

Impact of Intellectual Capital on Firm Performance
(Case Study of Chemical Sector in Pakistan)



**Thesis Submitted to
The Superior College, Lahore**

In Partial fulfillment of the
Requirement for the Degree of

Master of Philosophy In Commerce and Finance

By
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Roll No. MSCF14-16

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DEDICATION

I dedicate this thesis to my parents, **Supervisor Dr. Ahmad Raza Bilal** and Friends. I owe you a debt of gratitude for all that you have done for me.

Thank you.

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Regard

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Abstract:

The main objective of this study is to investigate the impact of intellectual capital on the financial performance of 10 chemical sector firms. Data were drawn from annual reports of listed companies of Karachi stock exchange Pakistan. To check the impact of intellectual capital on firm performance value added intellectual coefficient (VAICTM) used which developed by Pulic. This study examines the main three component of (VAICTM) which is humane capital efficiency, structural capital efficiency and capital employed efficiency. Pooled random effect method used to verify the impact of intellectual capita on the financial performance like return on assets (ROA), return on equity (ROE), earnings per share (EPS), Tobin q and economic value added (EVA). Hausman's test also applies to check that whether we use fixed effect modal or random effect modal. Finally we use the random effect modal. Unit root test is also applied to check the stationary trend among data.

Key word:

Intellectual capital (IC), value added intellectual coefficient (VAIC), Human capital efficiency (HCE), structural capital efficiency (SCE), capital employed efficiency (CEE), Return on equity (ROE), return on assets (ROA), earning per share (EPS), economic value added (EVA) and Tobin q.

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CHAPTER NO.1
IMPACT OF INTELLECTUAL CAPITAL ON FIRM PERFORMANCE
Introduction

Intellectual capital(IC) is greatest truth of the present era that cannot be falsify in knowledge base economy. In this ear firm which has more knowledge than other or asymmetric information mean that in which one party has more knowledge of market place .For example, some time seller have more knowledge than buyer about the market place .this could be reverse action ,some time buyer had superior information about market place than seller, both condition could be. The organization which has superior knowledge about market place that particular firm has competitive edge on other organization. As many researcher, academicians, practitioners and entrepreneurs focusing on intellectual capital(IC) such as khalique and shaari (2009) have investigated that intellectual capital(IC) is played important and vast roll in accomplishing task and success of organization in present era. They investigate that both tangible (land building furniture and machinery) and intangible assets (trademark, database, training and skills) are critical for the survival of the organization, to produce reliable and quality good for the customer in current world. They argue that, although tangible assets like land, building furniture and machinery crucial role but importance of intangible assets like trademark, database, training and skill cannot be minimized.

Intellectual capital(IC) is considered as knowledge base economy. According to Stewart (1997) the intellectual capital material, knowledge information and intellectual property experience that can be put to use to create wealth. Intellectual capital(IC) further includes special skill formula expertise, knowledge, and database; secrete formula, trademark and training that provide a particular organization a competitive on other organization. These are the particular that differentiate one organization to other organization. As it is refer to composition of human capital efficiency (HCE), structural capital efficiency (SCE) and capital efficiency (CEE) (Rehman and Zahid, 2011).

In recent era, there is competitive environment and competition is prevailing among the organization that every firm faced. Sustainable economic system of present world based on the pillar of economy like tangible assets, intangible assets development & management that is called intellectual capital. Role of intellectual capital is crucial in today's economy for better management and improvement of production of goods and services. A lot of studies have been made in the fields of intellectual capital from the second half of 1990s and up till now. But intellectual capital field is still a question mark. According to new approach researchers say that intellectual capital is a dynamic field of study for the intangible assets in available organizations (Emadzadeh *et al.*, 2011).

1.1 Background of study

As earlier studies describe the importance of intellectual capital, in the present era intellectual capital has become very popular in every country, it has become a big source of organizational performance. Every country knows the importance of tangible assets and intangible assets meaning that intellectual capital. Intellectual capital has three main forms or intellectual capital is composed of three main factors which are structural capital, human capital and capital employed. First, human capital is a collection of multiple factors like human competence, mental ability, ability to work with a team or ability to work with a group, salesmanship and special technical skills also. The term human capital cannot be used for an individual person, it can be applied only on group skills and aptitude of a collective work force.

Structural capital is also another important element of intellectual capital. Structural capital is just like basic infrastructure which provides the platform to the worker. Structural capital is a knowledge asset and indeed property of the firms, it includes the copyright which means that a firm's name and product cannot be copied without the permission of the company. It includes patents,

trademark, process, methodologies, models and special skills. It includes documents; computer network software and administrative software, that kind of software help the individual to share the information from one person to another person secretly (www.qfinance.com).

There are lots of governmental managers which accept that intellectual capital (IC) represent basic assets, which provide guarantee the success of any society. Intellectual capital grows productive capacity of the business firm or business organization and efficiency of the organizations, which leave the positively sign on the market economy (Boekestein, 2009). To find out the advantage of intellectual capital and advantage of the element of intellectual capital on the firm performance focus being carried on. There is need that to understand the importance of intellectual capital from the few years tem of intellectual capital seen the balance sheet of company to gain advantages of IC. When organization is intellectually strong then it can compete with organization in this competitive environment. Because intellectuality is wealth and health for the survival in the corporate sector (Delgado-verde *et al.*, 2011). Martin (2008) suggested that power and force full human capital resources can take the advantage from society and contribute toward the earning capacity of firms. Strong human capital resources contribute toward the experience and team work of the organization. Superior human resources qualities could subsequently lead to higher profitability of the organization. In short intellectual capabilities regarded as good will and reputation that contribute to earning capacity of the firms (Boekestein, 2009). According to Isaac & Herremans (2009) explore that intellectual capital resource are unique quality of the organization that need to continues improvement, which are include the intellectual property right, patent right and copy right.

1.2 Research Problem

In less developing like Pakistan chemical sector is less paid attention area. At time of independence when birth of Pakistan take place chemical sector about none exist. Old sector economy of Pakistan has been taken time to develop. However, chemical sector of Pakistan facing numerous problems, chemical sector is part and partial economy of Pakistan. Pakistan is an ideal state which more committed than other country to adopt the different method like policed procedure and data base system, But Pakistan till behind because this country is intellectual weak like training and knowledge. Pakistan is very responsible country it made the international treaties in trade to promote import and export culture at international level but still behind in chemical sector. The types of international agreement limit different type of chemical good and services across the border. This type of agreement create problem for the chemical sector of Pakistan. Moreover, it is necessary that while signing the international treaty it should be consider that what type of treaty is made.

In addition, October 2000 Government of Pakistan made a prohibited that good which are produced with use chemical should be avoided .The law which is made in the pursuance of the international law with respect of chemical sector. This is another problem for the chemical sector of Pakistan. Pakistan also made domestic law to control procedure this is check on the trade.

1.3 Research questions

- i -How capital employed (CE) impact financial performance in chemical sector of Pakistan?
- ii-How human capital (HC) influence financial performance in chemical sector of Pakistan ?
- iii-How structural capital (SC) effect financial performance in chemical sector of Pakistan?

1.4 Objective

1-To examine the effect of capital employed (CE) on financial performance (FP) in chemical sector of Pakistan.

2-To determine the effect of human capital (HC) on financial performance (FP) in chemical sector of Pakistan

3-To test the impact of structural capital (SC) on financial performance in chemical sector of Pakistan

1.5 Significance of study

Intellectual capital is one of the vital elements in any organization which play a critical role in the growth of any firm. This study will benefit both to management of any organization as well as shareholders because in new global era chemical is considering a premier corporate sector of Pakistan, stock market for selling and purchasing going up so, investor give the preference of this sector of economy. This is sector becoming to mature for the stock market, which may become profitable for the investor and organization of Pakistan.

1.6 Organization of study

A chemical sector is playing very curial and basic in the development of country and nation. Chemical sector of Pakistan is working as builder of economy. Just like a builder built the building with true beautiful appearance. It change basic raw material into final shape of product for benefit of general public. Chemical sector producing goods for export purpose also, the quantity goods which is producing this sector is more than 70,000 different products. Present chemical sector divided into four brad type of categories like special chemical industry, life science and customer product industry. First of all, basic chemical industry of Pakistan including polymer ,petrochemicals& intermediate and other derivative of basic industrial also. Secondly,

life science chemical industry of Pakistan includes life saving product of human being and animals, for example vitamins & proven teen oriented products and crops saving products also. Thirdly, special chemical industries of Pakistan include electronic product and industrial gases products. At the end, customer product industry of Pakistan include direct product which are directly consume by the customers, like bath soap, detergents and teeth brush.

1.7 Conceptualization of Variables

Following are variable of study

- Intellectual capital
- Structural capital
- Capital employed
- Human capital
- Return on asset
- Return on equity
- Earnings per share
- Economic value added
- Tobin q

1.7.1 Intellectual Capital

Bassi (1997) argue that there are many definition of intellectual capital. Basically intellectual capital is composition of different expertise of employ ,expertise are include knowledge, experience ,training, skill, intelligence, software and hardware and ability to perform activity .so, we can say that intellectual capital is beg terminology with of organization. Intellectual capital is mental ability to perform the work with group and without group. Intellectual capital type of knowledge which could be purchase with cash especially knowledge and learning ability.

So, individual employ has individual intellectual ability. It is often said that this ability with employ, when he leave organization it remain with employ. But structural capital remain with organization when employ the organization. Intellectual capital surrounded with much more than the patent, copyright and other mental ability. Intellectual capital has three main elements, structural capital human capital and capital employed.

Mola (1997) define that tangible assets of the organization are just like the intellectual capital resources of the organization, which are produced the future cash flows for the organization. Inversely, tangible assets which can be for the production process like supportive infrastructure which supports the in productivity. Like the structural capital other types of capital, relational capital like and human capital cannot remain in the possession of the corporate sector. These are qualities which are associated with people when employs leave the firms, these qualities goes with the employs. There is need that manager should careful about the structural capital, because managers are responsible for using this type of capital. They should manage in care full manner, other thing in this regard the structural capital is known as tangible assets, tangible assets are assets which can we touch and see in clear manner. Moreover, structural capital is systems which provide goods in organize and efficiency manner and time to their customer's .This type of organize system lead to contribute to the productive capacity and raised the good will of the firms. In field of knowledge where is more and more competition among the corporate sector, there is chance that to seek more knowledge about different capabilities, there is opportunity for f every firm gain more extensive knowledge of intangible assets. The firms which equipped with intellectual capital can earn higher profit than those create mass production .Stewart (1997) try to explain that academic researcher and business people feeling great challenges because today they

seen that financial statement of firm showing job title with chief knowledge officer. Firm have given difficult task to the individual people, today intellectual capital is very important.

SC & RC work combine to promote abilities and competencies of the employ give the boost to the production of goods and services. Structural capital and relational capital asset of the organization could be used combine to produce valuable goods. These are asset of organization and remain with organization when employ leave the firm. Knowledge officers are being held responsible for clarifying the value of knowledge management that is constantly developed in their firms. In the business studies knowledge creation was ignored at big scale even it is advice that procedure very much important for the international competition among the firms (Nonaka & Takeuchi, 1995).

Intellectual capital it further subdivided in to three categories structural capital, human capital and capital employed.

1.7.2 Structural capital

Structural capital is also called relational capital it work just like the bridge because it create relationship between the both end of canal structural capital an important factor for the intellectual capital that is need to attain sustainable competitiveness. Structural capital open suppliers, customer and business man an idea, preferences customer increased loyalty and preference rates. There need that Relationship capital a structural capital should be composed in order to increment and sustainable growth and in odor to achieve the advantage of intellectual capital. This organize study investigate the structural capital and its advantage to word consistent competitive environment in much study. Capital structure is considered main element of the intellectual capital which is regarded what is in hand of the organization after leaving the competent employee the particular organization. Structural capital is possession by an

organization comprises the basis element that supports human capital. Structural capital comprises organizational chart, proprietary database information systems, process manual, market intelligence, laboratories and Intellectual property. If we talk about competent people are part and partial of the intellectual capital that are possession of the particular organization and its effective and good manager are very important for the production of new stockholder value, consistent and competent management required gain long term advantage from competencies of the employ. Really structural capital plays a very vital role that managers and employees to used their capital fund more and more their human capital to ensure the and achieve goal of organizational at higher level and, if we to do so, then attainment of goals become easy process (Gagne, 2001). Each and every that support the employ or their functioning included in the definition of structural capital. Structural capital owned by the organization it is remain with the organization like hardware, software, patent and trade mark. Structural capital is further subdivided into three type organizational capital it comprised organizational philosophy and system of organizational leveraging. Process capital included special technique, especial formula and program that increase forwarding of goods and services. Innovational capital included commercial right; copy right, intangible assets and intellectual property right. Organizational intellectual process capital comprises entire communication ways of organization and distribution channel like internet radio and, the corporate knowledge of employee and tradition and training organization. Organizational culture is much important part of factor of production structural capital has received more consideration from present organizations and forms that helping as basic infrastructure for HC of the organization. However, Hunan capital an organization's unique innovational and processes capital that ultimately able the attainment of consistent competitive environment. The main objective of academic work explored innovational

and processes capital structure and to explain how effective worker of both type of structure translate into a good condition to increase the profit for people and an organization in to-day world, forceful competitive market economy (Nastansky, 2000).

In order to prove the things which are described above, innovational capital management is basically explored. There is major important of innovational capital and their relationship with the manager of the organization. Major purpose of this study to explore innovative method of production for the organization .Because in the innovative environment organization tries to compete with other organization. A big part of this particular study is subsequently should be used for other investigation of patent management.

Secondly, this study describe capital process management is system in which is focus on the business management, methodology and unique special formula to create uniqueness from one organization to other organization, where more and more attention given to the process of business management and method of production good and services for the public& organizations. There is also another attempt to produce batter product from other organization.

1.7.2.1Innovational capital and effective management

Innovational capital is composition of the organization's knowledge to launch new products and services in the market economy which are representation new value for the consumer customer and initially include patents right of organization and brands value of the organization. Every kind of the of intellectual property right and their relationship among themselves are given blow with comprehensive detail.

1.7.2.2 Patent Management

A patent and copy right which are held by on organization, other condition is monopoly is situation in which there single buyer and single seller in the marker economy where other small scale people are excluded from the market economy. License provide safety and security the business they make the monopoly in the market other party can effect business of

Organizations have believe that their new lunch goods products or increase their capture market. (Japan Patent Office, 2000). It is duty of the organization manager and strong portfolios management to work for the success of the organization is bases which is vast important for organizations for the successful development of the organization. First of all we define patent, patent is like license issued by Government, holder of this license the Government provide unique right through which organization produce new goods model, new innovative products during particular time period without fear of competition. In most cases patents valid for 20years in America. Portfolio management is art of science, which makes mix decision about policy making, and investment making. Portfolio management makes investment and match objective the investments of the organization.

1.7.2.3 Rights of Acquit ion of patent

Organizations conducted the training and gaining the and continue to follow profits despite to meet need of the organization growing technical education is necessary so that contribution can be made through technical developments in the society. In the field of research and development technical education development and efforts are patent rights of the organization, organizations must develop and manage a copy right officers technical personnel relationship confirm that new idea and innovation create values for the organization. Patents rights allowed organizations to made new products that unique quality product. It is clear that organization used

technology in their production process, organization protected by patent against competitors of the organization .with help of patent and profitability organization can create the monopoly in the market place, patent becomes the opportunity for the organization, devoted customer perform they do not like to leave the organization and will to compete with other organization ,they with organization as assets of the that particular firm (Japan Patent Office, 2000).

1.7.2.4 Rights of patent maintaining

It is process in which corporate sector regularly pay fee charges to maintain the patent rights or applicant pay regularly to main his copy right with the company registrar office. It is duty of corporate sector to pay his annual fee regularly which is significant for the survival of corporate sector. It is also duty of corporate manager of instantly evaluate the progress of the organization patent right include the patent copy right special and secret formula which can be avoided to disclose.

Top management can obtain the all type of the information from patent officer .It is duty of the patent office regularly transfer the information to superior officer of the organization. It is also duty of patent officer regularly check and analyze report, communicate to portfolio management. Organization having patent licensed can perform well in the market place as compare to other which have no licensed in market place. (Japan Patent Office, 2000).

1.7.2.5 Portfolio management and effective patent

Today the present era is very competitive so that this environment there is need that a competitive portfolio management and efficient paten to compete with other word industry, there are new ideas and knowledge the market place the people have more determinant for the selling of product than ever. In Oder to explain the clear value of intellectual capital and technical knowledge very difficult because of need new method and technology more important factor is

regard is balance sheet which shows correct of liabilities and assets. The balance sheet is giving the true information that enables the investor to make their investment in this particular firm and industry. From starting point and throughout the implementation patent, corporate intellectual assets and assets management system used to earn higher profitability for the organization, when firm earning profit patent are very help full for implementing the polices and procedure (Zimmerman& Delphion Industry Insights, 2002).Organization which not understand the importance of patent leading toward ignorance. But other organization have knowledge about the patent right and going into competitive environments for gaining maximum profit .There should be awareness about the patent right. First of all researcher define the management which is making decision important level or higher level. Portfolio management is such type of management made decision of policy making and investment making in different field, which could be profitable for the organization. Portfolio management also made mix decision and make the different polices for doing investment. Another important work of the portfolio management mach investment polices with the objective of the organization. Further portfolio management duty sort out organizational weakness, strength, opportunities and threats. When organization is borrowing from the financial institution. There are two types of portfolio management passive management and active management. Commonly the passive management identify market price of share or maker index. It is known as I indexing or index. Active management include the team of manager, single manager and co-managers

1.7.3 Capital employed

Makki & Amin (2014) explain that capital fund is also known as capital employed. Capital employed is quantity of total capital which is applied to produce the wealth and profit for the organization. There are two ways of calculation of capital employed. Capital employed could be

calculated add the fixed asset into working capital is first method. Second method subtracts current liabilities from the total assets of the organization. Capital employed is also known as capital fund .simply, researcher define the capital employed as all the value or cost of land, building, plant and machinery. Because asset are being used acquisition of profit or acquisition of cash fallow are also known as capital employed. Shortly we can say that all the value of fixed assets subtracting current liabilities is equal to the capital employed.

1.7.4 Human capital

In Present challenging ,technological and globalize era and a knowledge-based economy evolution, has bust up lot of countries and firm are searching new method or new ways to gain competitive advantage. In recent scenario it is believe that, the people who have larger level competencies that particular people and that people have big know about the different thing then the success of the company is based on it. Shorty it is said that, the individual are going to become perishable thing which can be consider as frame work of the human capital. In big sense if we talk about, terminology of human capital then we can say that mixture. In day material economy and economic perspective, the capital fund is working as or refers as to element of manufacturing applied to produce goods with different manufacturing method (Boldizzoni, 2008). All studies are argue that the value of economic value added can be produce by combining the entire variable which is for the production goods and services. The quality labor is required to produce quality product to motivate people so that they purchase their product. The quality data base software to manage the system of accounts and communicate with other people. Then efficient trainer is also required to train the employee in this competitive environment (Little, 2003). Beach (2009) argue that the concept of human capital more than forever .it is discusses many time or this term is most frequently used today's organization balance sheet and

more and more people are being recognize this terminology (Alamon, 1991). Similar to this Woodhall (2001) investigate we can obtain maximum profit, if we don investment in the human capital because it is stronger method of obtaining maximum profit, it is better than making investment in the physical capital. Many studied prove that human capital is combination of various skill like knowledge ,superior information, data base management system , improve intellectuals skills and innovational skill meaning that to produce new thing that other organization cannot produce. In addition to seek the knowledge of different categories of business learning is very important phase .differ tent type of training session are conducted to seek the employee of the organization, like data base software are seek through the training session ,the employee seek how to run the software of the different company or organization. Organization can accumulate intellectual capital through the combination of different factor of production like human capital, structural capital and capital employed. These are almost important factor of production which are more frequently used all over word to produce the different thing and service also. Furthermore, many researcher supported this concept the combination of all the factor of production may increase the wage of the employee (Schultz&Denison, 1962).

Further, Lepak & Snell (1999) explore that more has been said about the intellectual capital all the theory says that making investment into the intellectual capital create value for the organization and firm .Making the capital investment in intellectual capital create the value for employ also. According to Lucas (1988) explore that If the organization make the education investment then employee seek more and more knowledge which is batter for creating the value for the organization and employee. It is said that not only physical capital is much important as well as infrastructure capital is also very important factor. Learning activates also increase the

knowledge of the employee because it is knowledge base economy (Vinokur *et al.*, 2000). Through better infrastructure given task to employ can be obtained by proper monitoring and controlling in market place, which create high reward for both labor and organization. National economic growth of the organization is normally influence by human capital investment. (Romer, 1986).As world changing, there is rapid progress in the world, people are now going toward global village, more attention given the intellectual capital firm arrange effective manager and efficient management need to compete with other organization.

Green (1996) suggested linkage between capital fund and microeconomic performance necessary to explicit the organizational goals. After studies different sectors of economy researcher conclude all element of intellectual capital necessary, because everyone has its own impact on different sector of economy. Structural capital is playing very crucial role in the organization, because without strong basic structure organization cannot compete in this competitive environment. In addition, many old studies present true and fair picture of the organization financial capital impact positively social capital and individual health also. Inversely purpose this researcher study is that to check intellectual capital on human capital. Before conducting this type of study some concepts of the variable are being presented before you. Like concept of structural capital and implementation of the structural capital and human capital how manage better human capital to produce the maximum profit.

Term human capital uses by Gary Becker he is a professor of the University of Chicago popular and he is very popular all over the world. Jaco Micer define the humane capital include all the attributes like personality, stock habit, knowledge, creativity and ability to perform. Furthermore, HC is combination of resource like tangible and intangible all tangible included composition of skill, composition of knowledge, training and judgments. It is said that the assets

or resources which are mentioned above capacity of the people , that thing are treated as wealth of people that can be used for the production new product and can be used to complete the goals (Hajeb *et al.*, 2015).

Human capital is summation of all the economic value within which employ perform their activities to raised their organization at highest level. In new organization they try to gain the new culture, which can be social biological. Researcher studies explain that the connected investment in educational development causes growth of economic development; economic developments lead to prosperity of the people business organization. With learning and educational facilities employee attitude improve which cause of growth productivity (Arman *et al.*, 2014).

1.7.5 Return on asset (ROA)

Return on assets is also another performance indicator which calculates profit of the organization with respect to assets. Formula of return on asset consist two parts ruminator represent net income and denominator represent total asset of the company. Organization with higher capital investment or non capital investment organization creates lesser return on assets. Lower capital investment or less capital intensive organization greater the return on assets. This rule of thumb returns on assets no less than 5%.

1.7.6 Return on equity (ROE)

In corporate finance, ROE is performance indicator of firms. So, it is defined as how much return is generated against each dollar of investment of shareholder in the organization or each dollar of equity of the shareholder in the organization. Researcher considers return on equity is best performance indicator of firms. Return on equity also measure management capability to create profitability on the assets of the organization. Return on equity (ROE) formula consists of

basically two parts one is numerator called Net income of the organization. Return on equity second part called denominator which represent shareholder or equity of the organization. Annually and minimum rate of return on equity which is acceptable 15% or 0.15. Rehman *et al.* (2001) explain this point in very clear manner, which is organization cannot faster grow than this rate without taking additional loan. Return on equity uses for the calculation of the valuation of stock price with other financial ratio also. In short earning per share affected the stock price.

1.7.7 Earnings per share (EPS)

Earnings per share are portion of company profit allocated to each outstanding share of common stocks. Earnings per share can be use as an indicator of the company profitability.

It can be calculated as:

1.7.8 Economic value added (EVA)

This performance indicator of the organization financial performance can be measure through economic value added depend on the residual wealth which is calculated subtracting capital cost from operating profit, adjusted for tax on cash basis (J William Petty, 2000). EVA can be presented as economic profit, and it try to calculate true economic profit of company. This performance indicate developed by Stern Stewart and Co.

1.7.9 Tobin q

Tobin (1969) explain his formula which is written his book, he define formula as it is ratio between market value of tangible assets and replacement value of assets. James Tobin introduces Tobin's formula a Nobel Prize winner in economic and a professor at Yale University. This formula basically two parts one is the numerator that is valuation of the market which going price of the market for converting present assets. The other is denominator, which is market price for new product which prevailing in the marker, which used to represent replacing or

reproduction cost. It is considered that the Tobin q ratio very considerable for measurement of the financial performance.

1.8 Structure of study

We have added five chapters in this study which are as follow.

1. Chapter one included introduction, background of study, problems statement, objective of study, justification of study and scope of study.
2. Chapter two includes review of literature, overview of population, variable and hypothesis.
3. Chapter three comprises data collection, methodology, procedure, sampling technique and theoretical frame work.
4. Chapter four includes analysis of data and interpretation.
5. Chapter five comprises limitation of the study, conclusion of data, implication of manager, empirical implication of study, theoretical implication of study, discussion and finding of study.

1.9 Summary

This conducted to check the impact of intellectual capital on the firm performance .chapter first of this study include introduction of the variable and definition of the variable, background of study and then we have describe reason of study through presenting problem statement. Every study has its contribution toward the different field, but our study has contribution toward theoretical research and practical as well. This is useful for academic researcher and business organization. As we know that objective base of any study, objective of study are describe here to do further worker on the study. At the end of this chapter we have describe each variable with

CHAPTER 2

2.1 Overview of population

According to Bontis (2001) intellectual capital and its review of literature has obtained from financial reports and accounting practices. Sharabati *et al.* (2010) further investigated a lot of research question intended to explain why organization has more value with respect to their value of book to more explain the role of soft assets in such organization. According to Stewart (1997) intellectual capital(IC) is equipment that used to produce wealth by producing higher level assets. Another researcher also includes human capital, structural capital and relational capital. Mohammadghorban *et al.* (2013) examined the impact of intellectual capital its components are human capital efficiency, structural capital efficiency and capital employed on firm performance its components are valuation, profitability and productivity. The result of academic work shows that there is positive and significant association amongst the variable. Meaning that there is positive significant impact of intellectual capital on market to book value, return equity, return os assets and assets turnover ratio. Makki& Lodhi (2009) have taken seven year data from Lahore stock exchange and check the impact of IC on return on equity in Pakistan by using multiple regression models, the researcher argued that there is significant relationship between intellectual capital(IC) and return on investment (ROI) of an organization.

Furthermore, Mehralian *et al.* (2012) investigated the relationship between intellectual capital and corporate performance taking proxy variable for intellectual capital as capital employed, human capital & structural capital, for performance proxy variable as assets turn over (ATO), market to book value (MB) and return on assets (ROA), researcher find that relationship between performance of company and company's IC and conventional performance indicator are varied. This research paper also suggested that corporate IC performance can exemplifies profit but not

production and valuation of market in the country of Iran. Khalique *et al.* (2013) explain the association of Islamic banking performance and intellectual capital in the banking sector of Malaysia, taking proxy variable for intellectual capital as human capital, customer capital and structural capital. Data for this study were collected from the 140 respondent of the Islamic banking from Kuala Lumpur headquarter city an in Malaysia, the researcher concluded that there was significant and positive impact on the financial performance of the banking sector of Malaysia by intellectual capital. Narwal& Deep (2014) analyzed IC and its relationship with financial performance organization in Indian textile sector, the researcher observes that there was positive and significant relationship between intellectual capital and profitability of the companies only. Zhang Xinyu (2014) carried out study of impact of intellectual capital component on firm performance in pharmaceutical sector of china for the period of ten year from 2010 to 2012. Researcher concluded that financial capital and human capital are positively related firm performance but structural capital have no impact on the performance of pharmaceutical firm. Ahanger (2011) try to find the relationship between intellectual capital and financial performance, the study indicated that relationship between performance of company's and intellectual capital and profitability, employee productivity and growth sales are informative. The empirical finding says that performance of company's intellectual capital can explain profitability and productivity.

Moreover, Fathi *et al.* (2013) argued that there is positive and significant relationship between component of intellectual capital (structural capital, Human capital and capital employed) and financial performance measures component (return of equity, return of assets and growth revenue). This study further indicated that there was no significant relationship between value added efficiency of capital employed and value added efficiency of human capital with growth

rate. Mohajeri & Azad (2012) examined that there is positive relationship between intellectual capital and equity growth with EVA and return of assets. Further this study showed that there was no significant relationship between intellectual assets with net earnings. This study adopts data from stock exchange whose share are traded in Tehran stock exchange for three year period. Rehman *et al.* (2014) attempted to investigate efficiency of intellectual capital using VAIC model asset return, equity return, sales growth, earning per share and market book values are proxies for intrinsic and extrinsic performance. This was conducted in oil and gas sector of Pakistan, the result indicate that there is positive impact of intellectual capital and organizational performance. Data for this research report were collected from state bank of Pakistan and financial reports of the companies which are at the site of register in Karachi stock exchange for the period of 10 years starting from 2005 -2013.

2.2 Literature review

Rezazdeh *et al.* (2013) further argue that human capital and physical capital efficiency have positive and significant with equity. The researcher has taken data of 22 pharmaceutical firm resided in Iranian stock exchange from the period of 2004-2008. They also find that there is no positive relationship between human capital efficiency and return on equity. Try to find the relationship between structural capital efficiency and physical capital efficiency, the result was that it has greater impact on this performance index. Rehman *et al.* (2012) examine impact of intellectual capital taking three basic elements of IC's like capital employed efficiency, human capital efficiency and structural capital efficiency on the financial performance of the organization. The study suggested that value added have significantly and positively influence earnings per share and return on investment. Rehman *et al.* (2013) try to examined the impact of intellectual capital on the firm performance in the insurance sector of Pakistan by using both

model like VAICTM and VA data for this period were 2006-2010. The researcher further indicates that there is a positive relationship between HCE and EPS; on the other hand, there is a negative relationship between CE and return on investment. Arman *et al.* (2014) explored the influence of IC on innovation and organizational strategy of firm performance, which has a positive and significant impact. The result is that there is a positive impact of intellectual capital on market value and financial performance. Ranani and Bijani (2014) investigated intellectual capital (human capital efficiency, structural capital efficiency and physical capital efficiency) and their impact on financial performance (earnings per share and the efficiency of the assets). The researcher has taken the data of 70 companies from 2004-2007 years and used the panel data regression model to interpret the results. The result of the academic work shows that intellectual capital has a significant and positive impact on the earnings per share and efficiency of the assets. Structural capital, as like other component of intellectual capital, has a positive and significant impact on efficiency of assets. On the other hand, results indicate that structural capital has a negative impact on earnings per share.

Kamath (2015) explored the relationship between intellectual capital and firm performance using VAIC methodology, taking intellectual capital as a dependent variable and return on equity, return on asset, asset turnover ratio, market capitalization, and leverage and market book value. The result shows that profitability is strongly affected by the intellectual capital. On the other hand, structural capital and human capital of the firm have a greater effect on the profitability. It has been seen that the firm having lower leverage has higher profitability. The study shows that return on equity (ROE) and return on asset (ROA) moving in the same direction. This study was conducted in India for the period of five years from 2008-2013.

Further Abujafari *et al.* (2014) explain the influence of IC on return of fixed assets and firm's total assets return which listed on the Tehran stock exchange. Total period of study five year from 2008-2012 and total firm of the industry is 41. In this study VAIC methodology use which is developed by Pulic to measure the intellectual capital which very popular methodology to indicate the intellectual capital. The study uses independent variable applied capital coefficient (VACA), human capital efficiency coefficient (VAHU) and efficiency coefficient of structural capital (STVA). Dependent variable are those which measure the financial performance of the firm these are return of asset, return on fixed asset. Results show that efficient coefficient capital having positive and significant effect on the asset of the firm. Structural capital and human capital efficient have direct impact on the profitability. Structural capital and human capital having on effect on the assets return.

Literature review show that the impact of intellectual capital on financial performance of bank in Pakistan corporate restructuring and its effect on employee morale and performance. To check the impact of intellectual capital data has taken from banking sector of Pakistan uses VAIC methodology to check the impact of intellectual capital on firm performance. Variable which are taken as follow structural capital efficiency, human capital efficiency and return on assets. Data were period of study from 2007 -2010 in banking sector of Pakistan. From the above variable result indicate that IC significantly and positively influences the financial performance of the organization. The result proves that human resource (HR) activities and relation with stakeholder has positively and significantly influence the financial performance of the organization. The all over the factor positively affecting the financial performance of organization. Good relation with stakeholder may improve the financial performance of the firm .Human resource practices may increase financial performance of organization can cause of innovation (Khan *et al.*, 2012).

Present problem like as technological, universality and comprehensive knowledge person and organization evolution, have bust up more organization of the different country due to intellectual capital economy and organization to gain the competitive advantage, to gain the competitive benefits. In present era the survival of any organization depend upon the intellectual persons. In vast terminology, the term intellectual capital has becoming toward a mixture of different factor of production like human capital fund; fund which is provide basic infrastructure to organization and capital which is use for acquisition all fixed assets. In day material economy and economic perspective, the capital fund is working as or refers as to element of manufacturing apply to produced product for the customer which are no frequently used in the consumption of process of the employ and people (Boldizzoni, 2008). Although the meaning of intellect capital are discusses earlier, but lot of thing are reaming to discusses. The researcher try to define different factor of production it different word and own word. The intellectual capital include the human capital, it is one component of intellectual capital structural capital is and other component of intellectual capital ,this basic infrastructure of the organization that include data base for accounting and communication of information from one place to another place and form one city to another city. Innovational capital also included the definition of infrastructure .capital employed also included in the definition of IC's, this type of capital is also known as the worker capital of the organization and firm. Many researcher focus on the labor force they given the argument in the favor of worker who are backbone any organization, they server their ability to organization. Some other gives the argument in the favor of the physical capital. At the end they say that both are very important but most consideration should give the labor force, because this sector is very crucial for the survival of organization in the world (Little, 2003) and (Salamon, 1991)

Beach (2009) explore that the investment making in labor force side is more profitable than other factor of production or elements of intellectual capital. When it is compare with other element of instinctual capital like physical capital and infrastructure capital. Infrastructure capital also play vital role in attainment of the profitability.

Woodhall (2001) says that making capital investment in labor side is more effective because this thing motivate the employee, as we know that motivates employee perform well other employee. So, more and more investment needs labor force side. It is important that other side cannot be minimized, the investment should be made in other sector of economy like physical capita, infrastructure capital, relational capital, informational capital and capital employed also. In other sense learning much important, to gain the combination different knowledge and skill at large scale.

In today economy it is believable that the human capital is combination of different characteristic. In these characteristic first of all include the training of employee .Other quality which is included is skill of deferent field .in short we can say that it is consider as conceptual knowledge of the employee. In short all the factor such as human capital informational capital, capital employed and structural capital are final for batter productivity of the organization. These are all factor of production which cannot be ignored during working in organization. So, be aware when you're making the investment in all these sector of economy (Schultz, 1961).

Especially, Lepak & Snpell (1999) investigate capital investment in human capital can be used for the value carnation in organization. According to Lucas (1988) suggested investment in the education side of the labor force is crucial learned employee can perform batter .But uneducated worker cannot perform well .So education of labor force very important factor of intellectual capital of the organization. The learned worker has already sought a lot of thing of the

organization. By the participating in learning activity employee learner more and more which contribute the production capacity of the organization .There is chance of job seeking activity (Vinokur *et al.*, 2000). After getting the technical education and being worker of the organization, there is easy for to capture the market and they can received high reward in this regard. In addition making investment on the humane capital positively influence the economic growth strategy (Romer, 1986).Many countries scholar and policy maker suggested that there should be efficient and effective management for the measuring the intellectual capital and for the implementation intellectual capital fined different ways so, that productivity of the organization improved. It is necessary that to understand the importance of intellectual capital for the purpose of implementing the policies and procedure. Intellectual capital is instrument to check the financial performance of organization .it check the financial performance using it components like human capital, structural capital and capital employed. The people who favor of this say that intellectual capital is base on the proxies to explain the performance of intellectual capital .they also exemplifies relation of IC with each other's they indicate the human capital as wagon. This drawback of this system on intellectual capital checked the performance of the organization. Another hand acceptable that human capital contribute small part of it because it is element of intellectual capital other two component also contribute their part of contribution. Like capital employed contribute of its part in IC and structural capital contribute its part in IC.

Ashton & Green (1996) the relation between Human capital and financial performance consider necessary. In short, after taking study of many researches papers, academic work and studied related to intellectual capital we have concluded that intellectual capital positive and significant impact on the financial performance of the organizations. All the cases we have study that

element of intellectual capital, like human capital efficiency, structural capital efficiency and capital employed efficiency have significant relationship with organizational performance of the firms. From above literature of study we concluded that there are two types of hypothesis could be .so, on the base of above study we have develop two hypotheses.

2.3 Hypotheses

Following thesis had been made on the bases of research gap

H₀: Intellectual capital (IC) has no influence on financial performance of the organization in the chemical sector of Pakistan

H₁: Intellectual capital(IC) has significant influence on financial performance of the organization in the chemical sector of Pakistan

CHAPTER No.3

Research Methodology

3.1 Types of research

There are three main types of research which are as follows

1. Application
2. Objective
3. Types of information

Application research is further subdivide into two

- I. Pure research.
- II. Applied research.

Objectives are also divided into four types.

- A. Exploratory research.
- B. Descriptive research.
- C. Correlation research.
- D. Explanatory research.

With respect of information research is divided in two types

- Quantitative research.
- Qualitative research.

With respect of type our fall into explanatory research because here we want to check impact one variable on other variable meaning that we want to check the impact of independent variable on dependent variable.

3.2 Data and Methodology

3.2.1 Data collection

Correct data are required for correct results, because results are based on data. Data collected through organized way so that chance of error reduced. The researcher should pay attention to the following points

1. Resource of data
2. Way of collection of data
3. Sale
4. Right form of sale
5. Scale
6. Time collection of data

3.2.2 Sample size

Sample size is representative part of the population .To examine how much the impact the firm's financial performance receive by intellectual capital of firm. Ten chemical sector firms have been taken and data collected from them. The firms which are listed at Karachi stock exchange of Pakistan .The range of collected data from 2005 to 2014.

3.2.3Source of data

There are many source of collection of data according to researcher ,as primary sources and secondary sources .some time researcher collects data trough primary source according to requirement of research .some time researcher collects data through secondary source that also depend on type of researcher. Because our research is depend on secondary data, so we have collected from secondary source. Financial statement are best way of taking data, here are financial statement of firm used which are listed at the stock exchange. Because stock exchange

is official web site Government of Pakistan so we have collected data from financial statement of stock exchange. This study used both source of data, like Karachi stock exchange and statement bank of Pakistan

3.2.4 Sample

Sample is representative part of population which include characteristic of the whole population. It is selected from the population to check the impact .There is following reason that we select the sample from the population.

1. Time saving
2. Resource saving
3. Convenience
4. Accurate results
5. Results of some parts to help to judge whole population
6. Whole population cannot be examine

3.2.5 Sampling technique

When you are doing study about any population then you have complete knowledge

- a) Population
- b) Problem of population
- c) Whether this problem occurs all the time
- d) Whether this problem effect all the population in some units

Due shortage of time and limitation of resources you cannot examine all the resources .Then you have to select the sample from the population of firms sector to check the impact.

As we have already define sample is representative part of the population which include characteristics of whole population ,it must be accurate and correct ,so results correct be

obtained. There are many sampling technique available, that researcher used to examine the or calculate results of different studies, such as random sampling, cluster sampling and systematic sampling technique. This study uses the random sampling technique because each total population has an equal chance of being selected.

3.2.6 Methodology

Academic work conducted to determine the impact financial performance received by the intellectual capital. Value added intellectual coefficient (VAICTM) approach used introduced by (Public, 1997, 1998, 2002and 2000).It is also know Austrian approach. This study applied VAICTM approach to check how much financial performance affected by the impact factor of IC. VAIC model used in this research report it is considered that, this approach very important and

Introduction to Econometric

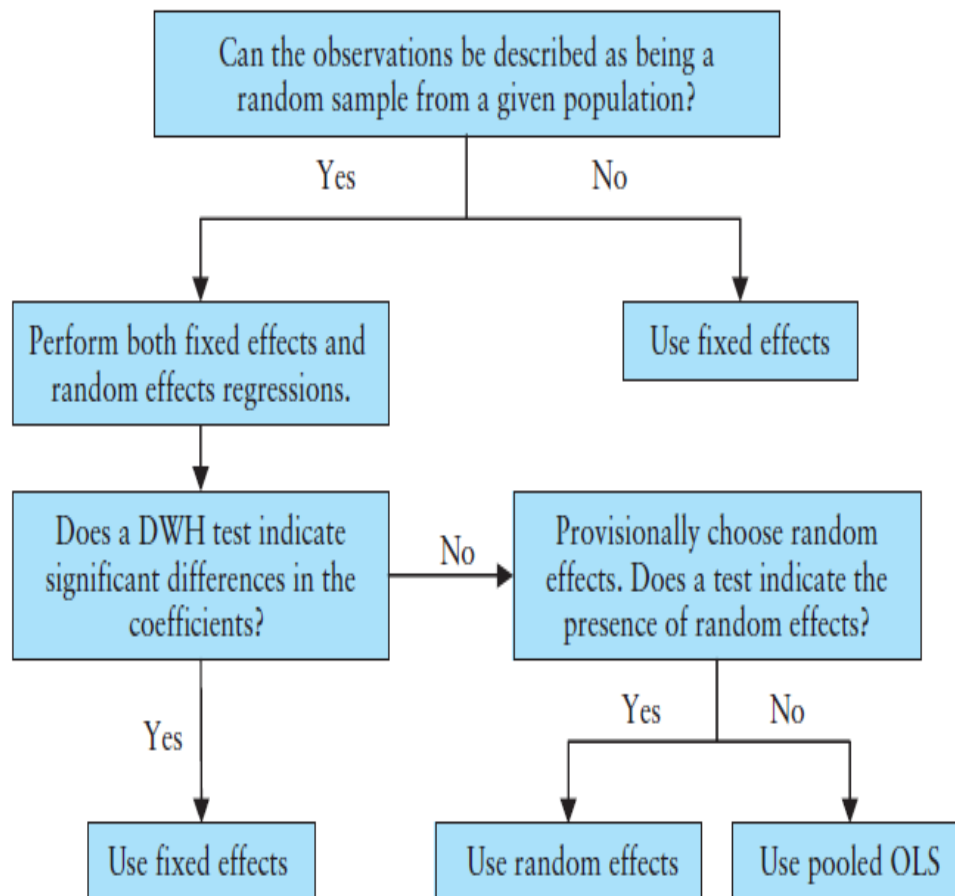


Figure 14.1 Choice of regression model for panel data

consistent for the measurement of intellectual performance of chemical sector. Many practitioner researcher and academicians have used this research methodology in their research paper. Our metrology matches with other paper methodology same studies (Rehman *et la.*, 2001).

3.2.7 Statistical technique

Panel data methodology used in academic work to check the influence of IC on organizational financial performance. It is very important statistical approach to examine impact of one variable on other variable .Therefore panel data analysis very important because it provides more degree of freedom. It plays very important role analyzing huge observation (Dougherty, 2011). According to Gujrati and Porter (2005) panel data include both qualities of time series data and cross sectional data. In time series data panel methodology used to the impact of variable. Because data collected from different firm are different in nature so, there best is that we use panel data technique .panel data include both qualities of time series data and cross sectional data. For the panel data there are two technique available random fixed model and random effect model.

First of all we need to decide about sampling technique. When you are using random sampling There is great chance of using random fixed model and random effect model. If you are using Sampling other than random sampling, then you have choice to use fixed effect model not random effect model (Dougherty, 2011). When you used random sampling then there is option to random fixed model a fixed effect model .First of all we decide which model we use fixed effect Sampling other than random sampling, then you have choice to use fixed effect model not random effect model (Dougherty, 2011). When you used random sampling then there is option to random fixed model a fixed effect model .First of all we decide which model we use fixed effect model or random effect model .the decision should be made on the base of Housman's test

.Housman's test just like a yard stick to decide about the model. Housman test applied to check the hypothesis, if the result is significant then we accept alternative hypothesis and use fixed effect model .If result is no significant we will use the random effect model

Source: Adopted from Dougherty (2011)

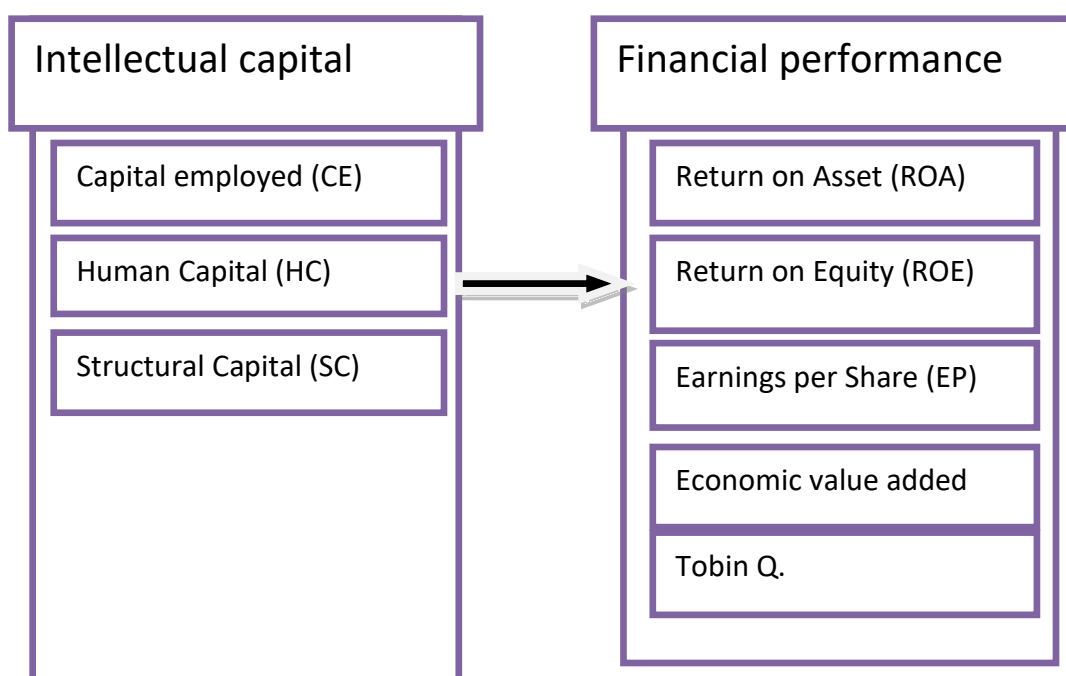
Narwal & Deep (2014) conducted study in textile sector of India to find out the impact of intellectual capital and its association with financial performance. They have taken period of ten year and use both model to check the impact of intellectual capital on firm performance, meaning that random effect model and fixed effect model, they find out that there is positive and significant relationship between the variables. Bhatia & Aggarwal (2015) examine the relationship between intellectual and financial performance software industry of India, they used the both model random effect model and fixed effect model for the better interpretation of results. The researcher finds out that there positive and significant relationship between the variables.

Rehman *et al.* (2013) investigate the relationship between intellectual capital and financial performance of insurance sector of Pakistan they uses both model of panel data analysis random effect model and fixed effect model taking period from 2006-2010. The empirical relationship shows that there is positive and significant impact of value added and VAIC on its financial performance indicators.

In this study panel data technique used as, it used many research papers by the researcher. Panel data are most useful when we suspect that the outcome variable depends on explanatory variables which are not observable but correlated with the observed explanatory variables. If such omitted variables are constant over time, panel data estimators allow to consistently estimating the effect of the observed explanatory variables (Watson, 2012). In this study panel data analysis used because it has both qualities of time series and cross section data (Porter,

2005). Panel data analysis further subdivides into two categories no one random effect model and fixed effect model. Hausman Test decides which type of test we use .Whether we use random effect model or fixed effect model. If the p-value is lesser than that 0.05 then we will use random fixed model, if p-value greater than that significant meaning that significant value (0.05) then study will use random affect model. According to test of table No.2, here we have used the random effect modal, because p-value is greater than 0.05.

3.3 Conceptual frame work



3.4 Variables with their acronyms and full name

Serial No.	Acronym Name	Variables full Name
1	VAIC	Value added intellectual coefficient
2	HCE	Human capital efficiency

3	SCE	Structural capital efficiency
4	CEE	Capital employed efficiency
5	ROE	Return on equity
6	ROA	Return on asset
7	EPS	Earnings per share
8	EVA	Economic value added(EVA)
9	Tobin q	Tobin q

3.5 Firm with their acronyms and full name

Serial No.	Acronyms Name	Full Name
1	BERG	Berger paints
2	BIFO	Biafo Indu....
3	COLG	Colgate Palmolive Pakistan
4	ICL	Ittehad chemical Limited
5	PGCL	Pak gum & chemical
6	PPVC	Pak. P.V.C
7	SHCI	Shaffi Chemical
8	NICL	Nimir Chemical Ind...
9	BUXL	Buxly paint
10	BAPL	Bawany air product limited

3.6 Research Models

Models

$$ROE_{it} = \beta_0 + \beta_1 (HCE_{it}) + \beta_2 (SCE_{it}) + \beta_3 (CEE_{it}) + \mu_{it} \dots \dots \dots 1$$

$$ROA_{it} = \beta_0 + \beta_1 (HCE_{it}) + \beta_2 (SCE_{it}) + \beta_3 (CEE_{it}) + \epsilon_{it} \dots \dots \dots 2$$

$$EPS_{it} = \beta_0 + \beta_1 (HCE_{it}) + \beta_2 (SCE_{it}) + \beta_3 (CEE_{it}) + \xi_{it} \dots \dots \dots 3$$

$$EVA_{it} = \beta_0 + \beta_1 (HCE_{it}) + \beta_2 (SCE_{it}) + \beta_3 (CEE_{it}) + \epsilon'_{it} \dots \dots \dots 4$$

$$TOBIN_{it} Q = \beta_0 + \beta_1 (HCE_{it}) + \beta_2 (SCE_{it}) + \beta_3 (CEE_{it}) + \eta_{it} \dots \dots \dots 5$$

$$ROE_{it} = \beta_0 + \beta_1 (VAIC_{it}) + \delta_{it} \dots \dots \dots 6$$

$$ROA_{it} = \beta_0 + \beta_1 (VAIC_{it}) + \lambda_{it} \dots \dots \dots 7$$

$EPS_{it} = \beta_0 + \beta_1 (VAIC_{it}) + \psi_{it}$	8
$Tobin_{it} Q = \beta_0 + \beta_1 (VAIC_{it}) + \Upsilon_{it}$	9
$EVA_{it} = \beta_0 + \beta_1 (VAIC_{it}) + \pi_{it}$	10

3.7 Dependent and independent variables

There are two types of variable

- Dependent variable
- Independent variable

3.7.1 Dependent variable

3.7.1.1 Intellectual capital

First of all according to the British English dictionary meaning of word intellectual” Relating to your ability to think and understand things, especially complicated ideas” .Intellectual capital combination of knowledge and other abilities of organization ,societies and individual. Intellectual capital knowledge could be used to produce the wealth, could be used to create the multiple physical assets, which can be to produce more and more products for the people and organization. IC can be define as “it collection of information knowledge professional skill of employee that provide one organization competitive edge on other organization”. if we talk about the employee training, it play very important role in employee performance, trained employee perform well as compare to untrained employee because training is part of intellectual capital. On other hand if we talk about professional skill also play vital role in the performance of business as professional worker well, as doctor perform well because they know human body very well. These are values that company uses to drive the profit. Intellectual capital can further subdivide in to three categories human capital, structural capital and capital employed. This study conducted to determine the impact of intellectual capital in firm performance. Value added

intellectual coefficient (VAICTM) approach used introduced by Pulic (1997,1998,2002and 2000).the measurement of intellectual capital can be made through VAIC model which is as follow

Firm performance =function of intellectual capital

Or $PF_i = B_0 + B_1 IC_i + \epsilon$

Where firm performance =FP

Intellectual capital =IC

The firm's financial performance can be measure through using proxies of performance. The proxies are as fallow like return on assets(ROA),return on equity(ROE),economic value added (EVA),earnings per share(EPS)and Tobin q. Anyhow in this study VAIC model is used develop by (Pulic,1998, 2000)

$VAIC = CEE + HCE + SCE$ (Hajeb *et al.*, 2015)

Where

$VAIC^{TM}$ = Value added intellectual coefficient.

HCE=Human capital efficiency.

SCE=structural capital efficiency.

CEE=capital employed efficiency.

3.7.1.2 Human capital

Gary Becker (2001) explains the term human capital .He is an economist and professor at University of Chicago which is popular all over the world. Jaco Micer define the humane capital as it is composition of attributes, personality, stocks of knowledge, habits including creativity and power to perform laboring so that quality can be produce . On other hand human capital is composition of special technical skill, abilities to perform the laboring, experience which is great

master of man, talent which is very forceful quality of employ, intelligences, force of mind, to understand the problem in better way and individual possessed quality are also include in the definition of human capital(Hajeb *et al.*, 2015).

It is already said that human capital is composition of different qualities, qualities which are used to create valuable product. Valuable goods lead to higher earning capacity, higher earning facility lead to higher profitability .To produce valuable goods firms need intellectual people, really organization used different capabilities of employ to motivate them, the motivated employ can perform well than unmotivated employ .There are some factor which are included it the definition of intellectual capital. (Arman *et al.*, 2014).Further human capital efficiency can be measured as

Human capital efficiency=Value added /Human capital

VA/ HC=HCE (Kharal *et al.*, 2014)

3.7.1.2 Structural capital

IC comprised main three basic elements SC is one of them. Structural capita include the technical knowledge of employ, patent right of organization, copy right of the organization, infrastructure which support to the organization and basic data base of the organization through which organization communicate with in vital system. Researcher concluded that basic infrastructure remain with the organization, even employ leave the organization .this good thing special formula remain in the possession of the organization (Kharal *et al.*, 2014).

Mohajeri&Azad (2011) argue for the support of the employ basic infrastructure play very vital role for the organization, it said that structural capital like building is very common for every organization; in which organization erect the machinery for the production. Other part of

structural capital is hardware; better the hardware better the production of good. Secondly, software which is use for the accounting practices of the firms. Thirdly, proprietary data base system and information system.

Zahid *et al.*, (2011) suggested that other things which are included in the definition of the structural capital goodwill of firms' management information system of firms. The researcher further divided the structural capital into two categories, which are innovational process capital and capital employed. Lodhi&Makki (2009) explore that organization capital comprises the organizational systems for leverage the organizational capability. Process capital is a term of organization, which derived from some special formula for production of goods for the people. Procedures are some special technique which other business organization does not have. Implementation program that increase production of goods. Further structural capital can be calculated as

Structural capital efficiency= structural capital ÷value added

SCE=SC/VA (Makki & Amin, 2014)

3.7.1.3 Capital employed

Makki & Amin (2014) Capital employed is a fund used for acquiring the fixed assets, fixed assets like plant machinery which frequently used in production process, good condition machinery produce better goods for the community .we can say amount spend on the machinery is capital fund or capital employed. Secondly, buildings is also used in the production process and provide the umbrella for the product of the organization this is also capital investment and known as capital employed or capital fund. In short all the expenditure made on creation of assets for the organization included it the definition of capital employed. So, capital employed is

combination of all assets of the organization which are used in the organization. Further capital employed efficiency can be calculated as follow.

Capital employed efficiency= value added ÷capital efficiency

CEE=VA/CE (Chan, 2009)

3.7.2 Independent variable

3.7.2.1 Return on equity (ROE)

In corporate finance, profit of the organization can be measure through the return on equity. Return on equity formula could be used in three ways. No one when the business man wanted to see the return on common equity they subtract preferred dividends from the net income of the organization and also subtract preferred equity form the shareholder equity, then formula could be such as:

Net income-Preferred dividend/common equity=return on investment

Secondly, when investor wants to calculate return on equity it can be calculated dividing net income by average shareholder equity. The average can be calculated in this way, adding beginning period equity into ending period equity is equal to average equity. When the investor wants to check the change in the return on equity or profitability the investor takes beginning period as equity denominators and net income as ruminator this why we called beginning return on equity. To calculate ending period return on equity divide net income by ending period return on equity. Return on equity (ROE) is a performance indicator this formula consist of two parts, one is net income which is called numerator and other is called denominator.

It can be calculated as

$$\text{Return on equity (ROE)} = \frac{\text{Net income}}{\text{Shareholder equity}} \text{ (Chan, 2009)}$$

3.7.2.2 Return on asset (ROA)

Return on asset performance indicator of firm, this performance indicator widely used in the organization to check the return on asset. Return on asset is varied from organization to organization. With respect to investment it can become more or less maybe. Return asset give single about the capital intensity. Return on asset less or more maybe, but thumb rule is that 5% return on assets is acceptable.

It can be calculated as:

$$\text{Return on assets (ROA)} = \frac{\text{Net Income}}{\text{Average Total assets}} \text{ (Hajeb et al., 2015)}$$

3.7.2.3 Earning per share (EPS)

Earnings per share are portion of company profit allocated to each outstanding share of common stocks. Earnings per share can be use as an indicator of the company profitability.

It can be calculated as:

$$\text{Earnings per share} = \frac{\text{Net income} - \text{Divided on perferred stock}}{\text{Average outstading share}} \text{ (Azad\&Mohajeri, 2012)}$$

3.7.2.4 Tobin q

Tobin's q (1969) explain this formula which is normally called Tobin q formula, which is consider performance indicator of the organization .It consider best indicator for measurement of organization. Tobin q formulas also consist of two parts, one is called numerator and other is called denominator. Numerator represents total value of assets. Researcher suggested that Tobin q is good performance indicator of the organization.

It can be calculated as:

$$\text{Tobin q} = \frac{\text{Total market value of firm}}{\text{Total assets value}} \text{ (Tobin, 1969)}$$

3.7.2.5 Economic value added (EVA)

Financial performance of the organization could be performed through the economic value added but it depends on the residual wealth which is calculated by subtracting capital cost from operating profit, adjusted for tax on a cash basis (William Petty, 2000). EVA can be presented as economic profit and it tries to calculate the true economic profit of a company. This performance indicator was developed by Stern Stewart and Co. It can be calculated as:

$$\text{EVA} = (\text{ROIC} - \text{WACC}) * (\text{total asset} - \text{current liabilities}) \quad (\text{Stewart, 1994})$$

OR

$$\text{EVA} = (\text{NOPAT} - \text{WACC}) * (\text{Total asset} - \text{current liabilities})$$

Where

$$\text{Return on investment capital (ROIC)} = \frac{\text{NOPAT}}{\text{Total assets} - \text{current liabilities}}$$

Net operating profit after tax = NOPAT

Weighted average cost of capital = WACC

EVA calculation:

$$\text{NOPAT} - (c * \text{capital}) = \text{EVA}$$

Alternatively

$$(R * \text{capital}) - (c * \text{capital}) \quad (\text{Stewart, 1994}) = \text{EVA}$$

Where

Stand for rate of return = R

Stand for cost of the capital = C

Where

$$\text{WACC} = \frac{MVe}{MVd + MVe} * Re + \frac{MVd}{MVd + MVe} * Rd * (1 - t)$$

Where

Stand for market value of equity= MV_e

Stand for market value of debt= MV_d

Stand for cost of equity = R_e

Stand for Cost of debt= R_d

Stand for corporate tax rate in a country = t

3.8 Summary

This study conducted to check how much financial performance influence by impact of intellectual capital. In this academic work we applied VAICTM approach to explore that how much financial performance affected by the IC. VAIC model is used in this research report it is considered that, this approach very important and consistent for the measurement of intellectual performance of chemical sector. Panel data methodology applied in financial performance of the organization. It is very important statistical approach to examine impact of one variable on other variable .therefore panel data analysis very important because it provides more degree of freedom. It plays very important role analyzing huge observation (Dougherty, 2011). According to Gujrati and Porter (2005) panel data include both qualities of time series data and cross sectional data. There are many source of collection of data according to researcher, as primary sources and secondary sources .some time researcher collects data trough primary source according to requirement of research .some time researcher collects data through secondary source that also depend on type of researcher. Because our research is depend on secondary data, so we have collected from secondary source. Financial statement are best way of taking data, here are financial statement of firm used which are listed at the stock exchange. Because stock exchange is official web site Government of Pakistan so we have collected data from financial

statement of stock exchange. This study used both source of data, like Karachi stock exchange and state bank of Pakistan.

CHAPTER FOUR

Table NO.1

4.1 Descriptive Statistics

Variable	N	Min.	Max.	Mean	Std. Deviation
ROE	100	-613.85	404.24	9.93	87.72
ROA	100	-76.28	68.14	8.22	22.07
EPS	100	-30.74	58.21	6.18	14.09
TOBIN Q	100	0.00	0.68	0.04	0.10
EVA	100	-1.17	50.19	-7.62	12.45
HCE	100	-36.90	22.30	0.77	5.78
SCE	100	-106.19	10.81	-0.19	10.76
CEE	100	-2.46	2.01	0.28	0.52
VAIC	100	-106.17	25.27	0.86	12.46

Table No.1 include total nine variables which are return on equity (ROE), return on assets(ROA), earning per share(EPS) Tobin q, economic value added(EVA), human capital employed(HCE), structural capital employed(SCE), capital employed efficiency(CEE) and value added intellectual coefficient. Table 1 shows the maximum, minimum, mean and standard deviation of all dependent and independent variables from period 2005to 2014. Mean value of VAIC is 0.8624 maximum values 25.27, minimum value -106.17and standard deviation value 12.46.Here mean value of HCE is 0.77, with maximum value 22.30 along minimum value -36.90 and standard deviation 5.78.value added intellectual coefficient (VAIC) have significant contribution the toward the performance of firm because mean value of value added intellectual coefficient is high.

Table No. 2

4.2 Unit root test at level

Method	ROA. Prob.	ROE. Prob.	EVA. Prob.	EPS. Prob.	TOBINQ Prob.	HCE. Prob.	SCE. Prob.	CEE. Prob.	VAIC. Prob.
Levin,lin&chu*	0.000	0.000	0.05	0.005	0.002	0.040	0.000	0.003	0.000
Im,Pesaran &Shin W-stat	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
ADF-Fisher	0.000	0.002	0.05	0.03	0.000	0.04	0.002	0.003	0.010
Chi-square									
PP-Fisher	0.03	0.000	0.00	0.050	0.003	0.000	0.054	0.000	0.00
Chi-square									

From table No: 2 we concluded that the entire variables are significant at level, meaning that all the variable are stationary at level. We can say that there is stationary trend among the variables

Table No.3

4.3 Correlation Matrix of selected variables

Variables	CEE	EPS	HCE	ROA	ROE	SCE	TOBINQ	VAIC
CEE	1.00							
EPS	0.105*	1.00						
HCE	0.421*	0.232*	1.00					
ROA	-0.028	0.106*	0.205*	1.00				
ROE	0.107*	-0.73**	-0.257*	0.065***	1.00			
SCE	0.050	0.762*	0.110*	-0.316*	-0.057	1.00		
TOBINQ	-0.082**	-0.070	-0.008	-0.101*	-0.06**	0.254*	1.00	
VAIC	0.048**	0.62*	0.007	0.214	0.030	0.8670	0.0419	1.00

Note *, ** and *** represent level of significance at 1percent, 5 percent and 10 percent

respectively

Table No. 3 shows the correlation matrix which tells us relationship between the variables in this paper. Correlation matrix tells us how much correlated one variable with other variable. The correlation matrix also helps us to examine the problem of multi co linearity. Capital employed efficiency (CEE) has positive association with earning per share (EPS), human capital (HCE), return on equity (ROE), return on asset (ROA), structural capital efficiency (SCE) and value added intellectual coefficient (VAIC), and negative association with Tobinq. Earnings per share

has also positive association with human capital (HCE), return on equity (ROE), return on asset (ROA), return on asset (ROA) and negative association with Tobin q and positive association with VAIC.

Return on asset (ROA) has positive association with return on equity (ROE) and negative association with structural capital employed (SCE), Tobin q. Similarly return on equity (ROE) negatively associated with structural capital efficiency (SCE), Tobin q and positively correlated with VAIC. At the end Tobinq is positively correlated with VAIC.

Multi co linearity among independent variables

To check the absence of multi co linearity problem, the Pearson's correlation coefficient used. if the correlation coefficient among the variable is greater than 0.8 then it create serious problem (Narwal&Deep, 2014).As table s shows that the correlation among the explanatory not more than from -0.15 to 0.79.So,there is no multi co linearity among the independent variable.

Table No. 4

4.4 Hausman's Test

Test summary	Chi-Sq.State	Chi-Sq.d.f	Prob.
Cross-section random	4.032073	3	0.2580

Table No.4 shows the results of Housman's test. Hausman's test used to determine whether, we use random effect model or fixed affect model. Here p-value is non significant meaning that P-value is more than 0.05, then we will use random effect model.

Table No. 5

4.5 Random effect model

ROE	coefficient	Std.D	P
C	-2.66	10.73	0.021
HCE	0.62	2.47	0.04
SCE	0.65	0.81	0.05
CEE	45.71	27.13	0.00

Table No: 5.1

R ²	F Statistic	Durbin Watson	P-value
0.6	6.5	1.96	0.051

From the table NO.5 we have concluded that human capital efficiency (HCE) positive and significant impact on return on equity (ROE) during planning firm should consider that particular factor so that maximize this positive impact. Structural capita efficiency (SCE) also has positive and significant impact on return on equity (ROE). Structural capital is one of the three primary components of intellectual capital, and consists of the supportive infrastructure, processes, and databases of the organization that enable human capital to function. Structural capital is owned by an organization and remains with an organization even when people leave. So during planning management also consider that particular variable. Capital employed efficiency (CEE) has positive and significant impact on return on equity (ROE).

Table No.6 Random effect model

ROE	coefficient	Std.D	P
C	8.04	4.89	0.03
VAIC	0.21	0.13	0.00

Table No: 6.1

R ²	F-Statistic	Durbin Watson	P-value
0.65	6.7	1.93	0.048

Table No.6 shows that there positive and significant impact of value added intellectual coefficient (VAICTM) on return on equity (ROE).intellectual capital is increasingly recognized as an important strategic for sustainable corporate competitive advantages so during planning management consider more so it can be batter.

Table NO: 7 Random effect model

ROA	coefficient	Std.D	P
C	5.66	3.36	0.000
HCE	0.91	0.45	0.004
SCE	0.11	0.14	0.002
CEE	6.47	5.18	0.051

Table No: 7.1

R ²	F-Statistic	Durbin Watson	P-value
0.7	6.9	1.98	0.046

Table No.7 presenting results which we can see on the table that there is significant and positive relationship between human capital efficiency (HCE) and return on asset (ROA), because there is p-value is less than 0.05 and human capital efficiency is 0.9171, that is positive then we can say that there is positive and significant impact of human capital efficiency (HCE) on return of asset (ROA).Structural capital efficiency (SCE) has positive and significant impact on return of asset (ROA).Capital employed has also positive and significant impact on return on asset.

Table No: 8 random effect models

ROA	coefficient	Std.D	P
C	9.76	9.09	0.00
VAIC	0.20	0.71	0.02

Table No: 8.1

R ²	F-Statistic	Durbin Watson	P-value
0.5	6.7	1.90	0.055

From the table No.8 we have concluded that there is positive and significant impact of value added intellectual coefficient (VAICTM) on return asset (ROA).

Table NO: 9 Random effect model

EPS	coefficient	Std.D	P
C	4.59	2.71	0.00
HCE	0.01	0.25	0.00
SCE	0.04	0.08	0.03
CEE	5.62	2.92	0.05

Table No: 9.1

R ²	F-Statistic	Durbin Watson	P-value
0.5	6.8	1.40	0.031

Table No.9 shows that human capital efficiency (HCE), structural capital efficiency (SCE) and capital employed efficiency are independent variables, which are basic component of intellectual capital. Earnings per share (EPS) are dependent variable. That particular table shows that HCE and SEC have positively and significantly influence the earnings per share (EPS).CEE positively and significantly influence on earning per share because here is p-value 0.05 which significant.

Table No.10 Random effect model

EPS	coefficient	Std.D	P
C	6.12	3.79	0.11
VAIC	0.06	0.07	0.00

Table No.10.1

R ²	F-Statistic	Durbin Watson	P-value
0.7	7.1	1.57	0.041

Table No.10 explaining the result of earning per share (EPS) and VAICTM from the above table (meaning that table No.10) we can concluded that there is positive and significant of VAICTM on earning per share

Table No.11 Random effect model

TOBINQ	coefficient	Std.D	P
C	0.05	0.01	0.00
HCE	0.00	0.00	0.00
SCE	0.00	0.00	0.00
CEE	-0.05	0.03	0.46

Table No. 11.1

R ²	F-Statistic	Durbin Watson	P-value
0.65	6.1	1.98	0.00

Table No.11 showing the results of human capital efficiency (HCE) structural capital efficiency (SCE) and capita employed efficiency (CEE) from the table.11 we have concluded that, on the bases of results is that human capital efficiency and SCE has influence positively and significantly on Tobin q. CE has negative and non significant influence on Tobin q. Capital employed is also consider as capital fund which used in acquisition of all the fixed assets. Capital employed also used to acquisition of cash fallow lead to the signal batter the capital employ, batter the production o f good, batter productivity lead to profitability of organization. So, researcher the concluded that capital employed in backbone of organization.wih out the capital employed organization cannot survive.

Table No. 12

TOBINQ	coefficient	Std.D	P
C	0.044068	0.01	0.00
VAIC	2.71	0.00	0.97

Table No.12.1

R ²	F-Statistic	Durbin Watson	P-value
0.51	7.12	2.00	0.05

Table No.12 shows that relationship between Tobin q and VAICTM. The impact of VAICTM on

Tobin q is positive and non significant.

Table No.13 Random effect model

EVA	coefficient	Std.D	P
C	-7969371	4221177	0.06
HCE	-468521.4	411242.6	0.25
SCE	-14796.34	129637.6	0.90
CEE	2484690	4680914	0.59

Table No.13.1

R ²	F-Statistic	Durbin Watson	P-value
0.016	0.54	0.74	0.65

Table No.11 show the results of random effect regression model here is HCE and SCE have Non significant and negative impact on economic value added .CEE has positively and non significantly influence the economic value added (EVA).intellectual capital(IC) is attaining importance in today knowledge economy and plays key role in innovation, productivity growth as well as the performance and competitiveness of organization. Intellectual capital can be check through VAICTM. VAICTM comprises comprehensive three elements which are HCE , SCE and CEE . There is need to be considered more and more during planning and development.

Table No.14 Random effect model

EVA	coefficient	Std.D	P
C	-7571136.	4764083.	0.11
VAIC	-60801.29	111076.6	0.58

Table No.14.1

R ²	F-Statistic	Durbin Watson	P-value
0.30	0.30	0.73	0.58

Table No. 12 shows that, VAICTM has negative and Non significant impact on economic value added (EVA).

4.6 Summary

Chapter four include analysis and interpretation of data which have been done in this study. This academic work examine the influence of IC on the firm financial performance .First of all descriptive statistics has been done to check the higher mean of data ,in this study higher mean

shows that higher the performance of the variable. Secondly, unit root test is applied to check the stationary among the variables or to check the trend among the variable, as results shows that there is no trend among the variable because result of all the variables is positive and significant. Further, correlation test applies to check the association among the variable and multi co linearity of the variables, results show that there is positive association among the variable .there is no multi co linearity among variable. In odor to decide which of test we use whether random effect model or fixed effect model Hausman's test applied. At the end after using the hausman's test it is concluded that we should use random effect model to the impact of one variable on other variable.

CHAPTER 5

5.1 Discussion

That particular academic work is conducted to explore how much financial performance is influenced by the impact of intellectual capital period from 2005 to 2014. The results show that there is a positive and significant value added intellectual coefficient (VAICTM) on return on equity (ROE), return on asset (ROA) and earnings per share (EPS). Value added intellectual capital (VAIC) is negatively affecting economic value added (EVA) and Tobin q. This study was conducted in the chemical sector of Pakistan, which is a very premier sector of the economy of Pakistan. A lot of chemical products are produced in this sector, like fertilizer, which is used for the fertility of fields in Pakistan, meaning that in the agriculture sector, which is an important sector of the economy of Pakistan. Most important role of this sector is that it produces a lot of different paints, which are used in the decoration of houses in Pakistan. To explore the impact of intellectual capital on the firm's performance, different types of tests were used, such as the unit root test, Hausman test, and random effect model. The results of our study are just like studies (Chen & Hwang, 2005), (Jasor & Rezazadeh, 2013) and (Wing & Chang, 2005).

Rehman *et al.* (2011) interpreted that intellectual capital performance impacts on the performance of the corporate Modaraba sector of Pakistan. They investigated that intellectual capital has a positive impact on the performance indicators return on equity and earnings per share. So, our results are the same as stated above. Adzad and Mohajeri (2012) conducted a study in the petrochemical and pharmaceutical sectors and concluded that there is a positive relationship between intellectual capital and return on equity and return on assets. The results also match our study. Rehman *et al.* (2013) conducted a study in the insurance sector of Pakistan to check the intellectual capital efficiency.

associations with performance of the organization, the conclusion of research work we have conducted are same with earlier study that we have conducted in chemical sector of Pakistan.

Xinyu (2014) try to examine the impact of intellectual capital of China's public pharmaceutical company on company's performance, the results shows that there intellectual capital is significantly effecting the firm performance, the results of this study also same our study.

5.2 Implications

This study is very helpful for educationist that are going study the intellectual capital, business managers who are serving the business community and public day night and academic researchers who are working for students and the managers of the organizations. Concept of intellectual capital is new term in the business organization and emergent concept until now. It is seen that business organizations are not completely aware of this term, particularly chemical sector in Pakistan which is called intellectual capital. Academic work of this particular study avail major contribution in promotion of this idea inside the Pakistani chemical business organization. In addition there necessity of time and need of hour to understand the importance of intellectual capital, the manager of corporate sector should disclose importance of intellectual capital to promote the business organization. Without giving the proper attention proper true and fair result cannot be attained. The present study is helpful particularly scholar, practitioners and policy makers. Because in Pakistan research don by academic researcher on this topic is little contribution toward intellectual capital, developing countries like Pakistan there is need to develop sense about Intellectual Capital. Intellectual Capital is very playing very important role for firm development and organization performance particularly in the financial and performance sectors. We have concluded from above studies and literature review that we don shows the result that, this is clear that financial performance of the organization is increases by efficiency

of the intellectual capital. The business organization should be given proper focus and attention to the Intellectual Capital. In the developing countries like Pakistan there need that term of intellectual capital should be given more attention, so that performance of the organization could be improve. In the developed countries business organization gives more attention to the human capital (intangible assets) than physical capital (tangible asset). Human capital increases the efficiency and provides the innovation chance in business organization. Like Pakistan is under develop country so, there is need to focus on the intellectual capital. On the bases of academic research work following implication could be recommended.

- The result shows that it would be interesting for the business manager to apply value added intellectual coefficient (VAIC) method for the better control of intellectual capital(IC)
- It is also important for decision maker who are working in knowledge based industries .it is necessary that business manager and decision maker should be aware of importance of the intellectual capital
- It is also suggested that business firm should trained key people and search the technical personnel for training of employs
- It is need of time manager should create cooperative team work program which focused on intellectual capital measurement and management.
- Intellectual capital(IC) should be disclosed in annual financial reports as supplementary report by Pakistanis chemical sector.

5.3 Conclusion and Recommendations

As we have earlier described that this academic work applied to check the influence of IC on the financial performance of the organization. As we have describe results above that shows intellectual capital impact is significant effect and positive on return on equity ,return on asset and earnings per share. On other hand intellectual capital has negative and non significant impact on economic value added and Tobin q. To improve the performance the of firm, it is recommended that during planning firm management should keep in mind those entire variable due to which firm performance weak. There is need to improve these variable so that firm performance can be increase.

5.4 Limitation and future guidelines

This study conducted on chemical sector to analyze how much financial performance influence by the impact of IC from the period of 2005-2014. So , in future by use of panel data analysis researcher receive the results of intellectual capital (IC) performance taking all other chemical firms. Moreover, researcher may produce batter results of their academic work by increasing number of firms in quantity of chemical industry. VAIC model develop by the Pulic which is uses to check the performance of intellectual capital in the organization. Here we have also uses Pulic model to examine the performance of intellectual capital. Furthermore, different countries have different accounting method to check the performance of organization, which may produce the different results.

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