CHAPTER - II  
REVIEW OF THEORY AND EMPIRICS  

There has been a wide use of the term ‘Intellectual Capital’ (IC) in recent times. However, there have been only a limited number of research studies which have used emerging economies as a case study for evaluating the implications of IC for specific industries. The implications of IC are more prominent in these economies as they have sufficient human capital at their disposal. The intellectual capital has been measured and reported in many of the studies. It was in the 1990s when the topic of IC attracted the attention of researchers. It mainly focused on raising awareness about the existence and value of intangible assets within organizations and developing classification models for IC. Later on, the researchers carried out research into intellectual assets and formulated the concept of the knowledge-based organization. The specific studies on the measurement of IC are concerned with the creation of frameworks, indices and guidelines which support the initial concepts. A gap still lies in the above studies because these have not been developed in accordance with the accounting norms and principles. The literature available on the subject can be categorized into three broad categories: conceptual background of intellectual capital, model and measurement of IC, and relation of intellectual capital with performance.  

I  
Intellectual Capital Related Studies  

One set of studies mainly focused on the definition and concept of intellectual capital and intellectual assets. These have formulated the concept of knowledge-based organization and classified the three components of intellectual capital: human capital, structural capital and customer capital. The studies reviewed under this category are as follows.  

The pioneering work undertaken by Bontis (1999) is an attempt to raise the understanding and importance of IC. The paper conceptualizes
intellectual capital. The author found that knowledge stocks and flows are closely related to business performance. Although knowledge stocks have a positive association with business performance, yet the misalignment of knowledge stocks with knowledge flows acts as a detriment to the overall efficiency of the organization’s learning system. The work highlights the importance of integrating IC with research in the knowledge management and organizational learning domains. The study of IC stocks and their exponential growth due to organizational learning flows produces a tremendous amount of energy which can take companies far beyond their current vision. It needs people to re-think their attitudes on this elusive intangible asset and to start measuring and strategically managing IC may, in fact, become the most important managerial activity in the near future.

Luthy (2000) developed a working definition of IC and a framework for identifying and classifying the various components of IC. Study presented the methods of measuring IC at both the component and organization levels. The aim is to provide an exploratory foundation for the development of methods and processes useful for meaningful management of intellectual systems and processes useful for meaningful management of intellectual capital. Brooking has offered a comprehensive definition of IC as “Human capital, structural capital and customer capital.” Intellectual capital is the term given to the combined intangible assets which enable the company to function.”. Human capital, structural capital and customer capital, and human-centered assets act as the main component of intellectual capital. Stewart has defined IC quite effectively as “package of useful knowledge.” Various other definitions include the concepts such as ability, skill, expertise, and other forms of knowledge that are useful in organizations. Intellectual capital is the term given to the combined intangible assets which enable the company to function.”. Human capital, structural capital and customer capital, and human-centered assets act as the main component of intellectual capital.
Human capital is an organization’s combined human capability for solving business problems. It is inherent in people and cannot be owned by organizations. Therefore, there is a loss of human capital when people leave an organization. Human capital also depends upon how effectively an organization uses its people resources as measured by creativity and innovation. Structural capital is of utmost significance in an organization which supports employees (human capital) in their work. Structural capital, being an asset of the organization, remains with an organization even when people leave. The traditional things such as buildings, hardware, software, processes, patents, and trademarks form the structural capital. It also includes the things such as organization’s image, organization, information system, and proprietary databases. However, customer capital can be called the strength and loyalty of customer relations. Customer satisfaction, repeat business, financial well-being, and price sensitivity are the indicators of customer capital. The customer capital, for being separate from human and structural capital, has its central importance to an organization’s worth. The relationship of an organization with its customers is of paramount significance.

The author concludes that intellectual capital is a key asset on which lies the success of an organization. Intellectual capital comprises of all useful knowledge in whatever form it may exist in the organization. Thus, it plays a very significant role in the economic development and growth of an organization.

**Malhotra (2000),** in his case study, discussed the framework for developing an understanding of intellectual capital and knowledge assets. This framework of IC was popularized by a Swedish Company Skandia. In an attempt to bridge up the gap between the accountants and the resource management practitioners and researchers, some warnings were observed. These warnings were explained in the discussion as a point which deserves attention in future research and practice. As the world economies are changing fast, they would be expected to plan invention, and implement information and knowledge management systems which provide differential advantage in
The study under review used specific indicators of the various components of IC that represented critical success factors pertinent to long-term future success and growth. However, such indicators may vary across different nation states depending upon their specific national economic strength in the global market. The diverse methods applied at the level of business enterprise may be extrapolated to similar assessments at the level of nations. The study presents a case for assessing knowledge capital at the national economic level, using Skandia model. The four components of intellectual capital are (a) market capital; (b) process capital; (c) human capital; and (d) renewal and development. While concluding, the author has discussed about transition in most of the developing and developed nations to knowledge economics which has resulted into an increasing awareness of knowledge as a key factor for economic growth and performance.

Bontis (2002), in his research paper, highlighted the strategic importance of intellectual capital disclosure in a Canadian corporation. As the dynamics of the Canadian economy shift towards a knowledge-based orientation and away from its natural resource roots, the significance and value of IC increases. The electronic database used to perform the content analysis was Compact D: Cancorp Plus. This database has a collection of annual reports from approximately 11,000 Canadian corporations as required by the Canadian Business Corporations Act. The database files can be obtained through submissions required by provincial legislation and submissions to Industry Canada—a federal government department. Under the Canadian Business Corporations Act, all publicly traded companies are required to provide audited financial statements to Industry Canada. Prior to 1994, the large private corporations were also required to do this. A list of related terminology was compiled to identify the companies disclosing IC. A total of 74 counts of IC disclosure were observed across 10,000 annual reports. Most of IC terms were disclosed only once in each annual report. There were many companies that did not even disclose the number of employees working in the company. It is evident from the study that IC disclosure is still an issue of academic discussion. There is no evidence at all that IC disclosure concluded
that such statements could only be general in nature as the diversity of companies would prevent meaningful comparison between them. Only a small proportion of Canadian companies even used the terms in their annual reports.

The study made a major recommendation for corporations that are concerned with their relationship with the capital markets to develop strategic and tactical initiatives which provide for voluntary disclosure of IC. Intellectual capital has been measured by human resource cost accounting, human asset accounting and human capital accounting as components of human resources. The author concluded that only a small number of Canadian corporations used the terms in their annual reports.

Pomeda et al. (2002) examined the initiatives developed in the area of intangibles, called intellectual capital of nations as an expression which involves the integral management of the national intangibles. The analysis underlines the different international experiences, with the purpose of elaborating an integrated exercise which resolves the basic issues in order to propose a model to check it. The models used for the purpose of this study are ‘Balanced Business Scorecard’, ‘Dow Chemical Model’, ‘Technology Broker’, ‘Intellectual Capital Index’, ‘Stewart’s Model’, ‘Strategic Management Model of Competences’, ‘Organizational Learning Model’, ‘Knowledge Management Model’, etc. These models have helped the companies to measure their intangible assets in many ways. The most important is to inform the third parties about the value of intangibles. The paper focuses on the main approaches to the measurement and management of the IC which form the basis of the models specifically-oriented toward the description of the IC of Nations. The three basic concepts adopted by the different nations in the model through the social capital include (a) people, integrated into the model through the human capital; (b) infrastructure use, implemented within the model through the technological capital; and (c) Interactions between (a) and (b).

Marr et al. (2003) examined the reports on the results of a systematic investigation into the theoretical strength of why firms measure their IC and
existing empirical evidence which helps to prove that the measurement of IC is really beneficial for the firms. Specific focus on the measurement of IC is related to the creation of frameworks, indices and guidelines which support the initial concepts even though none of the above is developed as per the accounting principles. There has been an expansion in the area of IC measurement and the number of measurement frameworks as researchers try to develop metrics that form strategy formulation for implementation, improve disclosure, benchmark performance, and predict future business performance. Through the systematic review of literature, the author has successfully identified five main reasons. These are: (a) to help organizations formulate their strategy; (b) to assess strategy execution; (c) to assist in diversification and expansion decisions; (d) to use these as a basis for compensation; and finally, (e) to communicate measures to external stakeholders. The study revealed that majority of research within the IC measurement field is at the theory building stage, and that a small portion of the proposed measurement theory has yet been fully tested.

Donnell et al. (2006) follow Marx and Engels to identify the “essential condition of capital”. The paper aims to start an initial critical exploration of the essential condition of intellectual capital, especially the ownership rights of labour. It can only be sufficiently addressed by taking in contrast to unitarism. This is a more pragmatic and realistically revealing perspective for IC theory and practice to adopt in any discussion on the vital principle or the essential condition. Unitarist human resource arguments have been challenged here with both empirical evidence and insights from pragmatic human resource and accounting discourse in identifying capital’s often more latently strategic purposes such as conserving cash, reducing reported accounting expense in order to boost reported earnings, deferring taxes, and attracting, retaining and exploiting key elements of labour; not to mention the evidence of fraudulent and criminal activity. There was no evidence of any real movement on granting labour any ownership rights to any innovative products, processes or services developed within the firm in the context of intellectual capital labour employment relation. There is a strong evidence of
broad-based employee stock options which become institutionalized in certain firms; and sectors representing are not insignificant proportion of labour’s compensation package.

Kok (2007) presented intellectual capital as a part of knowledge management initiatives at institutions of higher learning. Bringing IC, knowledge management and enabling technologies together is a big challenge to leaders wishing to create an information age institution. Knowledge management plays a vital role in achieving business success. Knowledge management is the art of creating value from an organization's intangible assets. The conversion of knowledge into a valuable asset is known as an intellectual asset or intellectual capital. The models used in the study for measurement of intellectual capital are (a) market capitalization method – calculates the difference between market capitalization and stockholders’ equity; (b) return on assets method – compares tangible assets and the annual financial figures with the industry average and above-average earnings are then used to estimate the value of intangible assets; (c) direct IC method – identifies and values the components; and (d) scorecard method – identifies and reflects various components of IC in terms of scorecards and graphs. Today, the institutions of higher learning are giving more and more importance to the management of IC. The study makes it clear that specific models are required to be developed for these institutions. As a result, a framework was developed which helped to manage and measure IC at institutions of higher education.

El-Bannany (2008) examined the determinants of intellectual capital performance in the UK banks over the period 1999-2005. The groups of banks selected for the purpose of data collection were Alliance & Leicester Group, Abbey Group, Barclays Group, Bradford & Bingley, HBOS Group, HSBC Bank Group, Lloyds TSB Group, Northern Rock Plc and The Royal Bank of Scotland Group. The study proposed six research hypotheses. First, there is a negative relationship between the levels of investment in information technology and intellectual capital performance. Secondly, there is a positive
relationship between bank’s relative efficiency and intellectual capital performance. Thirdly, there is a negative relationship between barriers to entry in a firm’s sector and intellectual capital performance. Fourthly, there is a positive relationship between the staff costs ratio and intellectual capital performance. Fifthly, there is a positive relationship between bank profitability and intellectual capital performance. Lastly, there is a positive relationship between bank risk and intellectual capital performance.

The study uses multiple regression method to test the relationship between intellectual capital performance as a dependent variable and certain independent variables. The study concluded that the standard variables, bank profitability and bank risk are quite important. It also concluded that the variables such as investment in information technology systems, bank efficiency, barriers to entry and efficiency of investment in intellectual capital, which failed to get the attention of researchers in previous studies, have a significant impact on intellectual capital performance.

Stahle and Bounfour (2008), in their research paper, made an attempt to create understanding on the dynamics of IC which has emerged recently as one of the main issues on the research agenda. The data collected for analysis relates to 51 countries. It analyzes time dependent relationship between IC and GNP growth. The research identifies the parameters of four types of effects for a nation's GNP growth: sustaining effects, boosting effects, linear growth potential and exponential growth potential. Countries have been being grouped according to their developmental stage as developing, transitional and developed countries; and the effects of IC were studied within and between these groups. The study specifies the type of IC factors that have significant effects on economic growth of different level of economies. The findings provide important guidelines and framework for policy-makers. The value of the paper lies in the fact that it relates IC factors to economic performance and specifies under which circumstances IC has important effects on national GNP growth.
Snyder and Crescenzi (2009) made an effort to examine the capacity in current legal remedies and formulate suggestions to protect IC in a better way. Intellectual capital’s rising value in the production of wealth has subjected it to vulnerability of crime. Today, more and more cyber crime cases are being reported. The intangible nature of IC facilitates theft; and the lack of legal remedies has led to more number of IC theft cases. Intellectual capital assets increased risk of theft and subsequent damage from loss. The authors discussed the two aspects to prosecution and punishment in criminal matters, which together with the nature of cyber-crime and IC make the economic espionage act and unlikely to be effective protection for IC assets. The first is the apprehension and trial of the perpetrators; and the second is the restoration of stolen property. It highlights the risks of crime inherent in IC and a distributed cyber environment in greater detail in order to demonstrate that traditional legal remedies are inadequate and ineffective to protect IC property rights. Under such circumstances, prevention is the only reasonable method to protect IC.

II
Model and Measurement of IC Evidence Studies

Some studies have specifically focused on the measurement of IC, and created the frameworks, indices and guidelines to support the initial concepts. Some of the representative studies are reviewed as under:

Bontis (1998) carried out an empirical pilot study to explore the development of several conceptual measures and models regarding IC and its impact on business performance. The study explores the development of items and constructs through principal component analysis and partial least squares. The author has reviewed the concepts of human capital, structural capital and customer capital. A survey was conducted which took into consideration the IC constructs as well as business performance within the context of conceptual model. The strong contribution of partial least squares is that principal components analysis and path analysis are incorporated into an a priori theoretical and measurement model. The author revealed that an intellectual
employee (human capital) is practically useless without the supportive structure of an organization (structural capital) that can utilize and nurture his or her skills. Continued research on the issue has provided that only the organizations with a high level of IC can be successful as value-added service of the firm comes from deep professional knowledge, organizational learning, and protection and security of information. Managers and analysts researchers should realize that the study of IC can take companies far beyond their current vision. The people should rethink over their attitude on intangible assets; and start recognizing that measuring and strategically managing knowledge may make the difference between mediocrity and excellence.

Gray (2001) discusses the measurement of intellectual capital assets and highlights the benefits of intellectual capital measurement. Effectiveness can be measured as a change in intellectual stocks; and therefore, companies should measure activities which increase those stocks, and understand how intellectual resource management affects business performance. In terms of efficiency, intellectual resource measures include operating performance measures such as lead times, customer satisfaction, employee productivity, or learning measures. The frameworks are basically a hierarchy of measures with each category of intellectual assets being measured by its own set of indices. Indices are a collection of measures specific to the business; they can range from direct counts ratios to concrete financial measures.

Till today, there has not been any standardized index method accepted by all. However, Kaplan and Norton’s Balanced Scorecard is the most widely accepted and used; but unfortunately, the measure of intellectual stocks is not fully accurate as it heavily relies on a number of assumptions and approximations. Where measurement frameworks have been successful, there are not only clear links between the strategy and the measures, but also between the stocks and flows of intellectual components. There has been a continuous increase in the number of measurement frameworks. The researchers are trying to standardize metrics across industries, improve measures for disclosure and look for better ways of predicting future
performance. A good quality business performance measurement system needs to be guided by strategy, used to assess and challenge the assumptions undertaking the current strategic direction. The author has suggested that financial performance measures should be supplemented by non-financial measures as these are more informative of employees’ actions and can improve contracting. In terms of behaviour, it has been felt that relying purely on financial measurement can encourage short-term thinking, especially if those financial measures are linked to compensation systems.

Intellectual resources should be an overriding factor in determining and executing strategy in the highly knowledge-based organizations. It is suggested when internal measurement is satisfactory then firms can consider the external reporting of their intellectual assets. The author, on the basis of his study, also suggested that a good measurement system should satisfy two key areas of performance: effectiveness and efficiency. The change in intellectual stocks and effects on business performance form the basis to measure effectiveness. For the purpose of efficiency evaluation, intellectual resource measure may include operating performance measure such as lead times, customer satisfaction, employee productivity, etc. Intellectual capital measure should affect managerial behaviour and action in order to realize the strategy. Further, a performance measurement system should assess the impact of practices on the journey towards achieving those strategic goals.

Tsan and Chang (2003) discussed the factors of IC and gave a model to explore the IC profile of four Taiwanese IT industries through two-stage survey. The study is based on primary data collected from 200 respondents belonging to the industries such as computer hardware manufacture, computer software, information applications, electronic optical equipments, communication equipments, communication service and semi-conductors. The first-stage survey has helped to reduce the indicators to a manageable number. The study has identified eight IC factors as a measuring model to explore the intellectual capital profiles of four Taiwan IT industries. Generally, the weaker capital needs to enhance include R&D, human resource, and innovation and
creativity. Coping strategies include vitalizing industrial R&D networking, encouraging inter-industry interactions, introducing overseas R&D, investing more in R&D, subsidizing innovation and creativity, and protecting patents and copyrights. For human resources enhancement, training and development, facilitating working environment, team building, and an organizational culture of innovation and continuous learning can work; and for customer relationship, customer service, branding, information and communication technology, and the quality of relationship with customer and supplier should be emphasized. As far as business networking is concerned, sustaining measures may include establishment of industry community, R&D and marketing alliance, global production and marketing integration, and regional market expansions. The Innovation capability plays an important role in Taiwan’s information technology industries. The study found that there is no compelling evidence which shows that the investment and development of R&D will help to achieve the goal of establishing Taiwan as an Asia pacific electronic and information industry resource integration center. It concluded that the intellectual capital system model helps to identify the interactions among IC elements. It further revealed that higher the IC management, greater would be the influence from the input of IC to output of intellectual capital.

Ariely (2003) found knowledge management as a methodology towards IC. In order to find a clear difference in perceptions towards the terms of knowledge management and intellectual capital, both the terms need to be studied deeply. Further, it is equally important to understand the relationship of knowledge management with associated concepts which include organizational learning and the learning organization, human resources management, information systems and artificial intelligence, and cultural issues. IC of the organization includes the knowledge and management of all its elements, i.e., processes, components, and forms. The intellectual capital is then transformed, through its value to the organization, into owned intellectual property. Hence, the study seeks to explore knowledge management as a methodology towards intellectual capital and property. The process becomes a part of it in itself. It has been found that executives play a significant role in
the process of converting resources into something of value to customers and managerial skill. These activities provide a competitive advantage to the organizations over their rivals. Knowledge management and managerial skill in IC activities are, indeed, a source of sustainable competitive advantage.

**Hill and Youngman (2003)** recognized certain intangibles as assets for the system of national accounts and classified expenditures on them as investment, or gross fixed capital formation. It is necessary to be able to account for both the production and the use of intangible assets. The authors mentioned that there are a number of research papers which suggest the ways in which knowledge and skills might be recognized as intellectual capital as these make a major contribution to production, productivity and welfare. The study suggests that the fundamental concepts of the system of national accounts must be preserved, but some of its conventions should be changed. An asset in the system of national accounts can be called as an entity over which ownership rights may be established. However, economic benefits may be derived by holding them, or using them over a period of time. The balance-sheets of the system include assets over which ownership rights are actually enforced. Assets can be financial or non-financial. Some non-financial assets can be converted into outputs from processes of production as understood in the system of national accounts.

Information is intangible. It is a public good as well. However, all productive activities do not actually fall in the production boundary of national accounts. By convention, the household production of services for one’s own consumption is excluded. It does not present a true picture of the economic production that takes place within the economy. However, this convention stands justified because most of the users of national accounts wish to focus on market and monetary activities. The authors purpose that the own account production of human assets should be included within the production boundary of the system of national accounts. It has been argued that as intellectual capital formation is a productive activity, it should be properly represented in the system of national accounts.
Serenko and Bontis (2004) conducted a meta-review analysis of the literature on knowledge management and intellectual capital by investigating in research productivity and carrying out a citation analysis of individuals, institutions, and countries. The meta-analysis has its focus on journals of intellectual capital, knowledge management, and knowledge and process management. The concepts of knowledge management and IC has been provided strong representation in the management lexicon of academia, business and government. The results of the study show that 2.8 percent of total work was contributed by top 3 KM/IC scholars; 13.1 percent of total work was contributed by top 25 KM/IC scholars; and 84.1 percent of total work was contributed by top 631 KM/IC scholars. Further, 7 percent of total work was contributed by top 3 KM/IC institutions; 20.5 percent of total work was contributed by top 25 KM/IC institutions; 72.5 percent of total work was contributed by top 6 KM/IC institutions; and 2 percent of all citations were contributed by top 3 publications. About 6 percent of all citations were contributed by top 25 publications; and 91.8 percent of all citations were contributed by top other publications. Further, 5.5 percent of all citations were contributed by top 3 authors; 15.1 percent of all citations were contributed by top 25 authors; and 79.4 percent of all citations were contributed by top 631 authors. The results also revealed that 659 individual authors published 450 distinct papers in the three journals. Further investigation pointed out that almost half of the papers were written by a single researcher, 33.8 percent by two co-authors, and 15.1 percent by three individuals. The study concluded that research productivity is exploding; and several leading authors and foundation publications are referenced regularly.

Montequin et al. (2006) presented an integrated framework for intellectual capital measurement and knowledge management implementation in small and medium-sized enterprises (SMEs) in correlation with the main factors for the successful implementation of knowledge management (KM). The study systematically identifies some of the factors for the successful implementation of knowledge management and links them with a general IC measurement strategy. In order to achieve the objectives, the study firstly
undertakes the key success factors for KM implementation. Then it assumes a generic IC measurement model to present an example of integration. After that, based on those key success factors, new indicators have been identified. The existing model has been extended considering the critical factors for a successful KM implementation, and linked with the IC measurement model. The resulting model indicates what has to be done to build a supporting infrastructure and to instill the right culture and the right set of behaviours within the organization. The validity of the resulting model has been checked with some companies. All these tasks have been performed considering the focus target. The SME’s knowledge structures and cultures differ substantially between organizations.

In this paper, a general purpose IC measurement system has been taken as a reference. This model is based on KNOQUA and European Union project for building a network between the European Union and Asia within the fields of IC, organizational learning and customer relationship management. The model was developed by combining the most successful elements of existing methods. It was tested on Thai SMEs. It has a quite generalized structure, suitable for most SMEs across the world.

The quality of relationships and the ability to create new customers are the key factors which contribute toward the success of a company. The relations held with suppliers and the different alliances of the company are also a source of significant knowledge. The relationship of a firm with its customers contributes to its organizational capital and comprises an important part of its shareholder value. Therefore, the value in these relationships should be understood and managed carefully. Based on the key success factors for implementing KM, the IC measurement model should be extended to ascertain what can be considered low competence or high competence for the implementation of a KM programme.

Mouritsen (2009) studied the classification, measurement and ontology of intellectual capital entities, and developed an alternative role for measurement. Measurement is helpful in manufacturing new managerial
objects that attract the attention of managers. They have to deal with these objects in order to be accountable as managers. Measurement also helps to develop the actions that can be made in the name of intellectual capital. The dual conclusion drawn from the study suggests that measurement of IC is difficult because it is not possible to copy its properties in number, yet it is necessary because it allows intervention to happen since it develops a completely new set of dimensions to manage.

III

Intellectual Capital and Performance Evidence Studies

Intellectual capital has a positive association with business performance. The misalignment of knowledge stocks with knowledge flows act as a detriment to the overall efficiency of the organization’s learning system. This section covers such studies to describe the underlying process.

Bontis et al. (2000) examined the three elements of intellectual capital, i.e., human capital, structural capital, and customer capital; and tried to find their interrelationships within two industry sectors in Malaysia. The paper has also examined the inter-relationship among IC measures within the Malaysian business context. The study has been conducted through a psychometrically validated questionnaire which was originally administered in Canada. The questionnaire carried 63 statements; and the response data was collected on a seven-point Likert scale. The study finds the human capital to be the most important irrespective of industry type. Further, customer capital has a significant influence over structural capital regardless of industry. Finally, the development of structural capital has a positive relationship with business performance irrespective of industry. The study provides a clear explanation of business performance variance within the Malaysian context.

Firer and Stainbank (2003) studied the relationship between intellectual capital and performance of a company’s in South Africa. A sample of 65 publicly listed South African companies in the high knowledge-base business sectors was considered for the study. Business service, chemical and pharmaceutical products, communications, electronic and electrical products,
finance, insurance, real estate, and health and social services were the business sectors included in the sample. The companies representing these sectors derive their value exclusively from the efforts of people (human capital) and the collective routine systems, processes and information within the organization (structural capital). For the purpose of analysis, three dependent variables were taken into consideration, viz. profitability, productivity and market valuation. These variables contributed most toward company’s performance. The result of profitability model based on linear regression model is found to be positive and statistically significant. The result of productivity model has shown that it is negative and statistically significant but the result of third dependent variable, viz. market valuation model is not statistically significant. Therefore, the study suggests that there is a positive relationship between performance of intellectual capital and productivity and profitability and not the market valuation.

Mavridis (2004), in his study, has analyzed the intellectual or human capital and physical capital of the Japanese banking sector and discussed their impact on the banks’ value-based performance. It has studied the actual status of human capital and physical capital and its predictive, discriminative and integrative impact on the intellectual added value-based performance situation. The study is based on secondary data collected from financial statements of Japanese banks and applied the value added intellectual coefficient (VAIC) model. As per the VAIC concept, the human or knowledge potential contributes highly towards the success and performance of any firm. The study revealed that the success of best performing index banks lies greatly in the usage of their human capital. As the data used for the study covers a short period of fiscal years, the author has expressed his intention to continue with further research in the field.

Seleim et al. (2004) examined intellectual capital in Egyptian software firms. The study contributes towards the development of IC theory by building a measurement system in unique context. The knowledge-based economy has brought many changes in the nature of work and the demands placed on
organizations to become the storehouses of innovation, nourishing and sustaining wellsprings of talent. The knowledge-based economy has provided new models for the firms. The emergence of these trends has a great influence on management research. This study takes into consideration three groups of variables: human capital, structural capital and relational capital. The study has its focus on all the 107 member firms of the Software Industry Chamber in Egypt. But the final sample consists of 38 software firms representing 35.5 percent of the total population. Egyptian software industry is a suitable example to understand the features of knowledge-based economy.

The results have shown that a positive association exists between the human capital indicators and organizational performance. A positive association also exists between the structural capital indicators and organizational performance. Further, there is a positive association between the relational capital indicators and organizational performance. The software firms need to develop a knowledge management strategy for each component of IC. A knowledge management strategy includes a series of initiatives which support the firm’s different kinds of knowledge assets. These assets include an intellectual property policy to protect certain innovations, a secure documentation of potential business interest (customer lists, price lists, business practices and internal processes), and a set of human resource policies to support the recruitment, retention and training of developers. The study suggests that the top management should adopt a policy regarding their stocks of knowledge. Existing knowledge assets should be exploited to seize market opportunities.

**Cabrita and Vaz (2006)** have examined the inter-relationship and the interaction effects among IC components and organizational performance in the Portuguese banking industry. Human capital, structural capital and relationship capital are the main components of IC. Intellectual capital components interact to create value. Partial Least Squares model has been used for the estimation of parameters. The model has been used and interpreted sequentially in two stages; first being the assessment of the
measurement model (validity and reliability of measures) and followed by the assessment of the structural model. The study brought out that IC is substantively and significantly related to the organizational performance in the Portuguese banking industry. It also proves empirically that value is created when IC components interact. More they interact, higher would be the value.

The study carried out by Ji-jian et al. (2006) analyzes how do human capital and structure capital impact the enterprise performance; and thereby the relations between IC and enterprise performance. The data collected for the study relates to A-share listed companies in China Shanghai Stock Exchange. The data used for the research has been collected from 2004 annual financial reports of automobile industry listed companies. The hypotheses formulated for the study are: (a) intellectual capital value-added coefficient plays a significant positive role on enterprises performance; (b) capital value-added coefficient plays a significant catalytic role on enterprises performance; (c) human capital value-added coefficient plays a significant catalytic role on enterprise performance; and (d) structure capital value-added coefficient and corporate performance are positively relevant.

The intellectual value-added coefficient, capital value-added coefficient, and human capital value-added coefficient respectively have a significantly positive relationship with enterprise performance alternative variable ROA, and structural capital and additional value value-added coefficient both have a positive relationship with ROA. The results of the study show that the empirical results support the assumptions that physical capital and intellectual capital have a positive role to play in the performance of an enterprise; and intellectual capital plays a more important role in the performance of an enterprise than physical capital. The components of intellectual capital of human capital and structural capital also play a positive role in business performance. The study revealed that the impact of human capital on business performance is more significant as compared to matter capital, while the impact of structure capital is less significant.
Kamath (2007) has investigated the intellectual capital performance of Indian banking sector. The tool used to measure the intellectual capital performance is value added intellectual coefficient. The study relates to the period 2000-05. The implications of IC are more prominent in developed economies as they have enough human capital at their disposal. Therefore, it is of utmost importance to understand whether this resource is being efficiently utilized by specific sectors to their advantage in creating value over a period of time. On the one hand, service sector is playing a dominant role in the growth of economies, while on the other, these economies are moving towards more liberalization and globalization. The secondary data used for the purpose of this study aims to derive the VAIC for all banks’ average, the group average, and each bank separately. The study provides that the overall top performers in human capital efficiency are the foreign banks. However, the top performers in capital employed efficiency are the public sector banks. The overall top performers in the value creation efficiency analysis are the foreign banks. The public sector banks in India seem to have a large and inefficient workforce which is contributing nothing to overall value creation. Thus, it can be concluded that vast differences exist in the intellectual and value creation performance of the Indian banking sector.

Kolakovic and Holmik (2006), in their research paper, analyzed the efficiency of Croatian sugar industry, by using the concept of intellectual capital. In this age of globalization, traditional activities have become secondary and lend support to the activities based on knowledge, information and technology. The Croatian sugar industry faces the consequences of failing privatization. There is a need to increase the production to sustain competition in the European Union market. The Croatian sugar factories send their production mainly to the European Union market where they get good earnings. The study concludes that the IC concept, its measurement and management help to increase the competitive abilities of the company. Thus, the Croatian companies are required to adopt various systems of IC to manage the execution. Managers remain aware about the intellectual capital concept in order to implement measurement systems and manage intellectual capital. The
lack of such understanding can put the company into a calculable loss in the
long-term. Therefore, everyone understands the importance of IC which
enables to compete in the domestic as well as global market.

**Lybaert et al. (2006)** have studied the relationship between innovation
and intellectual capital, and the economic performance of firms in Flanders.
They have applied both growth rate in sales and growth rate in total assets as
measures of performance. The authors have also pointed out several new
indicators of IC which not only aim at generating new technological
knowledge, but also emphasize on the adoption and diffusion of technology.
The results indicate that the technical know-how turnover ratio and the
product innovation indicator are significant and positively related to sales
growth. However, process innovation is not significantly related to sales
growth as it is often associated with rationalization and restructuring
processes, and therefore, does not affect the sales growth directly. The model
confirms the significant negative relation between age and firm growth. The
study also reveals that firm size is significantly and positively related to sales
growth. Thus, larger firms realize more growth rates. While concluding, it can
be said that some indicators of innovations capacity and intellectual capital are
significantly related to the sales growth rate, but not to the total assets growth
rate.

**Moslehi et al. (2006)** have identified the key influencing factors which
affect the competitiveness and export performance of selected sectors. The
study provides a framework to examine the role of intellectual capital in the
long run. Information and communication technologies and e-commerce have
been found to be influential in the services industries. The Internet is
instrumental in selling a variety of services. This form of commerce is greatly
reshaping many of the existing service industries and also creating new
services. This has given rise to cross-border trade, and enabled the companies
to have access to new clients in foreign markets. As a result, more and more
companies are becoming competitive in their services exports. This empirical
study is an attempt to identify and evaluate the IC influence on export
development in service sectors. It also identifies intellectual capital separately for each service industry by taking into consideration the sources like: (a) value chain model (primary and secondary activities), (b) PEST model for environmental factors, (c) service sector literature review, and (d) key processes in business process management studies. Based on the structure of each industry, the study focuses on both public and private organizations. The study has developed a general taxonomy for each service sector according to their needed Intellectual capital. The factors such as capital, innovation, culture, market orientation structural capital and human competencies have contributed highly towards intellectual capital. A strong relationship exists between IC and export performance. Intellectual capital improves the export performance of the companies. Thus, export performance of each sector depends on the level of IC.

Vaithilingam et al. (2006) tried to find the impact of key drivers such as infrastructure, intellectual capital institutions, integrity, interaction and innovation on the soundness of banking sector in developed, developing and under developed countries. The results reveal that infrastructure and intellectual capital have a positive but an insignificant effect on the soundness of banks. This could be due to the reason that in most of the front-end financial transactions user-friendly technology, and transparent processes and systems are adopted. The empirical model suggests that soundness of banks depends on the measures taken to limit illicit financial activities such as money laundering and terrorist financing. Growing innovation in digital technology has also helped to bring transparency among and within financial institutions. ICT has played an anchor role to enhance the productivity and efficiency of the banking sector leading to the socio-economic development of a country. The study has concluded that there has been less development of the banks in developing and underdeveloped countries than developed countries only the well-developed financial institutions with good integrity system and high innovative capacity can be financially strong.
Salleh and Selamat (2007), in their study, made an attempt to examine the extent to which Malaysian firms have adopted intellectual capital management. The study specifically investigates the differences in the degree to which firms of different industries, types and sizes acknowledge and adopt IC management in their business models. As many as 449 organizations listed on the main board of Bursa Malaysia under consumer products, industrial products, trading/services, finance and technology counters form the sampling frame for the study. The hypotheses formulated for the study describe the differences in the degree to which Malaysian firms in different industries, types and sizes acknowledge and adopt intellectual capital in their business models. The study shows that most of the Malaysian firms employ elements of IC in their business model with some contradictions. There are significant differences among sub-categories of local-based companies. The study also provides that foreign-affiliated companies and European-affiliated companies tend to adopt higher human capital, while Singapore-affiliated companies tend to adopt higher structural and customer capital than their Japanese counterparts. It can be concluded that companies with a positive gap, as opposed to those with a negative gap, tend to be greater in the degree of adoption of IC.

Kamath (2010) has estimated the intellectual capital performance of banks in Pakistan which adopted the value added intellectual capital model for a period of two years. Intellectual capital derives some value to the organization. Intellectual capital can be classified into human capital, structural capital and customer capital. Human capital covers all the aspects related to the employees in the organization; their training, development and their contribution to the organizational development. The structural capital is referred to as the vision, mission, infrastructure and intellectual property that the organization owns, while customer capital contributes towards the organizational growth. It is generated through large customers; and their commitment levels are measured through repeat business, networking, etc. The secondary data used for the study aims to derive the VAIC for all banks average and then for each bank separately. Apart from it, a regression is run to
find the coefficients as well as the linear best fit. The author revealed that the performance of private sector banks was much better than all other banks in Pakistan on intellectual capital efficiency levels. Efficient usage and management of human resources have been instrumental in improving their efficiency.

Abdulsalam et al. (2011) have analyzed the intellectual capital performance of the Kuwaiti banks using value added intellectual coefficient model. The data used for the study relates to the period 1996 to 2006. The intellectual capital of a company consists of all employees, their organization and their ability to create value. The intellectual capital efficiency needs to be monitored properly and regularly. If a company creates little value with regard to its intellectual potential, its intellectual ability is likely to remain low. Thus, there is a great need to have efficient management of knowledge. Intellectual capital is the prime factor of value creation. Human capital efficiency and capital employed efficiency are the main indicators of value efficiency. The VAIC reflects the value creation efficiency of all resources. It explains the intellectual ability of a company, a region or a national economy as a whole. The data pertains to commercial and non-commercial banks. The performance of commercial banks was far better than that of non-commercial banks during the last 3 years. Of all the banks under study, the performance of Commercial Bank of Kuwait was excellent, while the Kuwait Real Estate Bank appeared at the bottom. The human capital efficiency results showed similar results as those of VAIC. However, capital employed efficiency results showed National Bank of Kuwait as the top performer, while the worst performer was still the Kuwait Real Estate Bank.

Abdullah and Sofian (2012) established the relationship between IC and corporate performance across several industries in Malaysian public listed companies. Intellectual capital is mainly constituted of three components, i.e., human capital, structural capital and relational capital. But, the study under review has attempted to empirically evaluate the inclusion of spiritual capital as the fourth component of IC. Human capital is constituted of knowledge,
professional skills and experiences, expertise, educational level and creativity of employees. Structural capital is constituted of innovation capital, databases, software systems, distribution networks, organizational charts, corporate culture, strategies and policies. Relational capital is constituted of marketing channels, customer relationships, and relationships with suppliers, customer loyalty, governmental and industrial networking, intermediaries or partners. The values such as morale, faith, honesty, ethics, desire and motivation, commitment, self-esteem, enthusiasm and sincerity can be considered as spiritual capital. The data for the study was collected through a questionnaire. The response of the respondents was collected on a 7-point Likert Scale ranging from 1 (strongly disagree) to 7 (strongly agree). The questionnaire was divided into three parts which aimed to capture information on IC practices of Malaysian public listed companies, the perception on the relationship of IC and corporate performance, and the demographic profile of the respondents. The study has adopted Pearson correlations method to measure the relationship between IC components and corporate performance.

The study concluded that most of the Malaysian public listed companies understand the importance of intellectual capital and adopt key performance indicators to measure their performance. The study found that all the four components of IC had a significant positive relationship with corporate performance of Malaysian public listed companies. The relational capital proved itself to be an important component of IC by establishing a close relationship with corporate performance, followed by spiritual capital, structural capital and human capital. The results show that IC is vital for the success of any business. The study suggests that spiritual capital needs to be considered in IC while measuring performance.

Mondal and Ghosh (2012), in their research study, tried to find out have investigated the relationship between performance and IC in 65 Indian banks for a period ranging from 1999 to 2008. It considers profitability and productivity as the two dimensions of financial performance. VAIC method has been used to measure the value-based performance of banks, while return
on assets and return on equity have been used to measure the profitability and productivity of the Indian banks. The intellectual capital and physical capital of selected banks have been studied to find their impact on corporate performance which has been measured through multiple regression technique. The overall empirical findings clearly reflect that IC is a significant determinant of the bank’s profitability and productivity. But when the measure of IC is classified into major components, the efficiency of human capital plays a major role in increasing the returns of banks. This suggests that more the human capital investment better would be financial performance of the banks.

However, the role of structural capital can be further studied to promote financial performance. Findings of the study also suggest that productivity of the banks can be increased by way of managing its intellectual ability in an efficient manner. The study found similar results in the Indian software and pharmaceutical sectors. Further, the relationships between the performance of a bank’s intellectual capital, and financial performance indicators, viz. profitability and productivity are varied. The study suggests that intellectual capital is vital for the banks as it provides them a competitive edge over their rivals.

Rehman et al. (2012), in their research paper investigated the intellectual capital performance, and tried to find out its impact on financial performance of banking sector in Pakistan. Intellectual capital performance has been measured through value added intellectual coefficient for the year 2010; and its impact on financial returns of banks has been studied through predictive analysis, while the financial performance has been measured on the basis of return on equity, return on assets and earnings per share. There are three main components of VAIC, viz. human capital efficiency, structural capital efficiency and capital employed efficiency. The analysis shows that human capital efficiency has a substantive positive relationship with financial performance, structural capital efficiency with financial performance (ROE and ROA) at (p<0.05), and capital employed efficiency with financial
performance (ROE) at (p<0.01). The study further suggests that value added efficiency has a significant and positive relationship with ROE and EPS at p<0.01 and P<0.05 respectively, but VAIC has a positive and significant relationship with ROE at p<0.01.

Anis (2013), in his empirical study, investigated the influence of corporate governance mechanisms in facilitating a relationship between intellectual capital efficiency and corporate performance in Indonesian banking industry. Corporate governance mechanisms include an internal and external mechanism which is measured by board of commissioner effectiveness, audit committee effectiveness, institutional ownership and external auditor. The intangible assets are gaining importance today. Knowledge assets or intellectual capital are turning more critical in the corporate value creation. The efficiency in value added intellectual capital investment is acquiring significance since it contributes highly towards the success of a company by providing it a long-term competitive advantage. The hypotheses formulated for the study are: firstly, there is a positive influence on intellectual capital efficiency toward corporate performance; secondly, there is a positive influence on corporate governance mechanisms toward intellectual capital efficiency; thirdly, there is a positive influence on corporate governance mechanisms toward corporate performance; and fourthly, corporate governance mechanisms moderate the influence of intellectual capital efficiency toward corporate performance. The independent variables used for the study include human capital efficiency, and structural and capital employed efficiency; and dependent variables include return on assets and return on equity. The purposive sampling technique was used to select 30 companies from the banking industry in Indonesia during the period 2009-11 from Indonesia Stock Exchange database. Structural Equation Model has been used to analyze the data with Smart PLS and IC efficiency measured by value added intellectual coefficient that is value added accumulation from physical capital, human capital and structural capital. However, corporate performance has been measured by Tobin’s Q, ROA and ROE.
The study found that IC efficiency and corporate governance mechanisms have a significant influence on the corporate performance in Indonesian banking industry. Corporate governance mechanisms moderate the relationship of IC efficiency to corporate performance. The overall results show that human capital and structural capital are the significant indicators for VAIC, while corporate governance internal mechanisms, i.e., board of commissioner effectiveness, audit committee effectiveness and institutional ownership have been the significant indicators for corporate governance mechanisms.

*Joshi et al. (2013)* investigated the intellectual capital performance of the Australian financial sector, and studied the relationship between IC performance and the financial performance of the financial sector for the period 2006-08. IC provides a sustainable competitive advantage to the companies, mainly through value outputs being generated by the company’s human resources, capabilities and competence. It is comprised of three components of intellectual capital, viz. human capital, structural capital and relational capital. The value added intellectual coefficient approach has been used to determine the IC performance of the Australian financial sector. The data required for the study was obtained from the annual reports of Australian financial sector companies. The top 40 financial sector companies listed in the Australian Stock Exchange were included in the sample on the basis of their market capitalization. The sample has been selected with the aim to analyze the IC performance of various sub-sectors in this financial industry including trading and investment banks, insurance companies, Australian Real Estate Investment Trust and diversified financials. These sub-sectors have been identified by the Australian Stock Exchange on the basis of their business activities. The research hypotheses formulated for the current study are: firstly, there are no differences in VAIC and its components across all the sub-sectors of financial sector industry in Australia; secondly, higher values of HCE, CEE, SCE and the sub-sector of company affect the financial performance of the financial sector; and thirdly, a higher value of VAIC leads to higher financial performance in the financial sector of Australia. The financial performance, as
measured by ROA has been used as a dependent variable. It is a traditional accounting performance measure of financial performance. It is computed as the ratio of operating income to book value of the total assets of the company. It is commonly used as a key performance indicator of profitability of companies in their annual reports. Regression has been used to test the second and third hypotheses. The linear multiple regression method has been used to find the relationship between ROA and various independent variables. The independent variables include CEE, HCE and SCE.

The study brought out that the value creation capability of financial sector in Australia is highly influenced by human capital. Majority of the companies under study have low levels of intellectual capital efficiency. The performance of various components of VAIC and overall VAIC differs across all subsectors in the financial sector. Investment companies have high value VAIC due to higher level of human capital efficiency as compared to banks, insurance companies, diversified financials and RIETs. Insurance companies focus more on physical capital rather than human and structural capital leading to lesser VAIC. The findings are a useful input for financial institutions to apply knowledge management in their institutions for maximizing their value creation.

Muralidharan and Venkatram (2013) assessed the intellectual capital performance of different commercial banks in India. The secondary data regarding pay, total income and expenditure pertained to the period 2006-12; and was collected from websites of RBI. The intellectual capital efficiency has been measured through value added intellectual coefficient. The study pointed out that foreign and new private sector banks ranked high regarding human capital efficiency and value added intellectual coefficient. VAIC score indirectly reflects only the profit motive of banks rather than the number and volume of their business concentrating all sections of people. Public sector banks remained on the top with respect to capital employed efficiency. Although VAIC scores for public sector banks are less as compared to foreign banks and new private sector banks, yet public sector banks have performed
well by achieving their targets in the priority sector loans, agriculture credit lending, education loan, financial inclusion, differential rate of interest scheme, below poverty line customers and social banking. The policies of financial inclusion, differential rate of interest scheme, below poverty line customers, social banking, etc. also enabled public sector banks to add more value to their performance. Thus, it is equally significant to include social and priority sector capital for assessing the performance of banks.

Rehman et al. (2013) investigated the intellectual capital performance of insurance sector. Insurance sector has a significant role to play in the development process of an economy. The insurance sector in Pakistan is facing business uncertainty due to poor business conditions. More than 40 insurance companies are operating in Pakistan. The years 2008 and 2009 have been quite difficult for insurance industry due to contraction in investment income and increase in operating cost. Human capital, structural capital and relational capital are the components of intellectual capital. Three hypotheses have been formulated for the study; firstly, there is a positive relationship between value added and performance indicators (ROE, ROA and EPS); secondly, there is a positive relationship between VAIC and financial performance indicators (ROE, ROA and EPS); and thirdly, there is a positive relationship between VAIC components (HCE, SCE and CEE) and financial performance indicators (ROE, ROA and EPS). The data collected for the purpose of this study relates to 24 insurance companies, out of which 21 are general insurance (non-life insurance) companies and remaining 3 belong to life insurance sector. The data has been collected from audited annual reports, relevant websites and Insurance Association of Pakistan for the period 2006-10. Value added and value added intellectual coefficient model have been used to measure the intellectual capital performance of insurance sector. An attempt has also been made to find the impact of intellectual capital performance on financial returns of both life and non-life insurance sectors. The study analyzes the empirical relationship of value added, VAIC and its performance components with performance indicators of insurance sector.
The study establishes a positive relationship between the two approaches, value added and VAIC and financial performance indicators. As far as the existence of relationship between the performance components of VAIC and financial performance indicators is concerned, earning per share is positively related to human capital efficiency. A negative relationship has emerged between capital employed efficiency and returns on investment.

The study conducted by Sledzik (2013) aims to determine the level of IC among domestic banks in relation to comparative banks. For this purpose, value added intellectual coefficient ratio has been used to measure the intellectual capital efficiency of the Polish listed banks. The data set pertains to the period 2005-09. Human capital efficiency, capital employed efficiency and structural capital efficiency are the three value efficiency indicators which have been used in the analysis. The data set has been divided into two groups of banks. The first group consists of 10 listed Polish banks; and the second group is comprised of 10 listed comparable banks from Europe. The study also takes into consideration the value of equity, net income, the value of market capitalization ratio and the return on equity return on assets ratio. The results showed that during the period 2005-09, as far as VAIC is concerned, the top two performers in the study were Komercni Bank and BRD Groupe Societe Generale S.A. However, the BCGE - Banque Cantonale de Geneve, Bankas Snoras and BOS Bank were the worst performers. The results based on human capital efficiency also showed similar results as those of VAIC. There was a significant decrease in VAIC ratio during the year 2008-09 due to the crisis in financial markets.

Berzkalne and Zelgalve (2014) examined the impact of intellectual capital on company value. A company manager always tries to maximize company value as it is at the center of corporate finance. Although calculating a value for a company is not an easy task yet it requires valuing different companies differently. Although, several changes have appeared in financial markets during the past two decades yet corporate valuation methods have not changed significantly. Traditional corporate valuation methods are based on
balance-sheet, income statement or cash flow statement. Intellectual capital is also an asset, but it is valued at zero on the balance-sheet. Large differences exist between company market and book value; and a part of this can be described by intellectual capital. The study has taken a sample of 64 Baltic listed companies of Latvian, Lithuanian and Estonian over the period 2005-11. The study has been conducted through monographic method, descriptive statistics and correlation analysis. Several sectors of industry have been undertaken for the study. The consumer goods sector has the highest number of companies while other sectors include utilities, telecommunication, technology, industrials, health care, consumer service and basic materials companies. The analysis has been conducted using the correlation method and Tobin’s Q as a proxy for company value and the value added intellectual coefficient for IC. The results show that an increase in IC means an increase in the value of company. A statistically significant and positive relationship was found between intellectual capital and company value for enterprises in Latvia and Lithuania, while such correlation was not observed for companies in Estonia. Estonian companies had the highest long-term debt ratio in comparison to those in Latvia and Lithuania. It may have been for the reason that cheaper long-term debt in the case of Estonian companies led to the highest company value and VAIC. The results also reveal that human capital efficiency and capital employed efficiency can be used to calculate the IC. However, structural capital efficiency is not found to be significant in the case of IC and company value.

Musibah and Alfattani (2013) examined and ascertained the effects of IC on corporate social responsibility for Islamic banking sector in Gulf Cooperation Council. The study assumed that there exist a relationship between intellectual capital and the corporate social responsibility activities. The intellectual capital and corporate social responsibility, in fact, is the same thing. Corporate social responsibility implementation demands the commitment of senior management and board, the engagement of staff and the provision of skills, tools and incentives. Intellectual capital has an ever increasing role in the corporate financial performance of the companies today.
Value Added Intellectual Coefficient is an appropriate measure of IC. Two regression models have been constructed to test the overall VAIC, and each of its three components (capital employed efficiency, human capital efficiency and structural capital efficiency) affects Islamic banks’ corporate social responsibility. Data has been collected from 53 Islamic banks in Gulf Cooperation Council for the period 2007-11. The results of the study indicate that value added intellectual capital (VAIC) has a negative impact on corporate social responsibility of Islamic banks in GCC. It has also been found that corporate social responsibility is positively associated with capital employed efficiency and negatively associated with human capital efficiency, but not with structural capital efficiency.

Shaban and Kavida (2013) studied intellectual capital to find its impact on financial sector banks in India. VAIC model has been used for the purpose the variables such as human capital efficiency, capital employed efficiency, and structural capital efficiency were considered. Performance has been measured by returns on assets. It provides a measure to assess the overall efficiency with which firm assets are used to produce net income from operations. The study applies two regression models; one model examines the relationship between financial performance measured by ROA and the aggregate measure of value added, VAIC, while the other examines the association between financial performance measured by ROA and VAIC components. The authors have found that IC and financial performance in private sector banks are positively related to each other. When VAIC is separated into three components, viz. capital employed efficiency, structural capital efficiency and human capital efficiency it has been observed that financial performance is significantly associated with capital employed efficiency and structural capital efficiency, but negatively associated with human capital efficiency.

Al-Musali and Ismail (2014) studied intellectual capital performance of commercial banks in Saudi Arabia and examined the impact of IC on financial performance of banks. The banking sector plays an anchor role in
Saudi’s economy as well as in the economic development of the country. The Saudi banking sector is seen as one of the major beneficiaries of the government’s constant efforts to diversify its economy to the non-oil sectors. The hypotheses formulated for the study are: firstly, banks with greater IC performance are associated with higher organizational performance; secondly, banks with higher human capital efficiency are associated with higher organizational performance; thirdly, banks with higher structural capital efficiency are associated with higher organizational performance; fourthly, banks with higher capital employed efficiency are associated with higher organizational performance. The secondary data required for the study has been collected from the annual reports of commercial banks. It pertains to the period 2008-10. Value added intellectual coefficient and regression analysis have been used to measure IC performance. The return on assets (ROA) and return on equity (ROE) are dependent variables. These measures are commonly used to measure the financial performance of banks. ROE indicates returns on common stocks of shareholders; and it is considered an important financial indicator for owners. It is calculated as the annual net profit of individual bank before tax divided by average shareholders’ equity. ROA shows the efficiency of utilizing available assets in creating profits. It is calculated as the annual net profit of individual bank before tax divided by average total assets. The study reached at the conclusion that Saudi listed commercial banks have a lower level of IC performance as compared to their counterparts in developed and emerging economies. It exhibits signs of redundant and non-performing resources. The study emphasizes on the need for a restructure in order to increase value creation efficiency. The comparison made between HCE, SCE, and CEE leads to the fact that the capability of Saudi commercial banks to create value mainly depends on HCE.

Ekwe (2014), in his research study, made a comparative assessment of the deviations in the intellectual capital and financial performance indices of six highly rated banks in Nigeria, and attempted to establish a relationship between the intellectual capital components and the financial performance indices of these banks. The modern technology and innovation-based
The environment in the world today has greatly changed the way businesses are done globally. This new technology utilizes a high level of intellectual capital which also determines the level of financial performance of business organizations. Some organizations even after posting high profitability are today being rated very low simply for their non-adoptions of this intellectually-based technology. The hypotheses formulated for the study are: firstly, there are no significant differences among the critical intellectual capital and financial performance indices of deposit money banks in Nigeria; secondly, there are no significant differences among the critical intellectual capital indices of deposit money banks in Nigeria; thirdly, there are significant differences among the critical financial performance indices of deposit money banks in Nigeria. The financial performance indicators used for the purpose of this study are: ROA, employee productivity, ROE, ratio of market to book values and growth in revenue. The secondary data has been collected from the annual reports of the banks for the period 2000-12. The study uses the Value Added Intellectual Coefficient model to find the deviations in the intellectual capital and financial performance indices of the banks under study. It adopted the ex-post facto research design for the purpose of this study. The study adopted the Duncan multiple range test of ANOVA to test the hypotheses. The SPSS package was used for compiling and analyzing the data.

The study found that there were significant deviations in both the intellectual capital components and financial performance indicators among the banks under study. The study further established that high intellectual capital has led to better financial performance. Thus, all the banks should adopt this new intellectually-based technology in order to increase their financial performance and returns to the stakeholders.

**Haq et al. (2014)** have examined the intellectual efficiency of commercial banks in Pakistan. They have also studied the relationship between IC and financial performance (profitability and productivity) of these banks. Intellectual capital has three components, i.e., human capital, structural capital and customer capital. The abilities, skills, experience and specialties of
the members of an organization constitute human capital. It is the basic source of innovation. Structural capital plays a supportive role for the human capital in organizations. It converts the individual know-how to the group property. It enables the employees to get maximum intellectual performance which ultimately leads to better organizational performance. Customer capital includes both the individual and organizational level relations with the society or other stakeholders. The IC efficiency and capital employed efficiency have been measured by using the VAIC tool. The data required for the study has been collected from 21 commercial banks working in Pakistan. The model ascertains how much and how efficiently IC and capital employed add to value. The regression analysis provides that there is a significant relationship between intellectual capital and organizational performance. But the banks under study are not utilizing their intellectual capital optimally. It has also been observed that in the case of public owned banks VAIC has a positive impact over profitability (ROA and ROE), but there is no relationship between VAIC and productivity (ATO). At the same time, for the private owned banks VAIC have a significant relationship; and it affects both the profitability and productivity.

**Sany and Hatane (2014)** attempted to examine the value added intellectual capital to firms’ profitability, Asset Turnover ratio (ATO) and employee productivity. The banking organizations are unique in the sense that this sector depends highly on the intellectuality of its human resources. The study is focused on banking companies listed in Indonesian Stock Exchange over the period 2007-11. The purposive sampling technique has been used in this study. Multiple regression analysis has been employed to test the hypothesis. The study reached at the conclusion that value added intellectual capital is significant in developing banking organizations profitability and employee productivity. There was an insignificant impact of intellectual capital on assets turnover.

The study examines the impact of IC on financial performance. HCE, SCE and CEE are the value added intellectual capital variables used in this
study. HCE and SCE variables together form intellectual capital efficiency. Capital employed efficiency, a variable of VAIC, is such a variable which consistently affects profitability, employee productivity and assets turnover. Intellectual capital and the value added contribute significantly to increase a firm’s profitability and employee productivity. The study suggests that companies can expect high returns by investing in intellectual capital.

**Anuonye (2015)** measured intellectual capital of selected insurance companies in Nigeria by using the earnings per share model. Intellectual capital significantly contributes towards the growth of an enterprise. Both the primary and secondary data were used for the purpose of this study. Ex-post facto research design was used to collect the secondary data. As many as 150 workers were selected as respondents from the human resources, accounts and marketing departments of 18 active insurance companies through the purposive sampling technique. In all, 150 questionnaires were distributed to the respondents; and the response rate was 74 percent. Pilot tests were employed to validate the measuring instruments, face validity, content validity. The Cronbach’s Alpha reliability test and regression have been used for data analysis. The primary data analysis revealed that human capital had a negatively insignificant effect on earnings per share. The secondary data analysis showed that structural capital had a negatively insignificant effect on earnings per share. The study brought out that human capital, structural capital and relational capital, all had a statistically insignificant relationship with earnings per share of insurance companies in Nigeria. The study emphasized on issuing a standard on intellectual capital accounting by the International Financial Reporting Committee, so that firms are able to measure and records their intellectual capital values in relation to earnings per share.

**Bhatia and Aggarwal (2015)** studied the relationship between intellectual capital and corporate financial performance of Indian software companies. The study period ranged from 2001-11. Intellectual capital is of great value for running a business successfully. It provides a competitive edge over other businesses. Thus, the companies need to invest in this regard to
sustain competition. The secondary data has been collected from Electronic database 'PROWESS' of Centre for Monitor Indian Economy (CMIE). Annual reports, especially the profit & loss accounts and balance-sheets of the selected companies are the other sources of secondary data collection. A sample of 51 software companies has been selected from Business Standard 1000 on the basis of their net sales. Return on assets and return on net worth are the dependent variables; and value added capital coefficient, value added human capital, structural capital value added and physical capital are the independent variables used for the purpose of this study. The Value Added Intellectual Coefficient method has been used to measure the value based performance of the companies. The data analysis has been done through Panel Regression. The intellectual capital (human capital and structural capital) and physical capital of the selected companies have been analyzed to find their impact on corporate performance. The results clearly reflect that intellectual capital is the positive predictor of profitability. However, physical capital has appeared to be the most significant factor affecting the performance of the firms. India being the second largest populated country in the world has a wide prospective for growth. As such, the Indian managers need to understand the importance of intellectual capital. They should disclose more information on intangible assets which would help them to enhance the market value of their companies.

Dadashinasab et al. (2015) investigated intellectual capital performance and its association with financial performance of banks and financial institutions in Iran. The study period ranged from 2007-12. The data was collected from the annual reports of firms listed in the Tehran Stock Exchange. The hypotheses formulated for the study were: (a) VAIC is positively related to financial performance; (b) human capital efficiency is positively related to financial performance; (c) structural capital efficiency is positively related to financial performance; and (d) capital employed efficiency is positively related to financial performance.

The data has been analyzed with the help of statistical software STATA. Similarly, regression models were used to study the relationship
between variables. The results of the study show that the relationships between VAIC, HCE, and SCE and financial performance are positive and significant. But the findings point out that there is a negative and insignificant relationship between CEE and financial performance. The findings of this study are quite useful for the Iranian banks to assess their organizational capabilities in this regard. The banks can identify which indicators are better predictors of their success. Thus, bank managers need to understand the significance of IC and its critical role in the survival of firms.

**Gupta and Singh (2015)** carried out their empirical study to determine the relationship between Intellectual Capital and Firm Profitability. The five IT companies listed on National Stock Exchange were selected randomly as the sample. The secondary data has been collected from respective Company’s audit reports for the period 2009-14. For the data analysis, descriptive statistics and regression analysis have been performed with the application of IBM-SPSS Statistics software. The hypotheses developed for the study are as hereunder: (a) There is no significant relationship between values added intellectual capital and Firm’s performance; and (b) There in significant relationship between values added intellectual capital and firm’s performance. The independent variables include: value added of capital employed, value added of human capital, value added of structural capital and value added of intellectual capital while dependent variables include return on asset, asset turnover ratio, and net profit margin. The study suggested that companies can be highly beneficial by investing in intellectual capital. Value Added Intellectual Capital is able to enhance the profitability of a firm. Investing in human expenditures never goes waste since the employees, staff, and experts are the assets of a firm. The study found a positive and significant relationship between Intellectual capital values added financial performance indices such as net profit margin, return on assets and assets turnover ratio.

**Kamath (2015)** studied the impact of intellectual capital on the financial performance and market valuation of firms in India. Thirty firms across various manufacturing and service sectors listed on Bombay stock
Exchange were selected as a sample for the study. The study period ranged from 2008-09 to 2012-13. The data has been collected from the annual reports of the respective companies and extracted through PROWESS database provided by CMIE. The statistical tools such as mean, median and standard deviation have been used for data analysis. Correlation analysis has been undertaken to find correlation between the variables of financial performance and market value; and the VAIC and its components. Multiple linear Regression analysis has been carried out to know the impact of IC on financial performance and market value of the firms under study. VAIC model has been used to evaluate the data. The results show that the financial performance and market value is, indeed, influenced by the IC of the firms. The study uses four dependent variables, viz. market value, return on assets, return on equity and growth of sales; and three independent variables, viz. human capital efficiency, structural capital efficiency and capital employed efficiency. The results provide that profitability, productivity and market valuation are influenced by overall IC efficiency. The size of the firm has shown no significant impact on any aspect of financial performance and market valuation. Leverage has influenced only profitability, and does not have any major influence on productivity and market valuation. The return on equity has a clear influence on profitability, productivity and market valuation. None of the control variables has any influence on growth of sales. The result is similar as in the case of other independent variables. In India, the measurement, management and reporting of IC by firms is still voluntary. If it is made mandatory, then the stakeholders would get a crystal clear picture about the real performance of the firms. It would also enable them to have a better decision-making.

Lipunga (2015) aimed to measure the intellectual capital efficiency of the commercial banking sector of Malawi. Intellectual capital is indisputably quite important in the knowledge based economy today. This is particularly true for the banking sector. The data for the study was collected from annual reports of the selected banks. The period of the study ranged from 2010-13. The performance of the banks under study has been examined by using the
value added intellectual capital coefficient. As per the VAIC methodology, the value added is determined as the difference between total revenues (Output) and total expenses excluding staff costs (Input). Thus, the formula used to calculate value added is as follows:

Value added (VA) = Output - Input

Where,

Output = gross revenues

Input = total expenses – staff costs

The calculated value added figure helps to determine the efficiency levels for each of the three elements which make up the VAIC of the firm. As already observed, VAIC is the sum of three indicators of intellectual capital efficiency, viz. capital employed efficiency (CEE), human capital efficiency, and structural capital efficiency. Basically, each efficiency level is calculated separately in order to ascertain the contribution of all company resources (human, structural, and physical) to the creation of value added.

The first component of VAIC as mentioned above relates to the capital employed representing the physical and financial capital of the firm. Capital employed efficiency explains how much of the company’s value added is generated with the tangible capital employed. The capital employed efficiency is derived from the ratio of value added to a company’s net assets. The formula used to calculate capital employed efficiency is as hereunder:

Capital employed efficiency = value added ÷ net assets

The second component of VAIC is related to human capital. This is a proxy of the total staff costs during a year, based on the new understanding that salaries and wages should no longer be considered as costs, but as investments. The human capital efficiency explains describes the relative contribution of human resources to the creation of value added. It is derived from the ratio of value added to the company’s total staff costs. It is calculated as per the following formula:

Human capital efficiency = Value added ÷ Human capital

Where, Human capital = total staff costs
The third component of VAIC is structural capital. Structural capital represents all the things which stay in the office when employees go home, e.g., databases, software, manuals, treatments and organization structure. Structural capital can be determined by subtracting human capital from the amount of value added. The following formula is used to obtain structural capital:

Structural Capital = Value added – Human capital

The structural capital efficiency is derived on the basis of calculated amount of structural capital. It is reflected by the share of structural capital in the total value created. The following formula is used to calculate the structural capital efficiency:

Structural capital efficiency = structural capital ÷ value added

It can be observed that SCE is calculated slightly different from CEE and HCE. It is argued that there is a proportionate inverse relationship between human capital and structural capital in the value creation process attributable to the entire intellectual capital base which necessitates the measurement difference to other ratios. Finally, VAIC which is the overall measure of efficiency is derived from the sum of the efficiencies calculated in the three formulas given above. As a performance indicator, the aggregate coefficient provides an understanding about the general efficiency. A higher coefficient indicates greater value creation in the use of the company’s resources and vice versa.

VAIC= CEE+ HCE +SCE

After calculation of VAIC, the calculated performance levels of the commercial banks were categorized as top performance, good performance, common performance and bad performance.

The results reflect that the selected commercial banks achieved on average common performance during the period under study except 2011 when they recorded good performance. Further, there was an upward trend in the level of efficiency, though at a very slow rate. It is evident that the
commercial banks need to put more efforts to improve their intellectual capital efficiency. Furthermore, consistent with the results of other studies, the study found that human capital efficiency of the banks under study was relatively higher than structural capital and capital employed efficiencies over the whole period. It establishes that human capital contributes significantly towards value creation of the banks.

Parham and Heling (2015) examined the efficiency of human capital and its effect on the financial performance of Dutch production companies. Human capital is recognized as the most important factor in enhancing corporate performance of companies. However, little evidence is available which proves about the efficiency of human capital in value creation for organizations and the key factors which help to improve the human capital efficiency. The data required for the study has been collected from annual reports of the companies, balance-sheets, cash flow statements, income statements in the annual reports from 2007-12. The hypotheses tested by the study are as hereunder: (a) There is a positive relationship between human capital efficiency and return on total assets of the Dutch production companies; (b) There is a positive relationship between human capital efficiency and return on equity of the Dutch production companies; and (c) There is a positive relationship between human capital efficiency and employee productivity of the Dutch production companies.

Human capital efficiency has been used as an independent variable which is a component of VAIC. Human capital efficiency is computed as the ratio of value added to human costs and three dependent variables, viz. return on total assets, return on equity and employee productivity. Multiple linear regression models have been used to analyze the relationship between performance of human capital and organizational performance measures such as return on total assets, return on equity and employee productivity. The results clearly show there is a positive relationship between HCE and all the three corporate performance measures. However, a statistically significant relationship is found between HCE and employee productivity.
Rezaei and Mousavi (2015) examined the three elements of intellectual capital, viz. human capital, structural capital and customer capital; and their internal relations in the Islamic banking industry. They also focused on finding the impact of intellectual capital on the performance of Islamic banking. Intellectual capital has an important role to play in the successful development an organization. Most of the organizations and banks in Islamic countries and Iran have started to shift in practicing intellectual capital after knowing about its importance. Intellectual capital includes intangible assets such as technology, customer information, brand name, reputation and corporate culture. In the present business scenario, intellectual capital is considered as the most significant strategic asset for the success of an organization. Intellectual capital ensures the success of knowledge intensive organizations. Banking sector appears under this category. Therefore, there is a dire need to nourish the concept and applications of intellectual capital in banking sector. The banking in Islamic countries depends highly on conventional banking sector and Islamic banking sector. The study revealed that most of the studies on intellectual capital have their focus on three dimensions, i.e. human, structural capital and customer-centered capital, while performance of the companies has been examined on the basis of three factors, viz. profitability, productivity and market value to book value. Due to underdevelopment of the banking system in most of the Muslim countries, and the lack of competition with global banking, there is a wide scope for progress which can be achieved through work and efforts. Thus, intellectual capital is highly related to organizational performance of Islamic banking industry. The dimensions such as human capital, structural capital and customer capital affect the intellectual capital of an organization significantly.

Winarso and Park (2015) carried out their case study on banking sector listed in Indonesia by finding the influence of intellectual capital component on the company's financial performance. It has been measured by on the basis of return on assets. Intellectual capital is a key resource for the companies to create value added which helps them to gain a competitive edge. The financial performance of a company can be judged from its intellectual
capital. Therefore, the company needs to manage and utilize its available resources properly to create added value for it. The sample includes 22 banking companies listed on the Indonesian Stock Exchange during the period 2008-12. The data for the study has been collected from the annual financial statements of these companies. Using multiple regression analysis, intellectual Capital measurement model is using a model of Value Added Intellectual Co-efficient as well as elements of Human Capital Value Added, Customer Value added Capital, and Structural Capital Value Added. The results obtained through multiple regression analysis explain that (a) Higher the human capital, better would be the financial performance; (b) Higher the customer capital, better would be the financial performance; and (c) Higher the Capital Structure, better would be the company's financial performance.

IV
Conclusion

The review of literature as made above reveals that the relation of intellectual capital input and performance is a tricky one. It needs proper quantification of the two primary variables, i.e., the intellectual capital and performance. Only a limited number of studies have been carried out in the Indian banking sectors which find a connection between intellectual capital and their performance. However, the present study is aimed to fill this gap.