s and the subsequent crash of 1999-2000. The ascent of stock markets around the world driven by dotcom companies was as spectacular as the crash. This experience is a potent reminder of the perils of overvaluation of knowledge rich companies. Bio-technology companies that sought to exploit new advances in bio sciences to create new drugs and cures had been similarly overvalued only to experience dramatic falls in their values.

The merger of American Online (AOL) the internet service with a more mature media company Time Warner (TW) in 2001 provides a cautionary tale in valuing knowledge-based companies. When the friendly "merger of equals" was announced in January 2000, the combined market capitalization of the two entities was $288bn. When the deal was consummated in January 2001 it was $205bn. By the middle of 2003, the merged firm, AOL Time Warner, was valued at just $74bn. 74% of the value of the two firms had been wiped out. While part of the decline was due to the general decline of stock markets, given the size of the firm, the stock market decline itself is partly due to the value decline of AOLTW. An analysis of the valuation metrics used at the time of merger announcement and merger consummation shows that they were based on extraordinary and widely exuberant optimism (Sudarsanam, Sorwar & Marr, 2003).

It is starkly apparent from cases like the AOL Time Warner merger that tools for valuation of knowledge–based companies are woefully inadequate. The traditional value tools such as relative valuation multiples such as Price Earnings Ratio (PER) or enterprise value to Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) do not fully capture how intellectual capital contributes to firm value. Although the discounted cash flow (DCF) represents a more sophisticated approach to evaluation than one based on multiples, it does not adequately or correctly address the complexities that intellectual capital-based competitive strategies engender. For example, managerial flexibility in expanding, abandoning, or deferring investments while awaiting new information is an important strand of corporate strategy but hardly incorporated in the traditional DCF

model. These models make assumptions about the future, which are far too static or only hazily mapped out.

Anghel (2008) argues that in the age of competitiveness, knowledge assets provide advantages to managers, investors and other users of knowledge. Consequently, knowledge and information are the common components in most of previous researches on Intellectual Capital (IC). In addition, Drucker (2003) divided the development of knowledge economy into three main categories. These include (1) Industrial Revolution (1750-1880), knowledge was devoted to manufacture tools and products, (2) Production Revolution (1880-1956), knowledge had an improved role in the process of employment and (3) Management Revolution (after 1945) knowledge was the final destination.

Mangena, Pik and Li (2010) discussed other benefits of reporting IC information, such as increase operational efficiency, create motivation, improve moral reasoning among employees, establish honesty with stakeholders, employ value market tool and increase external reputation.

In the simplest words, IC is the difference between market value and intangible assets in a company and is composed of some details such as customers' loyalty, trademarks, professional skills, experience, goodwill, technology, process and other intangible value (Tayles, Pike & Sofian, 2007). Edvinsson and Sullivan (1996) are in agreement that, market value could be divided into financial capital and intellectual capital. Edvinsson and Sullivan believed that IC is knowledge that creates value for a company. Stewart (1999) categorized IC into four dimensions and noted that they are useful to create value for a company and further stressed that, knowledge, information, intellectual property and experience are IC components. Sullivan (2000) believed that human capital and intellectual assets are subdivision of IC and the composition of IC includes knowledge, innovations and tradition. Furthermore, in this structure, people, expertise and knowledge are considered as parts of human capital and they are coincident non-financial assets. Financial assets are a section of intellectual assets that can be owned by stockholders as a "right of ownership". Thus, Sullvian (2000) shows that non-financial assets should be transformed into financial (physical assets) such as computer software and patent.

Generally, the market value of companies is greater than their book value. This is due to lack of fully reflecting the value of intellectual capital and intangible assets in the

statement of financial position and thus causes the financial statements lose utility value and effectiveness of their information. This leads to generate interest issues related to intellectual capital (Jafari, 2013).

The increasing gap observed between market value and book value of many companies has drawn attention towards investigating the value missing from financial statements. According to various scholars, IC is considered to be the hidden value that escapes financial statement and the one that leads organizations to obtain a competitive advantage (Chen, Cheng, & Hwang, 2005; Edvinsson & Malone, 1997; Lev & Radhakrishan, 2003; Lev & Zarowin, 1999; Lev, 2001; Ruta, 2009; Yang & Lin, 2009). Additionally, it is believed that the limitations of financial statements in precisely explaining firm value reveal the fact that, nowadays, the source of economic value is the creation of IC and no longer the production of materials goods (Chen, Cheng, & Hwang, 2005).

The widespread acceptance of IC as a source of competitive advantage led to the development of appropriate methods of measurement, since traditional financial tools are not able to capture all of its aspects (Campisi & Costa, 2008; Nazari & Herremans, 2007). Pulic (2000a, 2000b) developed the most popular method that measures the efficiency of value added by corporate intellectual ability (Value Added Intellectual Coefficient – VAIC). VAIC measures the efficiency of three types of inputs: physical and financial capital, human capital, and structural capital (Firer & Williams, 2003; Montequin, Fernandez, Cabal & Gutierrez, 2006; Pulic, 2000a, 2000b).

1.2 STATEMENT OF PROBLEM

Increasing attention to firms' financial performance led the researcher to carry out this study on identification of unreported elements of financial statements. One of the factors affecting firms' financial performance but is not reported in financial statements is intellectual capital.

The gap observed between market value and book value of firms in Nigeria has drawn the researcher's attention towards investigating the value missing from financial statements. Intellectual capital (IC) is therefore considered to be the hidden value that escapes financial statements and the value that leads organizations to obtain a competitive advantage (Chen, Cheng & Hwang, 2005; Edvinsson & Malone, 1997; Lev & Radhakrishan, 2003; Lev & Zarowin, 1999; Lev 2001, Ruta 2009; Yang & Lin, 2009). In addition, it is believed that the limitations of financial statements in precisely explaining a

firm's real value reveal the fact that, nowadays, the source of economic value is the creation of intellectual capital and no longer the production of material or physical goods (Chen, Cheng & Hwang 2005). If intellectual capital does not exist in organizations, then why does stock price react to changes in management? Obviously, investors and financial markets attach value to the skills and expertise of Chief Executive Officers and other top management (Bontis, 2001). Recent contributions have suggested that knowledge and information are actually subject to increasing returns, as opposed to the decreasing returns typical of the traditional resources (Bontis, Dragonetti, Jacobsen, & Roos, 1999). If this is true, then knowledge and information become even more attractive to companies than before. Having a good base of knowledge means that a company can in future years start leveraging that base to create even more knowledge thus increasing its advantage on the competitors (Arthur, 1996).

On a theoretical level, distinguished authors argue that Intellectual Capital is the value driver of all companies (Stewart, 1997), that knowledge management is a core organizational issue (Nonaka & Takeuchi, 1995) and that organizational knowledge is at the crux of every sustainable competitive advantage (Bontis, 1999). On the other hand, empirical evidence are inconclusive and far from achieving a solid scientific consensus. The study of Riahi-Belkaoui (2003) found a positive relationship between intellectual capital and financial performance, while Bontis, Chua and Richardson (2000) concluded that, regardless of industry, the development of structural capital has a positive impact on business performance. On the other hand, Firer and Williams (2003) examined the relationship between intellectual capital and traditional measures of firm performance (Return on Asset, Return on Equity) and failed to find any relationship, while Chen, Cheng and Hwang (2005), using the same methodology, concluded that intellectual capital has significant impact on profitability. Similar to the concept of Skandia Navigator, Bontis, William and Richardson, (2000), Pulic (2000a, 2000b) depicted firm's market value as created by capital employed and intellectual capital which consists of human capital and structural capital.

Nowadays firms face stronger competition than it was in the past and enhanced financial performance is the main objective of every business entity. Consequently, every organization wishes to increase its financial performance by adopting different approaches and strategies that can lead to enhanced financial performance. To increase the financial

performance, organizations normally focus on their physical assets without adequate attention to their Intellectual Capital but their Intellectual Capital inefficiency result in a decrease in their financial performance. Consequently, the desired levels of financial performance are never achieved. Hall (1992) states that the benefits of managing Intellectual Capital are that it increases the market value of organization, it improves better communication, optimal utilization of potential, increase value creation ability, better image, satisfy customers, value creating human capital, motivating employees, most efficient business processes. Managing the intellectual capital also increases the financial performance of the organization. There is therefore, the need to empirically investigate whether Intellectual Capital can be used by firms to enhance their competitive edge or advantage.

Some studies on the relationship of Intellectual Capital and financial performance in some developed nations, agree that intellectual capital relates positively and significantly with organizational financial performance and as such accord organizations competitive edge over others (Bornemann 1999, Brenna and Connell 2000, Kamath 2010); others posit that there are no relationships between Intellectual Capital and organizational performance and that physical assets still maintain the key determinants of organizational financial performance (Wright, Kacmar, McMahan & DeLeeuw, 1995; Gottfredson, 1997; Jensen 1998).

Several studies have been carried out on intellectual capital and firm's financial performance mainly in other countries, whose findings and results may not be palatable with the Nigerian environment, hence, the need for this study, in order to build on the findings of previous researches and probably establishing new empirical findings.

1.3 OBJECTIVES OF THE STUDY

The main objective of this study is to establish the extent to which Intellectual Capital (IC) impacts financial performance.

Specifically this study will:

1. Determine the extent to which Value Added Intellectual Coefficient (VAIC) indices {that is, Capital Employed Efficiency (CEE), Human Capital Efficiency (HCE) and Structural Capital Efficiency (SCE)} affect the Market-to-Book Value (MBV) ratio of quoted service firms in Nigeria.

2. Determine the extent to which Value Added Intellectual Coefficient (VAIC) indices {that is, Capital Employed Efficiency (CEE), Human Capital Efficiency (HCE) and Structural Capital Efficiency (SCE)} affect the Return on Assets (ROA) of quoted service firms in Nigeria.
3. Ascertain the extent to which Value Added Intellectual Coefficient (VAIC) indices {that is, Capital Employed Efficiency (CEE), Human Capital Efficiency (HCE) and Structural Capital Efficiency (SCE)} influence the Return on Equity (ROE) of quoted service firms in Nigeria.
4. Ascertain the extent to which Value Added Intellectual Coefficient (VAIC) indices {that is, Capital Employed Efficiency (CEE), Human Capital Efficiency (HCE) and Structural Capital Efficiency (SCE)} affect the Employee Productivity (EP) of quoted service firms in Nigeria.
5. Determine the extent to which Value Added Intellectual Coefficient (VAIC) indices {that is, Capital Employed Efficiency (CEE), Human Capital Efficiency (HCE) and Structural Capital Efficiency (SCE)} affect the Growth in Revenue (GR) of quoted service firms in Nigeria.

1.4 RESEARCH QUESTIONS

In line with the objectives of the study, the following research questions shall guide discussions in this work:

1. To what extent can the Value Added Intellectual Coefficient indices {that is, Capital Employed Efficiency (CEE), Human Capital Efficiency (HCE) and Structural Capital Efficiency (SCE)} of a quoted service company affect the company's Market-to-Book Value (MBV) ratio?
2. To what extent can the Value Added Intellectual Coefficient indices {that is, Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE)} of a quoted service company affect the company's Return on Assets (ROA)?
3. How can the Value Added Intellectual Coefficient indices {that is, Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE)} of a quoted service company affect the company's Return on Equity (ROE)?
4. How can the Value Added intellectual Coefficient indices {that is, Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed

Efficiency (CEE)} of a quoted service company affect the Employee Productivity (EP) of the company?

5. To what extent can the Value Added Intellectual Coefficient indices {that is, Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE)} of a quoted service company influence the company's Growth in Revenue (GR)?

1.5 RESEARCH HYPOTHESES

In line with the research questions above, the researchers hypothesized the following null hypotheses:

H_{o1}: Value Added Intellectual Coefficient indices of a quoted service company do not significantly affect the company's Market-to-Book Value (MBV) Ratio.

H_{o2}: Value Added Intellectual Coefficient indices of a quoted service company do not significantly affect the company's Return on Assets (ROA).

H_{o3}: Value Added Intellectual Coefficient indices of a quoted service company do not significantly affect the company's Return on Equity (ROE).

H_{o4}: Value Added Intellectual Coefficient indices of a quoted service company do not significantly affect the Employee Productivity (EP) of the company.

H_{o5}: Value Added Intellectual Coefficient indices of a quoted service company do not significantly affect the company's Growth in Revenue (GR).

1.6 SIGNIFICANCE OF THE STUDY

The wide increase in the number of service companies globally where personnel knowledge, skills, expertise and experience are the key to their success makes the reporting of intellectual capital a necessity.

Organizations do report on capital and other assets in their financial reports but reporting nothing regarding intellectual capital except as a charge in their income statements. Money spent on hiring, recruiting, training and developing human resources are expenses rather than capitalized. Nowadays, the amount invested by organizations on intellectual capital is very huge and calls for a better way of reporting. The financial information contained in the financial statements of organizations is considered inadequate because of many reasons, which inability to account and report human resources is one (Abubakar, 2011).

The concept of intellectual capital is relatively a virgin area in Accounting and yet to be applied in Nigeria (Kodwani & Tiwari, 2007). This study looks at the possible application of the concept in the financial reporting of the Nigerian quoted service companies. This study is expected to assist the Financial Reporting Council in Nigeria (formerly Nigerian Accounting Standard Board) to adopt a standard measure for valuing Intellectual Capital for inclusion in the financial statements of organizations. Adoption of a standard way of accounting for intellectual capital will increase the acceptance and application of the system by reporting organizations.

It is also expected that this study will assist the various users of financial statements in their analysis and interpretation of service companies' financial statements for informed decision making.

This study would be of invaluable use to academia/researchers in the course of their research works.

Moreso, this study can assist the management of the reporting organization to put more effort toward the development of their intellectual capital.

1.7 SCOPE OF THE STUDY

This study will comprise of all quoted service companies trading on the floor of the Nigerian Stock Exchange as at the end of December 2014.

The study covers a fifteen (15) year period from 2000-2014. The reason for the choice of this time frame is availability of published annual reports and accounts of the selected organizations.

1.8 LIMITATION OF THE STUDY

One of the limitations of this study was lack of sufficient relevant local materials and available accurate secondary data. Notwithstanding, scholarly articles and other relevant publications were gathered and used in this study.

1.9 OPERATIONAL DEFINITION OF TERMS AND VARIABLES

Value Added Intellectual Coefficient Indices include:

- Capital Employed Efficiency (CEE) measure the efficiency of Capital Employed (CE), where (CE) – book value of firm net assets.

  CE = physical capital + financial assets

CE = Total assets – intangible assets

CEE = VA/CE

CE represents tangible resources while HC represents intangible resource (Chen et al., 2005)

- Human Capital Efficiency (HCE). In VAIC model, HC is defined as salary and wages in a period (Pulic, 1998). Besides showing the firm size, high HC reflects higher employee skills that would add more value compared to employees with lower salary and wages. HCE shows the efficiency of HC usage in creating VA. If the human capital cost is low while VA is high then the firm uses its HC efficiently.

  HCE = VA/HC

- Structural Capital Efficiency (SCE). Structural capital (SC) includes strategy, organization network, patent, brand name. Internal structural capital is developed internally, consists of policy and process, work environment, innovation created by research and development. SC is measured using Pulic (1998)

  SC = VA – HC

  HC and SC are in reverse proportion, increasing HC will decrease SC. SCE is measured (Pulic, 1998):

  SCE = SC/VA

- Intellectual Capital Efficiency (ICE) is calculated:

  ICE = HCE + SCE

- VAIC - value added efficiency of tangible and intangible assets:

  VAIC = CEE + HCE + SCE

Financial Performance indices:

Market-to-Book Value Ratios

Market to Book value (MB) reflects the market valuation of the companies. It is the ratio of market capitalization of the given year to capital employed of the firm.

The Market-to-Book value ratio is simply calculated by dividing the market value (MV) with the book value (BV) of common stocks:

MV = Number of shares x stock price at the end of the year.

BV = Stockholder's equity – paid in capital of preferred stocks

MBV = market capitalization of 365 days

Book value of total assets

Market-to-book value (market value per share (MV) divided by Book value per share (BV) is the dependent variable in this model (Pulic 1998, 2000; Syed, 2005).

Return on Assets (ROA)

ROA is an indicator of how profitable a company is in relation to its total assets. It gives an idea as to how efficient the management uses assets to generate earnings. In fact, using this ratio, we can evaluate firm performance and it reflects the degree of efficiency in employing assets to obtain profit (Firer & Williams, 2003; Chen, Cheng, Hwang, 2005; Block, Hirt & Danielsen 2010).

ROA ratio is calculated by:

ROA = Net Income/Total Assets

Return on Equity (ROE)

ROE = Net income/shareholder's Equity

ROE measures organization's profitability by revealing how much profit a company generates with the money shareholders have invested.

Employee Productivity (EP)

Employee productivity (EP) is a tool that measures the net value added per employee which represents employee productivity (Chen, Cheng, Hwang, 2005). Higher EP represents higher productivity of employee, hence contribute positively to profitability (Clarke, Seng & Whitting, 2011).

EP = Profit before tax / number of employees

Growth Revenues (GR)

GR = [(current year's revenues/last year's revenues) – 1] x 100%

GR is the most traditional measure that indicates the growth of an organization. GR measures the changes in firm's revenues. Increase in revenue usually signal firm's opportunities for growth.

CHAPTER TWO
REVIEW OF RELATED LITERATURE

This chapter reviewed related literature to the present study. The review was organized under the following sub-headings:

2.1 Conceptual Framework

2.2 Theoretical Framework

2.3 Empirical Studies

2.4 Summary of Reviewed Related Literature

2.5 Gap in Literature

2.1 CONCEPTUAL FRAMEWORK

2.1.1 Intellectual Capital

Capital in the business context refers to any asset that will produce future cash flows. The most well known asset types are tangible in nature (Abhijit, 2008). Tangible capital therefore refers to the physical and financial assets of the organization (Abhijit, 2008). The value of such assets is disclosed periodically (by publicly listed companies) and can be found easily on the statement of financial position of the company's financial records. Physical assets can mean land, machinery, inventory, plants, trucks, et cetera (Abhijit, 2008). Whereas financial assets refer to the shareowners equity, retained earnings, working capital, prepaid expenses, accounts receivables et cetera (Abhijit, 2008). Intangible assets on the other hand, such as the skills of the workforce and its organization, are increasingly becoming important towards determining future profits (Abhijit, 2008). However, they are much harder to determine, harder still to quantify into a value and therefore are never reported. Hence these types of assets remain largely invisible to the external world, and more often than not to insiders as well (Abhijit, 2008).

The economist John Keneth Galbrait (1969) was the first to use the term intellectual capital, then the interest in this concept increased in the eighties of the last century, especially when researchers, managers and analysts around the world noticed that intangible assets form a major determinant of a company's profitability (Ungerer, 2004). Considering the importance of the intellectual capital and the role it plays in the organization, many companies sought to acquire human resources that characterize with a high level of competency, skills, expertise and high capacity; and to take advantage of it to

the fullest in order to achieve their goals, and access to a stage of development and creativity in the institutional and organizational performance. As those competencies, skills and abilities contribute to creation of new ideas and improve old ideas in order to drive the whole organization toward progress and prosperity (Stewart, 1997; Baker, 2014). Many concepts and terms that refer to the intellectual capital have been presented by academics, practitioners and those interested in this field according to their respective approach. Daft (2001) referred to intellectual capital as a set of information resources, which consist of two types of knowledge: explicit knowledge that can be expressed or written, and implicit knowledge that based on personal experiences and the rules that are used in the development of the organization. Guthrie (2001), on the other hand defined it as a set of skills and mental abilities possessed by a specific group of individuals working in the organization and characterized with a higher cognitive level that leads to innovation, excellence of organizational performance, and achieving a high level of productivity. In addition, Schermerhon defined it as the collective brainpower or common knowledge held by members of the organization, which can be used to create value to the organization (Schemerhorn, 2002).

Bernad (2007) posits that intellectual capital is the term used to describe the intangible assets provided to an entity by its employees' efforts and also knowledge assets such as patents, trademarks, copyrights and other results of human innovation and thought. Intellectual capital is often disaggregated into four categories: Bernad (2007)

1. Legally recognized intangible assets such as patents, copyrights, and franchises that are purchased.
2. Legally salable and protected intangible assets such as trademarks, brands, customer lists, and customer orders.
3. Structural intangible assets such as the systems and databases used within the company; examples of these systems are the information system, accounting system, purchasing system and sales system.
4. Human capital intangible assets such as what is in the minds of the individuals who work for the company: an example is the knowledge that researchers in a pharmaceutical company might have in their minds of past experiments and their results.

There are numerous definitions of intellectual capital since the beginning of its research in the early 1980s. Itami (1987), the pioneers who published works on intellectual capital,

defined intellectual capital as intangible assets which includes particular technology, customer information, brand name, reputation and corporate culture that are invaluable to a firm's competitive power. Stewart (1997) viewed intellectual capital as knowledge, information, intellectual property and experience that can be put to use to create wealth. Edvinsson (in Bontis, and John 2000) explained intellectual capital as applied experience, organizational technology, customer relationships and professional skills that provide a firm with a competitive advantage in the market. For Bontis, Chua and Richardson (2000), intellectual capital means individual workers' and organizational knowledge that contributed to sustainable competitive advantage, while Pulic (2001) includes all employees, their organization and their abilities to create value added that is evaluated on market into intellectual capital. Again, Edvinsson and Malone (1997) defined the difference between a firm's market value and book value as the value of intellectual capital. A firm's intellectual capital, in a broad sense, is comprised of human capital and structural capital (Bontis, 1996). Human capital is employee-dependent, such as employees' competence, commitment, motivation and loyalty, et cetera. Although human capital is recognized as being the heart of creating intellectual capital, a distinctive feature of human capital is that it may disappear as employees exit (Bontis, 1999). In contrast, structural capital belongs to firms, including innovative capital, relational capital, and organizational infrastructure et cetera.

Various attempts have been made towards developing a widely accepted definition of Intellectual Capital (IC), until most authors finally agreed on its basic paremeters. Klein and Prusak (1994) contributed to the creation of a universal definition by defining IC as the intellectual material that can be formalized, captured and leveraged to produce a higher value asset. In the same vein, Edvinnson and Malone (1997) defined IC as the knowledge that can be converted into value. Stewart (1997) argued that intellectual resources such as knowledge, information and experience, are the tools for creating wealth and defined IC as the new wealth of organizations. Sullivan (2000) defined IC as knowledge that can be converted into profits.

According to Edvinsson and Malone (1997) IC can be also defined as the gap that is observed between a firm's book and market value. Also, Kok (2007) argued that a method for determining the intellectual (intangible) assets of a company is to compare market to book value. These arguments are based on the nature of IC. The intellectual assets of a

company are intangible in nature and, thus, do not have a certain shape or an appropriate financial value. They are characterized as “hidden assets”, since it is difficult to identify their contribution to a firm and quantify them in a financial statement (Fincham & Roselender, 2003).

The observed gap between market and book value (Andrikopoulos, 2005; Chaminade & Roberts, 2003; Fincham and Roslender, 2003; Lev & Radhakrishnam, 2003; Lev & Zarowin 1999; Lev, 2001; Tseng & Goo, 2005; Zerenler & Gozlu, 2008) can be, therefore, attributed to intellectual capital assets that are not recognized in statement of financial position (Chaharbaghi & Cripps, 2006; Brennan & Connell, 2000). The role of IC in filling the gap between book and market value has brought even wider research attention towards the investigation of its nature (Chen, Cheng and Hwang, 2005).

In the last few decades, employees have been widely recognized as a valuable resource (Lickert, 1969; Lindsay, 1971; Becker, 1975; Blang, 1976; Wright & Mcmahan, 1992; Huselid, 1995; Verreault & Hyland, 2005) in Eric and Bruce (2009). the debate has now shifted from “ whether intellectual capital is important to or how important they are in organizations”. The knowledge that all employees bring to an organization is believed to provide the organization with a valuable asset (Ashton, 2005; Camuffo & Comacchio, 2005). Indeed, many researchers have argued that the collective knowledge of all employees in an organization provides a competitive edge for the organization (Barney, 2001; Barney, Wright & Ketchen, 2001; Marr & Spender, 2004; Schiuma, Ordonez De Pablos, & Spender 2007; Holton III & Yamkovenko 2008; Kang & Snell, 2009). Therefore in today’s knowledge economy, the collective knowledge of an organization is of utmost importance. Intellectual capital (IC) represents the collective knowledge that is embedded in the personnel, organizational routines and network relationships of an organization (Stewart, 1997; Bontis, 2002; Kong, 2008a). IC has been recognized as an important resource that organizations need to develop to gain sustained competitive advantages (Chen, 2008, Kong & Prior, 2008; Schiuma & Lerro, 2008).

Intellectual Capital (IC) is an intangible asset of an organization. Intangible assets are only those intangibles that would be recognized by the financial standards and allowed to be recorded in the statement of financial position (Starovic & Marr 2003). Intellectual

property is also defined as intangible assets, and includes patents, trademarks and copyrights, which can also be included in the traditional financial statement.

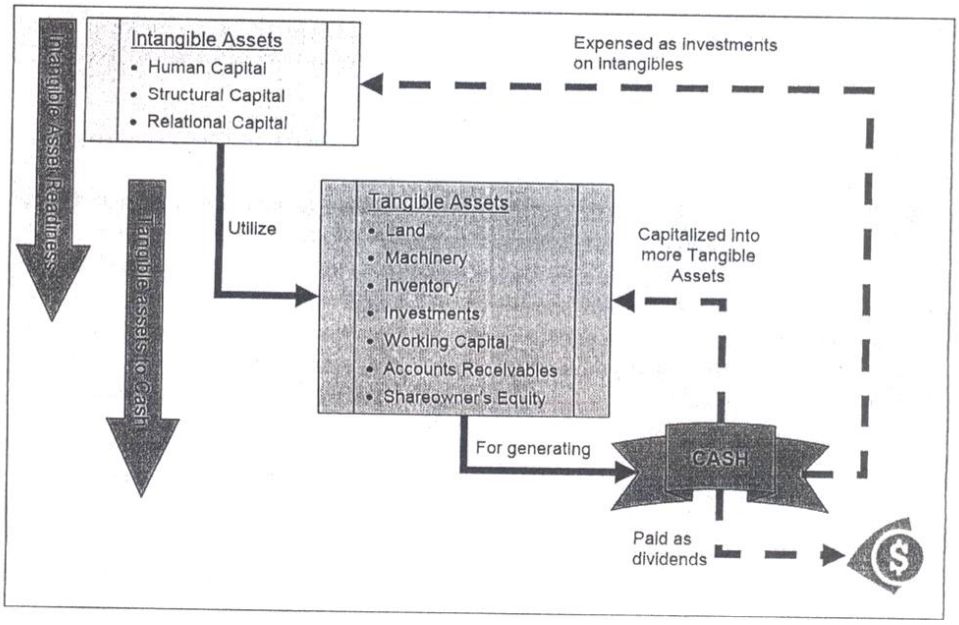
Intellectual capital can be the knowledge that is transformed into intellectual property or the end result of the process itself. Intellectual assets are a part of intellectual capital. They are "the codified knowledge and know-how of the firm's human capital" (Sullivan, 2000). Intellectual capital could be described as the 'combined intangible assets which enables the company to function". In other words, an enterprise is the sum of its tangible assets and its intellectual capital as follows:

Enterprise = Tangible assets + Intellectual capital

According to Rastogi (2000) IC terminology refers to company's ability to face the challenges simultaneously through effective solution. Alipour defines IC as group of knowledge for the organization stakeholder (Alipour, 2012). Stewart defines intellectual capital as "the intellectual material-knowledge, information, intellectual property, experience that can be put to use to create wealth" (Stewart, 1997). Pires and Alves (2011) described IC to include knowledge, competence, experience and employees skills (human resources); the research and development activities, routines, procedures, the organization systems and databases and intellectual property rights (activities and organizational resources); and resources related to external relations with customers, suppliers and partners in research and development (relational resources).

In order to understand how intellectual capital fits into the scheme of things, let us look at figure 1 below to understand the typical business cycle from the firm's perspective. The objective of a typical for-profit firm is to use its assets for producing goods and services which it can sell for generating cash. Both tangible and intangible assets are used in this process. It is the readiness of the intangible assets that determines the efficiency of this cycle. The cash so generated is used in general in one of three different ways. It is either capitalized into more tangible assets or spent for the development of more intangible assets or paid out as dividends. This is also the reason why tangible assets appear on the statement of financial position whereas intangible assets do not.

Figure 1: Assets to cash conversion cycle



Source: Abhijit, 2008

The picture above also reveals one more fact, that is, tangible assets can be acquired by just about any business which has enough money to buy such assets. However, intangible assets have to be cultivated, nourished and nurtured in a planned manner before their yield can be fully harvested. The real differentiator between one firm and the next therefore, is the readiness of the firm's intangible assets for converting its tangible assets to cash in the most efficient manner. This readiness is more commonly known as core competency in business texts and it is the chief source of competitive advantage for companies.

In today business environment, company's assets not only the tangible assets, but also intangible assets. Changes in business environment caused by globalization challenges organization to improve the competive advantage in global competition. Thus, there are changes from industrial economy to knowledge economy. Pulic (1998) stated that in industrial economy the wealth is created by quantity (employees, materials, machines), while in knowledge industry, creativity creates the value.

Microsoft's share price rose to $70 in 1995 while its book value was $7. For a $1 share book value, there was $9 additional market value which was not recorded in Microsoft statement of financial position. Other example of value creation of intellectual capital is in consulting industry. Mckinsey sells the transfer of knowledge of its consulting team, which is intellectual capital, surprinsingly clients are eager to pay at rate up to $500,000 per consultant (Sveiby, 1997; Bontis, 1998). Nike, a "shoemaker that makes no shoes",

represents knowledge intensive organization. Nike relies its works on knowledge-based activities, namely research and development, design, marketing, and distribution. (Steward, 1997; Bontis, 1998). Study of impact of IC to profitability has been very interesting by many researchers. Using the VAIC, IC is examined in relationship to firm financial performance, including ROA (Firer & Williams, 2003; Chen, Cheng & Hwang, 2005, Shiu, 2006; Ting & Lean, 2009; Clarke, Seng & Whitting, 2011; Ranjani, Fernando & Kumari, 2011; Mondal & Gosh, 2012; Banimahd, Mohammadrezaei & Mohammadrezaei, 2012; Rahman & Ahmed, 2012; Joshi, Cahill, Sidhu & Kansal, 2013), ROE (Chen, Cheng & Hwang, 2005; Tan, Plowman & Hankook, 2007; Clarke, Seng & Whitting, 2011; Ranjani, Fernando & Kumari, 2011; Mondal & Gosh, 2012; Rahman & Ahmed, 2012), firm market value (Firer & Williams, 2003; Chen et al., 2005) EPS (Tan, Plowman & Hankook, 2007; Kuryanto & Syafruddin, 2008), Revenue growth (Chen, Cheng & Hwang, 2005; Clarke, Seng & Whitting, 2011, Rahman & Ahmed, 2012), Emplolyee productivity (Chen, Cheng & Hwang, 2005; Clarke, Seng & Whitting, 2011), Asset Turnover Ratio (Firer & Williams, 2003; Mondal & Gosh, 2012), stock return (Kuryanto & Syafruddin, 2008; Djamil, Razafindrambinina, & Tandeans, 2003) and sales force performance (Putri, 2012).

In Germany, Bollen, Vergauwen & Schnieders (2005) examined IC and found that components in IC have relationship with firm performance in pharmaceutical industry. Firer & Williams (2003) researched on banking, electrical, information technology and services companies examined the relationship of VAIC impact on corporate performance (profitability, productivity and market value). Using data of 75 listed companies in South Africa, Firer and Williams found no association between efficiency of VAIC to profitability and market value. Only VA of human resource is significantly negative associated with productivity.

Chen et al (2005) found that IC has impact to market value and financial performance of listed companies in Taiwan Stock Exchange (TSE). The research found that the efficiency of VAIC has positive impact to market value, financial performance. Tan, Plowman and Hankook, (2007) found that IC had positive and significant impact on Return On Equity (ROE), earning per share (EPS) examined financial institutions data in Malaysia found that value added intellectual coefficient (VAIC^{TM}) has positive impact to financial performance which is proxied with return on Asset (ROA).

Clarke, Seng and Whitting, (2011) used data from Australian publicly listed companies examined the relationship between VAIC components and financial performance (ROA, ROE, Revenue Growth) and employee productivity (EP). Their study showed that previous year human capital employed and structural capital employed components has positive significant impact to firm performance.

Kamath (2008) tested 25 Indian top pharmaceutical firms on VAIC to firm performance. The performance was measured by ROA, Assets turnover ratio (ATO), and market to book value (MB). Mondal and Gosh (2012) study the relationship of IC on firm profitability and productivity performance in 65 Indian banking companies. The result suggests that the human capital has relationship with ROA, ROE, and ATO.

Rehman, Rehman, Usman, and Asghar, (2012) investigated data of banking companies in Pakistan on the relationship of IC to corporate performance (ROA, ROE, EPS). The results showed VAIC has positive and significant impact on ROE. Fathi, Farahmand & Khorasani (2013) found that value added of structural capital has positive significant with financial performance (ROE, ROA, and Growth Revenue). The study examined 49 Iranian listed companies data also indicated that value added efficiency of capital employed and human capital have significant positive impact on ROE and ROA.

Mavridis (2004) used VAIC to measure Japanese bank intellectual performance for several bank group and compared the performance among them. Goh (2005) study the efficiency of intellectual capital (VAIC) of Malaysian domestic and foreign banks. The result indicates that human capital has the most effect to value creation of the banks. Mention and Bontis (2012) surveyed banks in Luxembourg and Belgium. The questionnaire sent to bank executive and top level management reveal that HC has positive and significant effect on performance. This study result confirmed with the research by Kamath (2008) on 25 India pharmaceutical industry, in which HC is the component that has major impact on profitability and productivity.

In Indonesia, Iswati & Anshori (2007) examined data from 10 insurance companies listed IDX and found a positive and significant relationship between IC and profitability. In banking industry, Ulum (2008), Artinah (2011), Rachmawati (2012) found that IC has significant impact to firm performance. Razafindrambinina & Anggreni (2011) examined the relationship of IC to financial performance of consumer good firms listed on Jakarta

Stock Exchange (JSX) over the period of 2003-2006. Their study on 36 companies data showed that VAIC has positive and significant correlation to ROA, Assets Turnover (ATO), Revenue growth and Operating Cash Flow. Ifada and Hapsari (2012) concluded that IC has positive and significant impact to performance of (ROE, EPS and MBV). On the other hand, using data from manufacturing, property, service and trading companies listed in IDX 2003-2005, Kuryanto and Syafruddin (2008) indicated that IC has no impact to profitability.

Financial sector in Indonesia Stock Exchange (IDX) includes banking industry, insurance and other financial institutions. The industries in this sector are unique, use intensive knowledge compared to physical assets in manufacturing business (Alipour, 2012). The object of this research is service sector as the employees play important role which relies on human capital intellectual, and overall in service sector the employees are more homogeneous in "intellectual" compared to other sectors.

2.1.2 CHARACTERISTIC OF INTELLECTUAL CAPITAL

Although intellectual capital is similar to tangible assets in its potential for generating future cash flows, it is radically different from tangible capital in the following respects:

- Intellectual assets are non rival assets. Unlike physical assets which can only be used for doing one thing at a time, intellectual assets can be multiplexed. For example, a customer support system can provide support to thousands of customers at the same time. It is this ability to scale with need that makes intellectual assets far more superior to physical assets.
- Human capital and relational capital cannot be owned, but have to be shared with employees and suppliers and customers. Growing this kind of capital therefore requires careful nurturing.
- Structural capital is an intangible asset that can be owned and controlled by managers. However, it cannot be traded easily since no markets exist for this purpose. Moreover, customers do not care about the structural capital of their suppliers since everyone likes dealing directly with real human beings rather than with systems.
- Structural capital, in the form of just-in-time procurement processes and real time inventory control systems can be substituted for expensive capital expenditure such as storage warehouses. Hence the knowledge economy has opened up

opportunities for every firm to explore whether inexpensive intangible assets can do the work of costly physical assets.

- Firms that leverage their intellectual capital to do knowledge work are able to generate higher margin of profits than those who provide mass-produced solution.
- Human, structural and relational capitals often work together in judicious combinations to give rise to core competencies that assume strategic significance. Hence it is not enough to invest in people, systems and customers separately, but in combinations that produce end value (Abhijit, 2008).

2.1.3 COMPONENTS OF INTELLECTUAL CAPITAL

There are many aspects that are included in the concept of intellectual capital, but authors generally agreed on three essential components of intellectual capital, namely: human capital, structural capital and relational/customer/external capital (Tayles, Pike & Sofian, 2007; Roos, Pike & Fernstrom, 2005; Wall, Kirk, & Martin 2004; Edvinsson & Malone, 1997; Sullivan, 1999, Stewart, 1997).

2.1.3.1 Human Capital

Daft (2001) referred to human capital as the economic value of the knowledge, skills, and expertise enjoyed by workers in the organization. (Phatak, 2003), on the other hand, indicated to human capital as the loop that links together the knowledge, abilities, skills, experiences and creations owned by the members of the organization. Westhuizen (2005), indicated to human capital as the human potential owned by the organization and used to find appropriate solutions to business problems. Further, human capital has also been defined as a set of capabilities and human potential that is tapped to take advantage of economic resources available to the organization, which implies mental capacity and competencies derived from the information and experiences that affect the market value and operating the organization (Malhotra, 2003).

Ali and Ali (2013) defined Human Capital as the knowledge, skills, experience, intuition and attitudes of the workforce. Intellectual capital can be increased by increasing the capacity of each worker.

Human capital is the knowledge, skill and capability of individual employees providing solutions to customers. Human capital is the firm's collective capability to extract the best solutions from the knowledge of its people. It is important because it is a source of

innovation and strategic renewal, whether it is for brainstorming in a research laboratory, daydreaming at the office, throwing out old files, re-engineering new processes, improving personal skills or developing new sales leads (Ali & Ali, 2013).

Individual competence is important for organizations. This is people's capacity to act in various situations. It includes education, experience, values and social skills. People are the only true agents in business; all assets and structures, whether tangible physical products or intangible relations are the result of human action and depend ultimately on people for their continued existence. People create knowledge, new ideas, and new products, and they establish relationships that make processes truly work. Unfortunately, when people leave, they take along their knowledge, including internal, formal and informal relationship (Ali & Ali, 2003).

Intellectual capital - The commitment and competence of workers is embedded in how each employee thinks about and does work and in how an organization creates policies and systems to get work done. It has become a critical issue for six reasons:

First, intellectual capital is a firm's only appreciable asset. Most other assets (building, plant, equipment, machinery, and so on) begin to depreciate the day they are acquired. Intellectual capital must grow if a firm is to prosper. A manager's job is to make knowledge productive, to turn intellectual capital into customer value.

Second, knowledge work is increasing, not decreasing. Service generally comes from relationship founded on the competence and commitment of individuals.

Third, employees with the most intellectual capital have essentially become volunteers, because the best employees are likely to find work opportunities in a number of firms. This does not mean that employees work for free, but that they have choices about where they work and therefore, essentially volunteer in a particular firm. Volunteers are committed because of their emotional bond to a firm they are less interested in economic return than in the meaning of their work. Employees with this mind-set can easily leave for another firm.

Fourth, many managers ignore or depreciate intellectual capital. In the aftermath of downsizing, increased global competition, customers' higher requirements, fewer management layers, increased obligations, and pressures exacted from almost every other modern management practice, employees' work lives have not always changed for the better.

Fifth, employees with the most intellectual capital are often the least appreciated. Some studies have correlated front-line employees' attitudes to a firm with customers' attitudes to the same firm.

Sixth, current investments in intellectual capital is misfocused.

Human Capital (HC) includes expertise, experience productivity, knowledge of firm's employee (Pulic, 1998). Being an asset to, but not owned by the organization, human capital played an important role. Losing an employee contributes loss of corporate memory, however, other consider an employee departure is good as it will force firm to consider perspective from new employees (Bontis, 2000). Goh (2005) study shows that HC contributes more than 80 percent to value created in Malaysian domestic bank. The same also implied from study of Joshi, Cahill and Sidhu (2010), suggests that Australian owned banks have relatively higher HC efficiency than other VAIC components. Mondal and Gosh (2012) study on 65 Indian banks data also reveal that HC is a major component in enhancing the returns of banks.

2.1.3.2 Structural Capital

Structural capital is defined as the knowledge that stays within the firm. It comprises organizational routines, procedures, systems, cultures and databases (Bontis, 1998). A strong definition by Roos, Ross, Edvinsson and Dragonetti (1997) defined structural capital as 'what remains in the company when employees go home for the night". According to Bontis (1998) intellectual capital will not be maximized if organization has poor systems and procedures to track its activities. Mention and Bontis (2012) surveys on Luxemborg and Belgium banks found that structural capital has no significant impact to bank performance.

Structural capital represents a significant solid ground upon which human capital stands (Andriassen 2004). Phatak (2003) described structural capital as capital involving all internal operations in the organization, including all components and capabilities possessed by the organization such as traditional material, software, and processes, and

system information that contribute to the provision of adequate support to human capital, and thus is the property of the organization. (Mazlan, 2005) referred to structural capital as a set of capabilities and organizational competencies that enable the organization to carry out the functions entrusted to it including the organizational structure, procedures, databases and information systems.

The structural capital refers to the means and facilities owned by the organization to support personnel in carrying out their duties to the fullest and considered as the infrastructure enabling the human capital to work. According to Edvinsson and Malone, structural capital includes traditional property such as buildings, machinery, software and processes, patents and trademarks, as well as the mental image of the organization, information systems and databases. Because of this diversity in structural capital concept, Edvinsson and Malone divided this kind of intellectual capital to the following: (Edvinsson & Malone, 1997).

i. Organizational capital: includes the philosophy of the organization and its ability to raise the performance of the business.
ii. Process capital: includes techniques, programs and procedures in place to deliver products and services to the client optimally.
iii. Innovation capital: includes intellectual property and intangible assets. The intellectual property includes copyright, trademarks and patents. The intangible assets include the skills and talents and theories that run the organization's work.

2.1.3.3 Relational Capital

Relational capital is also known as customer capital and external capital. Relational capital represents external capital of the organization (Maditinos, Chatzoudes, Tsairidis & Theriou 2011). Relational Capital was defined by Maditinos, Chatzoudes, Tsairidis and Theriou (2011) as a set of relationships and values linking the organization with its customers through the achievement of their desires and meet their needs, and thereby the organization ensures customer satisfaction, and increase their loyalty an belonging to the organization through paying greater attention to customer views and comments and taking them into account. Newman (2007) indicated that the relationship between the organization and all the parties that contribute to the development of ideas, and create new products and services. However, Andriessen (2007) described relational capital as the relationship between the organization and its customers that arise from meeting the needs and desires of customers, solve their problems and satisfy their needs. Holton and

Yamkovenko (2008) indicated that the relational capital consists of ties associating the organization to its customers, and the established strategic alliances with other organizations that perform the same role. Baker (2014) believes that relational capital is the link that connects between the organization and its customers, through which to create ideas, develop and offer new products and services. The relationship between the two parties is established through the satisfaction of customer desires by the organization and provide for their needs and taking their opinions and suggestions into account, and thus achieving its satisfaction and increase loyalty and belongingness to the organization and its products and services (Baker, 2014). However, mention and Bontis (2012) reveal that relational capital has no significant impact to business performance of Luxemborg and Belgium banks.

2.1.4 CLASSIFICATION OF INTELLECTUAL CAPITAL

Human capital	**Relational (customer) capital**
Know-how	Brands
Education	Customers
Vocational qualification	Customer loyalty
Work-related knowledge	Company names
Occupational assessments	Backlog orders
Psychometric assessments	Distribution channels
Work-related competencies	Business collaborations
Entrepreneurial elan,	Licensing agreements
Innovativeness, proactive and	Favourable contracts
Reactive abilities, changeability	Franchising agreements

Organizational (structural) Capital

Intellectual property:	**Infrastructure Assets:**
Patents	Management philosophy
Copyrights	Corporate culture
Design rights	Management processes
Trade secrets	Information systems
Trademarks	Networking systems
Service marks	Financial relations

source: IFAC, 1998

2.1.5 MANAGING INTELLECTUAL CAPITAL

The current debate on intellectual capital is set in the context of a changing model of management and organization structures. It is said that organizations are moving from command and control to delegation, empowerment and coaching. Through this, everyone in the organization has an opportunity to shape the way it works. It is the role of management to harness and maximize that potential (Ali & Ali, 2013). It is clear that managers who want to grow their company's intellectual capital must be able to expand intelligence, encourage innovation and exercise integrity. Indeed these are the three core competencies of intellectual capital.

The challenge for managers is to develop the three core competencies of intellectual capital companywide. That is where dialogue comes in. Knowledge is created and transferred through conversation, and leaders must master the art of fostering a dialogue among team members (Walsh, Enz & Canina 2008).

Facilitate and train teams on knowledge creation and innovation. Conduct team-focused workshops to apply innovation skills to specific business challenges regarding revenue generation, quality, et cetera (Saint-Onge, 1996).

Coach specific project teams and sponsors on how to cultivate a better climate for innovation. Multiple way conversations will help people address the top issues that surface during the innovation process (Miles, Miles, Perrome, & Edvinsson, 1998).

Assess the culture for intelligence and innovation.

Conduct a "culture audit" to test for the values, mind-sets, behaviours, and outputs of the innovative learning organization.

Reengineer specific parts of the culture. Develop innovative approaches to technology networking, organizational structure, performance appraisals, rewards, et cetera, to encourage greater intelligence, innovation and high-integrity relationships (Bontis, 1996; Sveiby, 1998; Tapsell 1998; Knight 1999; Davies & Waddington, 1999).

If managers manage knowledge effectively, their organization will enhance their intellectual capital. There are two levels of knowledge in intellectual capital:

Explicit and tacit knowledge

Tacit knowledge is the experience and intellectual creativity and learning that rests with the human resources of the firm. Explicit knowledge is knowledge that can be codified into information and accessed and disseminated systematically. Tacit knowledge takes a different form in each segment of a firm's intellectual capital: In human capital, it is the mindsets of individuals, their assumptions, biases, values and beliefs. In customer capital, it is the individual and collective mindsets of customers that shape their perceptions of value provided by any given products or services. In structural capital, it is the collective mindsets of the organization, including its norms and values (Ali & Ali, 2013).

Managers who are interested in developing intellectual capital for their own organizations should follow these eight steps: (Stewart, 1997).

1. Make knowledge management a requirement for evaluation purposes for each employee in your organization - assign personal targets to intellectual capital development. For example, companies can have each employee aim to learn something that the organization currently does not know.
2. Formally define the role of knowledge in your business and in your industry - find and secure the greatest resources of intellectual capital.
3. Assess your competitors' and suppliers' strategies and knowledge assets – find and secure the greatest resources of relational capital.
4. Determine the extent of intellectual capital resources available to you from government and industry associations.
5. Classify your intellectual portfolio by producing a "knowledge map" of your organization - determine in which people and systems knowledge resides.
6. Evaluate the relative worth of the intellectual capital - use monetary values if at all possible, or company-developed indices or metrics.
7. Identify gaps you must fill or holes you should plug based on weaknesses relative to competitors, customers and suppliers, and
8. Assemble your new knowledge portfolio in an intellectual capital addendum to your annual report and continuously assess the development of your intellectual capital.

Intellectual capital is the source of inspired innovation and wealth production – the precursor for the growth of financial capital. If organizations enhance knowledge and

organizational learning, they can increase their intellectual capital and value (Bontis, 1996; Knight, 1999).

2.1.6 MARKET VALUE

Market value is the price an asset would fetch in the market place. Market value is also commonly used to refer to the market capitalization of a publicly-traded company, and is obtained by multiplying the number of its outstanding shares by the current share price (Scilly, 2015). The market value of a corporation is the value of the firm based on the price that shareholders are willing to pay for stock in the company on public markets (Scilly, 2015).

International Valuation standards (IVS) define market value as "the estimated amount for which a property should exchange on the date of valuation between a willing buyer and a willing seller in an arm's-length transaction after proper marketing where in the parties had each acted knowledgeably, prudently, and without compulsion.

2.1.6.1 How to calculate market value of a corporation

A company's market value of equity – also known as market capitalization – is the current market price of a company's stock multiplied by the number of all outstanding shares in the market. You can calculate the market value of your business to see how much your stake in the company is worth on the public markets. To calculate it, you will need to know the market price of an individual share and the number of stocks outstanding (Scilly, 2015).

Step 1

Find the current price of stock in the company. These figures are published publicly and can be accessed via Bloomberg (bloomberg.com), finance.yahoo.com) or google finance (google/finance) simply by searching for the compay's name or stock symbol.

Step 2

Determine the number of shares outstanding in the corporation. This figure is included in the financial details on the same websites listing their stock prices. Alternatively, you can look up the company's statement of financial position under "capital stock'.

Step 3

Multiply the stock price by the number of stocks outstanding. This will give you the market capitalization, which is the market value of the firm.

For example, if a company's stock is currently valued at N50 per share and there are a total of five million outstanding shares, the company's market value of equity is N250 million (N50 per share x 5 million shares = N250 million)

A company's market value is a good indication of investors' perceptions of its business prospects. The range of market values in the market place is enormous, ranging from less than $1 million for the smallest companies to hundreds of billions for the world's biggest and most successful companies (Scilly 2015).

Market value is determined by the valuations or multiples accorded by investors to companies, such as price-to-sales, price-to-earnings, enterprise value-to-Earnings Before Interest, Tax,Depreciation & Amortization, and so on. The higher the valuations, the greater the market value (Scilly, 2015).

Market value can fluctuate a great deal over periods of time, and is substantially influenced by the business cycle. Market values plunge during the bear markets that accompany recessions, and rise during the bull markets that are a feature of economic expansion (Scilly, 2015).

Market value is also dependent on numerous other factors, such as the sector in which the company operates, its profitability, debt load and the broad market environment. For example, company X and company B may both have &100 million in annually sales, but if X is a fast-growing technology firm while B is a stodgy retailer, X's market value will generally be significantly higher than that of company B.
In the example above, company X may be trading at a sales multiple of 5, which would give it a market value a market value of $500 million, while company B may be trading at a sales multiple of 2, which would give it a market value of $200 million.

Market value for a firm may diverge significantly from book value or shareholders' equity. A stock would generally be considered undervalued if its market value is well below book value, which means the stock is trading at a deep discount to book value per share. This does not imply that a stock is overvalued if it is trading at a premium to book value, as this again depends on the sector and the extent of the premium in relation to the stock's peers (Scilly, 2015).

2.1.7 INTELLECTUAL CAPITAL AND FIRMS' MARKET VALUE

Market values are values of firms as evaluated by the market. It is the overall values of stocks owned by the firm. In other words, it is the amount one must pay to buy the entire firm at a specific time (Najibullah, 2005). The rise and fall of market values depend on numerous factors such the firm's book value, profit level, economic outlook, speculation or confidence on a firm's ability to create value (Najibullah, 2005).

The basic idea behind the notion of intellectual capital is that it explains the difference between market value and accounting book value. Traditional accounting measures book values from the statement of financial position. Book value is the price paid for a particular asset. This price never changes so long as you own the asset (Scilly, 2015). Book value is the difference between a firm's total assets and liabilities. In other words, if a firm sells off its entire assets and pays for all its liabilities, the remaining amount is the book value (Najibullah, 2005). In the traditional accounting measures, assets mainly refer to physical and financial capital (Goh, 2005). Most intellectual capitals, except goodwill are not been regarded as asset. The reason being an asset, as defined by International Accounting Standard Committee is a resource control by a firm due to fast action and from which future benefits are expected. Examples of assets are land, building machinery et cetera. Due to the intangibility of intellectual capital, it could not be owned and controlled by firm (Goh, 2005). A good example is knowledge of an employee, which cannot be owned or controlled by the firm. For this reason, intellectual capital is not considered as an asset. Infact, the expenses to acquire intellectual capital are considered as an expense. By excluding intellectual capital, traditional accounting therefore underestimates the true value of firms. However, if the market is efficient, investors will place higher value for firms with greater intellectual capital (Firer & Williams, 2003; Riahi-Belkaoui, 2003). Therefore, intellectual capital is expected to play an important role in enhancing both corporate value and financial performance.

Several research studies in the intellectual capital literature done in different countries have proved that, there is a positive relationship between intellectual capital and firms' market value. Najibullah (2005) in Bangladesh found that Banks' market value is positively associated with corporate intellectual ability and its three (3) components. Chen, Cheng & Hwang (2005) in Taiwan found out that firms' intellectual capital has a positive impact on market value. Chan (2009) in Taiwan discovered that intellectual capital components have different levels of explanatory power for firms' market value.

2.1.7.1 Intellectual Capital and firm's Return on Asset

Return on Asset (ROA) is an indicator of how profitable a company is relative to its total Assets. ROA gives an idea as to how efficient management is at using its asset to generate earnings. It is calculated by dividing a company's annual earnings by its total assets.

ROA tells what earnings were generated from invested capital (assets). The assets of a company are comprised of both debt and equity. Both of these types of financing are used to fund the operations of the company. The ROA figure (which is displayed as a percentage) gives investor an idea of how effectively the company is converting the money it has to invest into net income. The higher the ROA number, the better, because the company is earning more money on less investment.

In the era of post industrial economies when the key roles of human capital, research and development are emphasized in the new economic models, tangible assets have a much smaller share, compared to knowledge and information, in determining the return on assets, the generation of revenue and the real values of companies (Omid & Mohamadreza, 2012). Therefore, continuous production and improvement of knowledge and innovation is considered the most important competitive advantage of organization on which the survival of companies depend and the causing agent and the source of which is intellectual capital, which refers to the difference between the book value of tangible assets and market value of the company (that is, the intangible assets).

Riahi-Belkaoui (2003) examined the relationship between a return on total assets based on net value added (i.e. stakeholder view) and the specific intangible assets of intellectual capital to test the resource-based view of the firm. The result using a sample of U.S multinational firms, showed statistically significant in support of both the resource-based and stakeholder view.

2.1.7.2 Intellectual Capital and Firms' Return on Equity

Return on Equity (ROE) is the amount of net income returned as percentage of shareholder equity. Return on Equity measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested. ROE is useful for comparing the profitability of a company to that of other firms in the same industry.

Increasing attention to shareholders' equity lead researchers to do multiple researchers on identification of unreported elements of financial statements. One of the factors affecting shareholders' equity but is not reported in financial statements is intellectual capital.

Maditinos et al (2011) investigated the empirical relation of IC with firms market and financial performance of 96 listed firms in Athens Stock Exchange and argued that only HCE has significant and substantive positive relation with financial performance (ROE) of firms. Abbassi and Sedghi (2010) investigated the effect of intellectual capital (the efficiencies of human, customer and structural capital) on the financial performance (earnings per share (EPS), Return on equity (ROE) and annual rate of return) of companies listed in Tehran Stock Exchange. The results obtained showed that the efficiency coefficient of each of the components of intellectual capital had a significant positive effect on ROE.

2.1.7.3 Intellectual Capital and firm's Employee Productivity

The current economy considers knowledge as the most important productive element and names it the most important competitive factors in organizations (Momeni and Esmaeili, 2015). Knowledge is one of the most significant elements of intangible assets. The basis of economy is knowledge. The effect of intellectual capital on the future organizational processes is a useful way to identify the weakness and to provide the approaches required for managers to make a decision. Bahman and Mohsen, (2015) investigated the effects of intellectual capital and of the experience of alliance and of the interaction between these two on each other and on the value of strategic international alliances and concluded that the trading companies that had a higher level of intellectual capital acquired greater wealth benefits and also discovered that there was a positive and significant relationship between intellectual capital and the experience of alliances.

2.1.7.4 Intellectual Capital and Firms' Growth in Revenue

In today's business world, most organizations are established for the purposes of making profit and giving a high return on the investments of stakeholders. The extent an organization can go in achieving this onerous objective depends on the amount of revenue such organization is able to generate from its operations as there seem to be a direct relationship between the level of revenue generated and the amount of profit made by an organization (Ekwe, 2013). There has been this belief that it is the amount of physical resources (assets and finance) invested in a firm that determines the amount of profit that firm makes. The use of high technology, information, and innovation-based environment in recent times, has taken the centre stage in the global economy. Under this new technology, knowledge, ability, skills, experience and attitude of workers, assume greater significance even as organizations utilize their intellectual capital as a critical resource to

enhance their performance. Organizations nowadays use their intellectual capital in combination with their physical assets to sharpen their competitive edge against their competitors. Organizations which have managed their intellectual capital better, are observed to have achieved stronger competitive advantage than the general enterprises.

Nikoomaram and Eshaqi (2010) discovered there was no significant relationship between intellectual capital and return on investments in growth-oriented companies, but that there was a significant relationship between intellectual capital and return on equity in growth-oriented companies and return on equity and return on investments of value-oriented companies. Moreover, they did not find any significant differences between the effects of intellectual capital on the return on investment and return on equity of value-oriented companies.

2.1.8 INTELLECTUAL CAPITAL AND FINANCIAL PERFORMANCE

IC is concerned with the control and alignment of knowledge flow across organizational levels in order to create value and enhance performance for organizations (Petty & Guthrie, 2000; Choo & Bontis, 2002). The traditional financial accounting is not able to calculate the true value of the organization and it only measure tangible assets and statement of financial position. Intellectual capital provides a new model to measure the true value of the organization (Firer & Williams, 2003; Chen, Cheng & Hwang, 2005; and Maditinos, Chatzoudes, Tsairidis and Theriou, 2011).

By financial performance we mean that it is the monetary measuring of the results of firm's processes and operations, for example, returns on equity, returns on assets, returns on investments, employee productivity, market values among others. To increase the financial performance, organizations normally focus on their physical assets without adequate attention on their Intellectual Capital but their Intellectual Capital inefficiency result in a decrease in their financial performance. Consequently, the desired levels of financial performance are never achieved. On a theoretical level, distinguished authors argue that IC is the value driver of all companies (Stewart, 1997), that knowledge management is a core organizational issue (Nonaka & Takeuchi, 1995) and that organizational knowledge is at the crux of very sustainable competitive advantage (Bontis, 1999). Advocates of resource-based theory, for example, suggest corporate performance is a function of the effective and efficient use of the respective tangible and intangible assets of the firm. Further, value added (also wealth creation) is considered the appropriate means of conceptualizing corporate performance rather than the mere financial returns to a firm's owner. In the opinion of Firer and Williams (2003), and also supported by other

researchers (Edvinsson & Malone, 1997; Pulic, 1998; Pulic 2000b; Stewart 1997; Sveiby 2000; Sveiby 2001), traditional measures of corporate performance based on conventional accounting principles of determining income may provide unsuitable accounting in the new economic world, where competitive advantage is driven by intellectual capital. Use of traditional measures may lead investors and other stakeholders to make inappropriate decisions when allocating scarce resources.

Intellectual capital is the moving force for business success (Pulic 2000a). Increasingly, entrepreneurs find performance of intellectual capacity significantly affects their firms' bottom lines and thus could not be ignored. Growth of a firm's intellectual capital has been interpreted as an early indicator for subsequent performance (Ross & Ross, 1997). Corporate performance refers to the overall well being of firms, which are measured through sales, asset, profit, book and market values (Goh, 2005). Gan and Saleh (2008) examined the relationship between intellectual capital and firm performance. They found that intellectual capital has a significant impact on profitability and productivity. Also, Chen, Cheng and Hwang (2005), using the same methodology, found that intellectual capital has significant impact on profitability. Appuhami (2007) found a positive relationship between intellectual capital and on investors' capital gain on shares. Using survey data, Bontis (1998) has already shown a very strong and positive relationship between Likert-type measures of intellectual capital and business performance in a pilot study. The explanatory power of the final specified model was highly significant and substantive ($R2 = 56.0\%$, p-value <0.001). In Malaysia, Bontis, William and Richardson (2000) found that IC has a significant and substantive relationship with business performance regardless of industry sector. Based on the resource-based and stakeholder views, Riahi-Belkaoni (2003) documented a significant positive relationship between intellectual capital and financial performance using 81 US multinational firms. While intellectual capital is generally intangible in nature, it is becoming widely accepted as a major corporate strategic asset capable of generating sustainable competitive advantage and superior financial performance (Barney, 1991). On the other hand Firer and Williams (2003) examined the relationship between IC and traditional measures of firm performance (ROA, ROE) and failed to find any relationship, while Chen, Cheng and Hwang (2005) using the same methodology, concluded that IC has significant impact on profitability.

2.1.9 INTELLECTUAL CAPITAL AND COMPETITIVE STRATEGIES

Within the resource based view of competition, intellectual capital may be an important source of competitive advantage. In their article introducing the dynamic capability approach Teece, Pisano and Shuen (1997) distinguished (a) models of strategy as emphasizing the exploitation of market power, such as competitive forces (Porter 1980) and Strategic conflict (Shapiro, 1989) and (b) models of strategy emphasizing efficiency, such as the resource based perspective (Penrose, 1959; Wernerfelt, 1984 in Sudarsananm, Sorwar, and Marr 2003) and the dynamic capabilities approach. A strategy view of emphasizing efficiency can be linked with the Schumpeterian view of the world. This view of innovation-based competition, increasing returns and development of strategic competence was first framed by Edit Penrose (1959) and then later picked up by Birger Wernerfelt (1984) and Richard P. Rumelt (1984) who are seen as developers of the modern resource based view of the firm (Chaharbaghi & Cripps, 2006). The resource based view understands firms as heterogenous entities characterized by their unique resource bases. This means that strategist had to move away from a black-box view of the firm and match external opportunities with company's capabilities (Andrew, 1995). Furthermore, transaction cost theories show that organizations should concentrate on core capabilities and not necessarily use excess capabilities to enter a multi-product or diversification strategy (Teece, 2007), Wernerfelt 1984 in Sudarsanam, sowar, and Marr 2003). This means that firms need to strategically develop their resources in order to gain a competitive advantage and therefore increased their performance (Petergraf, 1993). Firms need to identify and develop the competencies and capabilities which drive their performance (Prahalad & Hamel, 1990; Teece et al. 1997).

All organizational capabilities are based on knowledge (Marr and Schiuma and Neely, 2003). Hence, knowledge is a resource that forms the foundation of a company's capabilities. The ownership of specific knowledge provides organization with specific capabilities (Prahalad and Hamel, 1990). This means that the ownership of knowledge enable specific capabilities and therefore only the management of this knowledge allow an organization to identify, maintain and refresh its competencies over the time. The basis of the knowledge based view of the firm is therefore the fact that competition is based on capabilities and competencies which are underpinned by knowledge (Grant, 1991 in Sudarsanan, Sorwar & Marr 2003).

The performance capacity of a company is hence based on the knowledge of its people (Prahalad & Hamel, 1990) as well as in the collective or organizational knowledge (Nonaka & Takeuchi, 1995). This explains why companies are thriving to become learning organizations pursuing the objective of continuous development of their knowledge assets (Oliver, 2009).

2.1.10 INTELLECTUAL ASSETS, GROWTH OPPORTUNITIES AND VALUE OF A FIRM

A firm's value is made up of contributions from the various components of its asset portfolio. Physical assets and monetary assets generate income, profits and cash flows by enabling it to produce, market and sell its goods and services. These are sold to identifiable customers in existing markets. On the other hand, certain types of assets do not have immediate and measurable payoffs. Investments in these assets are aimed to enable the firm to produce goods or services sometime in the future but the outcomes are subject to much uncertainty.

The International Financial Reporting Standard defined an Asset as: (ICAN 2014)

- A resource controlled by the entity
- As a result of past events; and
- From which future economic benefits are expected to flow to the entity

Resource controlled by the entity

Control is the ability to obtain economic benefits from the asset, and to restrict the ability of others to obtain the same benefits from the same item.

An entity usually uses assets to produce goods or services to meet the needs of its customers, and because customers are willing to pay for the goods and services, this contributes to the cash flow of the entity. Cash itself is an asset because of its command over other resources.

Many assets have a physical form, but this is not an essential requirement for the existence of an asset.

The result of past events

Assets result from past transactions or other past events. An asset is not created by any transaction that is expected to occur in the future but has not yet happened. For example, an intention to buy inventory does not create an asset.

Expected future economic benefits

An asset should be expected to provide future economic benefits to the entity. Providing future economic benefits can be defined as contributing, directly or indirectly, to the flow of cash (and cash equivalents) into the entity.

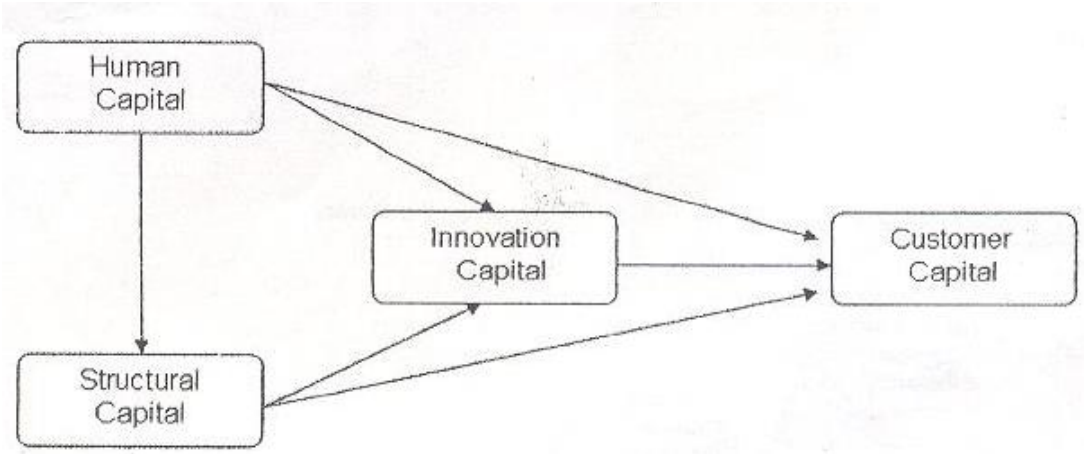
2.1.11 MEASUREMENT OF INTELLECTUAL CAPITAL

The measurement of intangibles and/or intellectual capital has always been a difficult challenge for the statistical system. The growth of the "new economy" – the knowledge economy, has made responding to this challenge even more urgent: the need to understand how such inputs affect the value chain of productivity, growth, and firm value now surpasses the need to measure the contribution of bricks, mortar, and equipment and other physical assets. Yet the changes that have brought the new economy into existence have also highlighted the need for improvements to traditional measures of inputs and outputs especially for human capital (Jeannet & Hein 2015).

Intellectual capital has increasingly been recognized as an important strategic asset to achieve a sustainable corporate competitive advantage (Chen, Cheng & Hwang 2005). The growing awareness and acceptance of the importance of intellectual capital as a source of competitive advantage has in turn led to the need for an acceptable measurement model, given that traditional financial tools do not address the necessary concepts of intellectual capital (Campisi & Costa 2008; Nazari & Herremans, 2007). The need for an appropriate measurement method lead to the development by Pulic (1998, 2000a) of what has become arguably the most popular method for measuring the efficiency of value adding to corporate intellectual capital known as the value added intellectual coefficient (VAIC^{TM}). VAIC^{TM} was designed to provide a means by which to measure the efficiency of three types of inputs: physical and financial capital, human capital, and structural capital (Firer & Williams, 2003; Montequin, Fernandez, Cabal & Gutierrez, 2006; Pulic, 2000a).

Chen, Zhu and Xie (2004) provided a perspective on the design of qualitative indices pertinent to the model (See figure 2)

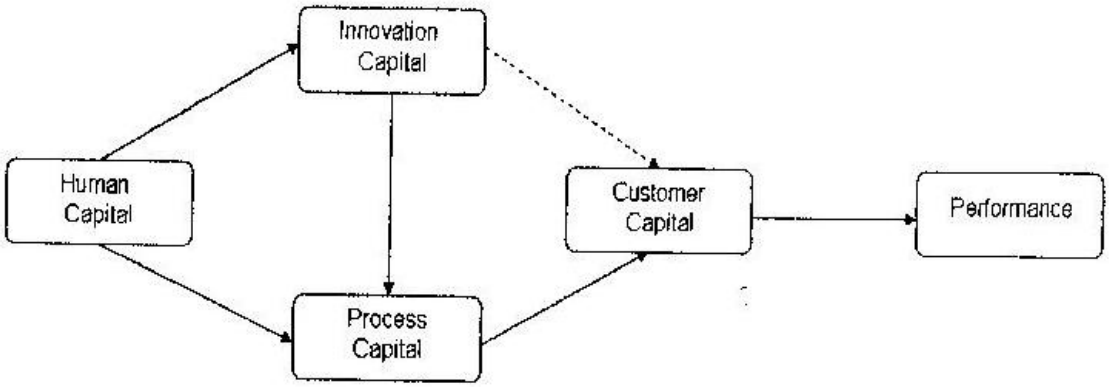
Figure 2: Intellectual capital Elements inter-relationship



Source: Chen, Zhu & Xie (2004).

A further development and extension to the understanding of the model came from the use of the model in research seeking to make links between intellectual capital and the relative performance of firms. Wang and Chang (2005) provided the impetus for such research by extending the application of the model to examining the impact of the VAIC elements on the performance of the business and in doing so highlighted the relationships between the elements refer to figure 2

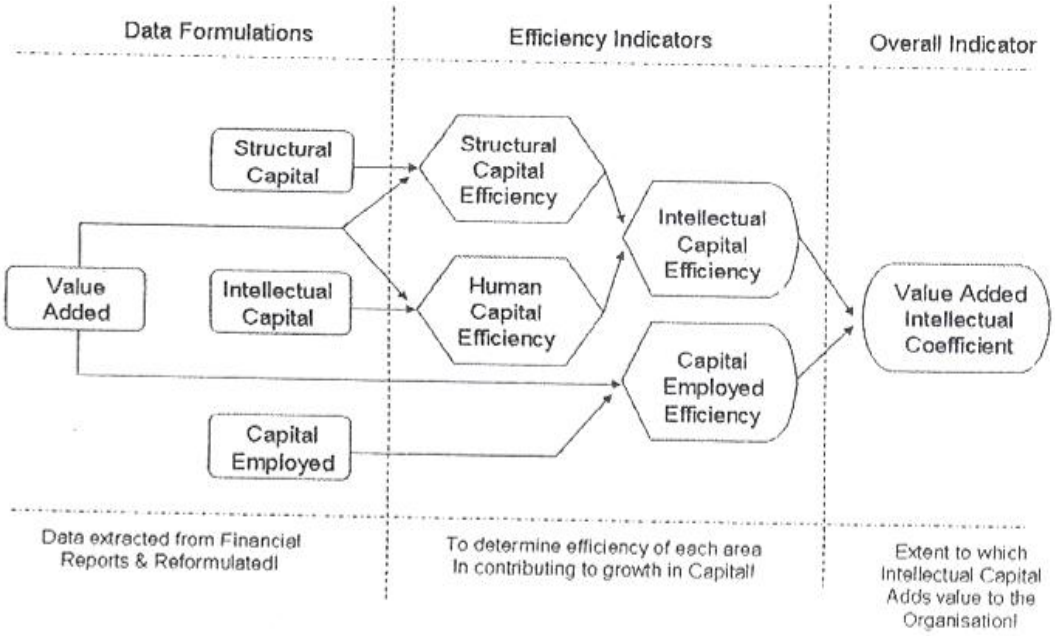
Figure 3: Intellectual capital Elements Relationship to Performance



Source: Wang & Chang (2005)

A further development in the understanding of the model came about when Kamukama (2013) provided a broader perspective of the model by encompassing the VAIC elements and their underlying constructs delineated into three the stages of the procedure for application of the model. In this way they highlighted the relationship between the constructs and elements with emphasis on the relevant role each plays in evaluating the contribution to the growth in capital. The detailed overview is presented in figure 4 below :

Figure 4: Overview of the VAIC™ model



Source: Laing, Dunn & Hughes-Lucas (2010)

Since the inception of the model the research has grown steadily into a sound body of knowledge and the use of the model has evolved accordingly.

Pulic developed VAIC™ (value added intellectual coefficient) method to measure the efficiency of value added of tangible and intangible assets used by a firm in its operation. Furthermore, the value of IC can be destroyed when the VAIC is decreasing, or when the efficiency is below the average of environment (industry) (Pulic, 2004). VAIC is calculated by summing: the capital employed efficiency (CEE), human capital efficiency (HCE), and the structural capital efficiency (SCE) (Pulic, 2004). Alternatively Value Added Human capital (VAHU) and Structural Capital Value Added (STVA) are used to represent HCE and SCE respectively, while Value Added Capital coefficient (VACA) has the same meaning with CEE.

Several steps are needed to calculate VAIC (Pulic, 1998; Pulic 2004), they are:

- Value Added (VA) – difference between output and input. Output is net revenue, while input is all costs spent to generate the revenue except human capital costs, as human capital is considered adding value entity:

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

- Capital Employed Efficiency (CEE) measure the efficiency of Capital Employed (CE), where (CE) – book value of firm net assets.

  CE = physical capital + financial assets

CE = Total assets – intangible assets (2)

CEE = VA/CE (3)

CE represents tangible resources while HC represents intangible resource (Chen et al., 2005)

- Human Capital Efficiency (HCE). In VAIC model, HC is defined as salary and wages in a period (Pulic, 1998). Besides showing the firm size, high HC reflects higher employee skills that would add more value compared to employees with lower salary and wages. HCE shows the efficiency of HC usage in creating VA. If the human capital cost is low while VA is high then the firm uses its HC efficiently.

  HCE = VA/HC (4)

- Structural Capital Efficiency (SCE). Structural capital (SC) includes strategy, organization network, patent, brand name. Internal structural capital is developed internally, consists of policy and process, work environment, innovation created by research and development. SC is measured using Pulic (1998)

  SC = VA – HC (5)

  HC and SC are in reverse proportion, increasing HC will decrease SC. SCE is measured (Pulic, 1998):

  SCE = SC/VA (6)

- Intellectual Capital Efficiency (ICE) is calculated:

  ICE = HCE + SCE (7)

- VAIC - value added efficiency of tangible and intangible assets:

  VAIC = CEE + HCE + SCE (8)

2.1.11.1 Why should Intellectual Capital be Measured

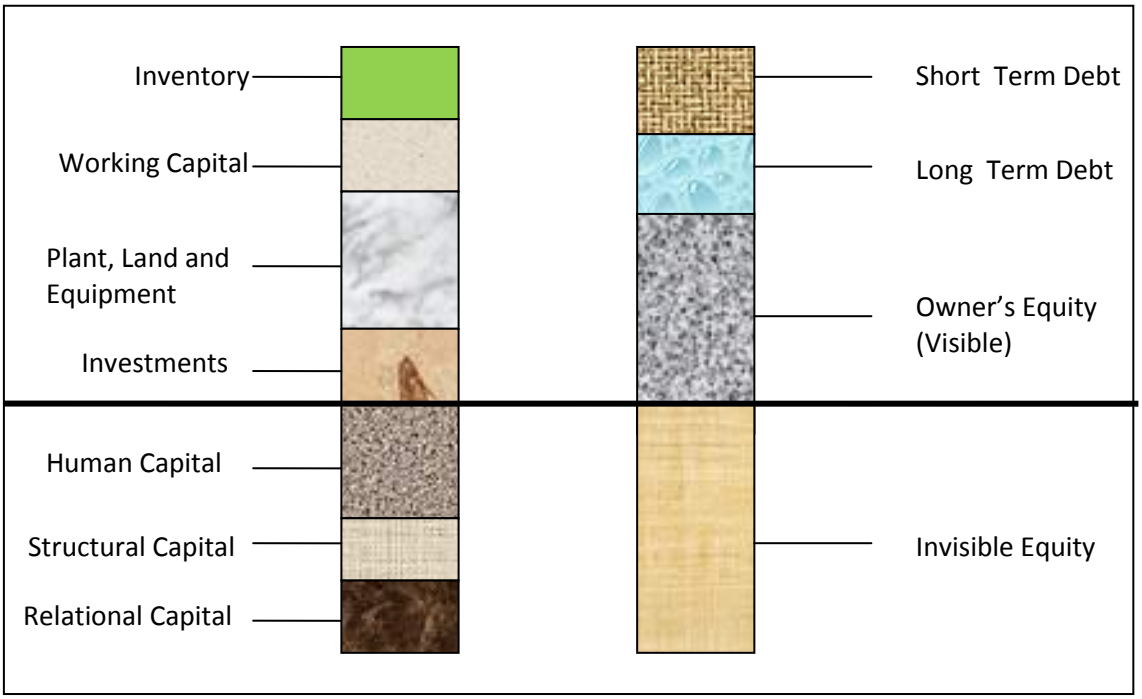
A review of several research papers that studied intellectual capital measurement related issues found five (5) generic reasons as the purpose of measuring intellectual capital: (Marr, Schiuma & Neely, 2003)

- to help organization formulate their strategy.
- to evaluate strategy execution
- to assist in the firm's diversification and expansion decisions
- for use as a basis for management compensation
- to communicate with external shareholders

The first three of these purposes relate to internal decision making – the purpose is maximizing operating performance for generating revenues at the lowest cost and the sustainability of supplier and customer relations and market share. The fourth point relates to the executive incentive scheme and the fifth relates to signaling motivations to external stakeholders. There are various other studies that have concluded likewise that intellectual capital measurement is necessary and beneficial for both efficient internal governance and succinct external communications. This is also quite obvious from the diagram in figure 1. If the primary objective of all for-profit companies is to effectively manage their future cash flows, then they need to manage the ultimate drivers of these cash flows - the intangible assets. Since you cannot manage what you cannot measure, their measurement becomes quite important, if not absolutely necessary.

Modern accounting systems however are designed exclusively, barring a few exceptions, for measuring and reporting tangible assets. This creates the phenomena of the invisible Statement of Financial Position. Look at the figure 5 below, showing the Statement of Financial Position of a typical firm.

Figure 5: Market Valuation of a Firm Equals Visible Plus Invisible Equity.



Source: Marr, Schiuma & Neely, 2003

Everything that appears below the solid horizontal line represents the invisible assets of the firm. This is balanced on the right hand side by a corresponding invisible equity. We already know that the market value of most public companies is considered higher than their corresponding book value, which represents only the tangible assets of the firm. Looking at figure 5 we can now easily understand why this is the case.

The invisible equity of a firm can be considerably large depending on how effectively the firm is harnessing its intellectual capital. For companies in the services sector, it is disproportionately large in comparison to physical assets. Even for companies in the manufacturing and agriculture sectors, investment in intangible assets is increasing as compared to those in tangible assets, signaling the increasing importance of intellectual capital as a key growth driver in the knowledge era (Marr, Schiuma, and Neely, 2003).

2.1.12 Why is Intellectual Capital so Hard to Measure?

The first reason is historical.

Accounting rules, although revised on a regular basis, were initially designed for assets such as plant or machinery - tangible things that represented a source of wealth during the industrial age (CIMA, 2001; Wall, Kirk & Martin, 2004).

Second, some intangibles are hard to measure. Creativity, for example, is at the heart of a knowledge-generation process yet is essentially an unpredictable process with unpredictable outcomes. It can manifest itself in many ways. For companies such as Sony and 3M, product and process innovation play a key role in market differentiation (CIMA, 2001; Wall, Kirk & Martin, 2004).

Third, the idiosyncratic nature of IC.

What is valuable for one company may be worthless for another. This has resulted in diverse measuring systems that make comparability across companies and sector difficult (CIMA, 2001; Wall, Kirk and Martin, 2004).

Finally, intellectual capital can have two dimensions. (CIMA, 2001). The meritum guidelines distinguish between intangible resources and intangible activities as a way of highlighting IC’s static or dynamic character:

> *"The intangible resources of a company, a static notion, can be measured at any given time. Thus worker competencies (human capital), intellectual property rights (structural capital), customer satisfaction or agreements with suppliers (relational capital) would be considered under this category.*
> *Intangible resources can also be analyzed in a dynamic sense. Companies are undertaking activities to acquire or internally produce intangible resources, to sustain and improve existing ones and to measure and monitor them. These dynamic activities thus imply an allocation and use of resources that are sometimes not expressed in financial terms and consequently, may not appear in the corporate financial reports".*

This dynamic nature of IC means that its individual components are often not valuable by themselves but work only as a system. In other words, it is the intellectual capital elements interacting that generate value for companies. For example, a company may have good programming skills that enable it to build software. However, they might be worth little unless accompanied by a strong distribution network, loyalty and commitment from its employees and a powerful brand name. This dynamic combination of intangibles is often the recipe for success in companies such as Microsoft, where the value of its intellectual capital is more than the sum of its individual parts (CIMA, 2001; Marr, Schiuma & Nelly, 2003; Wall, Kirk & Martin 2004).

2.1.13 WHY SHOULD YOU MANAGE INTELLECTUAL CAPITAL

Traditionally, the only intangible assets recognized in financial reporting statements were intellectual property, such as patents and trademarks, and acquired items such as goodwill. Although it is still not possible to assign monetary values to most internally generated intangible assets, they nevertheless need to be considered if the process of value creation is to be properly understood. Failure to do so can have damaging consequences at all levels (CIMA, 2001). For an individual firm, not understanding how value is generated can lead to inefficient resource allocation. It means the company does not fully understand its business model and may therefore be unable to assess the value of future business opportunities. On a wider scale, it can lead to anomalous market behavior: if the markets don't get the information they need through "official" channels they may resort to rumours and speculations, which could lead to volatility. There may also be a misallocation of resources on a macro level in terms of market investments (CIMA, 2001; Dipiazza & Eccles, 2002). Some go as far as to say that the lack of understanding of intellectual capital by market participants contributed to some of the spectacular market failures in the

past few years (Holland, 2002). Marconi in the UK and Enron in the US are both examples of how rapid change in the company value-creation processes created systemic problems in the market for information. In both cases, the company value-creation processes switched out of heavy use of tangible (Enron in physical energy production, Marconi in electrical goods and defence) into a perceived increased use of intangibles (energy-trading skills, provision of high-tech services). This sudden switch may have contributed to confusion among analysts and investors (CIMA, 2001; Hauschild, Licht & Stein, 2001). Companies that measure and report intangible may experience substantial gains. For example, Leif Edvinsson, former corporate director for intellectual capital at Sweddish financial services company Skandia AFS, claims that a reduction in the cost of capital of 1 percent was directly attributable to the company's ability to measure and report its intangibles (CIMA, 2001; Edvinsson & Malone, 1997).

As long as it is relevant and timely, additional information helps investors to assess a company's potential for future earnings, so helping to keep share prices stable. This in turn reduces the risks associated with a company and results in a lower cost of capital (Stewart, 1995). There can be little double that looking beyond the assets reported in financial statements should be a critical exercise for every organization wholly or partly dependent on intangibles for its value creation. Finance professionals should be at the forefront of this process, using their skills and expertise in measurement and control to develop systems capable of accommodating intellectual capital (Stewart, 1995; Neely, Adams & Kennerly, 2001; CIMA, 2001).

2.1.14 MODES AND VALUATION OF INTELLECTUAL CAPITAL (IC) MEASUREMENTS

Performance management and valuation framework have traditionally paid little attention to assessing knowledge, concentrating almost exclusively on financial result (Overell, 2002). When influential authors such as Kaplan and Johnson argued during the 1980s that the finance-dominated performance-management systems were failing to meet the needs of modern companies, a number of seemingly more comprehensive approaches, such as the smart pyramid or performance measurement matrix, were proposed. Although, these represented a step in the right direction, they fell short of explicitly addressing the issue of IC (CIMA, 2001).

The total quality management (TQM) movement with its associated initiatives, such as the EQFM excellence model or the Malcolm Baldridge award, encouraged organizations to examine the "softer" dimensions of their performance such as leadership, employees and impact on society (CIMA, 2001; Marr & Spender, 2004). Business results-expressed in financial terms-still mattered but were to be considered in a wider content of interaction with various stakeholders. However, TQM was primarily developed as a philosophy of business behavior and has limited use in performance measurement. Since then, there has been a proliferation of models, none of which has been put into widespread use except the balanced scorecard. (CIMA, 2001; Meritum, 2002).

Measurement approaches (explained below) are mainly about how companies' measure and report performance internally in order to gain management insights that can help them to run their business. Valuation approaches, on the other hand, are primarily concerned with placing an economic value on firms and their intangibles. They generally take an external view and are designed to help analysts or investors assess the financial value of an organization (Meritum, 2002).

Generic Models

2.1.14.1 Balanced Scorecard

In 1992, Robert Kaplan and David Norton pioneered their balanced scorecard (BSC). Since then, it has become a model for many of the reporting systems that include non-financial measures (Kaplan and Norton, 2002). Over the past decade, the balanced scorecard has evolved from being a measurement framework to being a strategy implementation tool. It represents a set of cause-and-effect relationships among output measures and performance drivers in the four perspectives: (Kaplan & Norton, 2002)

Financial measures: how do we look to shareholders, for example, cash flow and profitability.

Customer measures: how do our customers see us, for example, price as compared with competitors and product ratings?

Internal process measures: what must we excel at, for example, length of cycle times and level of waste?

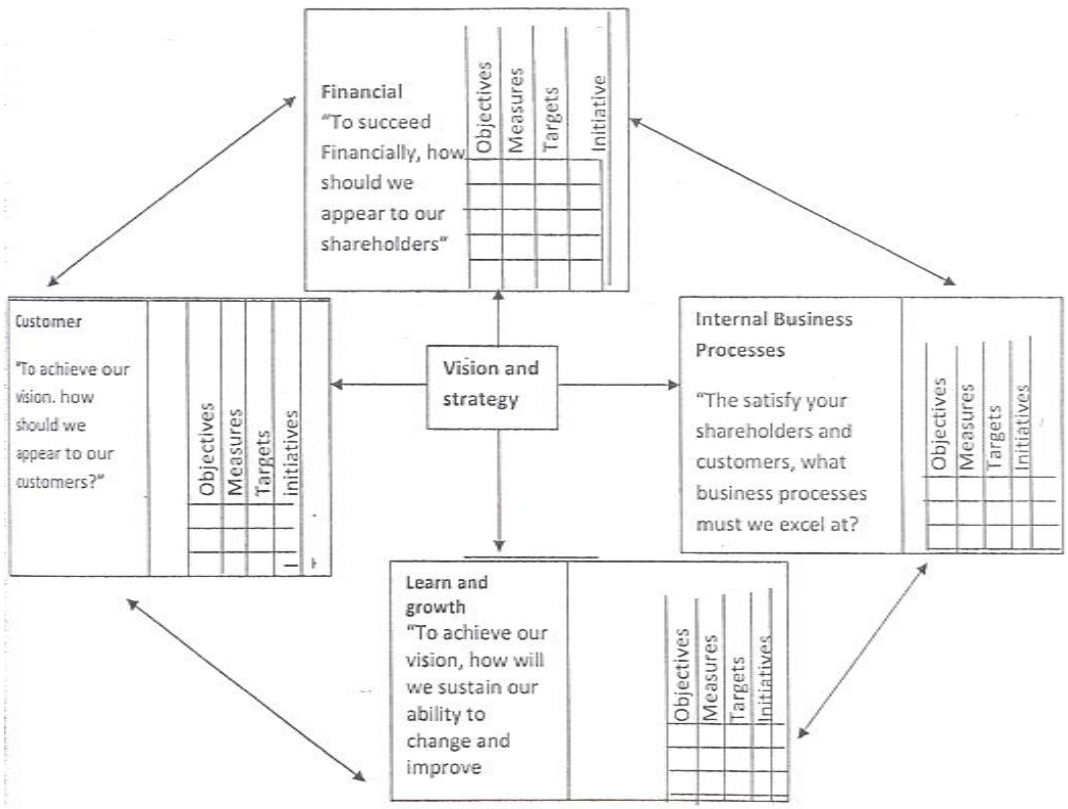
Learning and growth measures: can we improve and create value, for example, percentage of sales derived from new products?

Today, Kaplan and Norton stress the importance of visualizing casual relationships of measures and objectives in so-called strategy maps. These are essentially communication tools that visualize an organization's strategy and the processes and system needed to implement it (Kaplan & Norton, 2002).

Although Kaplan and Northon insisted that companies should select their own measures, many have criticized the BSC model for being too limited. For example, the perspectives fail to address the needs of all an organization's stakeholders and the execution may be too driven from the top for it to be effective (CIMA 2001). It has also been said that some of the relationship between the four perspectives are more logical than causal. (Kaplan & Norton 2002).

Pricewaterhouse Coopers, in the recent book "building Public Trust", has disclosed the findings of an unpublished survey in which 69 percent of executives reported "that they had attempted to demonstrate empirical cause-and-effect relationship between different categories of value drivers and both value creation and future financial results. Less than one-third of these felt they had truly completed the task; this suggests its difficulty" (CIMA, 2001).

Figure 6: The Balanced Score Card

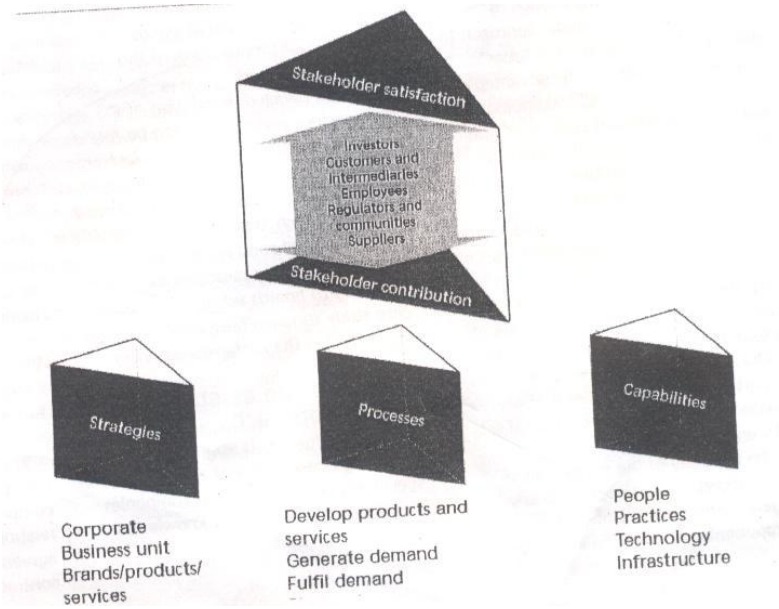


Source: (Kaplan & Norton, 1996)

2.1.14.2 Performance Prism

The performance prism (see figure 7) is a second-generation performance measurement and management approach developed by Cranfield school of management in collaboration with consultancy Accenture (CIMA, 2001; Marr, Schiuma & Neely, 2003). It recognizes the importance of companies taking a holistic approach to stakeholder management in today's culture of involvement. Its advantages are that it addresses all stakeholders -not only investors but customers and intermediaries, employees, suppliers, regulators and communities. It does this in two ways: by considering the requirements of those stakeholders and, uniquely, what the organization wants and needs from its stakeholders. In this way, the reciprocal relationship and the exchange process with each stakeholder is examined (CIMA, 2001; Wall, Kirk & Martin, 2004). The performance prism addresses the strategies, processes and, importantly, the capabilities that are needed to satisfy these two critical sets of wants and needs. The flexibility of the performance prism allows it to be applied to any organization or organizational component (CIMA, 2001). The focus on intangible framework is useful for companies attempting to measure their intellectual capital. Also, it creates a visual map of how the different areas of performance interrelate. It explicitly acknowledges that all five facets of the performance prism should be covered in a so-called success map. This way, it avoids the often-criticized narrowness of the balanced scorecard (CIMA, 2001; Marr, Schiuma & Neely 2002; Marr, Schiuma and Neely 2003; Wall, Kirk and Martin, 2004).

Figure 7: Performance Prism



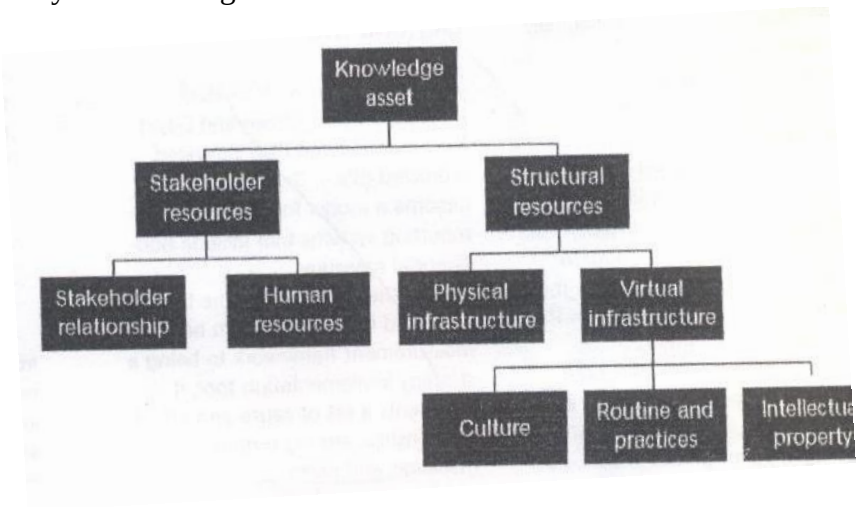
Source: CIMA 2001

2.1.14.3 Knowledge Assets Map Approach

The knowledge assets approach takes a knowledge-based view of a firm. It was specifically designed to help companies identify and measure their knowledge-based assets and their contribution to value. Having identified the critical knowledge assets, they can easily be integrated into broader frameworks such as the performance prism (CIMA, 2001; Windle, 2001).

Knowledge assets are identified as the sum of two organizational resources: stakeholder and structural. This distinction reflects the two key components of any enterprise: its actors, who can be internal or external, and its constituents parts, or the elements at the basis of an organization processes (CIMA, 2001; Marr, Schiuma & Nelly, 2003)

Figure 8: Hierarchy of knowledge assets



Source: CIMA 2001

Stakeholder resources are divided into stakeholder relationship and human resource - the external and internal actors of a company. Structural resources are split into physical and virtual infrastructure, which refers to their tangible and intangible nature. Finally, the virtual infrastructure is further divided into culture, routines and practices, and intellectual property.

Stakeholder relationships include all forms of relationship established by the company with its stakeholders. These relationships could be licensing agreements, financial relationships, or contracts and arrangements about customer loyalty, which represents a fundamental link between the company and one of its key stakeholders.

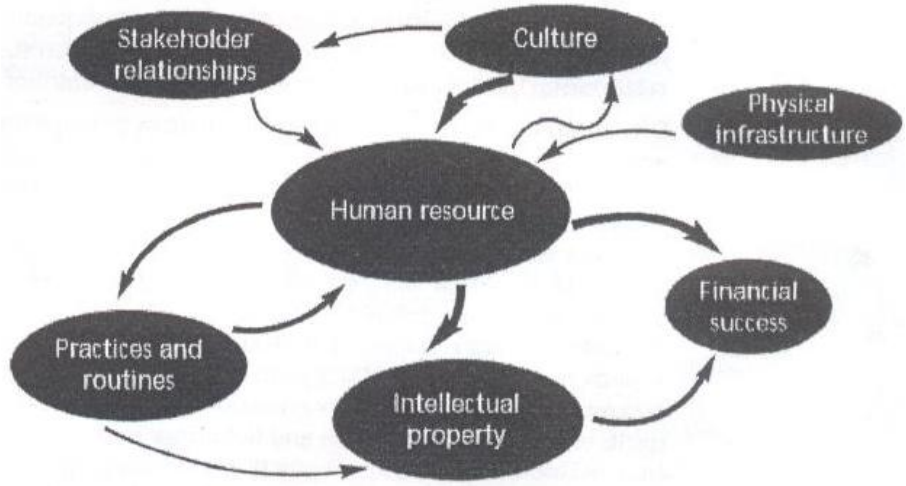
Human resources contain knowledge provided by employees in forms of competencies, commitment, motivation and loyalty as well as advice. Key components are also know-how, technical expertise, problem-solving capacity, creativity, education and attitude.

Physical infrastructure comprises all infrastructure assets, such as structural layout and IT equipment such as computers, servers and physical networks. This category is often overlooked as knowledge assets but plays a key role in how knowledge is shared.

Culture embraces corporate culture and management philosophies. Some important components are the organization's values, mission and vision. Culture is of fundamental importance for organizational effectiveness and efficiency, since it provides a framework, sometimes implies, through which to interpret events.

Routines and practices cover internal practices and virtual networks and routines. These routines could include tacit rules and procedures, such as manuals with codified procedures and rules, databases and tacit rules of behavior or management style. They determine how processes are handled and how work flows through the organization (CIMA 2001; Marr, Schiuma & Nelly, 2003). Intellectual property is the sum of patents, copyrights, trademarks, brands, registered designs, trade secrets and processes whose ownership is granted to the company by law. These are the tools and enablers that allow the company to perform its daily processes to produce results. This framework can be used to help identify knowledge assets, which can then be the basis for visualization of how these assets are interrelated and transformed to satisfy stakeholders' needs. Such a visualization is called a **value creation map** (see figure 9) and it shows the pathways of how value is created in organizations (CIMA 2001; Marr 2003). Knowledge assets are represented in bubbles linked with arrows. The size of individual bubbles represents stocks of particular knowledge assets in terms of strategic importance and arrows of different thickness show the transformations and relationships between knowledge assets and stakeholder needs (Roos and Roos 1997 in CIMA 2001; Marr, Schiuma & Nelly, 2003). A map can be used to visualize the static and dynamic nature of IC and how it adds value to different stakeholders.

Figure 9: Value Creation Map



Source: Marr, 2003

It is possible to provide a wide range of indicators for each of the categories listed: It is up to the management team to identify the most meaningful ones.

Care needs to be taken when selecting the metrics. Many of those proposed in accounting literature tend to be generally and fail to address the types of knowledge that play a critical role in value delivery for individual companies (Marr, Schiuma & Nelly,, 2003). Managers need to start by recognizing that knowledge assets are unique to each company and the metrics selected should therefore reflect this (see table 1).

Table 1: Knowledge assets indicators

Knowledge assets indicators	
Stakeholder relationships	Number/quality of partnering agreements; number/quality of distribution agreements; number/quality of licensing agreements; public opinion survey; market share; length of relationship; partner satisfaction index; customers retention.
Human resources	Demographics indicators, for example, number of employees; number of employees in alliances; average years of service with company; average age of employees; full-time permanent employees as percentage of total employment; employees working at home/total employees; number of women managers. Competence indicators, for example, employees with high qualifications; people with PhD and/or masters degree/total employees; average years of service with the company; number of years in specific professions; definition of a competence map. Attitude indicators, for example, average level of happiness (measured with likert-type scale); savings from implemented suggestions from employees; number of new solutions, products and processes suggested; qualitative descriptions of employees (commitment, loyalty, entrepreneurial spirit, enthusiasm); motivation and behavior indicators. Human resource management practices indicators, for example, training expenses/employees; employee turnover; time in training; expenses for employee-development activities (social and personal); indicators about activities to motivate employees; indicators about recruitment practices.
Physical infrastructure	Scalability/capacity measures, facilities/equipment versus plan; time to execute server updates; system integration, use of knowledge-sharing facilities.
Culture	Management philosophy; number of internal disputes and complaints; qualitative measures about employee satisfaction, feedback; values; behavior; motivation; commitment; loyalty; opinion survey.
Practices and routines	Process quality; number of codified processes; networking practices; norms, database availability; intranet use.
Intellectual property	Revenues from patents; number of patents and registered designs, value of copyrights, value of patents versus R&D spend; trademarks; brand recognition survey.

Source: Marr, Schiuma & Nelly,2003

Individual company Models

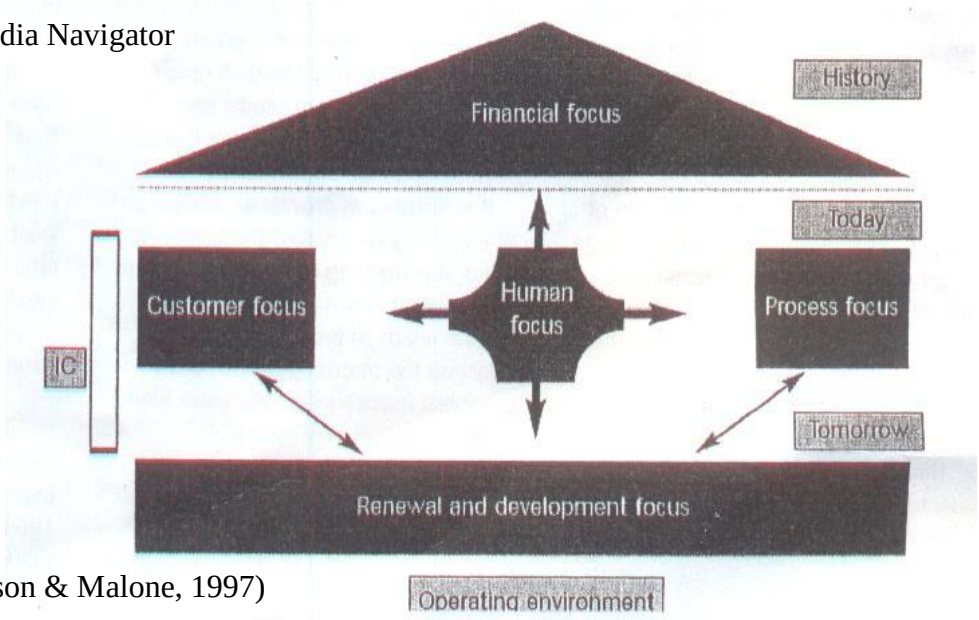
Some companies, notably from Scandinavia, have developed their own measurement models. It should be pointed out that all those mentioned derive at least a part of their income from consultancy and therefore have a commercial interest in promoting their models (Meritum, 2002). Elsewhere the development and use of IC models is patchy. Mainland Europe is probably the least advanced, with the UK and US a little further ahead. Pacific Rim countries such as Australia and Japan, on the other hand, have recently made strong advances (CIMA 2001).

2.1.14.4 Skandia Navigator

Skandia's navigator model, was developed in 1994 at the Swedish financial services company, Skandia, by a team led by Leif Edvinsson (Edvinsson & Malone, 1997). It reflects four key dimensions of its business: financial focus; customer focus; process focus; and renewal and development focus. At the heart of these is human focus, which drives the whole model (Edvinsson & Malone, 1997).

The similarity with the balanced scorecard is immediately apparent. Indeed, Sveiby (2001) sees the navigator as a combination of BSC and Celemi's intangible assets monitor. Edvinsson says that the navigator can be viewed as a house. The financial focus is the roof. The customer focus and process focus are the walls. The human focus is the soul of the house. The renewal and development focus is the platform. With such a metaphor, renewal and development become the critical bottom line for sustainability" (see figure 9 (Edvinsson & Malone, 1997).

Figure 10: Skandia Navigator



Source: (Edvinsson & Malone, 1997)

Each of the five focuses has critical success factors that are quantified to measure change. The indicators used for the financial focus are largely represented in monetary terms. Customer focus concentrates on assessing the value of customer capital to the organization and makes use of both financial and non-financial indicators. The measures used for the process focus emphasize the effective use of technology within the organization. They tend to monitor quality processes and quality management system but also include some financial ratios.

The renewal and development focus attempts to capture the innovative capabilities of organization, measuring the effectiveness of its investment in training and its expenditure on Research and Development (R & D).

Finally, the human focus includes measurements that reflect the human capital of the organization and how the resources are being enhanced and developed. Measurements from the five focuses can then be recorded and compared from year to year.

2.1.14.5 Ericsson's Cockpit Communicator

Ericsson, the Swedish telecommunications company, has developed a commercial product called the cockpit communicator, based on the balanced scorecard and with five very similar perspectives: innovation, employee, process, customer and financial. (CIMA 2001)

Each is represented as the dials in an aircraft cockpit and each has its own indicators. Following inputs relevant to each indicator, the communicator suggests the actions that will match the organization's strategies. The dials will subsequently show if the company is on target in each perspective (CIMA 2001). According to Ericsson in CIMA (2001), the aims of this product are:

- a vision-driven organization, that are compatible with the company's strategies;
- a communicated strategy linked to indicators and actions;
- a balanced focus on part, present, and future performance;
- a balance between short-term results and long-term strategy;
- the ability to evaluate and change organizational strategy rapidly in line with performance and changing business conditions;
- the ability to manage, measure and communicate future values.

2.1.14.6 Celemi's Intangible Asset Monitor

International training consultancy Celemi monitors three overall categories: (CIMA 2001) Customers (external structure); people (competence); and organization (internal structure). Under each of these interdependent categories, the three keep areas of growth/renewal, efficiency and stability are tracked, each with its own performance indicators (See table 2) Celemi also produces a management training game called Tango which uses intangible assets monitor thinking and accounting (CIMA 2001)

Table 2: Celemi's Intangible Assets Monitor

Our customers (external structure)	Our structure (internal structure)	Our people (competence)
Growth/renewal	**Growth/renewal**	**Growth /renewal**
Revenue growth	Organization-enhancing customers	Average professional competences years
Image-enhancing customers	Revenues from new products R & D revenues Intangible investments (%value added)	Competence- enhancing customers Growth in professional competence Expert with post-secondary degree
Efficiency	**Efficiency**	**Efficiency**
Revenues per customer	Proportion of admin staff Revenues per admin staff	Value added per expert Value added per employee
Stability	**Stability**	**Stability**
Customer satisfaction index	Admin staff turnover	People satisfaction index
Repeat orders	Admin staff seniority (years)	Median age of all employees (years)
Five largest customers	Rookie ratio	Expert seniority (years) Expert turnover

Source: "uncovering Hidden Assets" Celemi Annual Report, 1999

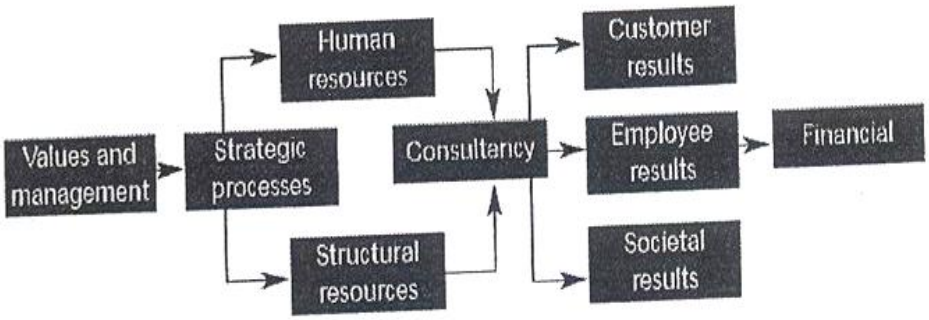
2.1.14.7 Ramboll's Holistic Company Model

As with other Nordic models, Ramboll's holistic company model (See figure 11) consists of key areas within which certain performance indicators are managed (CIMA 2001). These key areas lead to three sets of results - customers, employee and societal - and all three combined to produce the financial results. The key areas are values and management,

strategic processes, human resources, structural resources and consulting services. For example, the performance indicators for human resources are staff composition, staff turnover and competence building (CIMA 2001). These key performance indicators (KPIs) are then further subdivided. The ones for competence building, for example, are supplementary training expenses excluding salary, the amount spent per course participant and the hours off contributed by employees (CIMA 2001).

Table 3 below provides a list of possible human, organizational and customer capital indicators, but measurements will always be company-specific.

Figure 11: Ramboll's holistic company model



Source: CIMA 2001

Table 3: Ramboll's holistic company model list of indicators

Human capital indicators	Organizational capital indicators	Customer capital indicators
Revenue generated per employee	Income per Research & Development expenses	Growth in sales volume
Number of senior positions filled by junior staff	Individual computer links to database	Revenues per customer
Recruitment, development and training spend per employee	Number of times database has been consulted	Proportion of sales to repeat customers
Employee satisfaction	Upgrades of database	Effectiveness of advertisement campaign
Staff turnover	Upgrades of SOPs	Brand loyalty
Educational level of staff	Value of new ideas	Brand image
Staff with professional qualifications	Ratio of new ideas generated to new ideas implemented	Product returns as a proportion of sales
New ideas generated by staff	Number of new product introductions	Customer complaints
Value added per employee	New product introductions per employee	Reputation of company
Post-training evaluation exercise-benefits accrued	Proportion of income from new product introductions	Proportion of customer's business that your product or service represents
Proportion of revenue-generating staff to other	Number of patents	
Image of company from employee's perspective	Average length of time for product design and development Changes implemented due to employee or customer satisfaction surveys IT expenditures as a percentage of administration spend	

Source: CIMA 2001

All of the above indicators are either numerical or can be represented numerically, for example, company image can be rated from 1, for poor, to 10, for excellent. Therefore indicators provide figures that can be compared from year to year. Where the indicators give a financial figure they represent a link between the non-financial and financial dimensions. For example, the innovative capabilities of staff (new ideas) can be measured by assessing the value of new ideas to the organization (money saved or money earned). Skandia Banken (Part of the Skandia Group) makes an interesting measure - an expense ratio that compares the cost of knowledge transfer to overall operating expense (Lynn,

1998). The key is in identifying appropriate measurement techniques and indicators that show how value has been created.

2.1.14.8 Bates Gruppen Company IQ Measurement System

Bates Gruppen is the Norwegian arm off Bates Worldwide and part of the Cordiant Communications Group. It has recently proposed a method that consists entirely of non-financial measures. The company IQ allows a company to score its knowledge assets against those of a similar organization (CIMA 2001).

Stage One

Identify why customers buy from your company as opposed to a rival. This is best done in a day workshop in which management select between eight and twelve attributes – for example, rapid response or good design. The final list is sent to customers and employees who rate each attribute twice, once for its value to customers and then for its uniqueness. A scale of one to seven is used. The results are plotted on to a two-by-two matrix. Any attributes that make it into the top upper-right quadrant i.e. are high on value and uniqueness – will be explored further.

Stage Two

Identify the intellectual assets that produce star attributes – Bates Gruppen in CIMA (2001) has identified 100. Ideally, these should be divided as equally as possible between human, customer and structural IC assets. All of these assets must either be measurable in absolute terms, for example, training expenses, or capable of measurement using scales, for example, customer satisfaction. At least 60 percent of the assets identified should be comparable to data from reputable benchmarking studies or from the PIMS database - a huge repository containing data on items such as quality for thousands of companies (CIMA 2001)

Stage Three

It is now possible to calculate your company IQ. Scores on the 100 selected assets must first be weighted for relative impact on profitability (available from PIMS) then compared with similar companies on the chosen database. Bates Gruppen in CIMA (2001) has selected a median score of 100.

> The process does not stop at stage three. As with any measurement system some form of feedback has to be built into the system for a company to remain competitive. The strength of assets within the 100 can be identified and weaker ones improved (CIMA, 2001).

This method is more than just a measurement system. It requires an organization to identify its highly valuable, unique capabilities and the intellectual capital assets behind them.

While calculating its IQ, a company may find it is producing goods or providing services that are similar to those of a competitor or contain features that add little value to customers. This system requires a great deal of work initially, including gathering data from employees and customers who may provide hastily compiled information of little use. It may also be difficult for a company to divide its knowledge assets equally between the three types of intellectual capital, meaning that some are incorporated to make up the numbers while others are excluded. The suggestion that at least 60 percent of the indicators are comparable to those from other companies still leaves a lot open to subjectivity. (CIMA 2001).

Valuation of IC

Valuation approaches were developed to allow external parties or stakeholders to organization. They are usually based on publicly available data and are mostly used by finance professionals (Merritum Guidelines, 2002).

2.1.14.9 Value Added Approach

This measurement and valuation technique was proposed by Robinson and Kleiner (1996) and comprises a framework of two parts:

The first part uses Porter's value chain industrial perspective, is that raw materials enter from one end of the chain and, as they go through the processes that will eventually convert them into finished goods, value is added to them. Production is not the only function involved as the raw materials have to be procured and the finished goods marketed and sold (Robinson & Kleiner 1996). The whole procedure also has to be administered and managed. The key point is that all of these internal functions should serve the overall purpose of the organization (Robinson & Kleiner 1996). The second part

of the framework is borrowed from the economic value added (EVA) theory, which has its roots in corporate finance and was developed by stern Stewart, a new York-based consultancy. If the return on capital for any project is greater than the cost of capital then the company should proceed with it (Robinson & Kleiner, 1996). The basic objective of EVA is to develop a performance measure that accounts for all the ways in which organizational value can be added or lost (Stewart, 1997).

Robinson and Kleiner (1996) proposed combining Porter's concept and EVA so that the financial project evaluation approach, which relies on value creation, should be applied to all of the internal processes of the value chain. The unfortunate difficulty is that many of the internal processes are in the form of intellectual capital and are not readily measurable" (Stewart 1997). To overcome this barrier, Robinson and Kleiner (1996) have come up with several suggestions, which includes that measuring intellectual property (patents, licenses) at their current market value; with the use of Hay method (which is named after the Hay group, a global personnel consultancy) in measuring human capital whereby job categories and their related salaries are evaluated by measuring know-how, problem-solving and accountability; the use of ratios such as training per employee, number of ideas per employee and other productivity/employee ratios; measuring the ability of an organization to learn and adapt to changes in the environment.

Porter's value chain concept and EVA are both well established and combining them to assess how key activities create value within an organization has clear benefits (Robinson & Kleiner 1996). It should eliminate any wasteful activities and lead to the maximum amount of value being added to a product or service (Robinson & Kleiner 1996).
Robinson and Kleiner's suggestions to overcome this shortfall of providing clear valuations for all "soft assets, so their proposal should be seen as more of a framework to be used if and when a reliable method of measuring intellectual capital is agreed (CIMA 2001).

2.1.14.10 Value Creation Index

The value creation index attempts to measure the importance of different non-financial metrics in explaining the market value of companies (Meritum 2002). It followed a survey of readers of Forbes ASAP, the technology supplement of US business journal Forbes, in which they were asked to rank the key drivers of corporate value in their industries. Publicly available information was then used to develop a series of metrics associated with those value drivers and the correlation between the metrics and share prices was tested (Meritum 2002). The aim was to discover what factors the market considers important rather than just what managers say is important (Meritum 2002). The survey revealed the following key findings: Key drivers of corporate value (in rank order): (Meritum 2002)

1. customer satisfaction
2. Ability to attract talented employees
3. Innovation
4. Brand investment
5. Technology
6. Alliances
7. Quality of major processes, products or services
8. Environmental performance

The authors compared these findings with those of their own research. Key drivers of corporate value in durable manufacturing (in rank order):

1. Innovation
2. Ability to attract talented employees
3. Alliances
4. Quality of major processes, products or services
5. Environmental performance
6. Brand investment
7. Technology
8. Customer satisfaction

This kind of rigorous analysis, especially the attempt to correlate metrics with capital markets, is in stark contrast to simpler measurement techniques. However, the statistical and data gathering techniques required are daunting and few corporate teams have the time, skill or inclination to incur the necessary costs. Nevertheless, it offers two important insights:

What management (and perhaps users) consider important may not coincide with marketplace behavior. For example, customer satisfaction does not have the impact in the marketplace that managers tend to assume it has (Meritum 2002). The value creation index attempts to develop different indices for different industries. This is consistent with the view now widely held in IC circles that non-financial performance metrics must be company-or industry-specific (CIMA 2001; Meritum 2002).

2.1.14.11 Market or Value-based Approach

A simple way of calculating the value of an organization's intellectual capital is to take the difference between its market value - the number of shares in issue multiplied by the market value of the share and the net value of its assets. This can be done with a minimum of information and the gap between the two figures, the market-to-book ratio, is often used as an indication that a company has many intellectual capital assets that are not reflected in its financial statements.

There are several drawbacks to this method. The most obvious flaw is that this method values IC as one asset and makes no attempt to separate the items that might comprise it.
In addition, the market value of a company is subject to a number of external variables, including deregulation, media and political influences and rumours. You only have to look at the overvaluation of some of the earliest dotcoms to go public and the subsequent dramatic drop in their share values. In the case of lastminute.com, the share price fell by 90 percent in less than 18 months, yet there was little change in the company's intellectual assets.

The current financial accounting model also does not attempt to value the firm in its entirety. Instead, it records each of its severable assets at an amount in accordance with current legislation and the financial accounting standards. The market, however, would value the company in its entirety as a going concern. This means the figure for intellectual capital would differ simply by the adoption of different accounting policies across national boundaries.

2.1.14.12 Tobin's q

The "q" developed by economist James Tobin stands for the ratio of the market value of the firm to the replacement cost of its assets. If the latter is lower than the former, then the

company is making a higher than normal return on its investment. Technology and human capital assets were traditionally associated with high q values.

It could be argued that Tobin's q is more accurate than the market-to-book method because it uses replacement, rather than historic, costs. However, finding these replacement costs is more difficult than simply referring to a statement of financial position. The model is also subject to the same drawbacks as previous ones, since it uses the market value as one of its key measures.

Tobin's q cannot provide an accurate figure for individual intellectual assets. Its real value lies in trend analysis: If the q is falling, either the company is not managing its intellectual assets effectively or investors' sentiment has moved against it.

2.1.14.13 Calculated Intangible Value

Calculated intangible value (CIV) is similar to the super-profits method of valuing a company - the difference between the maintainable profit and the expected return on the tangible assets employed. Stewart (1995) illustrates the method by using data from US pharmaceutical company Merck:

Stage One

Calculate average pre-tax earnings for three years - $3.694 billion.

Stage Two

Go to the statement of financial position and get the average year end tangible assets for three years - $12.953 billion

Stage Three

Divide earnings by assets to get the return on assets (ROA) – 29 percent.

Stage Four

For the same three years, find the industry's average ROA. For pharmaceuticals the average is 10 percent (This method will not work if the ROA is below average).

Stage Five

Calculate the "excess return". Multiply the industry average ROA by the company's average tangible assets – 10 percent x $12.953 billion. This is what the average drug company would earn from that amount of tangible assets. Subtract that from the company's pre-tax earnings, which in the case of Merck would give an excess of $2.39

billion. This is how much more that company earns from its assets than the average drug manufacturer.

Stage Six

Calculate the three-year average income tax rate and multiply this by the excess return. Subtract the result from the excess return to get an after tax figure. This is the premium attributable to intangible assets. For Merck, with an average tax rate of 31 percent, this is $1.65 billion.

Stage Seven

Calculate the net present value (NPV) of premium. This is done by dividing the premium by an appropriate percentage, such as the company's cost of capital. Using an arbitrarily chosen 15 percent rate, this yields Merck $11 billion. This is the CIV of Merck's intangible assets.

This final figure is not the amount left were you to subtract the tangible assets from the market value of Merck, which at the time of calculation would have been $45.6 billion. Rather, the $11 billion reflects a measure of the company's ability to use its intangible assets to outperform other companies in its industry. A rising CIV indicates that a business is generating the capacity to produce future wealth — even if the market hasn't recognized it yet. A weak or falling CIV may point to the fact that a company's investments in intangibles aren't paying off or that too much is still being spent on tangible fixed assets.

A major benefit of CIV is that it allows inter and intra industry comparisons on the basis of audited financial results. As with other methods that provide ratios, there is also the potential for setting benchmarks and spotting trends.

But there are problems. First, it adopts the industry ROA as a basis for determining excess returns and, as averages tends to suffer from outlier problems, there could be excessively high or low ROAs. Second, the company's cost of capital will determine the NPV of intangible assets. Calculating the industry average to counter this will result n the same problems as the adoption of an average industry ROA. It is also impossible to separate IC from goodwill using the resulting value, so the method fails to evaluate the individual components of IC.

2.1.14.14 Matching assets to earnings - the Baruch Lev method

Baruch Lev, professor at Stern School of Business, New York University, has proposed a method of matching earnings with assets that generate them. The calculation uses expected after-tax returns on assets - two are averages and one (for IC assets) is formulated using

correlations between return on equity and cash flow, traditional earnings or knowledge earnings.

Stage One

Take average annual earnings for a company. Lev suggests using three years of past earnings and three years of earnings provided by the consensus forecasts of analysts. For the sake of this example, assume they are $1 billion.

Stage Two

See what the balance sheet has in the way of financial assets. Assume they are $5 billion. Then take the expected after-tax return on financial assets, which is approximately 4.5 per cent. Therefore the $5 billion worth of financial assets explains $225 million of the earnings.

Stage Three

Now turn to the physical assets of the company and again assume they are worth $5 billion. Using the average after-tax return for physical assets, which is approximately 7 per cent, $350 million of earnings can be credited to them.

Stage Four

This leaves a balance of $425 million that must have been produced by assets not on the statement of financial position, which Lev calls knowledge-capital earnings. These earnings are then divided by an expected rate of return on knowledge assets, which has been worked out at 10.5 per cent (see notes below).

Stage five

Using the formula:

$$\frac{\textbf{Knowledge capital earnings}}{\textbf{Knowledge capital discount rate}}$$

It can now be assessed that, to produce $425 million in earnings, this imaginary company would need $4.06 billion of intangible assets. In order to calculate the intellectual asset discount rate, Lev looked at whether cash flow, traditional earnings or knowledge earnings most correlates with return on equity. He found only a 0.11 correlation between strong returns on equity and cash flows, a 0.29 correlation with traditional earnings and a strong 0.53 correlation with knowledge earnings. This would seem to justify a rate of 10.5 percent that compares with 4.5 percent for financial assets and 7 percent for physical assets.

Like CIV, Baruch Lev's method uses both earnings and assets as data sources rather than relying purely on assets. By matching assets to earnings, organizations would be left with a figure they can use for comparisons with other companies, or for indicating that their own earnings from IC are going up or down. However, like some of the other methods, this one results in a single figure for IC while not attaching values to individual components. The figure of 10.5 percent representing the expected rate of return on knowledge assets could be challenged. The method has also been criticized as being too complex.

2.1.14.15 Human Resource Accounting (HRA)

The aim of human resource accounting (HRA) is not simply to describe the financial accounting aspects of capitalizing expenditure on recruitment, training and development. It is also designed to quantify the economic value of people to the organisation in order to contribute to decision-making, planning and control processes.

As a result, various models have been proposed, all with the underlying rationale of attempting to calculate the contribution each employee makes to the organisation.

According to Bontis, William and Richardson (2000), HRA can provide external information of accounts to users but also has other associated benefits. It allows for internal feedback to the members of the organisation on the accomplishment of strategic goals. It also acts as a starting point to develop future plans and strategies by recognizing the core competencies inherent in a company's unique IC.

However, HRA again relies on human capital alone and, although salaries, wages and the costs of recruitment and training are simple enough to measure, putting value on the growth and accumulation of employee knowledge can prove a lot more difficult.

2.1.14.16 Value-Added Intellectual Capital Coefficient

This method calculates the difference between sales and all inputs (except labour expenses), divided by intellectual capital, which is estimated by total labour expenses. The higher the ratio, the more efficient the company is at using IC assets.

The main advantage of this approach is simplicity. The figures are easy to obtain from any annual report and, once calculated for a year, can be used for inter or intra company comparisons. However, this straightforwardness has many disadvantages. Comparing an organisation's labour expenses to its IC would appear to undervalue IC when compared with other methods such as the market-based approach. Also, a company could be using

its labour resources inefficiently, but this could be masked by a more efficient use of other inputs leading to a similar ratio.

The approaches outlined give a good idea of the range of methods, disciplines and functional specialism employed in measuring and valuing intellectual capital. Only one of these - the balanced scorecard- is in widespread use, while the rest remain too theoretical, too flawed or simply too undeveloped to be accepted universally. Eventually, it may be a combination of these ideas that provides the most practical solution (CIMA 2001).

2.1.15 Knowledge Management

Intellectual capital and knowledge management (KM) should not be confused. It is essential for all companies to maintain and grow their IC stocks, rather than simply measure them and knowledge management is one way of helping them to do this. But the two are quite distinct: KM is a process within a company, whereas IC covers its whole operations.

As with many of the concepts in this area, there is no universal definition of knowledge management. The Gartner group defines it as "a discipline that promotes an integrated approach to identifying, managing and sharing all of an enterprise's information assets. These information assets may include databases, documents, policies and procedures, as well as previously inarticulate expertise and experience resident in individual workers (CIMA 2001).

KPMG came up with a more commonly used definition in 2001: "Knowledge management is a collective phrase for a group of processes and practices used by organizations to increase their value by improving the effectiveness of the generation and application of intellectual capital".

The term "knowledge worker" was first used by management guru Peter Drucker in the 1960s. He rightly predicted that knowledge would become the key economic resources and even called knowledge workers the new capitalists.

But it wasn't until the late 1990s that the craze for all things knowledge management really began. Traditional competitive advantage based on economies of scale was eroded by smaller, nimbler and more ingenious competitors. As the market cap of start-ups soared, companies around the world suspected that their potential for success may reside in the knowledge, expertise and creativity of their employees.

Yet few knew how to use this knowledge in a systematic way in order t gain real business benefits. This created a huge demand for products and services about knowledge management - books, conferences and consultancies were suddenly everywhere.

After the boom came the bust and much of the market cap created in the late 1990s had been wiped out even before Enron and the geopolitical developments sent the world stock markets into turmoil. But knowledge management remains an important concept in an economy dominated by intangibles and there are now signs that it is becoming a part of everyday business infrastructure. Rescued from being a consultant-driven fad, it is no longer seen as an end it itself - something companies could implement as a one-off initiatives or purchase with an expensive piece of software (CIMA 2001).

The misconception that there was a finite stock of knowledge to be "managed", almost always with an expensive IT system, meant that many companies initially overlooked the overall business purpose. In fact, many embarked on knowledge-management initiative without a clear idea of what business benefits they could expect and what else might have to be changed to make them work.
Instead, companies should start off with a clear value proposition that is then driven through every part of the system, including organizational culture.
It has been said that you can't manage knowledge; you can manage only the culture that leads to that knowledge being shared and most would agree that managing culture isn't easy. This is especially true for so-called tacit knowledge (see table 4 below) which cannot be codified or stored.

Tacit explicit knowledge

Some knowledge can be codified through a set of management and technological procedures and put into repositories such as databases or presented on intranets. Some, on the other hand, exists only in the heads of the employees or in the relationships that exist between them.

Sidney Winter presents a classification of knowledge dimensions as a continuum between the two sides of the table below:

Table 4: Tacit explicit knowledge

Tacit	**Explicit**
not teachable	Articulated
not articulated	Teachable
not observable in use	Articulated
Complex	Observable in use
An element of a system	Simple/independent

Source: Winter, 1987 in CIMA 2001

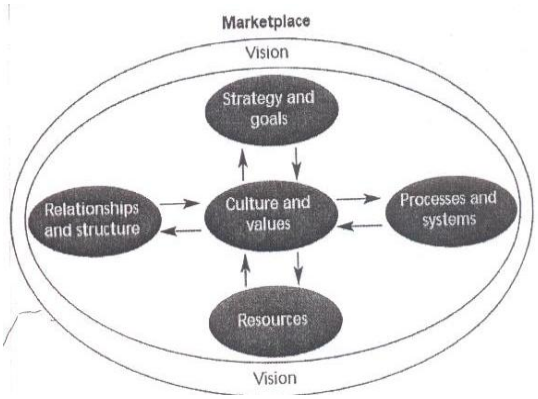
Managing tacit knowledge is usually seen as the more difficult part but many companies also struggle with explicit knowledge. A simple example is intranets, which so many have got wrong. As an internal knowledge-sharing tool, their potential is phenomenal, yet many intranets, which so many have got wrong. As an internal knowledge-sharing tool, their potential is phenomenal, yet many intranets lie unused, with staff relying instead on traditional ways of obtaining information such as social networks or using the phone. This shows the importance of addressing culture as well as structural issues surrounding knowledge management.

How that knowledge is used and shared will depend on the unspoken norms of behavior that constitute organizational culture. It is these, rather than formal systems, that guide many employees' interactions with customers, colleagues and other stakeholders.

The way in which an organization is structured - its myriad formal and informal relationships, the processes and systems used, and the resources at its disposal – will have a major influence on its culture. This can constrain strategy and goals and, consequently, the organization's vision (CIMA 2001).

The elements of the globe expressed in figure 11 combine to create an organization that is aligned to achieve its vision which is, in turn, appropriate for its marketplace and external environment. The interconnectedness serves to emphasise the importance of looking outside as well as inside. You may have a sophisticated knowledge-management system, but if your strategy is wide of the mark or you have failed to assess your risks properly, knowledge management by itself will not give you a competitive advantage (CIMA 2001).

Figure 12: KPMG Organization System Model

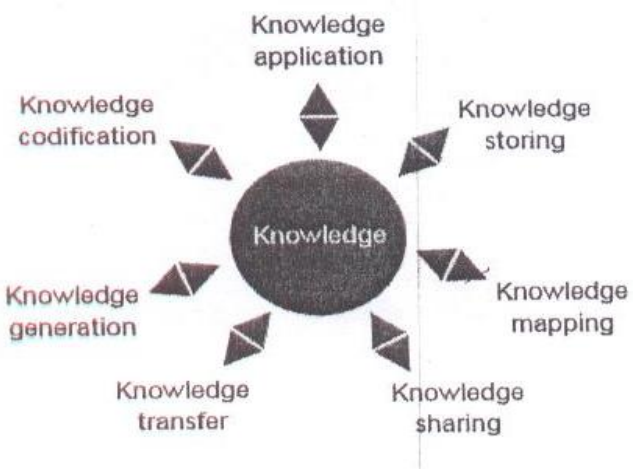


Source: Jensen, 1998 in CIMA, 2001

2.1.15.1 Knowledge Process Wheel

The knowledge process wheel, (see figure 13) developed by Cranfield school of Management's Centre for Business Performance, summarizes a set of knowledge management processes that can be used to grow and maintain IC.

Figure 13: Knowledge Process Wheel



Source: CIMA 2001

Knowledge generation includes a set of processes executed in order to increase the stock of corporate knowledge assets. There are two sub-processes of knowledge generation: knowledge acquisition and knowledge creation (CIMA 2001).

Knowledge acquisition is a process of capturing and bringing knowledge from external environment into company. The simplest way of doing this is to buy it, but knowledge assets can also be rented (for example, paying consultants to resolve specific problems or

building relationships through alliances). Some companies, known as knowledge brokers, specialise in providing support for knowledge acquisition.

Knowledge creation is the process of developing new knowledge assets within the company. As it is linked to individual learning processes, it can be the result of either fortuitous individual activity or planned organisational policy. The most effective way of creating knowledge internally is to encourage employees to be creative and keen to learn by devoting specific resources to these processes. A common way of doing this is to establish units designed for this purpose, such as Research & Development departments.
Knowledge mapping is the process of identifying knowledge assets within an organisation and defining ways of accessing them. Enabling everyone to access existing knowledge makes it easier to create new knowledge assets. Knowledge mapping is usually supported by knowledge storing technologies.

Knowledge sharing is a process that allows knowledge to be disseminated across an organization. Many companies admit that "if they knew what they knew" the benefits would be considerable. There would be less duplication of effort and information used for decision-making would be more accurate. The main obstacle to knowledge sharing is that knowledge often represents a source of power to be guarded jealously. This is especially true in economic downturns, when having unique knowledge can make you indispensable.

Knowledge sharing can be done through either formal or informal processes. The former includes meetings, seminars and workshops, knowledge databases or internal documents. Informal processes include casual discussions between individuals. Companies should encourage such knowledge sharing by providing time, space and social activities for this purpose.

Sharing can also be supported by the right IT infrastructure, such as on-line databases, data warehouses/knowledge repositories, intranets, decision-support tools and shared drives. Companies that have implemented these should remember that their success depends on people actually using them and that IT can only ever be a facilitator or a tool that brings scalability to the process.

Knowledge transferring is the process of passing on knowledge between cognitive systems. A distinction is often made between intra and inter organisational knowledge

transfer. When it takes place within a firm, among different units, groups or individuals, it overlaps with knowledge sharing. When it involves several companies, it shares characteristics with many knowledge-acquisition processes. The main difference is the disparity of use. The former is intended to turn individual/team knowledge into organisational knowledge. The latter works towards creating a channel and a context that enables an organisation to acquire the knowledge from the outside.

Knowledge codification is the process aimed at formalising knowledge into appropriate codes such as words, pictures or film. It involves:

capturing knowledge - identifying knowledge related to an activity needed to achieve a specific business goal;

externalisation — changing the nature of knowledge from a tacit to a more explicit one;

representation — a description of the explicit knowledge with an appropriate set of information codes.

Knowledge storing is the process of saving knowledge within the organisation, thus making it available anywhere at any time. This process is at the heart of knowledge mapping and can take the form of either knowledge databases or directories. In the former, codified knowledge is stored in appropriate information codes. This method is used by many consultancies, such as Accenture and Ernst & Young, which have developed best-practice databases to support their consultants throughout the world (CIMA, 2001).

Directories, on the other hand, provide links to people with specific know-how and the only information stored is that required for identifying people and places where knowledge resides. For example, pharmaceutical company Hoffman-LaRoche, as a part of its overall drug approval process knowledge map, has a catalogue of relevant experts, arranged according to know-how, questions and issues (CIMA, 2001).

Knowledge application is the process of applying knowledge within the organization. Knowledge becomes a valued-added resource only if it is applied to improve business performance. Transalating knowledge into action can mean a difference in organizational performance.

Combining the classification of knowledge assets within a company with the analysis of appropriate knowledge processes allows managers to identify and understand the levers they need to pull in order to manage their companies' capabilities.

Even if they are reluctant to instigate a comprehensive knowledge-management system, companies should still consider how individual elements may be applied. The knowledge process wheel could be used to identify any obvious gaps in their systems (CIMA, 2001).

2.1.16 Concepts of Disclosure

Andriassen (2004) described disclosure as any financial information, whether quantitative or qualitative the company has published using official and unofficial means. Ghazali (2008) divided the information contained in the financial reports to two types of optional and mandatory disclosure; the mandatory disclosure is required by national legislation such as the companies Act and the requirements of listing securities; whereas optional disclosure is done by some companies to provide other optional information in their annual reports that are not required by the accounting standards or national legislation.

The main purpose of the disclosure is to provide useful information to users of financial statements that enable them take appropriate decisions. To achieve this goal disclosure need to be adequate in that the information disclosed in the financial statements should not be misleading, rather they should be fair enough to fully serve all categories without bias, so that to present all the information appropriately, and the disclosure need to demonstrate that benefits overweigh costs, while discarding meaningless information (Douma & Schreuder, 2013). Deegan and Unerman indicate that the level of disclosure as practiced by the company in compliance with legislation differs from its level resulting from management's view of the right of the community to recognize some aspects of the organization's operations (Deegan & Unermanm 2011).

2.1.17 Intellectual Capital Disclosure

The last decades have witnessed interest by business organizations in the intellectual capital and its role in achieving many advantages to it, and this was due to the global interest in the knowledge economy, and as a result of that companies have come to be evaluated with their intangible more than tangible assets, which in turn led to the need to disclose of the components of intellectual capital through either being included in the financial statements at historical costs or separate report annexed to the financial statements and reported along with the accounting reports. This, of course, makes available useful information to the beneficiaries from those statements when the

organizations to disclose the intellectual property by issuing voluntary reports accompanying the accounting reports (Taliyang & Jasop, 2011). Disclosure is all about providing financial and accounting data about the organization, and to clearly state the budget items and statements of income and cash flows properly and present them to the beneficiaries in order to make appropriate and rational decisions (Ghaban & Yassin, 2007). However, disclosure is concerned with the information provided by the financial statements or other complimentary methods to provide financial information ((Ghaban & Yassin, 2007). Many countries, realizing the importance of recruiting the intellectual capital and the results they derive from being established there, has showed interest in disclosure of the intellectual capital on the financial reports, as there are some enterprises their physical capital constitutes a small percentage of the total capital they have (Ghaban & Yassin, 2007; Ghosh & Mondal, 2009).

Investors need financial information if they are to value companies with a greater degree of accuracy.

Holland (2002), points to the fact that much of this information does in fact get communicated, albeit in private meetings between companies and investors. Although, this can function relatively well, clearly it is not an ideal situation for the investment community as a whole, as it is biased towards the big institutional investors (Holland, 2002).

In Europe, there have been various initiative to address the reporting of intellectual capital, most notably the meritum guidelines and its follow-up project E* know Net (both sponsored by the European Union (EU) and the Organization for Economic Co-operation and Development (OECD) and a Danish initiative on intellectual capital statements sponsored by the Danish government (Wall, Kirk & Martins 2004).

Based on best practices observed in more than 100 European companies, there are guidelines on how to report intellectual capital. Although the guidelines vary slightly in content and terminology, the underlying ideas are the same. Organizations are encouraged to produce reports that contain the following three elements: (Marr, Schiuma & Neely, 2003; Marr and Gray, 2002; Wall, Kirk and Martin 2004)

- narratives about the company visions;
- management challenges and actions;
- a set of indicators.

The narratives give organizations the space to explore their strategic objectives, the products they sell and their customer approach. It also identifies the critical intangibles

and describes how they drive performance and deliver value to stakeholders. (Marr, Schiuma & Neely, 2003; Marr & Gray, 2002; Wall, Kirk & Martin, 2004).

With management challenges and actions, an organization can explain which IC assets need to be strengthened or acquired in order to achieve its strategic objectives. It allows firms to report on activities, initiatives and processes, either already in place or planned for the future. Activities and managerial actions can also be prioritized (Marr, Schiuma, & Neely, 2003; Marr & Gray, 2002; Wall, Kirk & Martin, 2004).

Organizations can create a set of indicators that visualize their performance in terms of intellectual capital management. Users of Intellectual capital statements should be able to look at these and assess how well the company is fulfilling its objectives.

(Marr, Schiuma & Neely, 2003; Marr & Gray, 2002; Wall, Kirk & Martin, 2004).

Many firms across Europe already published IC statements on a voluntary basis. They see it as a way of increasing transparency and explaining their view of the company's business model to the market. But, while separate intellectual capital statements may be appealing to users of information, especially individual shareholders, they may place an unwelcome burden on companies already facing greater demands for transparency (Holland, 2002).

This is also a danger of information overload, many companies already produce corporate social responsibility reports. At this stage, it is not yet clear whether there will be a consensus about the advantages of producing these kinds of statements or whether such reporting will one day become mandatory (Wall, Kirk & Martin, 2004).

2.2 THEORETICAL FRAMEWORK

2.2.1 Resource-Based View

Resources are the inputs or the factors available to a company which helps to perform its operations or carry out its activities (Black & Boal 1996, Grant 1991 cited by Ordaz, Daniel and Raquel, 2003). Also, these authors state that resources, if considered as isolated factors do not result in productivity; hence, coordination of resources is important. The ways a firm can create a barrier to imitation are known as "isolating mechanisms" and are reflected in the aspects of corporate culture, managerial capabilities, information asymmetries and property rights (Hooley and Greenley 2005).

King (2007) mentions that, inter-firm casual ambiguity may result in sustainable competitive advantage for some firms. Casual ambiguity is the continuum that describes the degree to which decision makers understand the relationship between organizational

inputs and outputs (Rugman & Verbeke, 2002 & Peteraf 1993, Lippman and Rumelt 1982 cited by King 2007, Makadok, 2001). Their argument is that inability of competitors to understand what causes the superior performance of another (inter-firm casual ambiguity), helps to reach a sustainable competitive advantage for the one who is presently performing at a superior level. Holley & Greenley (2005) state that social context of certain resource conditions act as an element to create isolating mechanisms and Wernerfelt (1984) in Holley and Greenley (2005) quote that tacitness (accumulated skill-based resources acquired through learning by doing) complexity (large number of inter-related resources being used) and specificity (dedication of certain resources to specific activities) and ultimately, these three characteristics will result in a competitive barrier.

According to Amit & Schoemaker (1993), "resources" can be divided into resources and capabilities. In this respect, resources are tradable and non-specific to the firm, while capabilities are firm-specific and are used to engage the resources within the firm, such as implicit processes to transfer knowledge within the firm (Makadok, 2001; Hoopes, Madsen & Walker, 2003). This distinction has been widely adopted throughout the resource-based view literature (Conner & Prahalad, 1996; Makadok 2001; Barney, Wright & Ketchen, 2001).
Makadok (2001) emphasizes the distinction between capabilities and resources by defining capabilities as a special type of resource, specifically an organizationally embedded non-transferable firm-specific resource whose purpose is to improve the productivity of the other resources possessed by the firm. Resources are stocks of available factors that are owned or controlled by the organization, and capabilities are an organization's capacity to deploy resources. Essentially, it is the bundling of the resources that builds capabilities (Makadok 2001).

The Resource-Based View (RBV) as a basis for the competitive advantage of a firm lies primarily in the application of a bundle of valuable tangible or intangible resources at the firm's disposal (Wernerfelt; 1984; Rumelt, 1984; Penrose 1959). To transform a short-run competitive advantage into a sustained competitive advantage requires that these resources are heterogenous in nature and not perfectly mobile (Peteraf, 1993; Wernerfelt, 1995). Effectively, this translates into valuable resources that are neither perfectly imitable nor substitutable without great effort (Barney, 1991). If these conditions hold, the bundle of resources can sustain the firm's above average returns.

The VRIN model (see below) also constitutes a part of RBV. There is strong evidence that supports the RBV (Crook, Ketchen, Combs, and Todd, 2008).

1. Identify the firm's potential key resources
2. Evaluate whether these resources fulfill the following criteria (referred to as VRIN):

- **Valuable** – A resource must enable a firm to employ a value – creating strategy, by either outperforming its competitors or reduce its own weaknesses. Relevant in this perspective is that the transaction costs associated with the investment in the resource cannot be higher than the discounted future rents that flow out of the value-creating strategy (Mahoney & Pandian, 1992, Conner, 1992; Rumelt 1991).
- **Rare:** To be of value, a resource must be rare by definition. In a perfectly competitive strategic factor market for a resource, the price of the resource will be a reflection of the expected discounted future above – average returns (Barney, 1991; Dierickx & Cool, 1989).
- **In-imitable:** if a valuable resource is controlled by only one firm it could be a source of a competitive advantage. This advantage could be sustainable if competitors are not able to duplicate this strategic asset perfectly (Peteraf, 1993; Barney 1991). The term "isolating mechanism" was introduced by Rumelt (1984) to explain why firms might not be able to imitate a resource to the degree that they are able to compete with the firm having the valuable resource (Peteraf, 1993; Mahoney & Pandian, 1992). An important underlying factor of inimitability is casual ambiguity, which occurs if the source from which a firm's competitive advantage stems is unknown (Peteraf 1993; Lippman & Rumelt, 1982). If the resource in questions is knowledge-based or socially complex, casual ambiguity is more likely to occur as these types of resources are more likely to be idiosyncratic to the firm in which it resides (Peteraf, 1993, Mahoney & Pandian 1992). Conner and Prahalad (1996) go as far as to say that knowledge-based resources are "the essence of the resource-based perspective.
- **Non-substitutable:** Even if a resource is rare, potentially value-creating and imperfectly imitable, an equally important aspect is lack of substitutability (Dierickx and Cool, 1989). If competitors are able to counter the firm's value-creating strategy with a substitute, prices are driven down to the point that the price

equals the discounted future rents (Barney, 1991), resulting in zero economic profits.

3. Care for and protect resources that possesses these evaluation, because doing so can improve organizational performance (Crook, ketchen, Combs & Todd, 2008)

The VRIN characteristics mentioned are individually necessary, but not sufficient conditions for a sustained competitive advantage (Dierickx & Cool, 1989; Priem & Butler, 2001a). Within the framework of the resource-based view, the chain is as strong as its weakest link and therefore requires the resource to display each of the four characteristics to be a possible source of a sustainable competitive advantage (Preim & Butler 2001a; Preim & Butler 2001b, Ludwig & Pemberton, 2011).

2.2.2 Knowledge-Based Theory

In the last two decades of the 20th century, a resource-based theorist of the firm (Hamel & Prahalad 1990 in Sveiby 2001), (Blackler, 1995), (Wenerfelt, 1995) has received attention as an alternative to the traditional product-based or competitive advantage (Porter, 1980 in Sveiby 2001) in view. The resource-based perspective promises to improve understanding of strategy formulation also in firms, which are dependent on intangible resources (Hall, 1992), such as, the rapidly growing knowledge-based services and knowledge-intensive industries (Sveiby, 1992).

Nonaka & Takeuchi (19955) and Krogh, Ichijo and Nonaka (2000) define knowledge as a justified true belief: when somebody creates knowledge, he or she makes sense out of a new situation by holding justified beliefs and committing to them (Huener, Von Krogh & Ross, 2000, Krogh, Ichijo & Nonaka 2000). The emphasis in this definition is on the conscious act of creating meaning. Building on Polanyi (1958 as cited by Sveiby 2001) and Wittgenstein (1995), (Sveiby 1994, 1997) defines knowledge as a capacity-to-act, (which may or may not be conscious). The emphasis of the definition is on the action element: A capacity to-act can only be shown in action. Each individual has to recreate his or her own capacity to act and reality through experience – a view which is akin to constructivism (Glasersfeld, 1988 as cited by Sveiby 2001).

Knowledge defined as a capacity-to-act is dynamic, personal and distinctly different from data (discrete, unstructured symbols) and information (a medium for explicit communication) since the dynamic properties of knowledge are in focus, the notion, individual competence can be used as a fair synonym (Sveiby 2001).

The knowledge-based theory of the firm considers knowledge as the most strategically significant resource of a firm. Its proponents argue that because knowledge-based resources are usually difficult to imitate and socially complex, heterogenous knowledge bases and capabilities among firms are the major determinants of sustained competitive advantage and superior corporate performance.

This knowledge is embedded and carried through multiple entities including organizational culture and identity, policies, routines, documents, systems, and employees. Originating from the strategic management literature, this perspective builds upon and extends the resource-based view of the firm (RBV) initially promoted by Penrose (1959) and later expanded by others (Wernerfelt 1984, Barney 1991, Conner 1992).

Although, the resource-base view of the firm recognizes the important role of knowledge in firms that achieve a competitive advantage, proponents of the knowledge-base view argue that the resource-base perspective does not go far enough. Specifically, the RBV treats knowledge as a generic resource, rather than having special characteristics. It therefore does not distinguish between different types of knowledge-base capabilities (Kogut & Zander, 1992; Kogut & Zander, 2000; Nickerson & Zenger, 2004; Phelan & Lewin, 2000). Information technologies can play an important role in the knowledge-base view of the firm in that information systems can be used to synthesize, enhance, and expedite large-scale intra and inter firm knowledge management (Alavi and Leidner, 2001).

2.3 EMPIRICAL STUDIES

Pulic proposed the Value Added Intellectual Coefficient (VAIC) method to provide information about the value creation efficiency of tangible and intangible assets within a company. Instead of valuing the intellectual capital of a firm, the VAIC method mainly measures the efficiency of firm's three types of inputs. Physical and financial capital, human capital, and structural capital, namely the Capital Employed Efficiency (CEE), the Human Capital Efficiency (HCE), and the Structural Capital Efficiency (SCE). The sum of the three measures is the value of VAIC.

Higher VAIC value suggests better management utilization of companies' value creation potential.

The increasing importance of intangible assets in the emerging knowledge economy is undisputable in recent years. Bahman and Mohsen (2015) investigated the relationship among intellectual capital, social capital and staff's productivity in bank on 185 staff using simple randomized method. Data was collected using questionnaire and was analyzed using Pearson correlation and regression coefficient. Their findings showed a high positive correlation between social capital dimensions, intellectual capital dimensions and productivity of human resources. Momeni and Esmaeli (2015) investigated the effect of intellectual capital on shareholders' eguity and debt costs. Pulic model was used, using data collected from the financial statements of 67 firms listed in Tehran Stock Exchange from 2003 to 2013, with the use of regression method. Their results indicated that there is a negative relationship between intellectual capital and share holders' equity and with debt costs. Sany and Saarce (2014) examined the relationship between intellectual capital and business performance in the Malaysian financial sector, they concluded that intellectual capital has a positive relationship with firm performance (measured by ROA and profitability).

However, the complete intellectual capital (IC) disclosure is still in its infancy stage (Deep & Narwal, 2013). Mehralian, Rajabzadeh, Sadeh and Rasekh (2012) carried out a study on pharmaceutical industry of Iran to find association between intellectual capital (IC) components with the traditional measures of performance and found that company's IC can explain profitability but not productivity and market valuation in Iran. Study also found that physical capital was the one which was having major impact on the profitability of the firms. Komnenic and Pokrajcic (2012) investigated if intellectual capital (IC) has an impact on organizational performance of Multi National Companies (MNCs) in Serbia. The study revealed that human capital was positively associated with all three corporate performance measures. The study also observed that the structural capital was having significant positive relationship with return on equity. Mondal and Ghosh (2012) investigated relationship between intellectual capital and financial performances of Indian banks and found that relationship between intellectual capital and financial performance indicators namely profitability, productivity and market valuation was varied. The results also suggested that intellectual capital worked as major factor for competitive advantage.
Pal and Soriya (2012) compared intellectual capital performance between Indian pharmaceutical and textile industry. The study found that profitability and intellectual capital were positively associated but no significant relationship was observed between

intellectual capital with productivity and market valuation in both industries. In banking industry, Ulum (2008), Artinah (2011), Rachmawati (2012) found that IC has significant impact to firm performance. On the other hand, using data from manufacturing, property, service and trading companies listed in 1DX 2003-2005, Kuryanto and Syafruddin (2008) indicated that IC has no impact on profitability. Ifada and Hapsari (2012) concluded that IC has positive and significant impact to performance of (ROE, EPS and MBV). Appah, Tebepah and Soreh (2012) examine human resource development on the performance of public sector accountants in Nigeria. The study finds that job training, performance appraisal, career planning and reward, employee welfare was positively related to productivity of public sector accountant's in Nigeria.

Ahangar (2011) analyzed the association of intellectual capital with financial performance components. He found that human capital was significantly associated with company's financial performance. IC efficiency was significantly associated with company's financial performance. IC efficiency was significantly related with profitability and productivity of the firm. Rehman, Rehman and Zahid (2011) carried out a study on Modaraba sector in Pakistan to examine impact of IC on corporate performance. He concluded that human capital efficiency (HCE) and structural capital efficiency (SCE) was positively associated with financial performance variable namely, return on equity (ROE) and earnings per share respectively.

In this modern economy, intellectual capital is the most important asset for the firm (Clarke, Seng & Whiting, 2011). Clarke, Seng, and Whiting (2011) examined the effect intellectual capital has on firm performance of Australian companies and found that direct association was there between VAIC and performance of firms, particularly with CEE and lesser association with HCE. It was also observed that current year performance was positively associated with prior year performance of HCE and SCE. Maditinos, Chatzoudes, Tsairidis, and Theriou (2011) in a study took four different economic industry of Greek, concluded that financial performance was only significantly associated with the human capital efficiency (HCE) of the company.

In another study Pal and Soriya (2011) examined the relationship between intellectual capital and company's performance in Indian IT industry. The result found that intellectual capital of the company was having positive association with the profitability, but not with productivity and market capitalization of the company. Olayinka and Uwalomwa (2011) carried out a study on the impact of intellectual capital on the business performance of

thirty-two (32) audited financial statements of quoted companies in Nigeria. The results show that intellectual capital has a positive and significant relationship with the performance of business organizations in Nigeria.

Sharabati, Jawad and Bontis (2010) conducted a survey on the pharmaceutical industry of Jordan and observed that firms were successfully managing the intellectual capital and business performance was influenced in a positive manner. The study found that IC components were positively associated with business performance. Zeghal and Maaloul (2010) carried out a study on 300 UK companies and found that IC was having a positive impact on economic and financial performance of the companies. However, the association between IC and stock market performance was significant only for high-tech industries. Okpala and Chidi (2010) x-rayed the relevance of human capital accounting to stock investment decisions. Survey research design was adopted, and the chi-square statistical technique was used to test the hypotheses at 5% alpha level. It was found that the quality of human capital is a major factor in determining the value of a firm's stock and investment decisions. It was also empirical verified that the inclusion of human capital value in the statement of financial position help investors make more rational investment decisions.

Chan (2009a, 2009b) carried out a study in Hong Kong stock exchange and no significant association was found between intellectual capital and four financial performance measures namely ROA, ATO, ROE and MB. Physical capital was found to be the most significant factor improving profitability, productivity and market valuation of the firms. Firer and Williams (2003), Shiu (2006b) and Chan (2009b), all find that HCE has a significant negative relationship with assets turnover and market to book ratio, showing that the efficiency with which a firm can use its human resources impacts negatively on firm performance. Additionally, Appuhami (2007) does not find a significant relationship between HCE and the capital gains made by investors. Guthrie and Petty (2000), Sciulli, Wise and Sims (2002), Guthrie, Petty and Riccori (2006), Abeysekera (2007), Dumay and Tull (2007), Sujan and Abeysekera (2007), White, Lee and Tower (2007), Bruggen, Vergauwen and Dao (2009), Woodcock and Whiting (2009) have all investigated Australian IC disclosure practices. In generally, the level of voluntary IC disclosure in annual reports is low. Larger firms, those with Big Four auditors and those in the more intangible-intensive industries make more voluntary disclosures than other firms

(Woodcok & Whiting, 2009). Ghosh and Mondal (2009) analyzed relationship of intellectual capital with conventional financial performance measures of Indian software & pharmaceutical companies. The study observed that the performance of a company's intellectual capital explained profitability but not productivity and market valuation of the companies.

Kamath (2008) examined relationship between intellectual capital (IC) with traditional measures of performance of top 25 firms in the drug and pharmaceutical industry in India and found that domestic firms seem to be performing well and efficiently utilizing their IC. It was revealed that human capital was having major impact on profitability and productivity of firms.

Gan and Saleh (2008) examined the relationship between intellectual capital and firm performance. They found that intellectual capital has a significant impact on profitability and productivity. Razafindrambinina & Anggreni (2008) investigated the association between intellectual capital and corporate financial performance of Indonesian listed companies from 2003 to 2006 by using VAIC model. It was found that intellectual capital was positively associated with financial performance with the exception of revenue growth. It was also found that physical/financial capital and structural capital were the most significant components in increasing the corporate performance.

Tan, Plowman and Hancock (2007) examined the relationship between capital and financial performance of companies listed in the Singapore stock exchange. For this purpose they used equity, earnings per share and annual return per share as indicators of financial performance and they used VAIC method for measuring intellectual capital. The results of their study indicated that there is a positive correlation between intellectual capital and the company's future performance. They also concluded that the growth rate of intellectual capital has a positive relationship with firm performance.

Cohen and Kaimenakis (2007) results from a study of smaller European firms shows that "hard" IC is positively significantly related to profits, while "functional" IC is positively significant related to sales per employee. No relationship is found between "soft" IC and performance. In Indonesia, Iswati and Anshori (2007) examined data from 10 insurance companies listed in IDX and found a positive and significant relationship between IC and profitability. In Nigeria, In the same vein, Enofe, Mgbame, Sunday and Christopher (2013) ascertain the relationship between firm's financial performance and human resources accounting disclosures on fifty (50) listed firms. The study finds that a positive

relationship exists between the financial performance of a company and its level of Human Resource Accounting Disclosure.

Shiu (2006a, 2006b) study the relationship between VIAC and performance in Taiwanese listed companies between 1992 and 2002. Findings show that across four performance measures, there is a significant positive relationship between VIAC in current and prior periods and return on assets (ROA), and likewise Ting and Lean (2009) observe significant positive relationships between VAIC, HCE, CEE and ROA. Samiloglu (2006) examined the relationship between value added intellectual coefficient (VAIC) and the ratio of market value to book value in the Turkish banking sector. The results of their study indicated that there is significant correlation between the dependent variable (ratio of market value to book value) and the independent variable (VAIC) and its three components.

Goh (2005) measured intellectual capital performance of commercial banks in Malaysia. He found that all banks were having relatively higher human capital efficiency than structural and physical capital efficiency. It was also revealed that domestic banks were generally less efficient in intellectual capital performance compared to foreign banks.

Mavridis (2005) in a study of the Japanese banking industry observed that best performing banks were having more usage of intellectual capital than physical capital. The contribution of intellectual capital was significant in corporate success of the banks. Chen, Cheng and Hwang (2005) conducted an empirical investigation on the relationship between IC, market value and financial performance. They used a large sample of Taiwanese listed companies between 1992 and 2002, and utilized Pulic's (2000a, b) Value Added Intellectual coefficient (VAIC). Their study underlined the importance of IC in the enhancement of firm profitability and revenue growth. The empirical results proved that (a) investors valuate higher companies with better IC efficiency, (b) companies with better IC efficiency obtain a higher degree of profitability and revenue growth in the current and following years. Chen, Cheng, and Hwang (2005) concluded that IC is indeed a significant strategic asset, since it is positively related to the firm's market value and financial performance. The increasing gap observed between market value and book value of many companies has drawn attention towards investigating the value missing from financial statements. According to various scholars, IC is considered to be the hidden value that escapes financial statements and the one that leads organizations to obtain a competitive advantage (Chen, Cheng, Hwang, 2005; Edvinsson & Malone, 1997; Lev & Radhakrishnan, 2003; Lev & Zarowin, 1999; Lev, 2001; Ruta, 2009; Yang & Lin, 2009).

Additionally, it is believed that the limitations of financial statements in precisely explaining firm value reveal the fact that, nowadays, the source of economic value is the creation of IC and no longer the production of material goods (Chen, Cheng, Hwang, 2005). A German study, Bollen, Vergauwen, & Schnieders (2005) found that all components of IC have a significant influence over intellectual property (IP), and that IP has a significant direct positive relationship with performance. This demonstrates that IC can have an indirect relationship with performance

Mavridis (2004) found that Japanese banks with the greatest performance were those who were most efficient in the use of their HC, whereas efficiency in physical assets utilization was less important. Bozbura (2004) suggests that the HC skills and expertise possessed by the company and which can be used in solving administrative problem in addition to the risks associated with it.

Traditional financial accounting statements have failed to reflect the true value created by companies, because only tangible assets are taken into account for measuring the performance of the firm (Firer & Stainbank, 2003). Firer & Willaims (2003) used the VAIC approach to measure the relationship between IC and traditional measures of corporate performance. They used a sample of 75 South African public traded companies, but the empirical results failed to support any relationship between the three value added efficiency components and the three dependent variables (profitability, productivity and market value). Their findings revealed that South African companies depend mostly on their tangible resources, pay the least importance to structural capital, while on the other hand, the market seems to react negatively to firms that concentrate solely on the enhancement of human assets. There are many firms which have started measuring, managing, and reporting their intangibles. The study of Riahi-Belkaoui (2003) found a positive relationship between IC and financial performance, while Bontis, William & Richardson (2000) concluded that, regardless of industry, the development of structural capital has a positive impact on business performance. By modeling sales as a function of a firm's organizational capital, net current assets, number of employees, and research and development capital, Lev and Radharkrishnan (2003) developed a firm-specific measure of organization capital. Using a sample of approximately 250 companies, they showed that organizational capital estimate contributes significantly to the explanation of the market value of firms, beyond assets in place and growth potential.

The legitimate justification is required for the increasing gap between the market value and book value of the companies. The reason for this gap simply may perhaps be the absence of intangible assets from financial statements of the firm. Now, the source of economic value is the creation of IC, not the production of materials goods (Firer & Williams, 2003). When companies have a large proportion of their investment in intangible assets and when traditional performance measurement techniques are used, then inappropriate decisions may be taken by investors and other stakeholders (Firer & Stainbank, 2003).

Fitz-enz (2001) suggests that human capital (HC) enhances the concept of efficiency and effectiveness in companies and increases the size of their assets.

Brennan & Connel (2000) indicate that (IC) is an important role in the management of the company's resources and it affects the performance. The results of the study also indicated there is a difference between the book and the market value and this difference is as a result of the value of financial assets, which cost is more than the historical book.

Using data from 30 randomly selected companies from the (UK) FTSE 250 from 1992 to 1998, Pulic (2000b) also showed that the average values of VAIC and firms' market value exhibit a high degree of correspondence.

On the other hand Bontis, William & Richardson (2000) found a positive relationship between financial performance and structural capital (SC) in Malaysian firms, concluding that the investment in IC, especially SC, can yield increased competitive advantage. Additionally, investment in HV causes flow-on effect through SC that indirectly affects performance.

2.4 SUMMARY OF REVIEWED RELATED LITERATURE

Intellectual capital can be defined as the intellectual material that can be formalized, captured and leveraged to produce a higher value asset (Klein and Prusak 1994). Edvinsson and Malone (1997) define the difference between a firm's market value and book value as the value of intellectual capital. A firm's intellectual capital, in a broad sense, is comprised of human capital, structural capital and relational capital.

Human capital is recognized as being the heart of creating intellectual capital, a distinctive feature of human capital is that it may disappear as employees exist (Bontis 1999).

This study was premised on two theories which are Resource Based Theory and Knowledge-Based View (KBV) of the firm. The knowledge-based theory of the firm considers knowledge as the most strategically significant resource of a firm.

The empirical reviews show that various attempts have been made towards the development of intellectual capital on firms, the method for determining the intellectual assets of a company, its basic parameters and the effect IC has on the value creation of a firm (for example, Clarke, Seng & Whiting 2011; Firer & Stainbank 2003; Firer & Williams 2003; Mehralian, Rajabzadeh, Sadeh & Rasekh 2012; Riahi-belkaoui, 2003; Chen, Cheng & Hwang 2005; Mondal & Ghosh 2012).

2.5 GAP IN LITERATURE

The increasing gap observed between market value and book value of many companies had drawn attention towards investigating the value missing from financial statements. According to various scholars, IC is considered to be the hidden value that escapes financial statements and the one that leads organizations to obtain a competitive advantage (Chen, Cheng, & Hwang, 2005; Edvinsson & Malone, 1997). It is believed that the limitations of financial statements in precisely explaining firm value reveal the fact that the source of economic value is the creation of IC and no longer the production of material goods.

The observed gap between market value and book value can therefore be attributed to the intellectual capital assets that are not recognized in statement of financial position. The role of IC in filling the gap between book value and market value has, hence, brought the need for this study.

Several studies have been carried out on intellectual capital and firm's financial performance mainly in other countries, whose findings and results may not be palatable with the Nigerian environment, hence, the need for this study, in order to build on the findings of previous researches and probably establishing new empirical findings.

Intellectual capital is interested to numerous parties, for example, shareholders, managers, researchers and policy makers. Present study finds intellectual capital disclosure in the long run. This study will determine the effect of intellectual capital on firms' market value and financial performance of selected quoted service firms in Nigeria, which managers may use in order to evaluate the corporate performance and benchmark it with global standards.

CHAPTER THREE
METHODOLOGY

3.1 RESEARCH DESIGN

This study is concerned with determining the influence of intellectual capital on firm's financial performance with a focus on service firms quoted on the Nigerian stock exchange as at 31st December, 2014.

The research study adopted in this work is the exploratory/formulative research study. The main purpose of such study is that of formulating a problem for more precise investigation or for developing the working hypotheses from an operational point of view.

The data type employed in this is the Panel Data. Panel Data are data that have the features/elements of time series and cross sectional data.

The research design employed in this study is the ex-post facto research design, in order to establish the meaningful relationship between intellectual capital indices and firm's financial performance. This study is treated as ex-post facto research since it relied on historical data. This is appropriate because ex-post facto research aims at measuring and establishing the relationship between one variable and another or the impact of one variable on another, in which the variables involved are not manipulated by the researcher (Onwumere, 2005). An ex-post facto research determines the cause-effect relationship among variables. It is most useful in investigating variables that cannot be observed experimentally, such as those studies in this work. Ex-post Facto seeks to find out the factors that are associated with certain occurrence, conditions, events or behaviours by analyzing past events or already existing data for possible causal factors (Gujarati, Porter & Gunasekar 2013; Kothari & Garg 2014).

3.2 POPULATION OF THE STUDY

The population of the study is centered on the performance indices of the thirty four (34) service firms listed on the Nigeria stock exchange from 2000 to 31st December 2014. (See Appendix 1)

3.3 SAMPLE SIZE AND SAMPLING METHOD

The thirty four (34) quoted service firms will represent the sample size for this study.

Data were gathered from the published financial statements of the thirty four (34) quoted service firms for a fifteen (15) year period spanning from 2000-2014, using Panel sampling method (that is all the service firms that filed their annual financial statements with NSE from 2000-2014 without missing any year was selected for this study) (See

Appendix 1). The reason for the choice of this time frame is availability of published annual report and accounts of the selected organizations and to have a fairly, reasonably, reliably and up-to-date available financial data.

3.4 SOURCE OF DATA

This study made use of secondary data precisely. The data were sourced from publications of the Nigerian stock exchange (NSE), fact books and the annual report and accounts of the selected quoted companies, particularly the comprehensive income statement and statement of financial positions of these companies as well as their respective notes to the accounts. Both the dependent and independent variables were computed from the data extracted from publications of the Nigerian stock exchange (NSE), the annual report and accounts of the selected quoted service companies and ratios were computed from the figures as reported in the annual reports. Such data extracted include: Total revenues of the quoted service firms on annual basis from 2000-2014, the number of employees, non-current asset schedules, employee payments for the period 2000-2014, as well as other relevant ratios that were required by a particular variable.

The need for an appropriate measurement method led to the development by Pulic (1998, 2000) of what has become arguably the most popular methods for measuring the efficiency of value adding to corporate intellectual capital known as value added intellectual coefficient (VAIC^{TM}) VAIC was designed to provide a means by which to measure the efficiency of three types of inputs; physical and financial capital, human capital, and structural capital (Firer and Williams, 2003; Montequin, Fernandez, Cabal and Gutierrez, 2006; Pulic, 2000).

Pulic (1998, 2000) developed the value added intellectual coefficient (VAIC) to measure the IC of companies. Pulic model uses the concept of Skandia models that the market value of the company is made up of capital operation and intellectual capital. The evaluation of performance includes evaluation of the efficiency of capital employed and evaluation of the efficiency of intellectual capital. VAIC is used to measure the value added by both the efficiency of capital employed (CEE) and intellectual capital (ICE);

VAIC = CEE + ICE

According to Skandia models, intellectual capital is divided into two main parts, human capital and structural capital, thus intellectual capital efficiency coefficient is the sum of human capital efficiency (HCE) and structural capital efficiency coefficient (SCE),

Thus,

VAIC = CEE + HCE + SCE

The use of VAIC from Pulic's model as a measure of firm's intellectual capital, is widely used because of its simplicity (Pulic 1998, 2000). It uses publicly available data (historical financial statements) and allows the comparison between companies and countries (Firer & Williams 2003). VAIC does not generate an amount for intellectual capital, however; it shows how well a company converts its intellectual capital into value added. The higher the VAIC indicator, the better is the management in utilizing the company's potential. This study will employ the VAIC method because it is easy to calculate and it is more acceptable as it is based on published audited financial information of the firm and therefore the subjectivity held by other measures is reduced to a large extent by this method.

3.5 RESEARCH VARIABLES

3.5.1 Independent Variables

This study includes three independent variables: Capital Employed Efficiency (CEE), Human Capital Efficiency (HCE), and Structural Capital Efficiency (SCE) are components of the Value Added Intellectual Coefficient (VAIC), which is a measure of the company's IC in this research.

- Capital Employed Efficiency (VACA), indicator of value added efficiency of capital employed.
- Human capital efficiency (VAHU), indicator of value added efficiency of human capital. Human capital efficiency (VAHU) may be obtained by treating the total expenditure on employees as an investment that captures the total human effort in a firm in value creation. This is the key assumption of the VAIC methodology. Therefore, HCE may be expressed as the amount of value added generated per money unit invested in employees.
- Structural Capital Efficiency (STVA), indicator of value added efficiency of structural capital.
- Value added intellectual coefficient (VAIC), the composite sum of the three separate indicators.

The VAIC model applied in this study used data from the financial statements to calculate the efficiency of capital employed, structured capital and human capital by using five different steps, as follows: (Taghizadah, Akbari & Ghanavati, 2012)

$Va_{it} = OUTPUT_{it} - INPUT_{it}$ - - - (i)

$Output_{it}$ is the total income generated by the firm from all products and services sold during the period t, and $input_{it}$ represents all the expenses incurred by the firm during the period t except cost of labour, tax, interest, dividends and depreciation. This calculation of the value added by a firm during a particular period has been derived from the theory of stakeholder view which holds that any party that either influences or is influenced by a firm's activities have a stake (or interest) in the firm including parties such as vendors, employees, customers, directors, the government as well as community members as whole (Donaldson & Preston 1995). This is why Riahi-belkaoui (2003) views value added by a firm as a wider performance measurement than simple accounting profit that only calculates the return attributable to the shareholders of a firm.

The first step towards the calculation of the above variables is to calculate Value Added (VA). VA is calculated according to the methodology proposed by Riahi-belkaoui (2003). Riahi-Belkaoui (2003) further suggests the following formula for calculating the value added of a firm for a particular time period t to be the net earnings retained for a period as follow:

$$R_{it} = S_{it} – B_{it} – DP_{it} - W_{it} - I_{it} - D_{it} - T_{it} - - - (ii)$$

Where:

R = retained earnings for the period

S = net sales revenues obtained for the period

B = Cost of goods sold plus all operational and other expenses in the period apart from labour, taxation, interest, dividend and depreictaion.

DP = depreciation charged during the period

W = wages and salaries paid to the employees for the period

I = interest expenses paid during the period

D = dividends paid to the shareholder for the period

T = taxes for the period

The elements in equation (ii) can be re-arranged as follows:

$$S_{it} – B_{it} = DP_{it} + W_{it} + I_{it} + D_{it} + T_{it} + R_{it} - - -(iii)$$

In equation (iii), the left hand side shows the difference between net revenues and all expenses except wages, interest, dividend, tax and depreciation. Hence, one may say that the expression (S-B) is the total value generated by the firm during the particular time period. The right hand side shows how the firm has distributed its generated revenues among the stakeholders. It includes wages and salaries paid to the employees, interest paid to debt-holders, taxes paid to the government, dividend and retained earnings paid to the shareholders and the provision for depreciation allocated to shareholders. According to the theory of stakeholder view (Donaldson and Preston, 1995), the right hand side of equation (iii) is the total value added to the firm during the given period and hence can be written as follows:

$$VA_{it} = DP_{it} + W_{it} + I_{it} + D_{it} + T_{it} + R_{it} \quad - - \quad - \quad (iv)$$

Secondly, capital employed (CE), human capital (HU) and structural capital (SC) are being calculated thus;

CE = Total assets – intangible assets

HU = Total investment on employees (salary, wages et cetera)

SC = VA – HU

Finally, VAIC and its three components are being calculated as thus:

VACA = VA/CE

VAHU = VA / HU

STVA = SC/VA

VAIC = VACA + VAHU + STVA - - - (v)

Pulic (2000) argues that there is a proportionate inverse relationship between HU and SC, in the value creation process attributable to the entire IC base. Therefore, the measure of STVA is slightly different from other ratios.

The sum of these three ratios would generate a value, which can be denoted as VAIC – an indicator of the firms' intellectual ability and performance. If the VAIC of any firm is higher than others, it means that the IC efficiency of this firm is higher (Pulic 1998, 2000).

VAIC = VAHU + SCVA + VACA

Where:

VAIC = Value added intellectual coefficient for the firm;

VAHU = Human capital coefficient for the firm;

SCVA = Structural capital value added for the firm;

VACA = Value added coefficient for the firm.

The use of the above measurement methodology is argued to provide certain advantages (Bontis, 1999; Chen, Cheng & Hwang 2005; Firer & Williams 2003; Pulic & Bornemann, 1999; Roos, Roos, Edvinsson and Dragonetti 1997; Sullivan 2000).

- It is easy to calculate, analyzing and understanding this coefficient is easy for managers and personnel of a business entity who are familiar with traditional accounting information.
- It is consistent with the viewpoint of shareholders, as well as the resource – oriented perspective which uses added value approach.
- It provides standardized measures, thus, allowing comparison between industries and countries.
- Data are provided by financial statements that are more reliable than questionnaire, since they are usually audited by professional public accounts.
- It is an appropriate measure- This coefficient contains useful information for stakeholders; everybody, including shareholders; use this coefficient to evaluate firm performance.

3.5.2 Dependent Variables

In this study one (1) dependent variable was calculated:

(i) Financial performance

Following Chen, Chang and Hwang 2015, the following dependent variables were used as proxies for financial performance:

(i) Market-to-Book Value Ratios

Market to Book value (MBV) reflects the market valuation of the companies. It is the ratio of market capitalization of the given year to capital employed of the firm.

The Market-to-Book value ratio is simply calculated by dividing the market value (MV) with the book value (BV) of common stocks:

MV = Number of shares x stock price at the end of the year.

BV = Stockholder's equity – paid in capital of preferred stocks

$$MBV = \frac{\text{market capitalization of 365 days}}{\text{Book value of total assets}}$$

Market-to-book value (market value per share (MV) divided by Book value per share (BV) is the dependent variable in this model (Pulic 1998, 2000; Syed, 2005).

The financial performance will be measured with the use of four (4) indicators which will serve as the proxies for financial performance.

(ii) Return on Assets (ROA)

ROA is an indicator of how profitable a company is in relation to its total assets. It gives an idea as to how efficient the management uses assets to generate earnings. In fact, using this ratio, we can evaluate firm performance and it reflects the degree of efficiency in employing assets to obtain profit (Firer & Williams, 2003; Chen, Cheng, Hwang, 2005; Block, Hirt & Danielsen 2010).

ROA ratio is calculated by:

ROA = Net Income/Total Assets

(iii) Return on Equity (ROE)

ROE = Net income/shareholder's Equity

ROE measures organization's profitability by revealing how much profit a company generates with the money shareholders have invested.

(iv) Employee Productivity (EP)

Employee productivity (EP) is a tool that measures the net value added per employee which represents employee productivity (Chen, Cheng, Hwang, 2005). Higher EP represents higher productivity of employee, hence contribute positively to profitability (Clarke, Seng & Whitting, 2011).

EP = Profit before tax / number of employees

(v) Growth Revenues (GR)

GR = [(current year's revenues/last year's revenues) – 1] x 100%

GR is the most traditional measure that indicates the growth of an organization. GR measures the changes in firm's revenues. Increase in revenue usually signal firm's opportunities for growth (Syed 2005; Chen et al. 2005; Maditinos, Chatzoudes, Tsairidis, Theriou 2011).

3.5.3 CONTROL VARIABLES

For the purpose of examining the association of variables in this study, this research used correlation and the Ordinary Least Square (OLS) regressions as the underlying statistical tests. In conducting the linear multiple regression analysis, the following control variables were included:

(a) Size of the firm (SALES): Size of the firm as measured by the natural log of total sales, is used to control the impact of size on wealth creation (Deep & Narwal 2014).

(b) Leverage (DER):

Financial leverage as measured by total debt divided by total equity is used to control the impact of debt servicing on corporate performance and wealth creation

$$DER = \frac{\text{Total debt}}{\text{Total equity}}$$

(c) Physical capacity (PC):

This ratio measures physical intensity, that is how much non-current assets are there in proportion to total assets

$$PC = \frac{\text{Non-current Assets}}{\text{Total Asset}}$$

(Deep & Narwal, 2014)

3.6 METHOD OF DATA ANALYSIS

The analyses of data for this study was done based on the data collected from publications of the Nigerian stock exchange (NSE) and the annual report and accounts of the selected quoted service companies.

Both the dependent and independent variables were computed from the data extracted from publication of the Nigeria stock exchange (NSE), the annual report and accounts of the selected quoted service companies and ratios would be computed from the figures as reported in the annual reports. Such data extracted include: Total revenues of the quoted service firms on annual basis from 2000-2014, the number of employees, non-current assets schedules, employee payments for the period 2000-2014, as well as other relevant ratios that were required by a particular variables.

Inferential statistics of the stated hypotheses were carried out with the aid of E-view 9.0 statistical software, using coefficient of correlation which is a good measure of relationship between two variables, tells us about the strength of relationship and the direction of relationship as well.

Variance inflation factor which was used to test for multicollinearity among the variables. Regression analysis predicts the value of a variable based on the value of the other variable and explains the impact or effect of changes in the values of variable on the values of the other variables. Multiple Regression Analysis was used for the study.

Auto Regressive method was employed to correct the problem of Auto Correlation, while White Heteroskedasticity test was carried out for a result free of heteroskedasticity.

3.7 MODEL SPECIFICATION

The following models will be used to test the hypotheses as follows:

$M/B = \beta_0 + \beta_1 \ VAIC + CV$

$$M/B_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 CEE_{it} + \beta_3 SCE_{it} + \beta_4 SALES_{it} + \beta_5 DER_{it} + \beta_6 PC_{it} + E_{it} \quad (1)$$

$$ROA_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 CEE_{it} + \beta_3 SCE_{it} + \beta_4 SALES_{it} + \beta_5 DER_{it} + \beta_6 PC_{it} + E_{it} \quad (2)$$

$$ROE_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 CEE_{it} + \beta_3 SCE_{it} + \beta_4 SALES_{it} + \beta_5 DER_{it} + \beta_6 PC_{it} + E_{it} \quad (3)$$

$$EP_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 CEE_{it} + \beta_3 SCE_{it} + \beta_4 SALES_{it} + \beta_5 DER_{it} + \beta_6 PC_{it} + E_{it} \quad (4)$$

$$GR_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 CEE_{it} + \beta_3 SCE_{it} + \beta_4 SALES_{it} + \beta_5 DER_{it} + \beta_6 PC_{it} + E_{it} \quad (5)$$

Legend:

β_o = Constant term (intercept)

β_{it} = Coefficients to be estimated for firm i in period t

E_{it} = Error term/unexplained variable(s) for firm i, in period t

M/B_{it} = Market value to Book Value ratio for firm i in period t

VAIC = value Added Intellectual Coefficient
(VAIC = HCE + CEE + SCE)

CV = Control Variables

ROA = Return on Assets – indicates the firm's profitability as measured by the firm's return on Assets

HCE = Human capital efficiency – indicates human capital performance as measured by the ratio of the value added to intellectual capital

CEE: Capital Employed Efficiency – indicates Capital employed performance as measured by the ratio of the value added to capital employed.

SCE: Structural Capital efficiency – shows structural capital performance as measured by the ratio of value added and structural capital

PC = Physical capital intensity as measured by non-current assets divided by total assets for firm i in year t

SALES = Size of the firm as measured by the natural log of total sales for firm i in year t

DER_{it} = Debt-to-equity ratio. This shows the risk profile of the company as measured by the debt-equity ratio for firm i in period t

ROE_{it} = Return on equity – indicates the firm's profitability as measured by the firm's return on equity for firm i in period t

EP_{it} = Employee productivity as measured by per employee of revenue for firm i in period t

GR_{it} = Growth in Revenue as measured by the ratio of the current year's excess revenue to previous year's revenue for firm i in period t

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.1 INTRODUCTION

This chapter deals with the presentation and analysis of data obtained from publications of the Nigerian Stock Exchange (NSE) and the annual report and accounts of the selected service firms. The results of the study with the discussion of major findings are also presented in this chapter. The study therefore considered only secondary data for the analysis and test of hypotheses.

4.2 TESTS OF HYPOTHESES AND ANALYSIS OF DATA

Inferential statistics of the stated hypotheses was carried out using coefficient of correlation which is a good measure of relationship between two variables, tells us about the strength of relationship and the direction of relationship as well. Multiple regression analysis predicts the value of a variable based on the value of the other variable and explains the impact or effect of changes in the values of variable on the values of the other variables.

The following models specification will be used to test the research hypotheses:

MBV_{it} = $\beta_0 + \beta_1 HCE_{it} + \beta_2 CEE_{it} + \beta_3 SCE_{it} + E_{it}$ - - **Ho_1**

ROA_{it} = $\beta_0 + \beta_1 HCE_{it} + \beta_2 CEE_{it} + \beta_3 SCE_{it} + E_{it}$ - - **Ho_2**

ROE_{it} = $\beta_0 + \beta_1 HCE_{it} + \beta_2 CEE_{it} + \beta_3 SCE_{it} + E_{it}$ - - **Ho_3**

EP_{it} = $\beta_0 + \beta_1 HCE_{it} + \beta_2 CEE_{it} + \beta_3 SCE_{it} + E_{it}$ - - **Ho_4**

GR_{it} = $\beta_0 + \beta_1 HCE_{it} + \beta_2 CEE_{it} + \beta_3 SCE_{it} + E_{it}$ - - **Ho_5**

4.2.1 TEST OF NULL HYPOTHESES IN THE BANKING SECTOR

4.2.1.1 Test of Null Hypothesis 1

Ho_1: Value Added Intellectual Coefficient indices of quoted banks do not significantly affect the banks' market-to-book value (MBV) ratio.

Model Specification:

MBV_{it} = $\beta_0 + \beta_1 HCE_{it} + \beta_2 CEE_{it} + \beta_3 SCE_{it} + E_{it}$ - - (1)

Legend:

β_o = Constant term (intercept)

β_{it} = Coefficients to be estimated for firm i in period t

E_{it} = Error term/unexplained variable(s) for firm i, in period t

MBV_{it} = Market Value to Book Value ratio for firm i in period t

VAIC = Value added intellectual coefficient (VAIC = HCE + CEE + SCE)

Table 4.3: Descriptive Statistics of Operational variables in Banking Sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
Mean	11.27759	0.150025	11.74211	13.17743	9.487064	3.354126	0.056627	0.309159	10.19518	83.40789	1.591425
Median	2.280264	0.142008	1.289850	6.641838	9.400213	2.922443	0.044558	0.381127	9.959571	6.804996	0.561433
Maximum	70.46621	0.253228	88.45052	101.9530	10.42344	8.550760	0.137428	1.086440	11.21544	742.6324	15.80790
Minimum	1.156506	0.099772	0.448631	6.266938	8.528635	1.267973	0.019612	-1.339659	9.443674	2.421844	0.354190
Std. Dev.	23.84748	0.043387	27.99255	24.56365	0.633301	1.969178	0.035867	0.553467	0.631588	209.4949	3.937190
Skewness	2.152477	0.980925	2.208514	3.472141	0.102959	1.263549	1.145897	-1.634294	0.484210	2.531912	3.461366
Kurtosis	5.643379	3.115330	5.983792	13.06176	1.820954	4.217721	3.091934	6.482275	1.744381	7.960021	13.01496
Jarque-Bera	15.95005	2.413846	17.75822	93.41382	0.895345	4.918170	3.287980	14.25619	1.571511	31.40257	92.63976
Probability	0.000344	0.299116	0.000139	0.000000	0.639114	0.085513	0.093208	0.000802	0.455775	0.000000	0.000000
Sum	169.1639	2.250377	176.1317	197.6615	142.3060	50.31188	0.849404	4.637387	152.9276	1251.118	23.87137
Sum Sq. Dev.	7961.831	0.026354	10970.16	8447.218	5.614974	54.28729	0.018010	4.288558	5.584646	614433.6	217.0205
Observations	15	15	15	15	15	15	15	15	15	15	15

Source: Researcher's computation using E-View 9.0, 2016

Legend :

MBV = Market to book value rati;, ROA = Return on Assets; ROE = Return on Equity;

EP = Employee productivity; GR = Growth Revenue; HCE = Human Capital Efficiency;

CEE = Capital Employed Efficiency;

SCE = Structural Capital Efficiency, DER = Debt-to-Equity Ratio

PC = Physical Capacity

From the 4.3 above, the mean serves as a tool for setting benchmark. The median re-ranks and takes the central tendency. While the maximum and minimum values help in detecting problem in a data.

The standard deviation shows the deviation/dispersion/variation from the mean. It is a measure of risk. The higher the standard deviation, the higher the risk.

The standard deviation is a measure that summarises the amount by which every value within a dataset varies from the mean. It is the most robust and widely used measure of dispersion. When the values in a dataset are pretty tightly bunched together, the standard deviation is small. When the values are spread apart the standard deviation will be relatively large (Azuka, 2011).

In many datasets, the values deviate from the mean value due to chance and such datasets are said to display a normal distribution. In a dataset with a normal distribution, most of the values are clustered around the mean, while relatively few values tend to be extremely high or extremely low. Many natural phenomena display a normal distribution (Azuka, 2011).

The standard deviation in the banking sector for the period 2000-2014 is 23.84748, 0.043387, 27.99255, 24.56365, 0.63301, 1.969178, 0.035867, 0.553467, 0.631588, 209.4949, 3.937190 for MBV, ROA, ROE, EP, GR, HCE, CEE, SCE, SALES, DER PC respectively. For such distributions, it is the case that 24%, 0.04%, 28%, 25%, 0.6%, 2%, 0.04%, 0.55%, 0.6%, 209% and 3.94% of values are less than one standard deviation (1SD) away from the mean values of MBV, ROA, ROE, EP, GR, HCE, CEE, SCE, SALES, DER and PC respectively.

Skewness and Kurtosis are contained in Jarque-Bera. Positively skewed is an indication of a rise in profit while negatively skewed is an indication of loss or backwardness.

Jarque-bera is used to test for normality; to know whether data are normally distributed.

Table 4.3 shows that, but for SCE with the negative value of 1.634294 all other data are positively skewed.

According to Jarque-Bera Theory:

H_o = not significantly normally distributed

H_1 = significantly normally distributed

When probability value (PV) is less than 10% = Accept H_1, (It is significant)

When probability value (PV) is greater than 10% = Accept H_o (It is not significant)

Table 4.3 reveals that MBV, ROE, EP, HCE, CEE, SCE, DER and PC with probability value of 0.000344, 0.000139, 0.00000, 0.085513, 0.093208, 0.000802, 0.000000, 0.000000 respectively are less than 10%. So invariably, they are significantly normally distributed. While the probability values for ROA, GR, sales are not significantly normally distributed because their probability values, 0.299116, 0.639114, 0.455775 are greater than 10%.

Table 4.4: Correlation matrix of variables in Banking Sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
MBV	1.000000	0.301189	0.992887	-0.109181	-0.132041	-0.264185	0.204756	-0.018830	-0.231763	0.950801	-0.096138
ROA	0.301189	1.000000	0.226095	0.345028	0.041401	0.375947	0.840929	-0.066403	0.028937	0.091762	0.078287
ROE	0.992887	0.226095	1.000000	-0.107242	-0.127766	-0.263595	0.151515	-0.009323	-0.225102	0.980827	-0.099273
EP	-0.109181	0.345028	-0.107242	1.000000	0.425000	0.723587	0.619647	0.027311	0.463256	-0.107581	-0.059362
GR	-0.132041	0.041401	-0.127766	0.425000	1.000000	-0.022155	0.179893	-0.236679	0.978058	-0.120870	-0.032610
HCE	-0.264185	0.375947	-0.263595	0.723587	-0.022155	1.000000	0.607834	0.197960	0.078195	-0.258006	-0.243359
CEE	0.204756	0.840929	0.151515	0.619647	0.179893	0.607834	1.000000	0.050382	0.158262	0.057613	-0.161079
SCE	-0.018830	-0.066403	-0.009323	0.027311	-0.236679	0.197960	0.050382	1.000000	-0.254432	0.004603	0.101896
SALES	-0.231763	0.028937	-0.225102	0.463256	0.978058	0.078195	0.158262	-0.254432	1.000000	-0.211252	-0.004873
DER	0.950801	0.091762	0.980827	-0.107581	-0.120870	-0.258006	0.057613	0.004603	-0.211252	1.000000	-0.102482
PC	-0.096138	0.078287	-0.099273	-0.059362	-0.032610	-0.243359	-0.161079	0.101896	-0.004873	-0.102482	1.000000

Source: Researcher's computation using E- View 9.0, 2016

Interpretation of Correlation Matrix Result

Table 4.4 shows the relationship between the variables. From the correlation table, it can be deduced that the variables have significant relationship since the correlation between them is greater than 0.75. Therefore a model with highly correlated variables will result to multicollinearity (Gujarati, Porter & Gunasekar 2013; Kothari & Garg 2014).

Multicollinearity exists in a multiple regression model when the independent variables are highly correlated.

All cross-sectional data has error of Heteroskedaticity (Gujarati, Porter and Gunasekar 2013).

Table 4.4 indicates that MBV and ROE are highly correlated, ROA and CEE are highly correlated, ROE and DER are highly correlated, GR and SALES are highly correlated.

Since, the result of the correlation analysis shows that the variable are highly correlated. Then, there exist the problem of multicollinearity. To correct the problem of multicollinearity, one of the two variables from each set of the variables should be dropped (see table 4.5).

Table 4.5: Test of Multicollinearity in Banking Sector

Variance Inflation Factors
Date: 03/17/16 Time: 11:08
Sample: 2000 2014
Included observations: 15

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1792.197	324.0395	NA
HCE	1.906405	5.125285	1.247481
SCE	22.46118	1.549246	1.161087
SALES	16.79806	316.8207	1.130773
DER	0.000156	1.348459	1.152690
PC	0.432353	1.328975	1.130995

Source: Researcher's computation using E-View 9.0, 2016

Table 4.5 shows that the variance inflation factor (VIF) is lesser than 10. This is an indication of non existence of multicollinearity among the variables in the model

Model Specification:

The model formulated includes:

$MBV = \beta_0 + \beta_1 HCE + \beta_2 SCE + \beta_3 SALES + \beta_4 DER + \beta_5 PC + E$ -(1)

$ROA = \beta_0 + \beta_1 HCE + \beta_2 SCE + \beta_3 SALES + \beta_4 DER + \beta_5 PC + E$ - (2)

$EP = \beta_0 + \beta_1 HCE + \beta_2 SCE + \beta_3 SALES + \beta_4 DER + \beta_5 PC + E$ - (4)

Table 4.6: Multiple Regression Analysis showing the Relationship between MBV and HCE, SCE, SALES, DER and PC in Banks.

Dependent Variable: MBV
Method: Least Squares
Date: 03/17/16 Time: 10:58
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	18.77135	42.33435	0.443407	0.6679
HCE	0.152691	1.380726	-0.110588	0.0144
SCE	-1.331099	4.739323	-0.280863	0.7852
SALES	-1.519078	4.098544	-0.370639	0.7195
DER	0.106911	0.012476	8.569674	0.0000
PC	-2.81E-05	0.657536	-4.28E-05	1.0000

R-squared	0.706220	Mean dependent var	11.27759
Adjusted R-squared	0.654121	S.D. dependent var	23.84748
S.E. of regression	9.108347	Akaike info criterion	7.545434
Sum squared resid	746.6579	Schwarz criterion	7.828654
Log likelihood	-50.59076	Hannan-Quinn criter.	7.542417
F-statistic	17.39392	Durbin-Watson stat	2.822347
Prob(F-statistic)	0.000217		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Regressed Result

The regressed coefficient result in table 4.6 above reveals that the MBV of banks has a positive relationship with HCE and statistically significant at 5% level of significance. The SCE of banks has a negative regressed coefficient with MBV at -1.331099 and statistically insignificant at 0.7852. Though, the regressed result shows the problem of auto correlation, because the Durbin-Watson Statistics is 2.822347, which is above 2 (based on the rule of thumb). Auto correlation is a problem associated with time series data. To correct the problem of Auto Correlation, Auto Regressive (AR) method is employed (see table 4.7).

The prob. (F-statistic) which is used to test the overall significance of a model reveals that the tested variables have a collective, statistically significant relationship at 1% level of

significance. It was observed from table 4.6 that a unit change in the independent variables (HCE & SCE) will lead to a change in the dependent variable (MBV). Thus, such relationship could be expressed as follows:

Model Specification

MBV= 18.77135 + 0.152691HCE – 1.331099SCE

The model shows that for there to be one unit increase in MBV, there will be 0.152691 multiplying effect of HCE. And for there to be one unit increase in MBV, there will be 1.331099 multiplying effect decrease in SCE.

The implication of the finding is that an increase in HCE will definitely lead to an increase in MBV, and for MBV to increase, SCE will decrease.

Decision Rule:

Accept the null hypothesis (H_o) if the p-value of the test is greater than 0.05, otherwise reject.

Decision:

The P-value of the test for HCE (0.0144) is lesser than 0.05. Hence, reject H_o and Accept H_1. While, the P-value of SCE (0.7852) is greater than 0.05, here, H_1 is rejected and H_o is accepted.

Conclusion:

Since the p-value of the test for HCE is lesser than 0.05, then there exists enough evidence to reject the null hypothesis and conclude that there is a statistically significant relationship between HCE of quoted banks and Banks' Market-to-Book value ratio (MBV). Furthermore, that IC positively and significantly affects the MBV ratio of Banks. However, for the fact that, Banks' SCE is greater than 0.05, as against the rule of thumb, then, no statistical significant relationship exist between Banks' SCE and market-to-Book value ratio.

Table 4.7: Correction of Auto Correlation Problem with the use of Auto Regressive (AR) Method

Dependent Variable: MBV
Method: Least Squares
Date: 03/17/16 Time: 11:46
Sample (adjusted): 2001 2014
Included observations: 14 after adjustments
Convergence achieved after 24 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	19.31231	34.42457	0.561004	0.5923
HCE	0.675990	1.290513	0.523815	0.0166
SCE	-3.288875	5.680392	-0.578987	0.5807
SALES	-1.890798	3.302812	-0.572481	0.5849
DER	0.115076	0.012111	9.502097	0.0000
PC	0.307961	0.776419	0.396644	0.7034
AR(1)	-0.548832	0.373834	-1.468115	0.1855

R-squared	0.728552	Mean dependent var	11.88333
Adjusted R-squared	0.667311	S.D. dependent var	24.62765
S.E. of regression	8.971007	Akaike info criterion	7.532726
Sum squared resid	563.3528	Schwarz criterion	7.852254
Log likelihood	-45.72908	Hannan-Quinn criter.	7.503148
F-statistic	15.16219	Durbin-Watson stat	1.421795
Prob(F-statistic)	0.001076		

Inverted AR Roots	-.55

Source: Researcher's computation using E-View 9.0, 2016

Table 4.7 shows the Durbin-Watson statistics value to be 1.421795. This indicates that the problem of Auto Correlation associated with time series analysis has been corrected. Since the Durbin-Watson statistics value is lesser than 2.

4.2.2 TEST OF HYPOTHESIS II IN THE BANKING SECTOR

Ho_2: Value Added Intellectual Coefficient indices of quoted banks do not significantly affect Banks' Return on Assets (ROA).

Model Specification:

$ROA_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + E_{it}$ - - - (2)

Legend:

β_o = Constant term

β_{it} = Coefficients to be estimated for firm i in period t

E_{it} = Error term/unexplained variables (s) for firm i , in period t

ROA = Return of Assets

Table 4.8 Multiple Regression Analysis showing the relationship between ROA and HCE, SCE, SALES, DER and PC in Banks

Dependent Variable: ROA
Method: Least Squares
Date: 03/17/16 Time: 23:14
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.201987	0.119487	1.690443	0.1294
HCE	-0.002913	0.004991	-0.583780	0.0005
SCE	-0.011943	0.013236	-0.902313	0.0032
SALES	-0.010787	0.011621	-0.928265	0.3804
DER	-1.94E-06	3.67E-05	-0.052863	0.9591
PC	0.002417	0.001835	1.317389	0.2242

R-squared	0.804438	Mean dependent var	0.150025
Adjusted R-squared	0.657767	S.D. dependent var	0.043387
S.E. of regression	0.025382	Akaike info criterion	-4.204841
Sum squared resid	0.005154	Schwarz criterion	-3.874418
Log likelihood	38.53631	Hannan-Quinn criter.	-4.208361
F-statistic	5.484630	Durbin-Watson stat	1.885816
Prob(F-statistic)	0.015634		

Source : Researcher's computation using E-view 9.0, 2016

Interpretation of Regressed Result

The regressed coefficient correlation result on table 4.8 shows a negative association between HCE (-0.002913) and ROA and statistically significantly at 1%. SCE associates negatively with ROA, and significantly affect Banks' ROA at 1% level of significance.

The coefficient of determination obtained was 0.80 (80%), which is commonly referred to as the value of R^2. The cumulative test of hypothesis using adjusted R^2 to draw statistical inference about the explanatory variables employed in this regression equation, shows that, there is 66% variation explained in the profit of the banks by assets, liabilities and equity chosen for this study. And 34% was explained by unknown variables that were not included in the model.

The predictive power of this model is very high and good for users of financial statement for investment decisions making.

Model Specification:

ROA = 0.201987 – 0.002913 HCE – 0.011943SCE

The model shows that for there to be one unit increase in ROA, there will be 0.002913 and 0.011943 multiplying effect decrease in HCE and SCE respectively.

Decision Rule:

Accept the null hypothesis, if the P-value of the test is greater than 0.05. Otherwise reject.

Decision:

The P-value of HCE (0.0005) and SCE (0.0032) is lesser than 0.05. In view of the rule of thumb, H_1 will be accepted and H_0 rejected.

Conclusion:

It would be concluded that HCE and SCE have negative relationship but statistically significant effect on ROA in the banking sector.

4.2.4 TEST OF HYPOTHESIS IV IN THE BANKING SECTOR

H_{04}: Value Added Intellectual Coefficient Indices of quoted banks do not significantly affect employee productivity of the bank.

Model Specification

$$EP = \beta_0 + \beta_1 HCE + \beta_2 SCE + E \quad - \quad - \quad - \quad - \quad (4)$$

Table 4.9: Multiple Regression Analysis showing the relationship between EP and HCE, SCE, sales, DER and PC in Banks

Dependent Variable: EP
Method: Least Squares
Date: 03/17/16 Time: 23:36
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	23.04728	23.14614	0.995729	0.3485
HCE	1.928827	0.966761	-1.995144	0.0311
SCE	-0.434992	2.563911	-0.169660	0.8695
SALES	-2.279332	2.251069	-1.012555	0.3409
DER	0.123392	0.007110	17.35495	0.0000
PC	-0.047645	0.355391	-0.134063	0.8967

R-squared	0.782371	Mean dependent var	11.74211
Adjusted R-squared	0.669149	S.D. dependent var	27.99255
S.E. of regression	4.916764	Akaike info criterion	6.327903
Sum squared resid	193.3965	Schwarz criterion	6.658326
Log likelihood	-40.45927	Hannan-Quinn criter.	6.324383
F-statistic	74.29821	Durbin-Watson stat	2.051323
Prob(F-statistic)	0.000001		

Source: Researcher's Computation using E-view 9.0, 2016

Interpretation of Regressed Result

The regressed coefficient result in table 4.9 shows that HCE associates positively with EP and statistically significant at 5% level of significance. SCE negatively associate with EP at an insignificant level. The R-Squared value shows that 78% of the systematic variations in the dependant variable can be jointly predicated by all the independent variables. 22% was explained by unknown variables that were not included in the model.

The predictive power of this very high and good for users of financial statement for investment decision making. The collective prob. (F-statistic) is statistically significant at 1% level of significance.

The regression effect can be summarized in the model below:

EP = 23.04728+1.928827HCE - 0.434992SCE

For there to be one percentage increase in EP there will be 1.928827 multiplying effect of HCE. And for a percentage increase in EP, there will be a multiplying effect decrease of 0.434992 of SCE.

Decision Rule:

Accept the null hypothesis if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

The P-value of HCE (0.0311) is lesser than 0.05, therefore H_1 is accepted and H_o is rejected. The P-value for SCE (0.8695) is greater than 0.05; therefore H_1 is rejected and Ho is accepted.

Conclusion:

HCE has a positively relationship and statistically significant effect on employee productivity of banks at 5% level of significance. While SCE statistically have insignificant effect on EP of banks quoted on Nigeria Stock Exchange.

4.4.2 TEST OF HYPOTHESES IN THE INSURANCE SECTOR

TABLE 4.10 DESCRIPTIVE STATISTICS OF OPERATIONAL VARIABLES FOR INSURANCE SECTOR

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
Mean	14.90640	0.434400	0.935600	6.221533	0.251133	3.551933	0.246467	0.699267	9.223333	1.109267	0.354867
Median	2.063000	0.435000	0.946000	6.307000	0.184000	3.627000	0.175000	0.770000	9.371000	1.226000	0.254000
Maximum	42.04500	0.527000	1.367000	6.533000	0.565000	5.950000	1.250000	1.096000	9.648000	1.435000	0.769000
Minimum	1.135000	0.344000	0.616000	5.775000	-0.001000	1.564000	0.082000	-0.325000	8.495000	0.548000	0.159000
Std. Dev.	16.90340	0.051779	0.215015	0.269131	0.198601	1.349249	0.284100	0.379390	0.356610	0.270524	0.207969
Skewness	0.476238	-0.015422	0.146693	-0.479610	0.332357	0.331083	3.207294	-1.646166	-0.685590	-1.013890	0.915060
Kurtosis	1.329992	2.713433	2.569142	1.640140	1.638373	1.968592	11.94055	5.012297	2.270941	2.952582	2.403618
Jarque-Bera	2.310088	0.051920	0.169822	1.730826	1.434921	0.938917	75.67524	9.305495	1.507287	2.571337	2.315634
Probability	0.315044	0.974374	0.918594	0.420878	0.487990	0.062340	0.000000	0.009535	0.470649	0.276466	0.314171
Sum	223.5960	6.516000	14.03400	93.32300	3.767000	53.27900	3.697000	10.48900	138.3500	16.63900	5.323000
Sum Sq. Dev.	4000.147	0.037536	0.647238	1.014042	0.552192	25.48663	1.129976	2.015117	1.780389	1.024569	0.605514
Observations	15	15	15	15	15	15	15	15	15	15	15

Source: Researcher's computation using E-View 9.0, 2016

Table 4.10 shows that HCE (0.331083) and CEE (3.207294) are positively skewed while SCE (-1.646166) is negatively skewed. The probability values for the VAIC indices (HCE, CEE & SCE) are all positive and statistically significant at 1% level of significance.

TABLE 4.11 Correlation Matrix of the variables in Insurance Sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
MBV	1.000000	-0.310296	-0.131186	0.716370	-0.710928	-0.720205	0.157888	-0.003333	0.734073	0.137807	0.892075
ROA	-0.310296	1.000000	0.916125	-0.698465	0.166392	0.487126	0.004444	0.348050	-0.570018	0.619823	-0.248484
ROE	-0.131186	0.916125	1.000000	-0.633196	0.063220	0.354692	0.062112	0.333147	-0.506186	0.777767	-0.033551
EP	0.716370	-0.698465	-0.633196	1.000000	-0.369086	-0.583898	-0.043977	-0.283118	0.932574	-0.482539	0.605495
GR	-0.710928	0.166392	0.063220	-0.369086	1.000000	0.631265	-0.088150	-0.148946	-0.258881	-0.420055	-0.668331
HCE	-0.720205	0.487126	0.354692	-0.583898	0.631265	1.000000	0.193038	0.364826	-0.553986	0.082520	-0.762360
CEE	0.157888	0.004444	0.062112	-0.043977	-0.088150	0.193038	1.000000	0.354563	0.027581	0.211003	-0.125572
SCE	-0.003333	0.348050	0.333147	-0.283118	-0.148946	0.364826	0.354563	1.000000	-0.344697	0.410536	-0.215898
SALES	0.734073	-0.570018	-0.506186	0.932574	-0.258881	-0.553986	0.027581	-0.344697	1.000000	-0.389639	0.613137
DER	0.137807	0.619823	0.777767	-0.482539	-0.420055	0.082520	0.211003	0.410536	-0.389639	1.000000	0.187763
PC	0.892075	-0.248484	-0.033551	0.605495	-0.668331	-0.762360	-0.125572	-0.215898	0.613137	0.187763	1.000000

Source: Researcher's computation using E-View 9.0, 2016

Legend:

MBV = Market Value to Book Value Ratio; ROA = Return on Asset,

ROE = Return on Equity; EP = Employee Productivity, GR = Growth in Revenue, HCE = Human Capital Efficiency; CEE = Capital Employed Efficiency; SCE = Structural Capital Efficiency

DER = Debt-to-Equity Ratio

PC = Physical Capital

Table 4.11 shows the association between the Independent variables (HCE, CEE, SCE) and the dependent variables (MBV, ROA, ROE, EP, GR). HCE has a negative relationship with MBV at -0.720205; moderately strong relationship with ROA at 0.487126, moderately strong relationship with ROE at 0.354612; negative relationship with GR and moderately strong relationship with EP and moderately strong relationship with GR at 0.631265. CEE associates positively with MBV at moderately strong degree; has a weak and positive relationship with ROA; a weak and positive association with ROE, negative relationship with EP and also has a negative relationship with GR at -0.088150. SCE associates negatively with MBV; moderately strong with ROA, moderately strong with ROE; negatively with EP, and negatively with GR.

The correlation matrix in table 4.11 shows the relationship between the variables. From the correlation matrix, it can be deduced that the variables have significant relationship since the correlation between them is greater than 0.75. Therefore, a model with highly

correlated variables will result to multicollinearity. (Multicollinearity exists in a multiple regression model when the variables are highly correlated).

The Correlation matrix in table 4.11 indicates that, MBV and PC are highly correlated, ROA and ROE are highly correlated, ROE and ROA are highly correlated, EP and SALES are highly correlated.

Since the result of the Correlation analysis shows that the variables are highly correlated, then, there exists the problem of multicollinearity. To correct the problem of multicollinearity, one of the two variables from each set of the variables should be dropped (see table 4.12).

Table 4.12: Test of Multicollinearity in Insurance Sector

Variance Inflation Factors
Date: 03/18/16 Time: 08:15
Sample: 2000 2014
Included observations: 15

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	5836.858	2545.195	NA
HCE	3.722115	23.23450	2.757738
CEE	38.91631	2.309192	1.278355
SALES	63.76329	2368.613	3.300171
DER	80.84284	45.78447	2.407872
PC	280.0421	20.30730	4.929445

Source: Researcher's computation using E-View 9.0, 2016

Legend:

VIF: Variance Inflation Factors

The variance Inflation Factor (VIF) value is less than 10.0. This is an indication of non-existence of multicollinearity among variables in the model.

4.4.2.1 Test of Hypothesis V in Insurance Sector

H_{05}: VAIC indices do not significantly affect growth in revenue of insurance companies

Model formulation:

GR = f (HCE, CEE) + e - - - (5)

Legend:

GR = Growth in Revenue

Table 4.13: Multiple Regression Analysis between GR and HCE, CEE, SALES, DER and PC in Insurance Sector

Dependent Variable: GR
Method: Least Squares
Date: 03/18/16 Time: 09:29
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.354082	1.881838	0.188158	0.8554
HCE	0.087957	0.048142	1.827037	0.0015
CEE	-0.052049	0.158896	-0.327569	0.7516
SALES	0.001735	0.196806	0.008814	0.9932
DER	-0.221682	0.226675	-0.977974	0.3567
PC	-0.214216	0.411240	-0.520903	0.6165

R-squared	0.699052	Mean dependent var	0.251133
Adjusted R-squared	0.473340	S.D. dependent var	0.198601
S.E. of regression	0.144127	Akaike info criterion	-0.731516
Sum squared resid	0.166181	Schwarz criterion	-0.401093
Log likelihood	12.48637	Hannan-Quinn criter.	-0.735036
F-statistic	3.097106	Durbin-Watson stat	1.393115
Prob(F-statistic)	0.071225		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation

The R-squared value shows that 70% of the systematic variations in the dependent variable can be jointly predicted by all the independent variables. And 30% was explained by unknown variables that were not included in the model. The predictive power of this model is very high and good for users of financial statement for investment decision making. The regression equation is:

GR = 0354082 + 0.087957HCE – 0.052049CEE.

The implication is that, for there to be a unit increase in GR there will be 0.087957 multiplying effect of HCE and 0.052049 multiplying effect decrease of CEE.

Decision Rule:

Accept H_0 if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since there exist a positive and statistically significant level of 1% between HCE and GR. Then H_1 will be accepted and H_o rejected. While for CEE, H_o will be accepted and H_1 rejected because the P-value (0.7516) is greater than 0.05. So, it is statistically insignificant.

Conclusion:

Based on the empirical observation above, HCE positively and significantly affect the GR of insurance companies at 1%. While CEE insignificantly affect the GR of insurance companies.

4.4.3 TEST OF HYPOTHESES IN HEALTH CARE SECTOR

4.4.3.1 Test of Hypothesis 1

H_{o1}: VAIC indices do not significantly affect Market-to-Book value (MBV) ratio of firms in Health Care Sector.

Model Specification:

$$MBV = \beta_0 + \beta_1 HCE + \beta_2 CEE + \beta_3 SCE + \beta_4 SALES + \beta_5 DER + \beta_6 PC + E \quad - \quad (1)$$

Table 4.14 Descriptive Statistics of operational variables in Health Care Sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
Mean	2.801867	0.599200	5.028800	5.689400	16.78873	5.922533	0.603333	0.672427	9.136533	4.030133	0.541400
Median	1.562000	0.519000	1.054000	5.569000	11.64700	2.876000	0.497000	0.652322	8.727000	1.152000	0.582000
Maximum	19.72800	1.545000	55.06400	6.771000	53.83100	38.51800	1.630000	0.974038	10.32400	30.64300	0.914000
Minimum	0.463000	0.145000	0.483000	5.149000	-1.129000	1.599000	0.082000	0.374699	8.527000	0.235000	0.084000
Std. Dev.	4.740578	0.396879	13.91572	0.443387	14.99211	9.271525	0.477364	0.162310	0.663303	7.758592	0.271800
Skewness	3.331980	1.309537	3.413539	0.901323	0.951804	3.176860	0.942865	-0.034988	0.740524	2.942292	-0.410719
Kurtosis	12.45123	3.796004	12.79857	3.245538	3.376790	11.70838	2.751816	2.913319	1.995261	10.63147	2.028243
Jarque-Bera	83.58381	4.683229	89.13815	2.068639	2.353558	72.62856	2.260982	0.007756	2.001876	58.04231	1.011921
Probability	0.000000	0.096172	0.000000	0.355468	0.308270	0.000000	0.000322	0.000129	0.367534	0.000000	0.602926
Sum	42.02800	8.988000	75.43200	85.34100	251.8310	88.83800	9.050000	10.08641	137.0480	60.45200	8.121000
Sum Sq. Dev.	314.6231	2.205180	2711.061	2.752286	3146.686	1203.456	3.190275	0.368825	6.159590	842.7405	1.034252
Observations	15	15	15	15	15	15	15	15	15	15	15

Source: Researcher's computation using E-View 9.0, 2016

According to Jarque-bera Theory in table 4.14 the P-value for HCE, CEE and SCE is statistically significant because they are less than 10%.

The skewness for SCE is negative while HCE and CEE are positively skewed. The values for the VAIC indices (HCE, CEE, SCE) are significantly normally distributed at 0.000000, 0.000322 and 0.000129 respectively.

Table 4.15 Correlation matrix of variables in health care sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
MBV	1.000000	-0.233178	0.037554	0.687532	0.250661	0.199133	-0.223225	0.416450	0.335596	0.257917	0.187199
ROA	-0.233178	1.000000	0.592831	0.134722	0.098998	0.529245	0.178892	0.483893	0.505042	0.441318	-0.764211
ROE	0.037554	0.592831	1.000000	0.255736	0.224208	0.970216	0.408211	0.528557	0.547219	0.954918	-0.506069
EP	0.687532	0.134722	0.255736	1.000000	0.561850	0.392943	-0.233901	0.507964	0.664289	0.445918	-0.192312
GR	0.250661	0.098998	0.224208	0.561850	1.000000	0.342741	0.052090	0.480437	0.301403	0.230273	-0.405734
HCE	0.199133	0.529245	0.970216	0.392943	0.342741	1.000000	0.426658	0.669305	0.506342	0.955033	-0.487259
CEE	-0.223225	0.178892	0.408211	-0.233901	0.052090	0.426658	1.000000	0.374768	-0.213032	0.270123	-0.060039
SCE	0.416450	0.483893	0.528557	0.507964	0.480437	0.669305	0.374768	1.000000	0.260168	0.517212	-0.626559
SALES	0.335596	0.505042	0.547219	0.664289	0.301403	0.506342	-0.213032	0.260168	1.000000	0.623183	-0.359867
DER	0.257917	0.441318	0.954918	0.445918	0.230273	0.955033	0.270123	0.517212	0.623183	1.000000	-0.388871
PC	0.187199	-0.764211	-0.506069	-0.192312	-0.405734	-0.487259	-0.060039	-0.626559	-0.359867	-0.388871	1.000000

Source: Researcher's computation using E-View 9.0, 2016

The correlation matrix in table 4.15 shows the relationship between the variables. From the correlation matrix, it can be observed that the variables have significant relationship since the correlation between them is greater than 0.75. Therefore a model with highly correlated variables will result to multicollinearity. (Multicollinearity exists in a multiple regression model when the variables are highly correlated). The correlation matrix in table

4.15 reveals that ROE and HCE are highly correlated. So, one of the variables will be dropped.

Model Formulation:

MBV = f (SCE, CEE) + ei - - - - - (1a)

Legend:

MBV = Market Value-to-Book-value

f = function

SCE = Structural capital Efficiency

CEE = Capital Employed Efficiency

ei = Error term

Table 4.16 Test of Multicollinearity in Health Care Sector

Variance Inflation Factors
Date: 03/18/16 Time: 12:33
Sample: 2000 2014
Included observations: 15

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	795.9620	546.0011	NA
HCE	0.498641	39.44069	2.744281
CEE	14.65469	5.797288	2.138035
SALES	8.581863	493.8293	2.417371
DER	0.636870	31.64015	2.454452
PC	39.65649	9.849197	1.875644

Source: Researcher's computation using E-View 9.0, 2016

Legend:

VIF = Variance Inflation Factors

The variance Inflation Factor (VIF) value is less than 10.0. This is an indication of non-existence of multicollinearity among variables in the model.

Table 4.17: Multiple Regression Analysis showing the Relationship between MBV and HCE, CEE, SALES, DER and PC in Health Care Sector.

Dependent Variable: MBV
Method: Least Squares
Date: 03/18/16 Time: 12:30
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-23.29061	28.21280	-0.825534	0.4304
HCE	0.802446	0.706145	1.136374	0.0028
CEE	-4.956842	3.828145	-1.294842	0.0022
SALES	2.304856	2.929482	0.786780	0.4516
DER	-0.650342	0.798041	-0.814923	0.4361
PC	10.88505	6.297340	1.728516	0.1180

R-squared	0.874479	Mean dependent var	2.801867
Adjusted R-squared	0.626967	S.D. dependent var	4.740578
S.E. of regression	4.676221	Akaike info criterion	6.212032
Sum squared resid	196.8034	Schwarz criterion	6.495252
Log likelihood	-40.59024	Hannan-Quinn criter.	6.209015
F-statistic	1.077601	Durbin-Watson stat	1.540339
Prob(F-statistic)	0.000433		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.17 shows that there is a positive and significant relationship between HCE and MBV at 1% while CEE associates negatively with MBV but statistically significant at 1%. And the overall prob. (F-statistic) is statistically significant at 1%. The coefficient of determination obtained was 87% which is commonly referred to as the value of R^2. The cumulative test of hypothesis using R^2 to draw statistical inference about the explanatory variables employed in this regression equation, shows that, there is 87% variation explained in the profit of the Health Care Sector by assets, liabilities and equity chosen for this study. And 13% was explained by unknown variables that were not included in the model. The predictive power of this model is very high and good for users of financial statement for investment decision making.

Decision Rule:

Accept the null hypothesis (H_o), if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of the test of the VAIC indices is less than 0.05, there exists enough evidence to reject the null hypothesis and accept H_1.

Conclusion:

There is significant relationship between VAIC indices and MBV ratio in Health Care Sector. More so, VAIC indices significantly influence MBV of firms in Health Care Sector.

4.4.3.2 Test of Hypothesis II in Health Care Sector

H_{o2}: VAIC indices do not significantly affect Return on Asset (ROA) of Health Care Sector

Model Specification

$ROA = \beta_0 + \beta_1 HCE + \beta_2 CEE + \beta_3 SALES + \beta_4 DER + \beta_5 PC + E$ - (2a)

Table 4.18 Multiple Regression Analysis between ROA and HCE, CEE, SALES, DER, PC in Health Care Sector.

Dependent Variable: ROA
Method: Least Squares
Date: 03/18/16 Time: 12:42
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.615260	1.607712	-1.004695	0.3413
HCE	0.027967	0.040240	0.695007	0.0004
CEE	0.136837	0.218148	0.627269	0.5461
SALES	0.279606	0.166937	1.674916	0.1283
DER	-0.037514	0.045477	-0.824910	0.4307
PC	-0.807485	0.358855	-2.250169	0.0510

R-squared	0.710191	Mean dependent var	0.599200
Adjusted R-squared	0.549185	S.D. dependent var	0.396879
S.E. of regression	0.266475	Akaike info criterion	0.482105
Sum squared resid	0.639082	Schwarz criterion	0.765325
Log likelihood	2.384216	Hannan-Quinn criter.	0.479088
F-statistic	4.410978	Durbin-Watson stat	1.602246
Prob(F-statistic)	0.026216		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.18 shows that VAIC indices are positively related with ROA, while HCE is statistically significant at 1%, CEE is statistically insignificant.

The regression equation is

ROA = -1.615260 + 0.027967HCE + 0.136837CEE

The implication is that for there to be a unit increase in ROA, there must be a multiplying effect of 0.027967 and 0.0136837 of HCE and CEE respectively.

Decision Rule:

Accept H_0 if the p-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of HCE is lesser than 0.05, H_1 will be accepted. Moreover, H_o will be accepted for CEE, because the P-value is greater than 0.05.

Conclusion:

HCE positively and significantly affect ROA, while CEE insignificantly affects the ROA of Health Care Sector in Nigeria.

4.4.3.3 Test of Hypothesis III in Health Care Sector

H_{o3}: VAIC indices do not significantly influence the ROE of Health Care Sector

Model Formulation:

ROE = f (HCE, CEE) + e - - - - - - (3a)

Table 4.19 Multiple Regression Analysis between ROE and HCE, CEE, SALES, DER and PC in Health Care Sector

Dependent Variable: ROE
Method: Least Squares
Date: 03/18/16 Time: 12:50
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.270849	20.21107	-0.161835	0.8750
HCE	0.406904	0.505868	0.804367	0.4419
CEE	3.642826	2.742405	1.328333	0.0216
SALES	0.309465	2.098621	0.147461	0.8860
DER	1.083218	0.571701	1.894730	0.0906
PC	-6.466643	4.511286	-1.433437	0.1855

R-squared	0.762745	Mean dependent var	5.028800
Adjusted R-squared	0.742048	S.D. dependent var	13.91572
S.E. of regression	3.349950	Akaike info criterion	5.544942
Sum squared resid	100.9995	Schwarz criterion	5.828162
Log likelihood	-35.58707	Hannan-Quinn criter.	5.541925
F-statistic	46.51620	Durbin-Watson stat	2.063851
Prob(F-statistic)	0.000004		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.19 shows that HCE and CEE positively associate with ROE. SCE is statistically insignificant while CEE is statistically significant with ROE at 5%. The regression equation is:

ROE = -3.270849 + 0.406904SCE + 3.642826CEE.

The implication is that for there to be a unit increase in ROE, there must be 0.406904 and 3.64282 multiplying effect of HCE and CEE respectively.

Decision Rule:

Accept H_o if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of HCE is not statistically significant, because the p-value of HCE (0.4419) is greater than 0.05, H_o will be accepted. While for CEE, H_1 will be accepted and H_o rejected.

Conclusion:

HCE does not significantly affect the ROE of Health Care Sector. While CEE significantly affects the ROE of Health Care Sector in Nigeria.

4.4.3.4 Test of Hypothesis IV in Health Care Sector

H_{o4}: VAIC indices do not significantly affect employee productivity of Health Care Sector in Nigeria

Model Formulation

EP = f (HCE, CEE) + e - - - - - (4a)

Table 4.20: Multiple Regression Analysis between EP and HCE, CEE, SALES, DER and PC in Health Care Sector.

Dependent Variable: EP
Method: Least Squares
Date: 03/18/16 Time: 13:02
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.563901	2.281090	0.685594	0.5102
HCE	0.065244	0.057094	1.142750	0.0282
CEE	-0.350737	0.309517	-1.133175	0.0286
SALES	0.432475	0.236857	1.825888	0.1012
DER	-0.060110	0.064524	-0.931587	0.3759
PC	0.446299	0.509159	0.876542	0.4035

R-squared	0.532554	Mean dependent var	5.689400
Adjusted R-squared	0.272862	S.D. dependent var	0.443387
S.E. of regression	0.378087	Akaike info criterion	1.181787
Sum squared resid	1.286545	Schwarz criterion	1.465007
Log likelihood	-2.863403	Hannan-Quinn criter.	1.178770
F-statistic	2.050713	Durbin-Watson stat	1.827755
Prob(F-statistic)	0.064711		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.20 shows a positive and statistically significant relationship between HCE and EP. While CEE associates negatively with EP but statistically significant at 5%.

The regression equation is:

EP = 1.563901 + 0.065244HCE – 0.350737CEE

The implication is that for there to be one percentage increase in EP there must be 0.065244 multiplying effect of HCE and 0.350737 multiplying effect decrease of CEE.

Decision Rule:

Accept H_0 if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of HCE (0.0282) and CEE (0.0286) is lesser than 0.05, then, H_1 will be accepted and H_o rejected.

Conclusion:

VAIC indices significantly affect employee productivity of health care sector in Nigeria.

4.4.3.5 Test of Hypothesis V in Health Care Sector

H_{o5}: VAIC indices do not significantly affect Growth in Revenue (GR) of Health Care Sector

Model Formulation

GR = f (HCE, CEE) + E - - - - (5a)

Table 4.21 Multiple Regression Analysis between GR and HCE, CEE, SALES, DER and PC in Healthcare Sector

Dependent Variable: GR
Method: Least Squares
Date: 03/18/16 Time: 13:08
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-76.85091	86.57851	-0.887644	0.3978
HCE	3.875893	2.166996	1.788602	0.0073
CEE	-8.309909	11.74768	-0.707366	0.4972
SALES	10.10635	8.989897	1.124190	0.2900
DER	-4.355758	2.449003	-1.778584	0.1090
PC	1.690901	19.32507	0.087498	0.9322

R-squared	0.811011	Mean dependent var	16.78873
Adjusted R-squared	0.683795	S.D. dependent var	14.99211
S.E. of regression	14.35023	Akaike info criterion	8.454584
Sum squared resid	1853.363	Schwarz criterion	8.737804
Log likelihood	-57.40938	Hannan-Quinn criter.	8.451567
F-statistic	1.256085	Durbin-Watson stat	1.749196
Prob(F-statistic)	0.000254		

Source: researcher's computation using E-View 9.0, 2016

Interpretation of Result

The R-squared value in table 4.21 shows that 81% of the systematic variations in the dependent variable can be jointly predicted by all the independent variables and 19% was explained by unknown variables that were not included in the model. The predictive power of this model is very high and good for users of financial statement for investment decision making.

The regression equation is

GR = -76.85091 + 3.875893HCE – 8.309909CEE

The implication is that for there to be a unit increase in GR, there must be 3.875893 multiplying effect of HCE and 8.309909 multiplying effect decrease of CEE.

Decision Rule:

Accept H_o if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since there exist a positive and statistically significant level of 1% between HCE and GR, then, H_1 will be accepted and H_o rejected. And for CEE, H_o will be accepted and H_1 rejected.

Conclusion:

Based on the empirical observations, HCE positively and significantly affect the GR of Health care sector in Nigeria. While CEE does not significantly affect GR of Health Care Sector in Nigeria.

4.4.4 TEST OF HYPOTHESES IN ICT (TELECOMMUNICATION SERVICES)

4.4.4.1 Test of Hypothesis 1

H_{o1}: VAIC indices have no significant affect on the MBV Ratio of Information Communication and Technology (ICT) Sector

Model Specification

$$MBV = \beta_0 + \beta_1 HCE + \beta_2 CEE + \beta_3 SCE + \beta_4 SALES + \beta_5 DER + \beta_6 PC + E \quad - \quad (1)$$

Table 4.22 Descriptive Statistics of Operational Variables for ICT (Telecommunication services)

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
Mean	1.727067	0.963067	4.053800	6.031730	28.97807	4.917667	0.501067	0.708422	9.031533	11.04333	0.547933
Median	1.602000	0.974000	1.143000	5.815909	25.24200	4.985000	0.428000	0.797905	9.169000	0.920000	0.497000
Maximum	4.043000	1.410000	23.62400	6.753071	84.07500	7.829000	1.243000	0.985507	9.416000	141.0590	1.079000
Minimum	-0.586000	0.580000	-16.40100	5.493406	-26.88000	-0.335000	-0.063000	0.010163	8.466000	-10.35200	0.157000
Std. Dev.	1.223222	0.259657	10.89606	0.458673	32.20479	2.265835	0.355927	0.285575	0.338782	36.92537	0.311804
Skewness	0.119212	0.269496	0.425017	0.379627	0.319207	-0.745901	0.598273	-1.864888	-0.371650	3.183095	0.434113
Kurtosis	2.810147	1.809426	2.770998	1.580566	2.152836	3.002501	2.522169	5.013092	1.608938	11.78550	1.918005
Jarque-Bera	0.058056	1.067487	0.484375	1.619537	0.703287	1.390924	1.037529	11.22736	1.554718	73.57085	1.202830
Probability	0.971389	0.586406	0.784909	0.444961	0.703531	0.498844	0.595256	0.003648	0.459618	0.000000	0.548035
Sum	25.90600	14.44600	60.80700	90.47594	434.6710	73.76500	7.516000	10.62632	135.4730	165.6500	8.219000
Sum Sq. Dev.	20.94780	0.943905	1662.137	2.945332	14520.08	71.87613	1.773581	1.141745	1.606826	19088.76	1.361103
Observations	15	15	15	15	15	15	15	15	15	15	15

Source: Researcher's computation using E-View 9.0, 2016

The correlation matrix in table 4.23 shows the relationship between the variables. From the correlation matrix, it can be deduced that the variables have significant relationship since the correlation between them is greater than 0.75. Therefore, a model with the variables highly correlated will result to multicollinearity. Multicollinearity exists in a multiple regression model when the variables are highly correlated. Since HCE and CEE have significant relationship, one of the two can be removed from the model to prevent the problem of multicollinearity in the model.

Thus, the model becomes a function of CEE and SCE on the dependent variables of ICT sector (see table 4.23).

Model formulation:

MBV = f (CEE, SCE) + e - - - - - (1a)

Table 4.23 Correlation matrix of variables for ICT (Telecommunication sector)

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
MBV	1.000000	-0.107766	0.393736	0.244734	-0.056650	-0.322327	-0.465606	-0.272697	0.682391	0.212367	0.354315
ROA	-0.107766	1.000000	-0.214408	-0.208018	0.206507	0.228493	0.601340	-0.124086	-0.144027	-0.198572	-0.296401
ROE	0.393736	-0.214408	1.000000	-0.027145	0.031553	-0.029562	-0.095559	-0.231025	0.286211	0.585370	0.363713
EP	0.244734	-0.208018	-0.027145	1.000000	0.017298	-0.343172	-0.514783	0.050635	0.559299	-0.232403	-0.308458
GR	-0.056650	0.206507	0.031553	0.017298	1.000000	-0.727431	-0.330306	-0.558805	0.148844	-0.202581	-0.284707
HCE	-0.322327	0.228493	-0.029562	-0.343172	-0.727431	1.000000	0.737935	0.430653	-0.479041	0.311561	0.137104
CEE	-0.465606	0.601340	-0.095559	-0.514783	-0.330306	0.737935	1.000000	0.249344	-0.657995	0.118315	-0.139094
SCE	-0.272697	-0.124086	-0.231025	0.050635	-0.558805	0.430653	0.249344	1.000000	-0.397347	0.083766	0.269137
SALES	0.682391	-0.144027	0.286211	0.559299	0.148844	-0.479041	-0.657995	-0.397347	1.000000	-0.182215	0.094598
DER	0.212367	-0.198572	0.585370	-0.232403	-0.202581	0.311561	0.118315	0.083766	-0.182215	1.000000	0.296967
PC	0.354315	-0.296401	0.363713	-0.308458	-0.284707	0.137104	-0.139094	0.269137	0.094598	0.296967	1.000000

Source: Researcher's computation using E-View 9.0, 2016

Table 4.24: Test of Multicollinearity in ICT (Telecommunication Services)

Variance Inflation Factors
Date: 03/18/16 Time: 15:08
Sample: 2000 2014
Included observations: 15

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	81.29061	1471.527	NA
SCE	0.031053	16.28769	2.693560
CEE	1.582935	10.58225	3.388057
SALES	0.932471	1378.657	1.808177
DER	5.36E-05	1.351995	1.233761
PC	0.751745	5.320388	1.234805

Source: Researcher's computation using E-View 9.0, 2016

Legend:

VIF: Variance Inflation Factors

The variance Inflation Factor (VIF) value is less than 10.0. This is an indication of non-existence of multicollinearity among variables in the model.

Table 4.25 Multiple Regression analysis showing the relationship between MBV and SCE, CEE, SALES, DER and PC in ICT (Telecommunication Services)

Dependent Variable: MBV
Method: Least Squares
Date: 03/18/16 Time: 15:02
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-22.22618	9.016131	-2.465157	0.0359
SCE	-0.138622	0.176219	-0.786649	0.0017
CEE	0.677529	1.258148	0.538513	0.0033
SALES	2.617004	0.965646	2.710108	0.0240
DER	0.010814	0.007318	1.477693	0.1736
PC	0.986384	0.867032	1.137655	0.2846

R-squared	0.643986	Mean dependent var	1.727067
Adjusted R-squared	0.446200	S.D. dependent var	1.223222
S.E. of regression	0.910294	Akaike info criterion	2.939076
Sum squared resid	7.457717	Schwarz criterion	3.222296
Log likelihood	-16.04307	Hannan-Quinn criter.	2.936059
F-statistic	3.255977	Durbin-Watson stat	1.664905
Prob(F-statistic)	0.059303		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

The regressed coefficient result in table 4.25 shows that both SCE and CEE are statistically significant to MBV at 1%. While SCE associates negatively, CEE associates positively with MBV. The overall significance of the model Prob (F-statistic) is statistically significant at 10%.

The regression equation is

MBV = -22.22618 – 0.138622SCE + 0.677529CEE.

The implication is that, for there to be a unit increase in MBV, there must be 0.138622 multiplying effect of SCE and 0.677529 multiplying effect of CEE.

Decision Rule:

Accept H_o, if P-value of the result is greater than 0.05, otherwise reject.

Decision:

Since the P-value of the VAIC indices (SCE = 0.017 and CEE = 0.0033) is lesser than 0.05, than H_1 should be accepted and H_0 rejected.

Conclusion:

There is significant relationship between VAIC indices and MBV ratio in ICT sector. Furthermore VAIC indices significantly affect MBV ratio of ICT sector.

4.4.4.2 Test of Hypothesis II in ICT Sector

H_{02}: VAIC indices do not significantly affect return on assets (ROA) of ICT (Telecommunication Services)

Model Specification:

$$ROA = \beta_0 + \beta_1 SCE + \beta_0 CEE + \beta_3 SALES + \beta_4 DER + \beta_5 PC + E \quad - \quad - (2a)$$

Table 4.26 Multiple Regression Analysis between ROA and SCE, CEE, SALES, DER and PC in ICT Sector

Dependent Variable: ROA
Method: Least Squares
Date: 03/18/16 Time: 15:14
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.159314	2.028831	-1.064314	0.3149
SCE	-0.042976	0.039653	-1.083790	0.3066
CEE	0.846542	0.283111	2.990139	0.0152
SALES	0.327688	0.217292	1.508053	0.1658
DER	-0.000804	0.001647	-0.488400	0.6369
PC	-0.074995	0.195102	-0.384392	0.7096

R-squared	0.599936	Mean dependent var	0.963067
Adjusted R-squared	0.377679	S.D. dependent var	0.259657
S.E. of REGRESSION	0.204837	Akaike info criterion	-0.044035
Sum squared resid	0.377622	Schwarz criterion	0.239186
Log likelihood	6.330259	Hannan-Quinn criter.	-0.047051
F-statistic	2.699284	Durbin-Watson stat	1.534202
Prob(F-statistic)	0.092774		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.26 shows the existence of negative relationship between SCE and ROA. CEE has a positive relationship with ROA and statistically significant at 5%. While CEE is not significant with ROA. The overall significant of the model Prob (F-statistic) is statistically significant at 10%.

The regression equation is :

ROA = -2.159314 – 0.04297SCE + 0.846542CEE

For there to be a unit increase in ROA there must be 0.042976 multiplying effect decrease of SCE and 0.846542 multiplying effect on CEE.

Decision Rule:

Accept H_o if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

The P-value of the SCE is not statistically significant. Therefore H_0 is accepted and H_1 reject. However, the P-value of CEE is statistically significant at 5%. Therefore, H_1 is accepted and H_o rejected.

Conclusion

SCE is not statistically significant with ROA, therefore, does not affect ROA of Telecommunication services while CEE positively and significantly affect ROA of telecommunication services.

4.4.4.3 Test of Hypothesis III in ICT Sector

H_{o3}: VAIC indices do not significantly affect the ROE of ICT (Telecommunication Services)

Model Formulation:

ROE = f (SCE, CEE) + e - - - - (3a)

Table 4.26 Multiple Regression Analysis between ROE and SCE, CEE, SALES, DER and PC in ICT sector

Dependent Variable: ROE
Method: Least Squares
Date: 03/18/16 Time: 15:19
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-152.2030	86.02409	-1.769307	0.1106
SCE	-1.777926	1.681328	-1.057453	0.3179
CEE	14.46477	12.00415	1.204980	0.0289
SALES	16.73352	9.213351	1.816225	0.1027
DER	0.197894	0.069825	2.834158	0.0196
PC	8.098584	8.272471	0.978980	0.3532

R-squared	0.591550	Mean dependent var	4.053800
Adjusted R-squared	0.364633	S.D. dependent var	10.89606
S.E. of regression	8.685235	Akaike info criterion	7.450300
Sum squared resid	678.8998	Schwarz criterion	7.733520
Log likelihood	-49.87725	Hannan-Quinn criter.	7.447283
F-statistic	2.606905	Durbin-Watson stat	1.400516
Prob(F-statistic)	0.100316		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.27 shows that SCE is statistically insignificant and relates negatively with ROE , while CEE associate positively with ROE in the ICT Sector. But, the overall significance of the model Prob (F-statistic) is statistically significant at 10%.

The regression equation is:

ROE = -152.2030 – 1.777926SCE + 14.46477CEE

The implication is, for there to be one unit increase of ROE there will be 1.777926 multiplying effect decrease of SCE and 14.46477 multiplying effect of CEE.

Decision Rule:

Accept H_o if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of SCE is greater than 0.05, H_o would be accepted and H_1 rejected. While for CEE, H_1 would be accepted.

Conclusion:

SCE has a negative and insignificant relationship with ROE, while CEE has a positive and statistically significant relationship with ROE. Hence, CEE significantly affects ROE of ICT (Telecommunication Services) at 5% level.

4.4.4.4 Test of Hypothesis V in ICT Sector

H_{o4}: VAIC indices do not significantly affect Employee Productivity of ICT (Telecommunication Services)

Model Formulation

EP = f (SCE, CEE) + e - - - - - - (4a)

Table 4.28 Multiple Regression Analysis between EP and SCE,CEE, SALES, DER and PC in ICT Sector

Dependent Variable: EP
Method: Least Squares
Date: 03/18/16 Time: 15:27
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.852789	3.826782	0.484164	0.6398
SCE	0.070273	0.074794	0.939552	0.3720
CEE	-0.746118	0.534005	-1.397213	0.0364
SALES	0.507173	0.409856	1.237442	0.2472
DER	-0.000867	0.003106	-0.279044	0.7865
PC	-0.663878	0.368001	-1.804012	0.1047

R-squared	0.643860	Mean dependent var	6.031730
Adjusted R-squared	0.590448	S.D. dependent var	0.458673
S.E. of regression	0.386363	Akaike info criterion	1.225094
Sum squared resid	1.343485	Schwarz criterion	1.508314
Log likelihood	-3.188205	Hannan-Quinn criter.	1.222077
F-statistic	2.146153	Durbin-Watson stat	2.190752
Prob(F-statistic)	0.023721		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

The R-squared value shows that 64% of the systematic variation in the dependent variable can be jointly predicted by all the independent variables and 37% was explained by unknown variables that were not included in the model. SCE associates positively with EP but not statistically significant. CEE negatively associates with EP but statistically significant at 5%.

The Regression equation is:

EP = 1.852789 + 0.070273SCE – 0.746118CEE

The implication of the finding is that for there to be a percentage increase in EP there will be a 0.070273 multiplying effect of SCE and 0.746118 multiplying effect decease in CEE.

Decision Rule:

Accept H_o if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

The P-value of SCE (0.3720) is greater than 0.05, hence, H_o will be accepted. While the P-value of CEE (0.0364) is lesser than 0.05, hence, H_1 will be accepted.

Conclusion:

SCE does not significantly affect EP in ICT (Telecommunication Services). However; CEE significantly affect EP in ICT (Telecommunications services).

4.4.4.5 Test of Hypothesis V in ICT Sector

H_{o5}: VAIC indices do not significantly affect growth in revenue of ICT (Telecommunication Services)

Model Formulation:

GR = f (SCE, CEE) + e - - - - - - (5a)

Table 4.29 Multiple regression Analysis between GR and SCE, CEE, SALES DER and PC in ICT (Telecommunication services)

Dependent Variable: GR
Method: Least Squares
Date: 03/18/16 Time: 15:36
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	168.6786	237.3028	0.710816	0.4952
SCE	-14.93417	4.638049	-3.219924	0.0105
CEE	32.45221	33.11420	0.980009	0.3527
SALES	-8.542653	25.41560	-0.336118	0.7445
DER	0.086471	0.192615	0.448931	0.6641
PC	-11.53725	22.82012	-0.505574	0.6253

R-squared	0.644203	Mean dependent var	28.97807
Adjusted R-squared	0.446538	S.D. dependent var	32.20479
S.E. of regression	23.95876	Akaike info criterion	9.479720
Sum squared resid	5166.200	Schwarz criterion	9.762940
Log likelihood	-65.09790	Hannan-Quinn criter.	9.476703
F-statistic	3.259065	Durbin-Watson stat	2.403670
Prob(F-statistic)	0.059163		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

The R-squared value shows that 64% of the systematic variations in the dependent variable can be jointly predicted by all the independent variables. And 3% was explained by unknown variables that were not included in the model.

The regression equation is

GR = 168.6786 – 14.93417SCE + 32.455221CEE

The predictive power of this model is very high and good for users of financial statement for investment decision making.

Decision Rule:

Accept H_o if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

The P-value for SCE is statistical significant (0.0105), therefore, H_1 will be accepted while for CEE H_o will be accepted because the P-value (0.3527) is greater than 0.05.

Conclusion:

SCE significantly affects GR in ICT Sector. While CEE does not significantly affect ICT Sector in Nigeria even though they positively associate.

4.4.5 Test of Hypotheses in Auto Mobile/Auto Part Sector

4.4.5.1 Test of Hypothesis 1

H_{o1}: VAIC indices do not significantly affects Market- to-Book value (MBV) Ratio in Automobile/Auto Part Sector

Model Specification

$$MBV = \beta_0 + \beta_1 HCE + \beta_2 CEE + \beta_3 SCE + \beta_4 SALES + \beta_5 DER + \beta_6 PC + E \quad - (1)$$

Table 4.30: Descriptive Statistics of Operational Variables for Automobile/Auto part Sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
Mean	2.326533	1.945933	8.902067	6.151925	10.58207	19.78787	1.163200	0.854566	9.818267	3.968400	0.135733
Median	1.790000	2.006000	5.961000	6.070223	20.24600	17.67500	1.369000	0.943423	10.18000	1.659000	0.123000
Maximum	8.124000	2.755000	55.06400	6.744981	70.35900	56.04500	2.575000	0.982157	10.33500	30.64300	0.253000
Minimum	0.426000	1.076000	3.127000	4.961358	-99.77200	2.207000	0.105000	0.546958	6.726000	0.559000	0.067000
Std. Dev.	1.862848	0.459671	12.83709	0.471150	38.12690	17.34890	1.000149	0.141680	0.905976	7.484532	0.058108
Skewness	2.152918	-0.212806	3.412296	-0.778208	-1.492443	0.569951	0.058098	-0.793584	-2.868547	3.312492	0.518436
Kurtosis	7.384031	2.279461	12.80612	3.785943	5.948801	2.131896	1.211761	2.341388	10.42910	12.36074	2.139599
Jarque-Bera	23.59997	0.437701	89.20939	1.900087	11.00311	1.283113	2.007063	1.845547	55.06615	82.19622	1.134620
Probability	0.000008	0.803442	0.000000	0.386724	0.004080	0.000472	0.000582	0.000415	0.000000	0.000000	0.567049
Sum	34.89800	29.18900	133.5310	92.27887	158.7310	296.8180	17.44800	12.81849	147.2740	59.52600	2.036000
Sum Sq. Dev.	48.58285	2.958165	2307.074	3.107750	20351.24	4213.780	14.00418	0.281025	11.49111	784.2551	0.047271
Observations	15	15	15	15	15	15	15	15	15	15	15

Source: Researcher's computation using E-View 9.0, 2016

According to Jarque-Bera Theory, the P-values of VAIC indices in table 4.30 (HCE = 0.00472, CEE = 0.000582, SCE = 0.000415) are statistically significant at 1%. The skewness for SCE is negative while the skewness for HCE and CEE is positive. The VAIC indices are significantly normally distributed.

Table 4.31 Correlation Matrix of Variables for Automobile/Auto Part Sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
MBV	1.000000	-0.540062	0.188907	0.013653	-0.350924	-0.101528	-0.093839	-0.365790	-0.187427	0.263751	0.443986
ROA	-0.540062	1.000000	-0.377756	0.225906	0.415155	0.577677	0.669672	0.668662	-0.139759	-0.474990	-0.508035
ROE	0.188907	-0.377756	1.000000	-0.096970	0.084189	0.265769	0.036852	0.202478	0.102572	0.993386	-0.166354
EP	0.013653	0.225906	-0.096970	1.000000	0.708050	0.106219	-0.070102	-0.145976	0.679939	-0.102022	0.141763
GR	-0.350924	0.415155	0.084189	0.708050	1.000000	0.525656	0.299281	0.243976	0.700014	0.047452	-0.402022
HCE	-0.101528	0.577677	0.265769	0.106219	0.525656	1.000000	0.893542	0.818546	-0.124740	0.198906	-0.727434
CEE	-0.093839	0.669672	0.036852	-0.070102	0.299281	0.893542	1.000000	0.858315	-0.394114	-0.031966	-0.744388
SCE	-0.365790	0.668662	0.202478	-0.145976	0.243976	0.818546	0.858315	1.000000	-0.375144	0.109032	-0.823973
SALES	-0.187427	-0.139759	0.102572	0.679939	0.700014	-0.124740	-0.394114	-0.375144	1.000000	0.123731	0.064148
DER	0.263751	-0.474990	0.993386	-0.102022	0.047452	0.198906	-0.031966	0.109032	0.123731	1.000000	-0.095715
PC	0.443986	-0.508035	-0.166354	0.141763	-0.402022	-0.727434	-0.744388	-0.823973	0.064148	-0.095715	1.000000

Source: Researchers' computation using E-View 9.0, 2016

The correlation matrix in table 4.31 shows the relationship between the variables. From the correlation matrix, it can be observed that the independent variables (VAIC indices) have significant relationship, since the correlation between them is greater than 0.75. Therefore a model with highly correlated variables will result to multicollinearity. Multicollinearity exists in a multiple regression model when the variables are highly correlated. Since HCE and SCE have significant relationship, one of the two variables would be removed from the model to prevent the problem of multicollinearity in the model (see table 4.32).

Model Formulation

MBV = f (CEE, SCE) + E - - - - - - (1a)

Table 4.32: Test of Multicollinearity in Auto mobile/Auto part Sector

Variance Inflation Factors
Date: 03/18/16 Time: 20:02
Sample: 2000 2014
Included observations: 15

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	99.44157	799.4025	NA
CEE	0.571938	10.51345	4.292523
SCE	43.40352	261.3454	6.536964
SALES	0.261880	204.5535	1.612762
DER	0.002623	1.434680	1.102577
PC	165.8513	28.76509	4.201644

Source: Researcher's computation using E-View 9.0, 2016

The Variance Inflation Factor (VIF) value is less than 10.0. This is an indication of non-existence of multicolinearity among variables in the model.

Table 4.33 Multiple regression analysis showing the relationship between MBV and CEE, SCE, SALES, DER and PC in Automobile Sector

Dependent Variable: MBV
Method: Least Squares
Date: 03/08/16 Time: 20:00
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16.33960	9.972039	1.638542	0.1357
CEE	1.941927	0.756266	2.567784	0.0303
SCE	14.77871	6.588135	-2.243231	0.0416
SALES	-0.579190	0.511742	-1.131801	0.2870
DER	0.121666	0.051218	2.375446	0.0415
PC	11.50259	12.87833	0.893174	0.3950

R-squared	0.654337	Mean dependent var	2.326533
Adjusted R-squared	0.462302	S.D. dependent var	1.862848
S.E. of regression	1.365988	Akaike info criterion	3.750807
Sum squared resid	16.79331	Schwarz criterion	4.034027
Log likelihood	-22.13105	Hannan-Quinn criter.	3.747790
F-statistic	3.407380	Durbin-Watson stat	1.757196
Prob(F-statistic)	0.052854		

Source: Researcher's computation using E-View 9.0, 2016

Table 4.33 shows that a positive and statistically significant relationship exist between VAIC indices and MBV at 5%.

Decision Rule:

Accept the null hypothesis (H_o), if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of the VAIC indices is lesser than 0.05, there exist enough evidence to reject the null hypothesis and accept H_1.

Conclusion:

There is positive and statistically significant relationship between VAIC indices and MBV in Automobile/Auto part service sector.

4.4.5.2 Test of Hypothesis II in Automobile/Auto Part Sector

H_{o2}: VAIC indices do not significantly affect ROA of Automobile/Auto Part Sector

Model Specification:

ROA: $\beta_0 + \beta_1 CEE + \beta_2 SCE + \beta_3 SALES + \beta_4 DER + \beta_5 PC + E$ - (2a)

Table 4.34: Multiple Regression Analysis between ROA and CEE, SCE, SALES, DER, PC in Automobile/Auto Part Sector

Dependent Variable: ROA
Method: Least Squares
Date: 03/18/16 Time: 20:10
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.342165	1.595382	-2.094900	0.0657
CEE	0.117579	0.120992	0.971797	0.3565
SCE	3.346345	1.054006	3.174882	0.0113
SALES	0.198573	0.081871	2.425423	0.0383
DER	-0.035898	0.008194	-4.380957	0.0018
PC	3.569333	2.060345	1.732396	0.1172

R-squared	0.854697	Mean dependent var	1.945933
Adjusted R-squared	0.773973	S.D. dependent var	0.459671
S.E. of regression	0.218538	Akaike info criterion	0.085463
Sum squared resid	0.429831	Schwarz criterion	0.368683
Log likelihood	5.359028	Hannan-Quinn criter.	0.082446
F-statistic	10.58789	Durbin-Watson stat	1.616707
Prob(F-statistic)	0.001455		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.34 shows that both CEE and SCE are positively related with ROA, while, CEE is not statistically significant, SCE is statistically significant at 5%. And the overall Prob (F-statistic) is statistically significant at 1%.

The regression equation is:

ROA = -3.342165 + 0.117579CEE + 3.346345SCE

For there to be a unit increase in ROA, there must definitely be a multiplying effect of 0.117579 and 3.346345 of CEE and SCE respectively.

Decision Rule:

Accept H_o if the P-value of test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of CEE is greater than 0.05, Accept $H_{o,}$ while for CEE, H_i will be accepted.

Conclusion:

CEE does not have any significant relationship with ROA, while SCE has a positive and statistically significant relationship with ROA at 1%. Therefore, SCE significantly affect the ROA of Automobile/Auto Part Sector.

4.4.5.3 Test of Hypothesis III in Automobile/Auto Part Sector

H_{o3}: VAIC indices do not significantly affect ROE of Automobile/Auto Part Sector

Model Formulation:

ROE = f (SCE, CEE) + e - - - - - - (3a)

Table 4.35: Multiple Regression Analysis between ROE and CEE, SCE, SALES, DER and PC in Automobile/Auto Part Sector

Dependent Variable: ROE
Method: Least Squares
Date: 03/18/16 Time: 20:15
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-15.42878	6.333206	-2.436172	0.0376
CEE	-0.558024	0.480302	-1.161820	0.2752
SCE	15.70898	4.184101	3.754446	0.0045
SALES	0.393996	0.325005	1.212274	0.2563
DER	1.668925	0.032528	51.30677	0.0000
PC	7.840844	8.178978	0.958658	0.3628

R-squared	0.797064	Mean dependent var	8.902067
Adjusted R-squared	0.795433	S.D. dependent var	12.83709
S.E. of regression	0.867534	Akaike info criterion	2.842850
Sum squared resid	6.773537	Schwarz criterion	3.126070
Log likelihood	-15.32138	Hannan-Quinn criter.	2.839833
F-statistic	611.2819	Durbin-Watson stat	1.805964
Prob(F-statistic)	0.000000		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.35 shows that CEE is negative associated and not statistically significant with ROE. SCE has a positive and statistically relationship with ROE at 1%. The R-square value is 99%.

The regression equation is

ROE = -15.42878 – 0.558024CEE+ 15.70898SCE

For there to be a unit increase in ROE, there must be 0.558024 multiplying effect decrease and 15.70898 multiplying effect of CEE and SCE respectively.

Decision Rule:

Accept H_o if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of CEE is greater than 0.05, accept H_o. And for SCE (0.0045), accept H_1

Conclusion:

CEE insignificantly affects ROE, while SCE positively and significantly affects ROE in Automobile/Auto Part Sector.

4.4.5.4 Test of Hypothesis IV in Automobile/Auto Part Sector

H_{o4}: VAIC indices do not significantly affect Employee Productivity of Automobile/Auto Part Sector

Model Formulation:

EP = f (CEE, SCE) + e - - - - - - (4a)

Table 4.36: Multiple Regression Analysis between EP and CEE, SCE, SALES, DER and PC in Automobile/Auto Part Sector

Dependent Variable: EP
Method: Least Squares
Date: 03/18/16 Time: 20:21
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.362725	2.079614	-1.136136	0.2852
CEE	0.258547	0.157715	1.639327	0.0356
SCE	1.976965	1.373919	1.438924	0.1840
SALES	0.562653	0.106721	5.272190	0.0005
DER	-0.012087	0.010681	-1.131594	0.2871
PC	7.722100	2.685704	2.875261	0.0183

R-squared	0.764989	Mean dependent var	6.151925
Adjusted R-squared	0.634428	S.D. dependent var	0.471150
S.E. of regression	0.284869	Akaike info criterion	0.615602
Sum squared resid	0.730355	Schwarz criterion	0.898822
Log likelihood	1.382987	Hannan-Quinn criter.	0.612585
F-statistic	5.859226	Durbin-Watson stat	1.960586
Prob(F-statistic)	0.001116		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.36 shows that the VAIC indices associate positively with EP. While CEE is statistically significant at 5%, SCE is statistically insignificant. The overall significance of the model Prob(F-statistic) is statistically significant at 1%

The regression equation is:

EP = -2.362725 + 0.258547CEE + 1.976965SCE

For there to be a percentage increase in EP, there must definitely be a multiplying effect of 0.258547 and 1.976965 of CEE and SCE respectively.

Decision Rule:

Accept H_o if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

The P-value of CEE (0.0356) is lesser than 0.05, therefore, H_1 is accepted while the P-value of SCE (0.1840) is greater than 0.05, therefore, H_o is accepted.

Conclusion:

CEE positively and significantly affects employee productivity in Automobile Sector. While SCE positively but insignificantly affect EP in Automobile/Auto Part Sector in Nigeria.

4.4.5.5 Test of Hypothesis V in Automobile/Auto Part Sector

H_{o5}: VAIC indices do not significantly affect GR in Automobile/Auto Part Sector

Model Formulation

GR = f (CEE, SCE) + E - - - - - (5a)

Table 4.37: Multiple Regression Analysis between GR and CEE, SCE, SALES, DER and PC in Automobile/Auto Part Sector

Dependent Variable: GR
Method: Least Squares
Date: 03/18/16 Time: 20:28
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-550.3089	107.8008	-5.104871	0.0006
CEE	24.12882	8.175460	2.951372	0.0162
SCE	85.44992	71.21972	1.199807	0.2608
SALES	44.66435	5.532085	8.073693	0.0000
DER	-0.375876	0.553682	-0.678867	0.5143
PC	167.7319	139.2186	1.204810	0.2590

R-squared	0.803568	Mean dependent var	10.58207
Adjusted R-squared	0.749995	S.D. dependent var	38.12690
S.E. of regression	14.76674	Akaike info criterion	8.511806
Sum squared resid	1962.510	Schwarz criterion	8.795026
Log likelihood	-57.83855	Hannan-Quinn criter.	8.508789
F-statistic	16.86602	Durbin-Watson stat	1.479696
Prob(F-statistic)	0.000246		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.37 shows that CEE and SCE associate positively with GR. While CEE is positively and statistically significant at 5%, SCE is statistically insignificant. And the overall prob(F-statistic) is statistically significant at 1%.

The regression equation is:

GR = -550.3089 + 24.12882CEE + 85.44992SCE

The implication is that for there to be a unit increase in GR there must be 24.12882 of CEE and 85.44992 of SCE multiplying effect.

Decision Rule:

Accept H_o if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

The P-value of CEE (0.0162) is lesser than 0.05, therefore, H_1 is accepted. While the P-value of SCE (0.2608) is greater than 0.05, therefore, H_o is accepted.

Conclusion:

From the empirical observation, CEE is positively and statistically significant with GR. Invariably, CEE significantly affects the GR of Automobile sector. While SCE is positively insignificant with GR in the Automobile sector.

4.4.6 TEST OF HYPOTHESES IN COURIER AND FREIGHT SECTOR

4.4.6.1. Test of Hypothesis 1

H_{o1}: VAIC indices do not significantly affect MBV ratio in Courier and Freight Sector

Model Specification

$$MBV = \beta_0 + \beta_1 HCE + \beta_2 CEE + \beta_3 SCE + \beta_4 SALES + \beta_5 DER + \beta_6 PC + E \quad - \quad (1)$$

Table 4.38 Descriptive Statistic of Operational Variables in Courier and Freight Sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
Mean	1.223933	1.223933	1.929667	5.380491	15.72667	2.119867	0.406733	-0.606822	8.489333	0.434400	0.386600
Median	1.157000	1.157000	1.912000	5.559157	9.983000	1.456000	0.317000	0.313414	8.578000	0.435000	0.332000
Maximum	1.758000	1.758000	3.078000	5.898083	56.32300	4.189000	1.045000	0.761299	8.856000	0.723000	0.881000
Minimum	0.264000	0.264000	0.508000	4.744090	-24.38500	0.064000	0.010000	-14.67433	8.059000	0.273000	0.162000
Std. Dev.	0.375296	0.375296	0.676935	0.367212	21.65554	1.327211	0.297404	3.909368	0.298830	0.108472	0.169690
Skewness	-0.787699	-0.787699	-0.164126	-0.762005	0.335798	0.402468	0.854562	-3.421682	-0.202360	1.032792	1.612925
Kurtosis	3.945999	3.945999	2.801442	2.150846	2.653273	1.937067	2.774401	12.83897	1.399738	4.503858	5.878508
Jarque-Bera	2.110496	2.110496	0.091984	1.902291	0.357038	1.111093	1.857502	89.77314	1.702898	4.080139	11.68245
Probability	0.348106	0.348106	0.955050	0.386298	0.836508	0.573759	0.000047	0.000000	0.426796	0.130020	0.002905
Sum	18.35900	18.35900	28.94500	80.70737	235.9000	31.79800	6.101000	-9.102329	127.3400	6.516000	5.799000
Sum Sq. Dev.	1.971857	1.971857	6.415381	1.887824	6565.475	24.66086	1.238289	213.9642	1.250191	0.164726	0.403126
Observations	15	15	15	15	15	15	15	15	15	15	15

Source: Researcher's computation using E-View 9.0, 2016

Table 4.38 shows SCE is negatively skewed, while HCE and CEE are positively skewed. CEE and SCE are normally distributed and statistically significant at 1%. While HCE is not significantly normally distributed and not statistically significant.

Table 4.39: Correlation Matrix of Variables in Courier and Freight Sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
MBV	1.000000	0.503200	0.749386	-0.263833	0.326637	0.316167	0.599351	-0.135545	0.175085	-0.077348	0.273033
ROA	0.503200	1.000000	0.749386	-0.263833	0.326637	0.316167	0.599351	-0.135545	0.175085	-0.077348	0.273033
ROE	0.749386	0.749386	1.000000	-0.275271	0.458009	0.170995	0.213932	-0.127829	0.003283	0.020253	-0.352372
EP	-0.263833	-0.263833	-0.275271	1.000000	0.264749	0.566235	0.470941	0.500754	0.668221	-3.45E-05	0.071387
GR	0.326637	0.326637	0.458009	0.264749	1.000000	0.237608	0.166497	-0.125063	0.032064	-0.180048	-0.284672
HCE	0.316167	0.316167	0.170995	0.566235	0.237608	1.000000	0.799617	0.496856	0.507073	-0.008399	0.181662
CEE	0.599351	0.599351	0.213932	0.470941	0.166497	0.799617	1.000000	0.426591	0.578397	0.074561	0.501882
SCE	-0.135545	-0.135545	-0.127829	0.500754	-0.125063	0.496856	0.426591	1.000000	0.329076	0.388897	0.054580
SALES	0.175085	0.175085	0.003283	0.668221	0.032064	0.507073	0.578397	0.329076	1.000000	-0.267778	0.418145
DER	-0.077348	-0.077348	0.020253	-3.45E-05	-0.180048	-0.008399	0.074561	0.388897	-0.267778	1.000000	-0.038836
PC	0.273033	0.273033	-0.352372	0.071387	-0.284672	0.181662	0.501882	0.054580	0.418145	-0.038836	1.000000

Source: Researcher's computation using E-View 9.0, 2016

The correlation matrix in table 4.39 shows the relationship between the variables. From the correlation matrix it can be deduced that the independent variables (VAIC indices) have significant relationship, since the correlation between them is greater than 0.75. Therefore a model with highly correlated variables will result to multicollinearity. Since HCE and CEE are highly correlated, one of the two variables would be removed from the model to prevent the problem of multicollinearity in the model.

Thus, the model becomes a function of CEE and SCE on the dependent variables of Courier and Freight sector (see table 4.40).

Model Formulation:

MBV = f (CEE, SCE) + E - - - - - - (1a)

Table 4.40: Test of Multicollinearity in Courier and Freight Sector

Variance Inflation Factors
Date: 03/18/16 Time: 22:00
Sample: 2000 2014
Included observations: 15

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	9.284774	61093.26	NA
CEE	0.029447	9.069648	6.992845
SCE	0.000424	440.5526	7.203742
SALES	0.102170	45706.16	6.041833
DER	0.724494	468.5781	6.350397
PC	0.165945	154.4443	1.637291

Source: Researcher's computation using E-View 9.0, 2016

The Variance Inflation Factor (VIF) value is less than 10. This is an indication of non-existence of multicollinearity among variables in the model.

Table 4.41: Multiple Regression Analysis showing the relationship between MBV and CEE, SCE, SALES, DER and PC in Courier and Freight Sector.

Dependent Variable: MBV
Method: Least Squares
Date: 03/18/16 Time: 21:51
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.834621	3.411104	0.830998	0.4275
CEE	1.217620	0.385014	3.162533	0.0115
SCE	-0.045234	0.027074	-1.670741	0.1291
SALES	-0.236810	0.388540	-0.609486	0.5573
DER	-0.071662	0.926554	-0.077343	0.9400
PC	-0.237702	0.579183	-0.410409	0.6911

R-squared	0.581428	Mean dependent var	1.223933
Adjusted R-squared	0.348889	S.D. dependent var	0.375296
S.E. of regression	0.302832	Akaike info criterion	0.737895
Sum squared resid	0.825363	Schwarz criterion	1.021115
Log likelihood	0.465786	Hannan-Quinn criter.	0.734878
F-statistic	2.500340	Durbin-Watson stat	1.451977
Prob(F-statistic)	0.090402		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

The regressed coefficient result in table 4.41 shows that CEE associates positively with MBV at 5% level of significance while SCE associates negatively with MBV at a statistically insignificant level. And the overall Prob(F-statistic) is statistically significant at 10%.

MBV = 2.834621 + 1.217620CEE – 0.045234SCE

For there to be a unit increase in MBV, there must be a multiplying effect of 1.217620 of CEE and multiplying effect decrease of 0.045234 of SCE.

Decision Rule:

Accept the null hypothesis (H_o), if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of CEE is less than 0.05 accept H_1 and accept H_o for SCE, because its P-value is greater than 0.05.

Conclusion:

There is a positive and statistically significant relationship between CEE and MBV at 5%. Moreover, a negative relationship exists between SCE and MBV at an insignificant level in the Courier and Freight sector.

4.4.6.2 Test of Hypothesis II in Courier and Freight Sector

H_{o2}: VAIC indices do not significantly affect ROA of Courier and freight sector

Model Specification

$$ROA = \beta_0 + \beta_1 CEE + \beta_2 SCE + \beta_3 SALES + \beta_4 DER + \beta_5 PC + E \quad - \quad - \quad (2a)$$

Table 4.42: Multiple Regression Analysis between ROA and CEE, SCE, SALES, DER, PC in Courier and Freight Sector

Dependent Variable: ROA
Method: Least Squares
Date: 03/18/16 Time: 22:09
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.834621	3.411104	0.830998	0.4275
CEE	1.217620	0.385014	3.162533	0.0001
SCE	-0.045234	0.027074	-1.670741	0.0115
SALES	-0.236810	0.388540	-0.609486	0.5573
DER	-0.071662	0.926554	-0.077343	0.9400
PC	-0.237702	0.579183	-0.410409	0.6911

R-squared	0.581428	Mean dependent var	1.223933
Adjusted R-squared	0.348889	S.D. dependent var	0.375296
S.E. of regression	0.302832	Akaike info criterion	0.737895
Sum squared resid	0.825363	Schwarz criterion	1.021115
Log likelihood	0.465786	Hannan-Quinn criter.	0.734878
F-statistic	2.500340	Durbin-Watson stat	1.451977
Prob(F-statistic)	0.000516		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.42 shows that CEE relates positively with ROA and statistically significant at 1%; while SCE relates negatively with ROA, but statistically significant at 5%. And the overall Prob(F-statistic) is statistically significant at 1%.

The regression equation is:

ROA = 2.834621 + 1217620CEE – 0.045234SCE

For there to be a unit increase in ROA there must be a multiplying effect of 1217620 of CEE and multiplying effect decrease of 0.045234 of SCE.

Decision Rule:

Accept H_o if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

There is definitely a significant and positive effect of CEE and SCE on ROA as shown by the exponentials above. Since the P-value of the test is less than 0.05. There exists enough

evidence to reject the null hypothesis and conclude that VAIC indices have significant and positive effect on ROA in Courier and Freight Sector.

4.4.6.3 Test of Hypothesis III in Courier and Freight Sector

H_{o3}: VAIC indices do not significantly affect ROE of Courier and Freight Sector

Model Formulation:

ROE = f (CEE, SCE) + E - - - - - - (3a)

Table 4.43: Multiple Regression Analysis between ROE and CEE, SCE, SALES, DER and PC in Courier and Freight Services

Dependent Variable: ROE
Method: Least Squares
Date: 03/18/16 Time: 22:19
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.264283	6.917049	0.038208	0.9704
CEE	1.634583	0.780733	2.093652	0.0016
SCE	-0.083337	0.054901	-1.517944	0.0502
SALES	0.194499	0.787884	0.246863	0.8106
DER	0.930093	1.878869	0.495028	0.6324
PC	-2.858845	1.174469	-2.434158	0.0377

R-squared	0.470977	Mean dependent var	1.929667
Adjusted R-squared	0.177076	S.D. dependent var	0.676935
S.E. of regression	0.614083	Akaike info criterion	2.151802
Sum squared resid	3.393883	Schwarz criterion	2.435022
Log likelihood	-10.13851	Hannan-Quinn criter.	2.148785
F-statistic	1.602500	Durbin-Watson stat	1.568894
Prob(F-statistic)	0.000307		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.43 shows that CEE is positively associated with ROE at a statistically significant level of 1%. And SCE, negatively related with ROE, but statistically significant at 5%.

The regression equation is:

ROE = 0.264283 + 1.634583CEE – 0.083337SCE

For there to be a unit increase in ROE there must be 1.634583 multiplying effect of CEE and 0.083337 multiplying effect decrease of SCE.

Decision Rule:

Accept H_o if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-values of the VAIC indices greater than 0.05, accept H_1 and reject H_o

Conclusion:

There is definitely a significant and positive effect of VAIC indices on ROE of Courier and Freight Services.

4.4.6.4 Test of Hypothesis IV in Courier and Freight Sector

H_{o4}: VAIC indices do not significantly affect Employee Productivity of Courier and Freight Services

Table 4.44: Multiple Regression Analysis between EP and CEE, SCE, SALES, DER and PC in Courier and Freight Services.

Dependent Variable: EP
Method: Least Squares
Date: 03/18/16 Time: 22:28
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.376765	3.306649	-0.416363	0.6869
CEE	0.166970	0.373224	0.447373	0.6652
SCE	0.020227	0.026245	0.770704	0.0006
SALES	0.804705	0.376642	2.136521	0.0614
DER	0.239156	0.898181	0.266268	0.7960
PC	-0.604444	0.561447	-1.076581	0.3097

R-squared	0.589163	Mean dependent var	5.380491
Adjusted R-squared	0.360920	S.D. dependent var	0.367212
S.E. of regression	0.293558	Akaike info criterion	0.675693
Sum squared resid	0.775588	Schwarz criterion	0.958914
Log likelihood	0.932299	Hannan-Quinn criter.	0.672677
F-statistic	2.581299	Durbin-Watson stat	1.966009
Prob(F-statistic)	0.000010		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.44 shows that the VAIC indices associate positively with EP. CEE is not statistically significant with EP, while SCE is statistically significant at 1%

The regression equation is:

EP = -1.376765 + 0.166970CEE + 0.020227SCE

For there to be a percentage increase in EP, there must be a multiplying effect of 0.166970 and 0.020227 of CEE and SCE respectively.

Decision Rule:

Accept H_o if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

The P-value of CEE is not statistically significant, since the P-value is greater than 0.05. For SCE, H_1 will be accepted because the P-value is lesser than 0.05.

Conclusion:

CEE does not significantly affect EP. However, there is a positive and statistically significant effect of SCE on EP of Courier and Freight Services.

4.4.6.5 Test of Hypothesis V in Courier and Freight Sector

H_{o5}: VAIC indices do not significantly affect GR in Courier and Freight Sector

Model Formulation

GR = f (CEE, SCE) = E - - - - - (5a)

Table 4.45 Multiple Regression Analysis between GR and CEE, SCE, SALES, DER and PC in Courier and Freight Services

Dependent Variable: GR
Method: Least Squares
Date: 03/18/16 Time: 22:33
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	47.88260	250.8954	0.190847	0.8529
CEE	43.17648	28.31877	1.524660	0.0016
SCE	1.591652	1.991385	-0.799269	0.0044
SALES	-1.267201	28.57815	-0.044342	0.9656
DER	-27.77585	68.15040	-0.407567	0.6931
PC	-72.06305	42.60040	-1.691605	0.1250

R-squared	0.319897	Mean dependent var	15.72667
Adjusted R-squared	-0.057938	S.D. dependent var	21.65554
S.E. of regression	22.27405	Akaike info criterion	9.333896
Sum squared resid	4465.198	Schwarz criterion	9.617116
Log likelihood	-64.00422	Hannan-Quinn criter.	9.330879
F-statistic	0.846659	Durbin-Watson stat	1.469403
Prob(F-statistic)	0.005498		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.45 shows that VAIC indices associate positively with GR and are statistically significant at 1%.

The regression equation is:

GR = 47.88260 + 43.17648CEE + 1.591652SCE

For there to be a unit change in GR, there must be a multiplying effect of 43.17648 and 1.591652 of CEE and SCE respectively.

Decision Rule:

Accept H_o if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of the VAIC indices are greater than 0.05, then H_1 is accepted.

Conclusion:

There is a positive and statistically significant effect of VAIC indices on GR of Courier and Freight services in Nigeria.

4.4.7 TEST OF HYPOTHESES IN FINANCE LEASING SECTOR

4.4.7.1 Test of Hypothesis 1

H_{o1}: VAIC indices do not significantly affect Market to Book Value ratio in Finance Leasing Sector

Model Specification

$$MBV = \beta_0 + \beta_1 HCE\ \beta_2 CEE + \beta_3 SCE + \beta_4 SALES + \beta_5 DER + \beta_6 PC + E \quad - \quad (1)$$

Table 4.46: Descriptive Statistics of Operational Variables for Finance Leasing Sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
Mean	5.464333	0.492133	1.367667	5.894662	59.67920	4.674200	0.220600	0.771880	9.407600	3.440467	0.432533
Median	1.860000	0.424000	1.347000	5.999459	53.83100	4.264000	0.132000	0.774175	9.395000	2.238000	0.444000
Maximum	19.72800	1.185000	3.816000	7.211710	120.6260	12.74600	0.874000	1.193934	10.01000	10.70400	0.851000
Minimum	-0.137000	0.127000	-2.872000	4.648003	19.21300	-5.156000	-0.352000	0.398665	8.527000	-3.769000	0.014000
Std. Dev.	7.337784	0.357978	1.509082	0.781946	36.97007	4.278459	0.262978	0.185415	0.440821	3.929189	0.276181
Skewness	1.174342	0.734753	-1.093147	-0.103032	0.451738	-0.048431	0.456388	0.110709	-0.211584	0.369249	-0.044567
Kurtosis	2.585192	2.246225	5.700626	2.084531	1.746516	3.774058	4.773858	3.702362	2.119361	2.465950	1.775171
Jarque-Bera	3.555236	1.704765	7.545790	0.550341	1.492183	0.380342	2.487333	0.338961	0.596622	0.519118	0.942594
Probability	0.169040	0.426398	0.022985	0.759443	0.474216	0.082681	0.028832	0.084410	0.742071	0.771392	0.624192
Sum	81.96500	7.382000	20.51500	88.41992	895.1880	70.11300	3.309000	11.57820	141.1140	51.60700	6.488000
Sum Sq. Dev.	753.8031	1.794074	31.88261	8.560147	19135.01	256.2729	0.968208	0.481304	2.720528	216.1393	1.067862
Observations	15	15	15	15	15	15	15	15	15	15	15

Source: Researcher's computation using E-View 9.0, 2016

Table 4.46 shows that VAIC indices (HCE, CEE, SCE) are significantly normally distributed, with P-values that are positively and statistically significant at 0.082681, 0.028832, 0.084410 respectively. HCE is negatively skewed at -0.048431, while CEE and SCE are positively skewed at 0.456388 and 0.110709 respectively.

Table 4.47: Correlation matrix of variables in Finance Leasing Sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
MBV	1.000000	-0.558775	0.074892	0.308952	-0.005332	0.474495	-0.186048	0.195403	0.618996	0.560807	0.300080
ROA	-0.558775	1.000000	0.096024	0.127231	-0.294414	-0.522157	0.324164	-0.047214	-0.450457	-0.633627	-0.552740
ROE	0.074892	0.096024	1.000000	-0.236386	-0.343013	0.349506	0.695866	-0.639284	0.083712	0.458653	0.200230
EP	0.308952	0.127231	-0.236386	1.000000	-0.290895	-0.463334	-0.311056	0.288141	0.456394	0.158852	-0.137533
GR	-0.005332	-0.294414	-0.343013	-0.290895	1.000000	0.309187	-0.469172	0.534212	-0.057483	-0.002194	-0.367208
HCE	0.474495	-0.522157	0.349506	-0.463334	0.309187	1.000000	0.205333	0.089524	0.147687	0.350459	0.242060
CEE	-0.186048	0.324164	0.695866	-0.311056	-0.469172	0.205333	1.000000	-0.470173	-0.322076	-0.032373	-0.055349
SCE	0.195403	-0.047214	-0.639284	0.288141	0.534212	0.089524	-0.470173	1.000000	-0.005351	-0.146292	-0.398311
SALES	0.618996	-0.450457	0.083712	0.456394	-0.057483	0.147687	-0.322076	-0.005351	1.000000	0.443337	0.322793
DER	0.560807	-0.633627	0.458653	0.158852	-0.002194	0.350459	-0.032373	-0.146292	0.443337	1.000000	0.524598
PC	0.300080	-0.552740	0.200230	-0.137533	-0.367208	0.242060	-0.055349	-0.398311	0.322793	0.524598	1.000000

Source: Researcher's computation using E-View 9.0, 2016

The correlation matrix in table 4.47 shows the relationship between the variables. From the correlation matrix, it can be observed that the independent variables (VAIC indices) have significant relationship, since the correlation between them is greater than 0.75. Therefore a model with all the independent variables will result to multicollinearity. Multicollinearity exists in a multiple regression model when the variables are highly correlated.

Since HCE and CEE have significant relationship, one of the two variables would be removed from the model to prevent the problem of multicollinearity in the model.

Thus, the model becomes a function of HCE and SCE on the dependent variables of Finance Leasing Sector (see table 4.47).

Model Formulation:

MBV = f (HCE, SCE) + E - - - - (1a)

Table 4.47 Test of Multicollinearity in Finance Leasing Sector

Variance Inflation Factors
Date: 03/19/16 Time: 10:03
Sample: 2000 2014
Included observations: 15

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	2371.048	1244.487	NA
HCE	0.234450	4.041033	2.297622
SCE	27.28900	3.188505	2.273732
SALES	27.58688	1286.217	1.814149
DER	0.355959	3.834747	2.311011
PC	51.55983	5.767499	1.945880

Source: Researcher's computation using E-View 9.0, 2016

The Variance Inflation Factors (VIF) value is less than 10. This is an indication of non-existence of multicollinearity among variables in the model.

Table 4.49: Multiple Regression Analysis showing the relationship between MBV and HCE, SCE, SALES, DER and PC in Finance Leasing Sector.

Dependent Variable: MBV
Method: Least Squares
Date: 03/19/16 Time: 09:55
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-64.74509	39.61690	-1.634280	0.1366
HCE	0.608099	0.403737	1.506177	0.0063
SCE	3.234208	6.535407	-0.494875	0.0325
SALES	7.140015	4.251116	1.679562	0.1273
DER	0.531378	0.515893	1.030015	0.3299
PC	-2.122562	6.721091	-0.315806	0.7594

R-squared	0.590915	Mean dependent var	5.464333
Adjusted R-squared	0.363645	S.D. dependent var	7.337784
S.E. of regression	5.853486	Akaike info criterion	6.661126
Sum squared resid	308.3696	Schwarz criterion	6.944346
Log likelihood	-43.95845	Hannan-Quinn criter.	6.658109
F-statistic	2.600062	Durbin-Watson stat	1.294512
Prob(F-statistic)	0.000904		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

The regressed coefficient result from table 4.49 shows that a positively and statistically significant relationship exist between the VAIC indices (HCE and SCE) at 1% and 5% level of significance respectively. And the overall Prob.(F-statistic) is statistically significant at 1%.

The regression equation is:

MBV = -64.74509 + 0.608099HCE + 3.234208SCE

For there to be a unit increase in MBV, there must definitely be a multiplying effect of 0.608099 and 3.234208 of HCE and SCE respectively.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-values of the VAIC indices are less than 0.05, hence, H_1 is accepted.

Conclusion:

There is a positive and statistically significant relationship between VAIC indices and MBV of Finance Leasing Sector. More so, VAIC indices significantly affect the MBV of finance leasing sector.

4.4.7.2 Test of Hypothesis II in Finance Leasing Sector

H_{o2}: VAIC indices do not significantly affect ROA of Finance Leasing Sector

Model Formulation:

ROA = f (FHCE, SCE) + E - - - - - - - (2a)

Table 4.50: Multiple Regression Analysis between ROA and HCE, SCE, SALES, DER and PC in Finance Leasing Sector

Dependent Variable: ROA
Method: Least Squares
Date: 03/19/16 Time: 10:08
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.129957	1.651411	0.684237	0.5111
HCE	-0.034970	0.016830	-2.077882	0.0675
SCE	0.505369	0.272425	1.855073	0.0966
SALES	-0.036788	0.177206	-0.207601	0.8402
DER	-0.029742	0.021505	-1.383025	0.2000
PC	-0.317752	0.280165	-1.134159	0.2860

R-squared	0.701337	Mean dependent var	0.492133
Adjusted R-squared	0.535414	S.D. dependent var	0.357978
S.E. of regression	0.244000	Akaike info criterion	0.305875
Sum squared resid	0.535823	Schwarz criterion	0.589095
Log likelihood	3.705935	Hannan-Quinn criter.	0.302858
F-statistic	4.226865	Durbin-Watson stat	1.522243
Prob(F-statistic)	0.029594		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.50 shows the existence of a negative relationship between HCE and ROA and positive relationship between SCE and ROE, though the VAIC indices are significant at 10%.

The regression equation:

ROA = 1.129957 – 0.034970HCE + 0.505369SCE

For there to be a unit increase in ROA, there must be 0.034970 multiplying effect decrease of HCE and 0.505369 multiplying effect of SCE.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-values of the VAIC indices are greater than 0.05, then, H_o wil be accepted.

Conclusion:

VAIC indices do not have significant effect on the ROA of finance leasing sector.

4.4.7.3 Test of Hypothesis III in Finance Leasing Sector

H_{o3}: VAIC indices do not significantly influence ROE of Finance leasing sector

Model Formulation:

ROE = f (HCE, SCE) + e - - - - - - (3a)

Table 4.51 Multiple Regression Analysis between ROE and HCE, SCE, SALES, DER, PC in Finance Leasing Sector

Dependent Variable: ROE
Method: Least Squares
Date: 03/19/16 Time: 10:17
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.662512	6.598135	-0.706641	0.4977
HCE	0.012193	0.067242	0.181324	0.8601
SCE	4.281344	1.088462	3.933388	0.0034
SALES	0.483719	0.708017	0.683203	0.5117
DER	0.164089	0.085921	1.909764	0.0885
PC	-0.199887	1.119388	-0.178568	0.8622

R-squared	0.731713	Mean dependent var	1.367667
Adjusted R-squared	0.582665	S.D. dependent var	1.509082
S.E. of regression	0.974889	Akaike info criterion	3.076189
Sum squared resid	8.553682	Schwarz criterion	3.359409
Log likelihood	-17.07142	Hannan-Quinn criter.	3.073172
F-statistic	4.909240	Durbin-Watson stat	1.599913
Prob(F-statistic)	0.019166		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.51 shows that positive relationship exists between the VAIC indices and ROE. While, HCE is not statistically significant with ROE, SCE is statistically significant with ROE at 1%.

The regression equation =

ROE = -4.662512 + 0.012193HCE + 4.281344SCE.

For there to be a unit increase in ROE, there must be 0.012193 and 4.281344 multiplying effect of HCE and SCE respectively.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of HCE of greater than 0.05, H_o is accepted. And the P-value of SCE is lesser than 0.05. H_1 is accepted.

Conclusion:

HCE has a positive relationship with ROE, but does not have significant effect on ROE. While SCE has positive relationship with ROE and it is statistically significant at 1%, with the ROE of finance leasing sector.

4.4.7.4 Test of Hypothesis IV in Finance Leasing Sector

H_{o4}: VAIC indices do not significantly affect Employee Productivity of Finance Leasing Sector.

Model Formulation

EP = f (HCE, SCE) + e - - - - - - (4a)

Table 4.52: Multiple Regression Analysis between EP and HCE, SCE, sales, DER and PC of Finance Leasing Sector

Dependent Variable: EP
Method: Least Squares
Date: 03/19/16 Time: 10:22
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.650940	4.230092	-0.390285	0.7054
HCE	-0.101323	0.043109	-2.350399	0.0433
SCE	-0.137782	0.697818	-0.197448	0.8479
SALES	0.875803	0.453913	1.929453	0.0857
DER	0.060257	0.055084	1.093902	0.3024
PC	-0.917661	0.717644	-1.278714	0.2330

R-squared	0.589296	Mean dependent var	5.894662
Adjusted R-squared	0.361127	S.D. dependent var	0.781946
S.E. of regression	0.625006	Akaike info criterion	2.187062
Sum squared resid	3.515688	Schwarz criterion	2.470282
Log likelihood	-10.40297	Hannan-Quinn criter.	2.184045
F-statistic	2.582717	Durbin-Watson stat	1.573364
Prob(F-statistic)	0.102410		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.51 shows that VAIC indices associate negatively with EP. While HCE is statistically significant at 5%, SCE is not statistically significant.

The regression equation is:

EP= -1.650940 – 0.101323HCE – 0.137782SCE

For there to be a percentage increase in EP, there must be a multiplying effect decrease of 0.101323 and 0.137782 of HCE and SCE respectively.

Decision Rule:

Accept H_o if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

The P-value of HCE is lesser than 0.05, therefore H_1 is accepted, while, the P-value of SCE is greater than 0.05, H_o is accepted.

Conclusion:

HCE has a statistically significant effect on EP of finance leasing sector at 5% while SCE is statistically not significant.

4.4.7.5 Test of Hypothesis V in Finance Leasing Sector

H_{o5}: VAIC indices do not significantly affect GR in Finance Leasing Sector

Model Formulation

GR = f (HCE, SCE) + e - - - - - - - (5a)

Table 4.52: Multiple Regression Analysis between GR and HCE, SCE, SALES, DER and PC of finance leasing sector

Dependent Variable: GR
Method: Least Squares
Date: 03/19/16 Time: 10:30
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	47.28243	218.2565	0.216637	0.8333
HCE	2.711203	2.362622	1.147540	0.2807
SCE	77.48552	56.10955	1.380969	0.0469
SALES	-4.757491	23.78073	-0.200057	0.8459
DER	1.447678	3.047294	0.475070	0.6461
PC	-46.95495	43.58461	-1.077329	0.3094

R-squared	0.436341	Mean dependent var	59.67920
Adjusted R-squared	0.123198	S.D. dependent var	36.97007
S.E. of regression	34.61793	Akaike info criterion	10.21580
Sum squared resid	10785.61	Schwarz criterion	10.49902
Log likelihood	-70.61846	Hannan-Quinn criter.	10.21278
F-statistic	1.393422	Durbin-Watson stat	1.698776
Prob(F-statistic)	0.023286		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.53 shows that VAIC indices associate positively with GR. Moreover, HCE is not statistically significant with GR, while SCE is statistically significant with GR of Finance Leasing Sector at 5%.

The regression equation is:

GR = 47.28243 + 2.711203HCE + 77.48552SCE

For a unit increase in GR, there will be 2.711203 and 77.48552 multiplying effect of HCE and SCE respectively.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

The P-value of HCE is not statistically significant, therefore H_o is accepted, because the P-value is greater than 0.05. However, the P-value of SCE is lesser than 0.05. Therefore H_1 is accepted.

Conclusion:

HCE has no significant effect on the GR of finance leasing sector, while SCE has a positive and significant effect on the GR of finance leasing sector at 5%.

4.4.8 TEST OF HYPOTHESES IN HOSPITALITY SECTOR

4.4.8.1 Test of Hypothesis 1

H_{o1}: VAIC indices do not significantly affect market to book value ratio in Hospital sector.

Model Specification

$MBV = \beta_0 + \beta_1 HCE\ \beta_2 CEE + \beta_3 SCE + \beta_4 SALES + \beta_5 DER + \beta_6 PC + E$ - (1)

Table 4.54 Descriptive Statistics of Operational Variables for Hospitality Sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
Mean	2.686000	0.620667	3.329933	5.791969	86.42093	4.794467	0.367000	-0.429612	9.292200	6.640933	0.723667
Median	2.079000	0.306000	1.938000	5.800849	11.44500	2.471000	0.150000	0.595342	9.225000	4.196000	0.835000
Maximum	8.944000	3.017000	18.52200	6.336487	942.6320	35.65800	2.941000	0.971955	10.52500	64.20000	0.912000
Minimum	-1.948000	0.127000	-3.001000	4.777915	-89.88000	0.064000	0.010000	-14.67433	8.183000	-24.67100	0.368000
Std. Dev.	2.710044	0.809915	5.238446	0.408602	243.6324	8.742051	0.727440	3.944900	0.515092	17.82180	0.198104
Skewness	0.859189	2.003751	1.995436	-0.992057	3.159801	3.223942	3.241344	-3.461512	0.435797	2.081276	-0.957490
Kurtosis	3.541379	6.159044	6.221478	3.604428	11.70391	11.90742	12.01299	13.01661	4.435657	9.059221	2.395119
Jarque-Bera	2.028698	16.27477	16.44062	2.688777	72.30959	75.57336	77.03699	92.66293	1.762992	33.77562	2.520644
Probability	0.362638	0.000292	0.000269	0.260699	0.000000	0.000000	0.000000	0.000000	0.414163	0.000000	0.283563
Sum	40.29000	9.310000	49.94900	86.87953	1296.314	71.91700	5.505000	-6.444186	139.3830	99.61400	10.85500
Sum Sq. Dev.	102.8208	9.183467	384.1784	2.337378	830994.5	1069.928	7.408364	217.8713	3.714470	4446.633	0.549435
Observations	15	15	15	15	15	15	15	15	15	15	15

Source: Researcher's computation using E-View 9.0, 2016

Table 4.54 shows that VAIC indices (HCE, CEE, SCE) are positively and significantly normally distributed with P-values that are positive and statistically significant at 0.000000, 0.000000, 0.000000 respectively. The VAIC indices are positively skewed, but for SCE that is negatively skewed at -3.461512.

Table 4.55: Correlation matrix of variables in Hospitality Sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
MBV	1.000000	0.231654	0.692306	0.311346	0.179598	0.238404	0.296814	0.151939	0.366054	0.766984	0.204450
ROA	0.231654	1.000000	0.685886	-0.266076	0.801229	0.793019	0.864146	-0.254639	0.387949	-0.115372	-0.296744
ROE	0.692306	0.685886	1.000000	0.039022	0.768040	0.773279	0.802447	0.072260	0.535988	0.551657	0.220169
EP	0.311346	-0.266076	0.039022	1.000000	0.010490	-0.003584	0.022808	0.674339	0.604066	0.127750	0.509617
GR	0.179598	0.801229	0.768040	0.010490	1.000000	0.956050	0.951935	0.090708	0.701427	-0.046885	0.225407
HCE	0.238404	0.793019	0.773279	-0.003584	0.956050	1.000000	0.963838	0.181871	0.689066	-0.042964	0.166428
CEE	0.296814	0.864146	0.802447	0.022808	0.951935	0.963838	1.000000	0.164506	0.707868	-0.031372	0.119904
SCE	0.151939	-0.254639	0.072260	0.674339	0.090708	0.181871	0.164506	1.000000	0.612686	0.084226	0.482011
SALES	0.366054	0.387949	0.535988	0.604066	0.701427	0.689066	0.707868	0.612686	1.000000	-0.001253	0.510718
DER	0.766984	-0.115372	0.551657	0.127750	-0.046885	-0.042964	-0.031372	0.084226	-0.001253	1.000000	0.260634
PC	0.204450	-0.296744	0.220169	0.509617	0.225407	0.166428	0.119904	0.482011	0.510718	0.260634	1.000000

Source: Researcher's computation using E-View 9.0, 2016

The correlation matrix in table 4.55 shows the relationship between the variables. From the correlation matrix, it can be observed that the independent variables (VAIC indices) have significant relationship, since the correlation between them is greater than 0.75. Therefore, a model with all the independent variables will result to multicollinearity.

Multicollinearity exists in a multiple regression model when the variables are highly correlated.

Since HCE and CEE have significant relationship one of the two variables would be removed from the model to prevent the problem of multicollinearity in the model.

Thus the model becomes a function of CEE and SCE on the dependent variables of Hospitality Sector (See table 4.56).

Model Formulation:

MBV = f (CEE, SCE) + E - - - - - - - (1a)

Table 4.56 Test of Multicollinearity in Hospital Sector

Variance Inflation Factors
Date: 03/19/16 Time: 12:33
Sample: 2000 2014
Included observations: 15

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	276.8639	1629.516	NA
HCE	0.036041	20.00670	15.13059
CEE	6.337503	23.44612	18.42220
SCE	0.024879	2.153893	2.126866
SALES	3.660978	1865.822	5.335746
DER	0.000652	1.307018	1.137753
PC	8.782899	28.96465	1.893457

Source: Researcher's computation using E-View 9.0, 2016

Table 4.57 Multiple Regression Analysis showing the relationship between MBV, and CEE, SCE, SALES, DER, PC in Hospital Sector

Dependent Variable: MBV
Method: Least Squares
Date: 03/19/16 Time: 12:58
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-30.25276	15.85810	-1.907716	0.0888
CEE	-0.425632	0.971560	-0.438092	0.0226
SCE	-0.143339	0.151161	-0.948254	0.0367
SALES	3.746767	1.819543	2.059180	0.0696
DER	0.129471	0.024352	5.316697	0.0005
PC	-3.651035	2.768118	-1.318959	0.2198

R-squared	0.793534	Mean dependent var	2.686000
Adjusted R-squared	0.678830	S.D. dependent var	2.710044
S.E. of regression	1.535832	Akaike info criterion	3.985195
Sum squared resid	21.22901	Schwarz criterion	4.268415
Log likelihood	-23.88897	Hannan-Quinn criter.	3.982178
F-statistic	6.918137	Durbin-Watson stat	1.103974
Prob(F-statistic)	0.006477		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

The regressed coefficient result from table 4.57 shows that negative relationship exists between the VAIC indices and MBV, however, VAIC indices are statistically significant with MBV at 5% level of significance.

The regression equation is:

MBV = -30.25276 – 0.425632CEE – 0.143339SCE

The predictive power of this model is very high and good for users of financial statement for investment decision making.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-values of the VAIC indices are lesser than 0.05, then, H_1 is accepted.

Conclusion:

There is a statistically significant effect of VAIC indices on MBV of hospitality sector in Nigeria.

4.4.8.2 Test of Hypothesis II in Hospitality Sector

H_{o2}: VAIC indices do not significantly affect ROA of Hospitality sector

Model Formulation:

ROA = f (CEE, SCE) + E - - - - - - - (2a)

Table 4.58 Multiple Regression Analysis between ROA and CEE, SCE, SALES, DER and PC in Hospitality Sector

Dependent Variable: ROA
Method: Least Squares
Date: 03/19/16 Time: 13:12
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.237408	1.726679	-0.716641	0.4918
CEE	0.937261	0.105786	8.859936	0.0000
SCE	-0.069958	0.016459	-4.250512	0.0021
SALES	0.262418	0.198117	1.324560	0.2180
DER	0.001122	0.002651	0.423005	0.6822
PC	-1.329131	0.301401	-4.409839	0.0017

R-squared	0.772594	Mean dependent var	0.620667
Adjusted R-squared	0.757369	S.D. dependent var	0.809915
S.E. of regression	0.167226	Akaike info criterion	-0.449766
Sum squared resid	0.251681	Schwarz criterion	-0.166546
Log likelihood	9.373243	Hannan-Quinn criter.	-0.452783
F-statistic	63.87932	Durbin-Watson stat	2.016722
Prob(F-statistic)	0.000001		

Source: Researcher's computation using E-View 9.0, 2016

Table 4.58 shows that VAIC indices are statistically significant with ROA at 1% level of significance. CEE associates positively while SCE associates negatively with ROA. The overall Prob(F-statistic) is at 1% level of significance.

The regression equation =

ROA = -1.237408 + 0.937261CEE – 0.069958SCE

The predictive power of this model is very high and good for users of financial statement for investment decision making.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-values of the VAIC indices (CEE = 0.000 and SCE = 0.0021) are lesser than 0.05, accept H_1.

Conclusion:

VAIC indices have significant effect on the ROA of hospitality sector at 1% level of significance.

4.4.8.3 Test of Hypothesis III in Hospitality Sector

H_{o3}: VAIC indices do not significantly affect ROE of Hospitality Sector

Model Formulation

ROE = f (CEE, SCE) + E - - - - - - (3a)

Table 4.59 Multiple Regression Analysis between ROE and HCE, SCE, SALES, DER, PC in Hospitality industry.

Dependent Variable: ROE
Method: Least Squares
Date: 03/19/16 Time: 13:31
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.860883	6.486446	-0.595223	0.5664
CEE	5.878206	0.397398	14.79175	0.0000
SCE	-0.190342	0.061829	-3.078502	0.0132
SALES	0.367543	0.744248	0.493844	0.6332
DER	0.171653	0.009961	17.23315	0.0000
PC	0.547938	1.132244	0.483940	0.6400

R-squared	0.790755	Mean dependent var	3.329933
Adjusted R-squared	0.785619	S.D. dependent var	5.238446
S.E. of regression	0.628202	Akaike info criterion	2.197264
Sum squared resid	3.551738	Schwarz criterion	2.480484
Log likelihood	-10.47948	Hannan-Quinn criter.	2.194247
F-statistic	192.8994	Durbin-Watson stat	1.765599
Prob(F-statistic)	0.000000		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.59 shows that the VAIC indices (CEE and SCE) are statistically significant to ROE at 1% and 5% level of significance respectively. CEE associates positively while

SCE associates negatively with ROE. The overall probability significance Prob (P-statistic) is at 1% level of significance.

The regression equation =

ROE = -3.860883 + 5.878206CEE – 0.1903425SCE

The implication of this finding is that for there to be a unit increase in ROE there must be a multiplying effect of 5.878206 of CEE and a multiplying effect decrease of 0.190342 of SCE.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of the VAIC indices (CEE = 0.0000, SCE = 0.0132) are lesser than 0.05, then, H_1 is accepted.

Conclusion:

VAIC indices have significant effect on the ROE of hospitality sector.

4.4.8.4 Test of Hypothesis IV in Hospitality Sector

H_{o4}: VAIC indices do not significantly influence Employee Productivity of Hospitality Sector

Model Formulation:

EP = f (CEE, SCE) + E - - - - - - (4a)

Table 4.60 Multiple regression Analysis between EP and CEE, SCE, SALES, DER and PC of Hospitality Sector

Dependent Variable: EP
Method: Least Squares
Date: 03/19/16 Time: 13:22
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.695589	2.793344	-0.607010	0.5588
CEE	-0.413066	0.171137	-2.413661	0.0390
SCE	0.017379	0.026626	0.652710	0.5303
SALES	0.828146	0.320506	2.583875	0.0295
DER	0.002364	0.004289	0.551052	0.5950
PC	-0.088964	0.487593	-0.182456	0.8593

R-squared	0.718196	Mean dependent var	5.791969
Adjusted R-squared	0.561638	S.D. dependent var	0.408602
S.E. of regression	0.270531	Akaike info criterion	0.512313
Sum squared resid	0.658683	Schwarz criterion	0.795533
Log likelihood	2.157650	Hannan-Quinn criter.	0.509297
F-statistic	4.587416	Durbin-Watson stat	1.182161
Prob(F-statistic)	0.023407		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.60 shows a negative relationship between CEE and EP and a statistical significance at 5% while SCE relates positively with EP but at a statistically insignificant level.

The regression equation is:

EP = -1.695589 – 0.413066CEE + 0.0173779SCE

The implication of this finding is that, for there to be a percentage increase in EP, there must be a multiplying effect decrease of 0.413066 of CEE and multiplying effect of 0.017379 of SCE.

Decision:

The P-value of CEE (0.0390) is lesser than 0.05, therefore H_1 is accepted. But SCE is statistically insignificant, because the P-value of 0.5303 is higher than 0.05; therefore, H_o is accepted.

Conclusion:

CEE has a statistically significant effect on EP of hospitality sector at 5%, while SCE has no statistical significant influence on EP of hospitality sector in Nigeria.

4.4.8.5 Test of Hypothesis V in Hospitality Sector

H_{o5}: VAIC indices do not significantly affect GR in Hospitality Sector

Model Formulation:

GR = f (CEE, SCE) + E - - - - - - - (5a)

Table 4.61: Multiple Regression Analysis between GR and CEE, SCE, SALES, DER, and PC of Hospitality Sector

Dependent Variable: GR
Method: Least Squares
Date: 03/19/16 Time: 13:18
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-665.0293	752.3527	-0.883933	0.3997
CEE	296.1906	46.09353	6.425862	0.0001
SCE	-12.46855	7.171481	-1.738630	0.1161
SALES	52.56537	86.32421	0.608930	0.5576
DER	-0.640626	1.155316	-0.554503	0.5927
PC	211.6970	131.3272	1.611981	0.1414

R-squared	0.842499	Mean dependent var	86.42093
Adjusted R-squared	0.810555	S.D. dependent var	243.6324
S.E. of regression	72.86415	Akaike info criterion	11.70424
Sum squared resid	47782.65	Schwarz criterion	11.98746
Log likelihood	-81.78184	Hannan-Quinn criter.	11.70123
F-statistic	29.50404	Durbin-Watson stat	1.556842
Prob(F-statistic)	0.000025		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.61 shows a positive relationship between CEE and GR, and statistically significant at 1%. SCE has a negative relationship and statistically insignificant with GR.

The regression equation is:

GR = -665.0293 + 296.1906CEE - 12.46855SCE

The implication of the finding is that, for there to be a unit increase in GR, there must be a multiplying effect of 296.1906 of CEE and multiply effect decrease of 12.46855 of SCE.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

The P-value of CEE (0.0001) is lesser than 0.05, therefore H_1 is accepted. However, the P-value of SCE is statistically insignificant because the P-value is greater than 0.05.

Conclusion:

CEE has a positive and statistically significant effect on the GR of Hospitality sector at 1% level of significance. While SCE has insignificant effect on the GR of Hospitality sector.

4.4.9 TEST OF HYPOTHESES IN PRINTING AND PUBLISHING SECTOR

4.4.9.1 Test of Hypothesis 1

H_{o1}: VAIC indices have no significant effect on Market to Book value ratio in Printing and Publishing Sector

Model Specification

$MBV = \beta_0 + \beta_1 HCE\ \beta_2 CEE + \beta_3 SCE + \beta_4 SALES + \beta_5 DER + \beta_6 PC + E$ - (1)

Table 4.62 Descriptive Statistics of Operational Variables for Printing & Publishing Sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
Mean	2.871133	1.311267	2.297667	5.666479	14.95693	5.017600	0.513133	0.775637	9.142267	1.672067	0.334333
Median	2.793000	1.357000	2.207000	5.593150	11.65100	4.660000	0.410000	0.763615	9.128000	1.658000	0.341000
Maximum	4.648000	1.604000	2.807000	5.893620	53.45700	9.630000	0.964000	1.181902	9.479000	2.283000	0.444000
Minimum	1.699000	0.968000	1.775000	5.438351	-8.981000	3.194000	0.284000	0.619954	8.683000	0.954000	0.220000
Std. Dev.	0.789910	0.231132	0.306331	0.176460	19.95610	1.748018	0.210211	0.135572	0.304134	0.350665	0.050921
Skewness	0.430310	-0.283540	0.378542	0.196744	0.806947	1.449369	0.557283	1.784296	-0.172596	-0.029785	-0.141043
Kurtosis	2.849022	1.669176	2.332337	1.325841	2.501476	4.505493	2.244295	6.469402	1.392429	2.538623	3.787506
Jarque-Bera	0.477163	1.307920	0.636844	1.848525	1.783237	6.668242	1.133342	15.48225	1.689651	0.135261	0.437336
Probability	0.787745	0.519982	0.727296	0.396824	0.409992	0.035646	0.567411	0.000435	0.429632	0.934606	0.803589
Sum	43.06700	19.66900	34.46500	84.99718	224.3540	75.26400	7.697000	11.63455	137.1340	25.08100	5.015000
Sum Sq. Dev.	8.735412	0.747909	1.313743	0.435935	5575.440	42.77796	0.618642	0.257316	1.294967	1.721519	0.036301
Observations	15	15	15	15	15	15	15	15	15	15	15

Source: Researcher's computation using E-View 9.0, 2016

Table 4.62 shows that HCE and SCE are positively and significantly normally distributed, while CEE is not significantly normally distributed with the P-values that are significant at 0.035646 (HCE), 0.567411(CEE) and 0.000435 (SCE). The VAIC indices are positively skewed.

Table 4.63 Correlation matrix of variables in printing and publishing sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
MBV	1.000000	0.145298	-0.252238	0.522529	0.709050	0.232965	-0.130513	-0.052395	0.154517	-0.480143	0.044494
ROA	0.145298	1.000000	0.188936	0.466015	0.196929	-0.074179	-0.231852	-0.399538	0.563296	0.028014	0.560078
ROE	-0.252238	0.188936	1.000000	0.078814	0.066921	0.596797	0.673808	0.581485	-0.590109	0.420336	-0.175437
EP	0.522529	0.466015	0.078814	1.000000	0.349797	0.138623	-0.186553	-0.142050	0.331479	-0.373759	0.068419
GR	0.709050	0.196929	0.066921	0.349797	1.000000	0.355839	-0.025313	0.112679	0.103228	-0.205274	0.187381
HCE	0.232965	-0.074179	0.596797	0.138623	0.355839	1.000000	0.785826	0.614827	-0.592695	-0.006165	-0.088168
CEE	-0.130513	-0.231852	0.673808	-0.186553	-0.025313	0.785826	1.000000	0.511081	-0.851958	0.000141	-0.465351
SCE	-0.052395	-0.399538	0.581485	-0.142050	0.112679	0.614827	0.511081	1.000000	-0.603490	0.277355	-0.326869
SALES	0.154517	0.563296	-0.590109	0.331479	0.103228	-0.592695	-0.851958	-0.603490	1.000000	-0.156195	0.611859
DER	-0.480143	0.028014	0.420336	-0.373759	-0.205274	-0.006165	0.000141	0.277355	-0.156195	1.000000	0.348033
PC	0.044494	0.560078	-0.175437	0.068419	0.187381	-0.088168	-0.465351	-0.326869	0.611859	0.348033	1.000000

Source: Researcher's computation using E-View 9.0, 2016

The correlation matrix in table 4.63 shows the relationship between the variables. From the correlation matrix, it can be observed that the independent variables (VAIC indices) have significant relationship, since the correlation between them is greater than 0.75. Therefore, a model with all the independent variables will result to multicollinearity.
Multicollinearity exists in a multiple regression model when the variables are highly correlated.

Since HCE and CEE have significant relationship, one of the two variables would be removed from the model to prevent the problem of multicollinearity in the model.
Thus, the model becomes a function of CEE and SCE on the dependent variables of printing and publishing sector (see 4.64).

Mode Formulation:

MBV = f (CEE, SCE) + E - - - - - - - (1a)

Table 4.64 Test of Multicollinearity in Printing and Publishing Sector

Variance Inflation Factors
Date: 03/19/16 Time: 16:48
Sample: 2000 2014
Included observations: 15

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	302.7716	7613.302	NA
CEE	4.338079	33.22095	4.498869
SCE	3.911993	60.86712	1.687451
SALES	3.387594	7126.979	7.353884
DER	0.672206	49.19705	1.939907
PC	44.80875	128.6716	2.726793

Source: Researcher's computation using E-View 9.0, 2016

The Variance Inflation Factors (VIF) value is less than 10. This is indication of non-existence of multicollinearity among variables in the model.

Table 4.65 Multiple Regression Analysis showing the relationship between MBV and CEE, SCE, SALES, DER and PC in Printing and Publishing Sector

Dependent Variable: MBV
Method: Least Squares
Date: 03/19/16 Time: 16:54
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16.57096	17.40033	0.952336	0.3658
CEE	-1.893855	2.082806	-0.909281	0.0386
SCE	1.543470	1.977876	0.780368	0.0455
SALES	-1.485080	1.840542	-0.806871	0.4405
DER	-1.867480	0.819882	-2.277744	0.0487
PC	8.298146	6.693934	1.239652	0.2465

R-squared	0.385400	Mean dependent var	2.871133
Adjusted R-squared	0.043956	S.D. dependent var	0.789910
S.E. of regression	0.772354	Akaike info criterion	2.610428
Sum squared resid	5.368782	Schwarz criterion	2.893648
Log likelihood	-13.57821	Hannan-Quinn criter.	2.607411
F-statistic	1.128735	Durbin-Watson stat	1.785939
Prob(F-statistic)	0.000898		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

The regressed coefficient result from table 4.65 shows a negative relationship between CEE and MBV, but statistically significant at 5%. SCE associates positively at a statistically significant level of 5%. And the overall significance of the model, Prob(F-statistic) is statistically significant at 1%.

The regressed coefficient result is =

MBV = 16.57096 – 1.893855CEE + 1.543470SCE

The implication of the finding is that, for there to be a unit increase in MBV, there must be a multiplying effect decrease of 1.893855 of CEE and a multiplying effect of 1.543470 of SCE.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-values of the VAIC indices (CEE = 0.0386, SCE = 0.0455) are lesser than 0.05, H_1 is accepted.

Conclusion:

There is a significant relationship between VAIC indices and MBV of printing and Publishing Sector in Nigeria. More so, VAIC indices have a positive and statistically significant effect on MBV of printing and publishing sector in Nigeria.

4.4.9.2 Test of Hypothesis II in Printing and Publishing Sector

H_{02}: VAIC indices do not significantly affect ROA of Printing and Publishing Sector

Model Formulation:

ROA = f (CEE, SCE) + E - - - - - (2a)

Table 4.66 Multiple Regression Analysis between ROA and CEE, SCE, SALES, DER, PC in Printing and Publishing Sector

Dependent Variable: ROA
Method: Least Squares
Date: 03/19/16 Time: 17:01
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.471276	3.981578	-2.127617	0.0623
CEE	1.102303	0.476592	2.312888	0.0460
SCE	-0.282095	0.452581	-0.623302	0.5486
SALES	0.987261	0.421156	2.344166	0.0437
DER	0.161124	0.187607	0.858840	0.4127
PC	0.420255	1.531719	0.274368	0.7900

R-squared	0.624143	Mean dependent var	1.311267
Adjusted R-squared	0.415334	S.D. dependent var	0.231132
S.E. of regression	0.176732	Akaike info criterion	-0.339194
Sum squared resid	0.281107	Schwarz criterion	-0.055974
Log likelihood	8.543955	Hannan-Quinn criter.	-0.342211
F-statistic	2.989057	Durbin-Watson stat	1.095624
Prob(F-statistic)	0.073136		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.66 shows that CEE is positively and statistically significant to ROA at 5%, while SCE is negatively and insignificant to ROA. The overall significance of the model is statistically significant at 10%.

The regression equation:

ROA = -8.471276 + 1.102303CEE – 0.0282095SCE

The implication of the finding is that, for there to be a unit increase in ROA, there must be 1.102303 multiplying effect of CEE and 0.282095 multiplying effect decrease of SCE.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of CEE is not greater than 0.05, H_1 is accepted. Moreover, the P-value of SCE is greater than 0.05, then, H_o is accepted.

Conclusion:

CEE has a positive and statistically significant effect on ROA of printing and publishing sector at 5% level of significance. While SCE is statistically insignificant.

4.4.9.3 Test of Hypothesis III in Printing and Publishing Sector

H_{o3}: VAIC indices do not significantly affect ROE of Printing and Publishing Sector

Model Formulation:

ROE = f (CEE, SCE) + E - - - - - - - (3a)

Table 4.67 Multiple regression analysis between ROE and CEE, SCE, SALES, DER and PC in Printing and Publishing Sector

Dependent Variable: ROE
Method: Least Squares
Date: 03/19/16 Time: 17:17
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.417087	4.851521	-0.704333	0.4990
CEE	1.288331	0.580723	2.218495	0.0502
SCE	0.521953	0.551467	0.946481	0.3686
SALES	0.462258	0.513176	0.900779	0.3912
DER	0.414638	0.228598	1.813835	0.1031
PC	-0.809274	1.866388	-0.433605	0.6748

R-squared	0.682308	Mean dependent var	2.297667
Adjusted R-squared	0.505813	S.D. dependent var	0.306331
S.E. of regression	0.215346	Akaike info criterion	0.056034
Sum squared resid	0.417366	Schwarz criterion	0.339254
Log likelihood	5.579745	Hannan-Quinn criter.	0.053017
F-statistic	3.865868	Durbin-Watson stat	2.216313
Prob(F-statistic)	0.037884		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.67 shows a positive and statistically significant relationship between CEE and ROE, at 5% level of significance. SCE relates positively with ROE but at an insignificant level.

The regression equation:

ROE = -3.417087 + 1.288331CEE + 0.521953SCE

The implication of this finding is that, for there to be a unit increase in ROE, there must be 1.28833 and 0.521953 multiplying effect of CEE and SCE respectively.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

The P-value of CEE is not greater than 0.05, therefore H_1 is accepted. However, the P-value of SCE is greater than 0.05, so H_o is accepted.

Conclusion:

CEE has a positive and statistically significant effect on ROE of Printing and Publishing Sector at 5% significant level, while SCE is not statistically significant on ROE of Printing and Publishing Sector.

4.4.9.4 Test of Hypothesis IV in Printing and Publishing Sector

H_o: VAIC indices do not significantly affect Employee Productivity of Printing and Publishing Sector

Model Formulation:

EP = f (CEE, SCE) + E - - - - - - (4a)

Table 4.68 Multiple Regression Analysis between EP and CEE, SCE, SALES, DER, PC in Printing and Publishing Sector

Dependent Variable: EP
Method: Least Squares
Date: 03/19/16 Time: 17:24
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.725258	4.298639	0.633982	0.5419
CEE	0.158849	0.514544	0.308718	0.0274
SCE	0.246848	0.488621	0.505193	0.0265
SALES	0.323589	0.454694	0.711664	0.4947
DER	-0.169792	0.202546	-0.838288	0.4236
PC	-0.018519	1.653693	-0.011198	0.9913

R-squared	0.837624	Mean dependent var	5.666479
Adjusted R-squared	0.691941	S.D. dependent var	0.176460
S.E. of regression	0.190805	Akaike info criterion	-0.185954
Sum squared resid	0.327659	Schwarz criterion	0.097266
Log likelihood	7.394653	Hannan-Quinn criter.	-0.188971
F-statistic	0.594813	Durbin-Watson stat	1.771250
Prob(F-statistic)	0.000560		

Source: Researcher's computation using E-View 9.0, 2016

Table 4.68 shows a positive relationship between VAIC indices and EP. And the VAIC indices are statistically significant at 5%.

The regression equation is:

EP = 2.725258 + 0.158849CEE + 0.246848SCE

The implication of the finding is that for there to be a percentage increase in EP, there must be 0.158849 and 0.246848 of CEE and SCE respectively.

Decision Rule:

Accept $H_{o,}$ if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

The P-values of the VAIC indices are lesser than 0.05, therefore, H_1 is accepted and H_o is rejected.

Conclusion:

VAIC indices have a positive and statistically significant effect on EP of printing and publishing sector in Nigeria at 5% level of significance.

4.4.9.5 Test of Hypothesis V in Printing and Publishing Sector

H_{o5}: VAIC indices do not significantly affect GR in Printing and Publishing Sector

Model Formulation

GR = f (CEE, SCE) + E - - - - - - (5a)

Table 4.69 Multiple Regression Analysis between GR and CEE, SCE, SALES, DER and PC in Printing and Publishing Sector

Dependent Variable: GR
Method: Least Squares
Date: 03/19/16 Time: 17:31
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	89.56947	486.9782	0.183929	0.8581
CEE	-14.36325	58.29089	-0.246406	0.8109
SCE	58.07913	55.35425	1.049226	0.0214
SALES	-14.80343	51.51072	-0.287385	0.7803
DER	-31.31201	22.94579	-1.364608	0.2055
PC	225.5298	187.3412	1.203845	0.2594

R-squared	0.577624	Mean dependent var	14.95693
Adjusted R-squared	0.323817	S.D. dependent var	19.95610
S.E. of regression	21.61566	Akaike info criterion	9.273888
Sum squared resid	4205.132	Schwarz criterion	9.557108
Log likelihood	-63.55416	Hannan-Quinn criter.	9.270871
F-statistic	0.586558	Durbin-Watson stat	1.010929
Prob(F-statistic)	0.011066		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.69 shows the existence of a negative relationship between CEE and GR; and CEE is not statistically significant at the P-value of 0.8109. Moreover, SCE associates positively with GR and it is statistically significant at 5%.

The regression equation is:

GR = 89.56947 – 14.36325CEE + 58.07913SCE

For a unit increase in GR, there will be 14.36325 multiplying effect decrease of CEE and 58.07913 multiplying effect of SCE.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of CEE is greater than 0.05, accept H_o. However, the P-value of SCE is lesser than 0.05, therefore accept H_1.

Conclusion:

CEE has no statistically significant effect on the GR of Printing and Publishing Sector, however, SCE has a positive and statistically significant influence on the GR of Printing and Publishing Sector in Nigeria.

4.4.10 TEST OF HYPOTHESES IN ELECTRICAL AND ELECTRONIC TECHNOLOGY SECTOR

4.4.10.1 Test of Hypothesis 1

H_{o1}: VAIC indices have no significant influence on Market to Book value in Electrical and Electronic Technology Sector

Model Specification

$MBV = \beta_0 + \beta_1 HCE\ \beta_2 CEE + \beta_3 SCE + \beta_4 SALES + \beta_5 DER + \beta_6 PC + E$ - (1)

Table 4.70 Descriptive Statistics of Operational Variables for Electrical and Electronic Technology Sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
Mean	-78.12473	0.767000	4.918200	5.501171	64.81280	6.381067	0.442267	0.340518	8.105533	2.675000	0.199267
Median	1.168000	0.702000	0.978000	5.442714	6.152000	4.530000	0.382000	0.220755	8.126000	0.649000	0.161000
Maximum	9.966000	1.413000	43.83600	6.193069	311.2810	24.12400	0.989000	1.377201	8.466000	31.08500	1.045000
Minimum	-1195.462	0.318000	-11.37600	4.737114	-40.33000	0.726000	0.012000	0.041453	7.648000	-14.03900	0.029000
Std. Dev.	309.1212	0.342959	14.61191	0.393721	111.6301	6.505906	0.371628	0.334650	0.293665	11.83339	0.245209
Skewness	-3.473652	0.517818	1.837908	-0.072710	1.197563	1.773487	0.267701	2.087061	-0.192958	1.198153	2.947728
Kurtosis	13.06825	2.451068	5.323718	2.563009	3.007973	5.154607	1.446926	7.234973	1.548914	4.357625	10.88317
Jarque-Bera	93.52167	0.858668	11.81956	0.132568	3.585433	10.76459	1.686684	22.09893	1.409114	4.740893	60.56296
Probability	0.000000	0.650942	0.002713	0.935865	0.166507	0.004597	0.430270	0.000016	0.494328	0.093439	0.000000
Sum	-1171.871	11.50500	73.77300	82.51757	972.1920	95.71600	6.634000	5.107777	121.5830	40.12500	2.989000
Sum Sq. Dev.	1337782.	1.646692	2989.111	2.170223	174458.1	592.5754	1.933499	1.567871	1.207352	1960.408	0.841783
Observations	15	15	15	15	15	15	15	15	15	15	15

Source: Researcher's computation using E-View 9.0, 2016

Table 4.70 shows that HCE and SCE are positively and significantly normally distributed, while CEE is not significantly normally distributed with the P-values that are significant at 0.004597 (HCE), 0.430270 (CEE), and 0.000016(SCE). The VAIC indices are all positively skewed.

Table 4.71 Correlation matrix of variables in Electrical and Electronic Technology Sector

	MBV	ROA	ROE	EP	GR	HCE	CEE	SCE	SALES	DER	PC
MBV	1.000000	-0.088705	0.318262	-0.484228	0.154310	0.154488	0.252759	-0.001278	-0.336394	0.396448	0.147565
ROA	-0.088705	1.000000	0.704923	-0.322433	0.302613	0.884852	0.875190	-0.707027	-0.317052	0.632679	0.125274
ROE	0.318262	0.704923	1.000000	-0.130318	0.126509	0.922742	0.636270	-0.342005	-0.033095	0.981986	-0.030837
EP	-0.484228	-0.322433	-0.130318	1.000000	-0.216863	-0.317448	-0.590678	0.589810	0.594047	-0.099616	0.088309
GR	0.154310	0.302613	0.126509	-0.216863	1.000000	0.204550	0.235468	-0.246707	-0.014807	0.073858	0.545669
HCE	0.154488	0.884852	0.922742	-0.317448	0.204550	1.000000	0.812415	-0.577202	-0.257062	0.857705	-0.068034
CEE	0.252759	0.875190	0.636270	-0.590678	0.235468	0.812415	1.000000	-0.719388	-0.619810	0.600357	-0.018275
SCE	-0.001278	-0.707027	-0.342005	0.589810	-0.246707	-0.577202	-0.719388	1.000000	0.444468	-0.289305	-0.067246
SALES	-0.336394	-0.317052	-0.033095	0.594047	-0.014807	-0.257062	-0.619810	0.444468	1.000000	0.004902	0.098372
DER	0.396448	0.632679	0.981986	-0.099616	0.073858	0.857705	0.600357	-0.289305	0.004902	1.000000	0.000163
PC	0.147565	0.125274	-0.030837	0.088309	0.545669	-0.068034	-0.018275	-0.067246	0.098372	0.000163	1.000000

Source: Researcher's computation using E-View 9.0, 2016

The correlation matrix in table 4.71 shows the relationship between the variables. From the correlation matrix, it can be observed that the independent variables (VAIC indices) have significant relationship, since the correlation between is greater than 0.75. Therefore, a model with all the independent variables will result to multicollinarity. Multicollinearity exists in a multiple regression model when the variables are highly correlated. Since HCE and CEE have significant relationship, one of the two variables would be removed from the model to prevent the problem of multicollinearity in the model.

Thus, the model becomes a function of HCE and SCE on the dependent variables of Electrical and Electronic Technology Sector (see table 4.72)

Model Formulation:

MBV = f (HCE, SCE) + E - - - - - - (1a)

Table 4.72 Test of Multicollinearity in Electrical and Electronic Technology Sector

Variance Inflation Factors
Date: 03/19/16 Time: 20:15
Sample: 2000 2014
Included observations: 15

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	3868704.	1182.273	NA
HCE	650.8493	15.95629	7.857516
SCE	67778.28	4.566752	2.165021
SALES	57404.90	1153.975	1.412030
DER	144.4289	6.084316	5.768485
PC	62668.22	1.835200	1.074753

Source: Researcher's computation using E-View 9.0, 2016

The Variance Inflation Factors (VIF) value is less than 10. This is an indication of non-existence of multicollinearity among variables in the model.

Table 4.73 Multiple Regression Analysis showing the relationship between MBV and HCE, SCE, SALES, DER and PC in Electrical and Electronic Technology Sector.

Dependent Variable: MBV
Method: Least Squares
Date: 03/19/16 Time: 19:06
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6218.630	1966.902	3.161637	0.0115
HCE	66.63246	25.51175	-2.611834	0.0212
SCE	26.49764	260.3426	-0.101780	0.0282
SALES	-740.7163	239.5932	-3.091558	0.0129
DER	41.65027	12.01786	3.465698	0.0071
PC	150.2551	250.3362	0.600213	0.5632

R-squared	0.669786	Mean dependent var	-78.12473
Adjusted R-squared	0.486333	S.D. dependent var	309.1212
S.E. of regression	221.5488	Akaike info criterion	13.92834
Sum squared resid	441754.8	Schwarz criterion	14.21156
Log likelihood	-98.46253	Hannan-Quinn criter.	13.92532
F-statistic	3.651006	Durbin-Watson stat	1.971478
Prob(F-statistic)	0.044157		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

The regressed coefficient result in table 4.73 shows that VAIC indices associate positively with MBV. However, HCE is statistically significant at 5%, SCE is also statistically significant with MBV at 5%.

The regressed coefficient result is =

MBV = 6218.630 + 66.63246HCE + 26.49764SCE

The implication is that, for there to be one unit increase in MBV, there must be a multiplying effect of 66.63246 and 26.49764 of HCE and SCE respectively.

Decision Rule;

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-values of the VAIC indices (HCE = 0.0212, SCE = 0.0282) are lesser than 0.05, invariably, H_1 is accepted.

Conclusion:

There is a positive and statistically significant relationship between VAIC indices and MBV of Electrical and Electronic Technology Sector. More so, VAIC indices statistically have a significant effect on the MBV ratio of Electrical and Electronic Technology Sector.

4.4.10.2 Test of Hypothesis II in Electrical and Electronic Technology Sector

H_{o2}: VAIC indices do not significantly affect ROA of Electrical and Electronic Technology Sector

Model Formulation:

ROA = f (HCE, SCE) + E - - - - - - - (2a)

Table 4.74 Multiple Regression Analysis between ROA and HCE, SCE, SALES, DER, PC in Electrical and Electronic Technology Sector

Dependent Variable: ROA
Method: Least Squares
Date: 03/19/16 Time: 19:18
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.016047	1.203894	0.013329	0.9897
HCE	0.063444	0.015615	4.063010	0.0028
SCE	-0.148413	0.159349	-0.931370	0.3760
SALES	0.046505	0.146649	0.317114	0.7584
DER	-0.012802	0.007356	-1.740405	0.1158
PC	0.270736	0.153225	1.766920	0.1110

R-squared	0.799497	Mean dependent var	0.767000
Adjusted R-squared	0.743662	S.D. dependent var	0.342959
S.E. of regression	0.135605	Akaike info criterion	-0.868971
Sum squared resid	0.165498	Schwarz criterion	-0.585751
Log likelihood	12.51728	Hannan-Quinn criter.	-0.871988
F-statistic	16.10989	Durbin-Watson stat	1.548699
Prob(F-statistic)	0.000294		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.74 shows that HCE relates positively with ROA and has a statistical significant effect on ROA at (0.0028). However, SCE associates negatively with ROA and has no statistical significant effect on ROA. The overall significance of the model Prob(F-statistic) is statistically significant at 1%.

The regression equation:

ROA = 0.016047 + 0.063444HCE – 0.148413

The implication of the finding is that, for there to be a unit increase in ROA, there must definitely be 0.063444 multiplying effect of HCE and 0.148413 multiplying effect decrease of SCE.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of HCE (0.0028) is lesser than 0.05, H_1 is accepted. However, H_o is accepted for SCE, because the P-value (0.3760) is higher than 0.05.

Conclusion:

HCE has a positive and statistically significant effect on the ROA of Electrical and Electronic Technology Sector. While SCE has no statistical significant effect on ROA of Electrical and Electronic Technology Sector in Nigeria.

4.4.10.3 Test of Hypothesis III in Electrical and Electronic Technology Sector

H_{03}: VAIC indices do not significantly affect ROE of Electrical and Electronic Technology Sector.

Model Formulation:

ROE = f (HCE, SCE) + E - - - - - - (3a)

Table 4.75 Multiple Regression Analysis between ROE and HCE, SCE, SALES, DER, PC in Electrical and Electronic Technology

Dependent Variable: ROE
Method: Least Squares
Date: 03/19/16 Time: 19:32
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-22.39340	12.81011	-1.748104	0.1144
HCE	0.985265	0.166154	5.929833	0.0002
SCE	3.175406	1.695569	1.872768	0.0281
SALES	2.205955	1.560431	1.413683	0.1911
DER	0.773661	0.078270	9.884472	0.0000
PC	-0.033646	1.630399	-0.020637	0.9840

R-squared	0.793731	Mean dependent var	4.918200
Adjusted R-squared	0.790249	S.D. dependent var	14.61191
S.E. of regression	1.442911	Akaike info criterion	3.860377
Sum squared resid	18.73793	Schwarz criterion	4.143597
Log likelihood	-22.95282	Hannan-Quinn criter.	3.857360
F-statistic	285.3395	Durbin-Watson stat	1.911752
Prob(F-statistic)	0.000000		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.75 shows that there exist a positive relationship between the VAIC indices and ROE. Statistically the VAIC indices (HCE and SCE) have positive and significant effect on ROE at 1% and 5% level of significance respectively. And the overall significance, Prob (F-statistic) is statistically significant at 1%.

The regression equation is :

ROE = -22.39340 + 0.985265HCE + 3.175406SCE

The implication of this finding is that, for there to be a unit increase in ROE, there must be 0.985265 and 3.175406 multiplying effect of HCE and SCE respectively.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-values of VAIC indices (HCE = 0.002, SCE = 0.0281) are lesser than 0.05. H_1 is accepted.

Conclusion:

VAIC indices have a positive and statistically significant effect on ROE of Electrical and Electronic Technology Sector in Nigeria.

4.4.10.4 Test of Hypotheses IV in Electrical and Electronic Technology Sector

H_{o4}: VAIC indices do not significantly influence Employee Productivity of Electrical and Electronic Technology Sector

Model Formulation

EP = f (HCE, SCE) + E - - - - - - (4a)

Table 4.76 Multiple regressions Analysis between EP and HCE, SCE, SALES, DER, PC in Electrical and Electronic Technology

Dependent Variable: EP
Method: Least Squares
Date: 03/19/16 Time: 19:41
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.754150	3.102538	0.243075	0.8134
HCE	0.008012	0.040242	0.199105	0.8466
SCE	0.547365	0.410657	1.332899	0.0370
SALES	0.553761	0.377928	1.465257	0.1769
DER	-0.002682	0.018957	-0.141492	0.8906
PC	0.141273	0.394874	0.357767	0.7288

R-squared	0.493539	Mean dependent var	5.501171
Adjusted R-squared	0.212172	S.D. dependent var	0.393721
S.E. of regression	0.349465	Akaike info criterion	1.024348
Sum squared resid	1.099133	Schwarz criterion	1.307568
Log likelihood	-1.682611	Hannan-Quinn criter.	1.021331
F-statistic	1.754076	Durbin-Watson stat	1.493312
Prob(F-statistic)	0.018496		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.76 shows that VAIC indices associates positively with EP. Moreover, HCE has no statistical significant effect on EP at the P-value of 0.8466, while SCE has a statistical significant effect on EP.

The regression equation =

EP = 0.754150 + 0.008012HCE + 0.547365SCE

The implication is that, for there to be a percentage increase in EP, there must be multiplying effect of 0.008012 and 0.547365 of HCE and SCE respectively.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-value of HCE (0.8466) is greater than 0.05, accept H_o. However, the P-value of SCE (0.0370) is lesser than 0.05, accept H_1.

Conclusion:

HCE has a positive relationship with EP, but has no statistically significant effect on EP. While, SCE has a positive relationship with EP and a statistically significant effect on EP of Electrical and Electronic Technology Sector.

4.4.10.5 Test of Hypothesis V in Electrical and Electronic Technology Sector

H_{o5}: VAIC indices do not significantly affect GR in Electrical and Electronic technology Sector

Model Formulation:

GR = f (HCE, SCE) + E - - - - - - (5a)

Table 4.77 Multiple Regression Analysis between GR and HCE, SCE, SALES, DER, PC in Electrical and Electronic Technology Sector

Dependent Variable: GR
Method: Least Squares
Date: 03/19/16 Time: 19:54
Sample: 2000 2014
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-489.9639	923.2993	-0.530666	0.6085
HCE	15.13261	11.97567	1.263612	0.0238
SCE	16.30305	122.2095	0.133402	0.0316
SALES	51.26152	112.4694	0.455782	0.6593
DER	-6.312955	5.641399	-1.119041	0.2921
PC	271.2356	117.5123	2.308146	0.0464

R-squared	0.642031	Mean dependent var	64.81280
Adjusted R-squared	0.432049	S.D. dependent var	111.6301
S.E. of regression	103.9990	Akaike info criterion	12.41581
Sum squared resid	97342.12	Schwarz criterion	12.69903
Log likelihood	-87.11860	Hannan-Quinn criter.	12.41280
F-statistic	1.425988	Durbin-Watson stat	2.513717
Prob(F-statistic)	0.002815		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

Table 4.77 shows the existence of positive association between VAIC indices and GR. Moreso, the VAIC indices (HCE = 0.0238, SCE = 0.0316) are statistically significant at 5%.

The regression equation is:

GR = -489.9639 + 15.13261HCE + 16.30305SCE

For a unit increase in GR, there must be 15.13261 and 16.30305 multiplying effect of HCE and SCE respectively.

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Decision:

Since the P-values of the VAIC indices (HCE = 0.0238, SCE = 0.0316) are lesser than 0.05, invariably, H_1 is accepted.

Conclusion:

VAIC indices have a positive and statistically significant effect on GR of Electrical and Electronic Technology Sector.

Table 4.78 Multiple Regression Analysis showing White Heteroskedasticity test between MBV and HCE, CEE, SCE, SALES, DER and PC of service firms in Nigeria

Dependent Variable: MBV
Method: Least Squares
Date: 03/21/16 Time: 16:26
Sample: 2000 2014
Included observations: 15
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-28.94983	17.30277	-1.673132	0.1328
HCE	-0.109013	0.090750	-1.201238	0.0040
CEE	0.898513	1.041324	0.862856	0.4133
SCE	-0.135399	0.111500	-1.214346	0.2592
SALES	3.580507	1.895676	1.888776	0.0956
DER	0.127534	0.007176	17.77286	0.0000
PC	-3.243443	1.606864	-2.018493	0.0782

R-squared	0.801707	Mean dependent var	2.686000
Adjusted R-squared	0.652987	S.D. dependent var	2.710044
S.E. of regression	1.596428	Akaike info criterion	4.078140
Sum squared resid	20.38867	Schwarz criterion	4.408563
Log likelihood	-23.58605	Hannan-Quinn criter.	4.074620
F-statistic	5.390713	Durbin-Watson stat	1.030814
Prob(F-statistic)	0.016441	Wald F-statistic	150.6322
Prob(Wald F-statistic)	0.000000		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

The coefficient of determination obtained was 0.80 (80%) which is commonly referred to as the value of R^2. The cumulative test of hypothesis using R^2 to draw statistical inference about the explanatory variables employed in this regression equation, shows that, there is 80% variation explained in the performance of service firms by HCE, CEE and SCE

chosen for this study. And 20% was explained by unknown variables that were not included in the model. The predictive power of this model is very high and good for users of financial statement for investment decision making. The prob. (Wald F-statistic) of 0.000000 is positively and statistically significant at 1%.

Table 4.79 Multiple Regression Analysis showing white Heteroskedasticity test between ROA and HCE, CEE, SCE, SALES, DER and PC of service firms in Nigeria

Dependent Variable: ROA
Method: Least Squares
Date: 03/21/16 Time: 16:31
Sample: 2000 2014
Included observations: 15
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.965677	1.087867	-0.887679	0.4006
HCE	-0.022735	0.029572	-0.768810	0.4641
CEE	1.213417	0.377800	3.211801	0.0124
SCE	-0.068303	0.012790	-5.340194	0.0007
SALES	0.227744	0.137387	1.657682	0.1360
DER	0.000718	0.001642	0.437186	0.6735
PC	-1.244126	0.501323	-2.481685	0.0380

R-squared	0.776574	Mean dependent var	0.620667
Adjusted R-squared	0759005	S.D. dependent var	0.809915
S.E. of regression	0.163986	Akaike info criterion	-0.473349
Sum squared resid	0.215131	Schwarz criterion	-0.142925
Log likelihood	10.55012	Hannan-Quinn criter.	-0.476868
F-statistic	55.58377	Durbin-Watson stat	1.694779
Prob(F-statistic)	0.000004	Wald F-statistic	626.4524
Prob(Wald F-statistic)	0.000000		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

The coefficient of determination obtained was 0.78 (78%) which is commonly referred to as the value of R^2. The cumulative test of hypothesis using R^2 to draw statistical inference about the explanatory variables employed in this regression equation, shows that there is 78% variation explained in the performance of service firms by HCE, CEE and SCE chosen for this study. And 22% was explained by unknown variables that were not included in the model.

The predictive power of this model is very high and good for users of financial statement for investment decision making. The prob. (Wald F-statistic =0.000000) is statistically significant at 1%.

Table 4.80 Multiple Regression Analysis showing White Heteroskedasticity test between ROE and HCE, CEE, SCE, SALES, DER, PC of service firms in Nigeria

Dependent Variable: ROE
Method: Least Squares
Date: 03/21/16 Time: 16:34
Sample: 2000 2014
Included observations: 15
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.871394	4.552305	-1.070094	0.3158
HCE	0.084547	0.064328	1.314314	0.0002
CEE	4.851241	0.841949	5.761921	0.0004
SCE	-0.196499	0.039358	-4.992551	0.0011
SALES	0.496489	0.568052	0.874020	0.4076
DER	0.173155	0.014012	12.35726	0.0000
PC	0.231823	1.604407	0.144492	0.8887

R-squared	0.792071	Mean dependent var	3.329933
Adjusted R-squared	0.786124	S.D. dependent var	5.238446
S.E. of regression	0.617077	Akaike info criterion	2.177078
Sum squared resid	3.046271	Schwarz criterion	2.507502
Log likelihood	-9.328087	Hannan-Quinn criter.	2.173559
F-statistic	166.8191	Durbin-Watson stat	1.887880
Prob(F-statistic)	0.000000	Wald F-statistic	10138.05
Prob(Wald F-statistic)	0.000000		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

The R-squared value shows that 0.79 (79%) of the systematic variations in the dependent variable can be jointly predicted by all the independent variables. and 21% was explained by unknown variables that were not included in the model. The prob. (Wald F-statistic = 0.000000) is positively and statistically significant at 1%.

Table 4.81 Multiple Regression Analysis showing White Heteroskedasticity test between EP and HCE, CEE, SCE, SALES, DER and PC of service firms in Nigeria

Dependent Variable: EP
Method: Least Squares
Date: 03/21/16 Time: 16:38
Sample: 2000 2014
Included observations: 15
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.416076	3.795042	-0.373138	0.7187
HCE	-0.023386	0.015960	-1.465306	0.0810
CEE	-0.129002	0.241667	-0.533799	0.6080
SCE	0.019083	0.026737	0.713707	0.4957
SALES	0.792479	0.426039	1.860108	0.0999
DER	0.001948	0.005443	0.357962	0.7296
PC	-0.001525	0.407927	-0.003739	0.9971

R-squared	0.734742	Mean dependent var	5.791969
Adjusted R-squared	0.535798	S.D. dependent var	0.408602
S.E. of regression	0.278390	Akaike info criterion	0.585139
Sum squared resid	0.620009	Schwarz criterion	0.915562
Log likelihood	2.611457	Hannan-Quinn criter.	0.581619
F-statistic	3.693212	Durbin-Watson stat	1.446588
Prob(F-statistic)	0.046228	Wald F-statistic	474.5873
Prob(Wald F-statistic)	0.000000		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

The R-squared value shows that 0.73 (73%) of the systematic variations in the dependent variable can be jointly predicted by all the independent variables. and 27% was explained by unknown variables that were not included in the model. The prob. (Wald F-statistic = 0.000000) is positively and statistically significant at 1%.

Table 4.82 Multiple Regression Analysis showing White Heteroskedasticity test between GR and HCE, CEE, SCE, SALES, DER and PC of service firms in Nigeria

Dependent Variable: GR
Method: Least Squares
Date: 03/21/16 Time: 16:42
Sample: 2000 2014
Included observations: 15
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-832.0504	544.1447	-1.529098	0.1648
HCE	13.97420	3.847628	3.631901	0.0067
CEE	126.4501	22.78950	5.548610	0.0005
SCE	-13.48632	3.784539	-3.563532	0.0074
SALES	73.87804	57.30244	1.289265	0.2333
DER	-0.392355	0.319155	-1.229353	0.2539
PC	159.4485	66.66215	2.391889	0.0437

R-squared	0.759117	Mean dependent var	86.42093
Adjusted R-squared	0.728454	S.D. dependent var	243.6324
S.E. of regression	65.16704	Akaike info criterion	11.49651
Sum squared resid	33973.95	Schwarz criterion	11.82693
Log likelihood	-79.22382	Hannan-Quinn criter.	11.49299
F-statistic	31.27967	Durbin-Watson stat	1.199394
Prob(F-statistic)	0.000039	Wald F-statistic	5197.250
Prob(Wald F-statistic)	0.000000		

Source: Researcher's computation using E-View 9.0, 2016

Interpretation of Result

The coefficient of determination obtained was 0.76 (76%) which is commonly referred to as the value of R^2. The cumulative test of hypotheses using R^2 to draw statistical inference about the explanatory variables employed in this regression equation, shows that, there is 76% variation explained in the profit of service firms in Nigeria by HCE, CEE and SCE chosen for this study. And 24% was explained by unknown variables that were not included in the model. The predictive power of this model is very high and good for users of financial statement for investment decision making.

4.5 DISCUSSION OF FINDINGS

4.5.1 Discussion of findings in the Banking Sector

The regressed coefficient result in table 4.6 reveals that the MBV of banks has a positive relationship with HCE and statistically significant at 5% level of significance. This is in tandem with A priori criterion which states that if the market is efficient, investors will place higher value for firms with greater intellectual capital (Firer & Williams, 2003; Riahi-Belkaoui, 2003).

The study is in agreement with Najibullah (2005) in Bangladesh, found that Banks' market value is positively associated with corporate intellectual ability and its three (3) components. This study is also in agreement with the study carried out by Chen, Cheng and Hwang (2005) in Taiwan. They found out that firms' intellectual capital has a positive impact on market value. The finding of this study is also in line with the study conducted by Samilogu (2006b). Samilogu examined the relationship between value added intellectual coefficients (VAIC) and the ratio of market value to book value in Turkish Banking sector. The results of their study indicated that there is significant correlation between the dependent variable (ratio of market value to book value) and the independent variable (VAIC) and its three components.

Table 4.8 indicates that ROA associates negatively with IC but statistically significant at 1%. This finding is in support with the study carried out by Chan (2009a) on Hong Kong stock exchange and no significant association was found between intellectual capital and ROA. The findings of this study is in line with Rehman, Rehman, Usman, and Ashgar (2012), they investigated data of banking companies in Pakistan on the relationship of IC to corporate performance (ROA, ROE, EPS). The results showed that VAIC has positive and significant impact on ROE and ROA. Ulum (2008), Artinah (2011), Rachmawati (2012) found that IC has significant impact to firm performance which is in tandem with the findings of this study.

These findings support several studies in the intellectual capital literature done in different countries have proved that, there is a positive and statistically significant relationship between intellectual capital and financial performance in the Banking Sector. As opposed to Shiu (2006b) and Chan (2009b), they found that HCE has a significant negative

relationship with market to book value ratio, showing that the efficiency with which a firm can use its human resources impacts negatively on Banks' performance.

4.5.2 Discussion of findings in Insurance Sector

Table 4.13 indicates that there exists a positive and statistically significant level of 1% between HCE and GR. This is in tandem with A priori which holds that knowledge, ability, skills, experience and attitude of workers, assume greater significance even as organizations utilize their intellectual capital as a critical resource to enhance their performance (Ekwe, 2013). This study is in agreement with the study carried out in Indonesia by Iswati and Anshori (2007). They examined data from 10 insurance companies listed on IDX and found a positive and significant relationship between IC and profitability.

Tan, Plowman and Hankook (2007) found that IC has positive significant impact on Return on Equity (ROE). They examined financial institutions data in Malaysia and found that value added intellectual (VAIC) has positive impact on financial performance which is proxied with Return on Asset (ROA). The study of Riahu-Belkaoui (2003) found a positive relationship between intellectual capital and financial performance in insurance companies, while Bontis, Chua and Richardson (2000) concluded that, regardless of industry, the development of structural capital has a positive impact on business performance. On the other hand, Firer and Williams (2003) examined the relationship between intellectual capital and traditional measures of firm performance (Return on Asset, Return on Equity) and failed to find any relationship, while Chen et al. (2005) using the same methodology, concluded that IC has significant impact on profitability, which is in line with this study.

4.5.3 Discussions of Findings in Health Care Sector

Table 4.15 shows that IC has a positive influence on the financial performance of Health Care Sector. In line with the findings of this study, Sharabati, Jawad and Bontis (2010) conducted a survey on the pharmaceutical industry of Jordan and observed that firms were successfully managing the intellectual capital and business performance was influenced in a positive manner. The study found that IC components were positively associated with business performance. Study of impact of IC to profitability has been very interesting by many researchers. Using the VAIC, IC is examined in relationship to firm financial

performance, including ROA (Firer & Williams, 2003; Chen, Cheng & Hwang, 2005, Shiu, 2006; Ting & Lean, 2009; Clarke, Seng & Whitting, 2011; Ranjani, Fernando & Kumari, 2011; Mondal & Gosh, 2012; Banimahd, Mohammadrezaei & Mohammadrezaei, 2012; Rahman & Ahmed, 2012; Joshi, Cahill, Sidhu & Kansal, 2013), ROE (Chen, Cheng & Hwang, 2005; Tan, Plowman & Hankook, 2007; Clarke, Seng & Whitting, 2011; Ranjani, Fernando & Kumari, 2011; Mondal & Gosh, 2012; Rahman & Ahmed, 2012), firm market value (Firer & Williams, 2003; Chen et al., 2005) EPS (Tan, Plowman & Hankook, 2007; Kuryanto & Syafruddin, 2008), Revenue growth (Chen, Cheng & Hwang, 2005; Clarke, Seng & Whitting, 2011, Rahman & Ahmed, 2012), Emplolyee productivity (Chen, Cheng & Hwang, 2005; Clarke, Seng & Whitting, 2011), Asset Turnover Ratio (Firer & Williams, 2003; Mondal & Gosh, 2012), stock return (Kuryanto & Syafruddin, 2008; Djamil, Razafindrambinina, & Tandeans, 2003) and sales force performance (Putri, 2012).

In Germany, Bollen, Vergauwen & Schnieders (2005) examined IC and found that components in IC have relationship with firm performance in pharmaceutical industry, which is in line with the findings of this study.

4.5.4 Discussion of Findings in ICT (Telecommunication Services)

Table 4.22 indicates that IC has a positive and significant influence on the financial performance of ICT (Telecommunication Services). In line with the findings of this study, Pal and Soriya (2011) examined the relationship between intellectual capital and company's performance in Indian IT industry. The result found that IC of the company was has positive association with profitability of the company.

Chen, Cheng and Hwang (2005) conducted an empirical investigation on the relationship between IC, market value and financial performance. They used a large sample of Taiwanese listed companies between 1992 and 2002, and utilized Pulic's (2000a, b) Value Added Intellectual coefficient (VAIC). Their study underlined the importance of IC in the enhancement of firm profitability and revenue growth. The empirical results proved that (a) investors valuate higher companies with better IC efficiency, (b) companies with better IC efficiency obtain a higher degree of profitability and revenue growth in the current and following years. Chen, Cheng, and Hwang (2005) concluded that IC is indeed a significant strategic asset, since it is positively related to the firm's market value and financial

performance. Bozbura (2004) suggests that the HC skills and expertise possessed by the company and which can be used in solving administrative problem in addition to the risks associated with it.

Firer & Willaims (2003) used the VAIC approach to measure the relationship between IC and traditional measures of corporate performance. They used a sample of 75 South African public traded companies, but the empirical results failed to support any relationship between the three value added efficiency components and the three dependent variables (profitability, productivity and market value). Their findings revealed that South African companies depend mostly on their tangible resources, pay the least importance to structural capital, while on the other hand, the market seems to react negatively to firms that concentrate solely on the enhancement of human assets. There are many firms which have started measuring, managing, and reporting their intangibles. The study of Riahi-Belkaoui (2003) found a positive relationship between IC and financial performance, while Bontis, William & Richardson (2000) concluded that, regardless of industry, the development of structural capital has a positive impact on business performance. By modeling sales as a function of a firm's organizational capital, net current assets, number of employees, and research and development capital. Lev and Radharkrishnan (2003) developed a firm-specific measure of organization capital. Using a sample of approximately 250 companies, they showed that organizational capital estimate contributes significantly to the explanation of the market value of firms, beyond assets in place and growth potential.

4.5.5 Discussion of findings in Auto Mobile / Auto Part Sector

Table 4.31 shows that IC is positively related with financial performance in Auto Mobile / Auto Part Sector. In line with A priori criterion which states that IC enhances the concept of efficiency and effectiveness in companies and increases the size of their assets (Fitz-enz, 2001). Using data from the (UK) FTSE 250 from 1992 to 1998, Pulic (2000b) also showed that average values of VAIC and firm's market value exhibit a high degree of correspondence. On the other hand, Bontis, William and Richardson (2000) found a positive relationship between financial performance and human capital (HC) in Malaysian firms, concluding that the investment in IC, especially HC can yield increased competitive advantage and this is in tandem with the findings obtained in this study.

4.5.6 Discussion of findings in Courier and Freight Sector

Table 4.39 shows that VAIC indices have significant and positive influence on courier and freight sector. This is in tandem with A priori which holds that IC is the moving force for business success (Pulic 2000a). Growth of a firm's intellectual capital has been interpreted as an early indicator for subsequent performance (Ross & Ross, 1997). Corporate performance refers to the overall well being of firms, which are measured through sales, asset, profit, book and market values (Goh, 2005). In line with the findings of this study, Gan and Saleh (2008) examined the relationship between intellectual capital and firm performance. They found that intellectual capital has a significant impact on profitability and productivity. Appuhami (2007) found a positive relationship between intellectual capital and investors' capital gain on shares.

4.5.7 Discussion of findings in Finance Leasing Sector

Table 4.47 shows that there is a positive and statistically significant relationship between VAIC indices and financial performance of finance leasing sector. This finding is in tandem with A priori which holds that the effect of IC on the future organizational processes is a useful way to identify the weakness and to provide the approaches required for managers to make a decision (Bahman and Mohsen, 2015). In line with the result of this study, Abbassi and Sedghi (2010) investigated the effect of intellectual capital on the financial performance of companies listed on Tehran Stock Exchange. The results obtained showed that the efficiency coefficient of each of the components of intellectual capital had a statistical significant and positive influence on ROE. On the other hand, Maditinos et al. (2011) investigated the empirical relation of IC with firms market and financial performance of 96 listed firms in Athens Stock Exchange and argued that only HCE has significant and substantive positive relation with financial performance of firms.

4.5.8 Discussion of findings in Hospitality Sector

Table 4.55 indicates that VAIC indices have a positive and statistical relation with the financial performance of Hospitality Sector. A priori holds that the current economy considers knowledge as the most important productive element and names it the most important competitive factors in organizations (Momeni & Esmaeli, 2015). In line with the findings of the study, Goh (2005) study shows that HC contributes more than 80% to

value created in Malaysian firms. The same also implied from study of Joshi, Cahill and Sidhu (2010), suggest that Australian firms have relatively higher HC efficiency than other VAIC components. Mondal and Gosh (2012) study on 65 firms' data also reveal that HC is a major component in enhancing the returns of firms.

4.5.9 Discussion of findings in Printing and Publishing Sector

Table 4.63 shows that VAIC indices have statistical influence on the financial performance of printing and publishing sector in Nigeria. In line with this study, Olayinka and Uwalomwa (2011) carried out a study on the impact of IC on the business performance of 32 audited financial statements of quoted companies in Nigeria. The results show that IC has a positive and significant relationship with the performance of business organizations. On the other hand, Firer & Willaims (2003) used the VAIC approach to measure the relationship between IC and traditional measures of corporate performance. They used a sample of 75 South African public traded companies, but the empirical results failed to support any relationship between the three value added efficiency components and the three dependent variables (profitability, productivity and market value). Their findings revealed that South African companies depend mostly on their tangible resources, pay the least importance to structural capital, while on the other hand, the market seems to react negatively to firms that concentrate solely on the enhancement of human assets.

4.5.10 Discussion of findings in Electrical and Electronic Technology Sector

Table 4.71indicates that VAIC indices has statistically significant influence on the financial performance of electrical and electronic technology sector in Nigeria. This result supports the argument of many researchers that collective knowledge of all employees in an organization provides a competitive edge for the organization (Barnry, 2001; Barney, Wright & Ketchen, 2001; Marr and Spender, 2004; Schiuma, Ordonez De Pablos & Spender 2007; Holton III & Yamkovenko 2008; Kang & Snell, 2009). In line with this study, Komnenic and Pokrajcic (2012) investigated if IC has an impact on organizational performance of Multi National Companies (MNCs) in Serbia. The study revealed that HC was positively associated with all three corporate performance measures. The study also observed that the structural capital was having significant positive realationship with ROE

in line with the finding of this study. In the same vein, Enofe, Mgbame and Christopher (2013) ascertained the relationship between firm's financial performance and human resource accounting disclosures on 50 listed firms. The study finds that a positive relationship exists between the financial performance of a company and its level of Human Resource Accounting Disclosure. Okpala and Chidi (2010) x-rayed the relevance of human capital accounting to stock investment decisions. Survey research design was adopted, and the chi-square statistical technique was used to test the hypotheses at 5% alpha level. It was found that the quality of human capital is a major factor in determining the value of a firm's stock and investment decisions. It was also empirical verified that the inclusion of human capital value in the statement of financial position help investors make more rational investment decisions.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

In the course of this study which determined the effect of intellectual capital on financial performance of selected quoted services firms in Nigeria, the following findings were made by the researchers:

1. There is a negative and statistically significant relationship at 1% between VAIC indices (HCE, CEE and SCE) and Market-to-Book Value (MBV) ratio, that, one unit increase in VAIC indices will lead to an average of 38.10% increase in MBV ratio of quoted service firms in Nigeria.

   A priori criterion holds that if the market is efficient, investors will place higher value for firms with greater intellectual capital. Therefore Intellectual capital is expected to play an important role in enhancing both corporate value and financial performance. Chan (2009a, 2009b) carried out a study in Hong Kong stock exchange and no significant association was found between intellectual capital and market to book value. Firer and Williams (2003), Shiu (2006b) and Chan (2009b), all found that HCE has a significant negative relationship with market to book value ratio, showing that the efficiency with which a firm can use its human resources impacts negatively on firm performance. Samilogu (2006b) examined the relationship between value added intellectual coefficient (VAIC) and the ratio of market value to book value in the Turkish banking sector. The results of their study indicated that there is significant correlation between the dependent variables (ratio of market value to book value) and the independent variable (VAIC) and its three components.

2. There is a negative and statistically significant relationship at 1% between VAIC indices and ROA, that, one unit increase in VAIC indices will lead to an average of 43.48% increase in ROA of quoted service firms in Nigeria.

   A priori criterion holds that, the higher the ROA number, the better, because the company is earning more money on less investment. Chan (2009a, 2009b) carried out a study in Hong Kong stock exchange and no significant association was found between Intellectual Capital and ROA. Tan, Plowman and Hankook (2007) found that VAIC indices have positive impact to financial performance which is proxied with return on asset (ROA).

3. There is a positive and statistically significant relationship at 1% between VAIC indices and ROE, that, a unit increase in VAIC indices will lead to an average of 71.11% increase in ROE of quoted service firms in Nigeria.

   Firer & Williams (2003) examined the relationship between intellectual capital and ROE and failed to find any relationship. Abbassi and Sedgh (2010) investigated the effect of Intellectual Capital on ROE of companies listed in Tehran Stock Exchange. The result obtained showed that the efficiency coefficient of each of the components of intellectual capital had a significant positive effect on ROE.

4. There is a positive and statistically significant relationship at 1% between VAIC indices and EP, that, one percentage increase in VAIC indices will lead to an average of 5.72% increase in EP of quoted service firms in Nigeria.

   A priori holds that the collective knowledge of all employees bring to an organization is believed to provide the organization with a valuable asset (Ashton, 2005; Camuffo & Comacchio, 2005). Clarke, Seng and Whitting (2011) used data from Australian publicly listed companies examined the relationship between VAIC components and employee productivity. Their employed and structural capital employed components have positive significant impact to firm performance.

5. There is a positive and statistically significant relationship at 1%, between VAIC indices and GR, that, one unit increase in VAIC indices will lead to an average of 81.30% increase in GR of quoted service firms in Nigeria.

   A priori holds that it is the amount of physical resources (assets and finance) invested in a firm that determines the amount of profit that firm makes (Nikoomaram and Eshaqi, 2010). Chen, Cheng and Hwang (2005) conducted a study on IC, market value and financial performance and utilized Public's (2000a, b) Value Added Intellectual Coefficient (VAIC). The empirical results proved that companies with better IC efficiency obtain a higher degree of profitability and revenue growth in the current and following years. Andriessen (2007) investigated the association between intellectual capital and corporate financial performance, using VAIC model. It was found that IC was positively associated with financial performance with the exception of revenue growth.

The study further discovers that:

6. Human capital has the highest impact on the dependent variables of the study
7. VAIC indices (HCE, CEE, and SCE) have the most significant effect on GR and ROE.
8. VAIC indices have the least significant effect on EP.
9. VAIC indices have a very strong, perfect and positive correlation with the hospitality sector, followed by health care sector.
10. VAIC indices have the weakest correlation with the ICT (Telecommunication services).

5.2 CONCLUSION

In a world of competition today, an integrated programme designed to measure, develop and launch its intellectual capital accurately is required. Human and intellectual capitals are perceived to be the strategic resources. Therefore, clear estimation and right applications of their values have become very important.

Intellectual capital plays a very vital role in the evaluation of organizations' financial statement. The rationale for intellectual capital essentially arises from the fact that employees are the key to organizational success, in terms of efficiency and effectiveness. Intellectual capital therefore provides information about Human Resource cost and value which facilitates decision making and is expected to induce management to motivate its employees financially, educationally and otherwise for increased productivity and proper resource management. A firm with good quality and stable personnel is likely to improve on shareholders wealth.

5.3 RECOMMENDATIONS

1. **Inclusion of Human Capital Accounting in the Financial Reporting of Nigeria Service Firms:**

Human Resource capital should be included in the statement of financial position of organization to aid investment decision. Major financial regulatory bodies such as International Accounting Standard Board, Central Bank of Nigeria, Financial Reporting Council of Nigeria, Nigeria Stock Exchange, Stock Exchange Commission et cetera should encourage the inclusion of human capital accounting in the financial reporting of Nigeria services firms.

2. **Creation of Standards**

Standards should be created for human resources identification and measurement. This will enhance valuation of human capital, ensure a higher degree of utility to stakeholders, uniformity in disclosures and will show a reliable comparison of human capital values.

5.4 CONTRIBUTIONS TO KNOWLEDGE

This work has contributed to the body of knowledge in the following areas:

Firstly, this work tends to be the first attempt by any researchers to exclusively determine the effect of intellectual capital on financial performance services firms in Nigeria.

Secondly, the results of this study have provided strong empirical validation that intellectual capital positively and significantly affect financial performance in quoted service firms in Nigeria.

Thirdly, by determining the relationship between intellectual capital and financial performance indices of service firms in Nigeria, using original model.

Fourthly, this study adopted cross-sectional analysis of all the firms considered in this study, while others adopted random sampling method or applied mono sector analysis.

Fifthly, this study appears to be the first attempt by any researcher to determine the effect of intellectual capital on financial performance of quoted service firms in Nigeria by employing multicollinearity test, VIF and white heteroskedasticity test.

Sixthly, other works in this area considered between one to three financial performance indices, but this work considered five financial performance indices, which are Market to Book value ratio, Return on Asset, Return on Equity, Employee Productivity and Growth in Revenue.

Nestor Intellectual Capital Model (NICM)

Several researchers have been conducted so far on intellectual capital. Variables of human capital, structural capital and relational capital as independent variables, and productivity, profitability and market value as dependent variables were used to form the research model called Nestor Intellectual Capital Model (NICM).

Nestor Intellectual Capital Model (NICM) was adapted from Pulic VAIC model. Intellectual capital is the moving force for business success. Corporate performance refers to the overall well being of firms, which are measures through sales, asset, profit, book and market values.

The main advantage of NICM is simplicity. It will help to identify the intellectual assets that produce star attributes. Ideally, these should be divided as equally as possible between human, customer and structural IC assets. All of these assets must either be measured in absolute terms, for example training expenses, or capable of measurement using scales, for example customer satisfaction (See Appendix 12).

5.5 POLICY IMPLICATION OF THE RESEARCH FINDINGS

It requires an organization to identify its highly valuable, unique capabilities and the intellectual capital assets behind them.

While calculating its Intelligence Quotient (IQ), a company may find it is producing goods or providing services that are similar to those of a competitor or contain features that add little value to customers. This system requires a great deal of work initially, including gathering data from employees and customers who may provide hastily compiled information of little use. It may also be difficult for a company to divide its knowledge assets equally between the three types of intellectual capital (HCE, CEE and SCE) meaning that some indicators are incorporated to make up the numbers while others are excluded. However, the statistical and data gathering techniques required are daunting and few corporate teams have the time, skill or inclination to incur the necessary costs.

5.6 SUGGESTIONS FOR FURTHER STUDIES

The recommended areas for further research include:

1. Impact of Intellectual capital on the firm's market value: The mediation role of financial performance.
2. Intellectual Capital Disclosure Emphasis: An Analysis of Manufacturing Companies Annual Reports.
3. Intangibles Disclosure and Capital Raising in Nigeria: An Analysis of information Intensity.

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APPENDIX I

NIGERIAN STOCK EXCHANGE

SERVICE COMPANIES:

BANKING

1. Access Bank Plc
2. Diamond Bank Plc
3. First City Monument Bank Plc
4. Fidelity Bank Plc
5. First Bank Plc
6. Guaranty Trust Bank Plc
7. United Bank for Africa Plc
8. Union Bank of Nigeria Plc
9. Wema Bank Plc
10. Zenith Bank Plc

INSURANCE COMPANIES

1. Allco insurance Plc
2. Conerstone Insurance Plc
3. Guinea insurance Plc
4. LASACO Assurance Plc
5. Law Union and Rock Insurance Plc
6. Linkage Assurance Plc
7. Mutual Benefits Assurance Plc
8. NEM Insurance Plc
9. Niger Insurance Plc
10. Prestige Assurance Plc
11. Standard Alliance Insurance Plc
12. Unic Insurance Plc
13. Wapic Insurance Plc

HEALTHCARE

1. Ekocorp Plc

ICT (TELECOMMUNICATION SERVICES)

1. Tripple Gee and Company Plc

AUTOMOBILE/AUTOPARTS

1. R.T. Briscoe (Nigeria) Plc

COURIER AND FREIGHT SERVICES

1. Trans-Nationwide Express Plc

FINANCE LEASING

1. C & I Leasing Plc

HOSPITALITY

1. The Tourist Company of Nigeria Plc

PRINTING AND PUBLISHING

1. Academy Press Plc
2. Learn Africa Plc
3. Studio Press (Nigeria) Plc
4. University Press Plc

ELECTRICAL AND & ELECTRONIC TECHNOLOGY

1. Interlinked Technologies Plc

APPENDIX 2-11

APPENDIX 12

Researcher's Conceptual Model