

CAPITAL UNIVERSITY OF SCIENCE AND
TECHNOLOGY, ISLAMABAD



**Effects of Intellectual Capital on
Firm Performance: An Evidence
of Non-Financial Firms of
Pakistan**

by

Muhammad Rehman Haider Khan

A thesis submitted in partial fulfillment for the
degree of Master of Science

in the

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I dedicate my thesis to My Parents, Grandfather, Sisters and respectful Teachers (Especially Dr. Jaleel Ahmed Malik) for motivating me to accomplish this thesis. I thank all of you for the guidance and the motivation you gave me during my MS study. This journey would not have been possible without your support and encouragement.



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CERTIFICATE OF APPROVAL

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Abstract

The study examines the effect of intellectual capital on firm performance by using a sample of Pakistan 100 non-financial companies listed on Pakistan Stock Exchange between 2007 and 2016. The 10 years data has been used in this study. The study used panel data because the population of industries of same or different nature have different variables which varies with respect to time. Intellectual Capital is measured by using Pulic model of intellectual capital which is known as Value added intellectual coefficient and its constituents. The constituents that are using in this paper are human capital, structural capital and capital employee efficiency. This study makes a valuable addition in the literature by selecting all the non-financial sectors of Pakistan. The dependent variables which are used as a firm performance are return on assets, return on equity, growth revenue and return on sales. The results shows that firm performance has positive and significant impact on intellectual capital of non-financial firms of Pakistan. The result of ordinary least square regression is used to find the positive relationship between intellectual capital and firm performance. Future researchers could use data from different nations and different industries, reliance on intellectual capital in order to provide further evidence on the impact of intellectual capital on firms financial performance.

Key words: Intellectual Capital, Value Added Intellectual Coefficient, Human Capital Efficiency, Structural Capital Efficiency, Capital Employee Efficiency, Firm Performance, Pakistan.

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Abbreviations

VAIC	Value Added Intellectual Coefficient
IC	Intellectual Capital
VA	Value Added
HCE	Human Capital Efficiency
SCE	Structural Capital Efficiency
CEE	Capital Employee Efficiency
ROA	Return on Assets
ROE	Return on Equity
GR	Growth Revenue
ROS	Return on Sales
LEV	Leverage
FS	Firm Size

Chapter 1

Introduction

1.1 Introduction of Intellectual Capital

This research was to analyze the effect of intellectual capital on non-financial firms performance of Pakistan. Furthermore whether or not the intellectual capital cooperates with the tangible assets to influence its firm performance. The true value created by an organizations was reflected due to traditional accounting statement because intangible resources are considered for estimating the performance of an organization. The knowledge economy give the idea of IC. The organization in knowledge based economy have been relying upon intangible resources as opposed to tangible resources to increase its competitive edge but the developing country like Pakistan has ignored the importance of intellectual capital and give more attention towards financial performance of the organization.

From the academic journals, the different definitions, history, concepts and origins of intellectual capital are discussed and included in the introduction section for more clarification in this work.

Edvinson and Malone (1997) stated that IC as an information that can be changed over value since intellectual capital determines the firm performance and makes the incentive for it, which shows the connection between organization intellectual capital and value creation by an organization (Marr and Roos,2005).

Marr and Schiuma (2001) defined IC as the set of information resources that are attributed to the firm and necessarily add to enhanced the position of the company by adding more value to key shareholders which will help to increase the competitive advantage. The knowledge, data, experience, ability, process, strategies, relations and so forth which are together named as intellectual capital (IC) considered as the base for achievement in the twenty-first century (Ghosh and Mondal, 2009).

Different researcher has said that IC is most critical for all type of organizations (recorded firms, non-benefit organizations and private-sector organizations) the reason is that IC is amongst the most vital components which are making value for the firms. So IC require the consideration of the administrators to be recognized, estimated and managed (Klein and Prusak 1994).

The most well-known model for characterizing (IC) was presented by Saint-Onge (1996). It splits intellectual capital into three sections: human capital, structural capital, and capital employee efficiency. Human capital are known as the biggest and most essential intangible resource of the firm. It contains the shared information, experience, talents and abilities of an individual's inside the firm. Structural capital are the helpful infrastructure for human capital – it is the capital, which stays in the production line or office when the representatives leave by the day's end. It have administrative capacity, procedures, information and licenses. Capital employee efficiency is an organization's relation with its clients, suppliers, key accomplices and investors. The worth of these benefits is determined by the organization's status and image.

The value making part of IC turns out to be more essential in the knowledge-based organization. An information association is one which identifies and values intellectual capital that gives an upper hand in the market (Lim, Lynn and Dallimore, 2004).

In the present century the time of making economy has moved to the information base economy. The information economy as the production and services are totally dependent on knowledge concentrated activities which contribute to the technological and logical development (Powell and snellman, 2004). The standard

feature of information economy is on productivity, supply and usage of the learning for creating the economic activities.

In such organization, knowledge influences the performance of the organization and supports a consistent learning process and draws in effectively in the administration of the intellectual capital (Huseman and Goodman, 1999).

Brookings (1996) stated that intellectual capital is including every irrelevant asset that could be considered as resources with some sort of exchangeable capitalized value. The term IC can also be said to be the knowledge resources of the organization which accomplishes hierarchical objectives. He additionally expressed that it is along these lines an arrangement of irrelevant assets incorporate the interior learning of representatives about the data procedures, external and internal experts, item, client and competitor.

As a general rule the wealth of current economy is never again rely upon physical assets rather it relies upon intangible assets. There are a few organizations that win benefit and keep up their quality in the present-day economy. Only relying on intangible resources or intellectual resources. Along these lines, IC related with the primary wellspring of individual hierarchical and also national intensity (Wiig, 1997).

For some organizations in this knowledge-based economy, intellectual, not physical capital are one of the most significant assets. (Marr, Gray and Neely, 2003) contend that a company's importance was often partially rely on intangible resources. It was recognized by numerous analysts that IC is the most essential key resources in estimating firm performance of a developing and under developing nations (Khalique, Abdul Nassir Shaari, Md. Isa and Ageel, 2011; Amrizah and Rashidah 2013 and Ngah and Ibrahim, 2012). Therefore, we should naturally believe the ability of intellectual capital usage to have an immediate effect on the performance of firms, in this way organizing the problem of an everyday interest to managers and investors (Pew Tan, Plowman and Hancock, 2008).

In any case, at exhibit the developed countries investigate rationale in estimating, admiring and detailing their intangible resources as they probably are aware that

IC has turned out to be most important financial performance indicator and device to get upper hand in the market. A couple of scientists have completed such examinations and make accessible confirmation for emerging and rising economies that IC explore reporting, measuring, valuation are all at their developing stages in these economies (Bharathi Kamath, 2008).

This study of intellectual capital has significantly focused on the developed countries, as opposed to developing countries like Pakistan. This paper is proposed to catch the IC observation in the non-financial sector of Pakistan and to check its relation with the performance of Pakistan. There was a little research done on this kind of study which become an important reason for taking this topic. We will talked about three components which will represent the intellectual capital i.e. human capital, structural capital and capital employee efficiency in this investigation.

1.2 Theoretical Support

1.2.1 Resource Based View Theory

The first individual who initially presented the Resource-based view theory (RBV) was (Penrose, 1959) and a short time later, Wernerfelt (1977) and Rumelt (1984), endeavored to understand the thought. The firm's RBV expect that the competitive advantage of an organization's in a given market can be controlled by the business resources and abilities. RBV supporters hold that firms are different entities characterize by their private assets (Barney, 1991; Nelson and Winter, 2002).

The main asset that see the similar benchmarks is "learning" nevertheless of whether it's named as undetectable resources, absorptive competency, center abilities, key resources, intangible resources, structure memory, or alternative ideas with comparable meaning.

The author places importance on the inner assets of an organization. To understand the significant role of the company's natural assets, the entrepreneur's

pictured the whole environment inside their mind. This picture will influence the individual's behavior. The author additionally acknowledged the actual fact that each markets and organizations cooperate with their various environments, and every being co-dependent with one another for their own survival. The researcher believes that an organizations are way larger than administrative body; it's regarded as more of a collecting of resources which are productive, whereas the utilization of those resources are decided by manager's decision. Capital of a company embraces tangible resources, like plant, equipment, property and natural resources, raw materials, semi-finished products, waste and by product, and even the unsold stock of finished commodities. Resources are thought to be a set of accessible services that would be describe individually from their usage, whereas services couldn't be explain that much. Such differences are what spelled out the uniqueness of individual companies (Penrose, 1959).

The Resource based view (RBV) joins a firm inner capability (what it excels at) to its external trade condition (what advertise requests and what contenders offer). Capacities have proved more durable to explain and regularly named as intangible resources or moderate things (Amit and Schoemaker, 1993).). Basically, inner capability refers to the firm's ability to prepare resources.

Dierick and Cools (1989) paper was generally important literature in the hypothesis of Resource-based theory. In Resource-Based Theory an organizational resources can be divided into three types, namely physical resources (buildings, new machinery, and the physical, environmental location), human resources (skill and awareness of employees), organizational resource (structure; strategies for making plans; checking and control; and finally social resources (relation between the employee in the company as well as the relationship of an organization with its investors and customers). Each of these resources have different contributions in achieving sustainable competitive advantages, so the company should be able to determine the key resources that can create sustainable competitive advantages. Therefore, the significance of managing IC must be realized by an organization because their intellectual capital can fulfill the criteria as a unique assets which

would help the company to make a competitive advantage by creating value added to the company's performance as set out by (Bassey & Tapang, 1997).

For this study, we are going to use resource-based theory which will able to facilitate us to find the relation among Intellectual capital and performance of non-financial companies of Islamic Republic of Pakistan. (Kolachi and Shah, 2013) says that with the assistance of resource based theory, IC is more vital for each minor and major firms in developed and developing countries like Pakistan , we have a tendency to utilize this theory to clarify the link between IC and the financial performance of a firm. Based mostly upon this theory, researchers have a tendency to argue that IC contributes greatly towards the financial performance of an organization. This argument is in consistent with (Zghal and Maaloul, 2010) that companies will make further returns and build a competitive advantage from the effective use of its strategic resources like IC assets.

1.3 Problem Statement

IC assumes an essential job in forming the organization's prosperity and future aggressiveness. On the other hand, some managers can find the favorable circumstances inside their business which are aimed to oversee intellectual capital (SMAC, 1998). A group of the senior managers don't know how to put resources into intellectual capital and see related returns. They are as yet managing tangible resources as opposed to including the intangible advantages for generate capital and investor value of the business.

Hence the problem is derived from the research gap in the literature. This research study is trying to explore the following gap and to suggest a possible solution for it: to look at the relation between intellectual capital (IC) and firm performance. To explore how intellectual capital is perceived and developed in the non-financial firms of Pakistan.

The inspiration for this investigation is that, no such investigation have been done on the non-financial companies of Pakistan because of the shortage of scholar articles particularly in non-Financial area or one can say absence of knowledge

about this concept. The past researcher only concentrated on financial sectors of Pakistan. However this study addresses the intellectual capital issues on this perspective. As a result, researcher will develop an accurate method to solve the limitations insignificance of traditional measures.

1.4 Significance of Study

Pakistan is an emerging nation with some scare resources in non-financial companies. Non-financial companies considered as a prime sector for Pakistan. It has been doing well from the beginning. Intellectual capital are among most vital resources in assessing the performance of a company for developed nations. Thus, it is relevant to investigate the performance of this particular sector which are described by the intellectual capital owned by an organizations.

This research would be essential to know the significance of intellectual capital in the emerging countries, especially in Pakistan, which could help to bring more profits to its economy and fortify the aggressiveness of the area overall as far as drawing in new investment from the investors. In addition, this exploration will give suggestions on the most proficient method to study the connection between intellectual capital and firm performance of a specific organization.

Thus, the reason behind this investigation was to see the connection between the parts of intellectual capital and measure their effect on the firm performance especially in a non-financial sector of Pakistan. From this experimental investigation, individual and also non-financial companies would take guidelines for performance enhancement in this sector by creating and overseeing IC. Moreover, this examination will help to fill in as a future reference for experts regarding the matter of intellectual capital and firm performance.

1.5 Research Objective

The major reason of this investigation is to check the relation among the intellectual capital and firm performance. To improve the firm performance and to

investigate the effect of intellectual capital on firm performance.

1.6 Research Questions

1. Can Pakistani firm performance be effected by introducing value added intellectual coefficient?
2. Can Pakistani firm performance be effected by introducing human capital efficiency?
3. Can Pakistani firm performance be effected by introducing structural capital efficiency?
4. Can Pakistani firm performance be effected by introducing capital employee efficiency?

1.7 Theoretical Framework

In the Figure 1.1 of theoretical framework has firm performance which includes Return on assets, Return on equity, Growth revenue and Return on sales are dependent variables. Whereas Value added intellectual coefficient (VAIC), Human capital efficiency (HCE), Structural capital efficiency (SCE), Capital employee efficiency (CEE) are using as independent variables. In this research control variables are also using which are leverage (LEV) and Firm size (FSIZE).

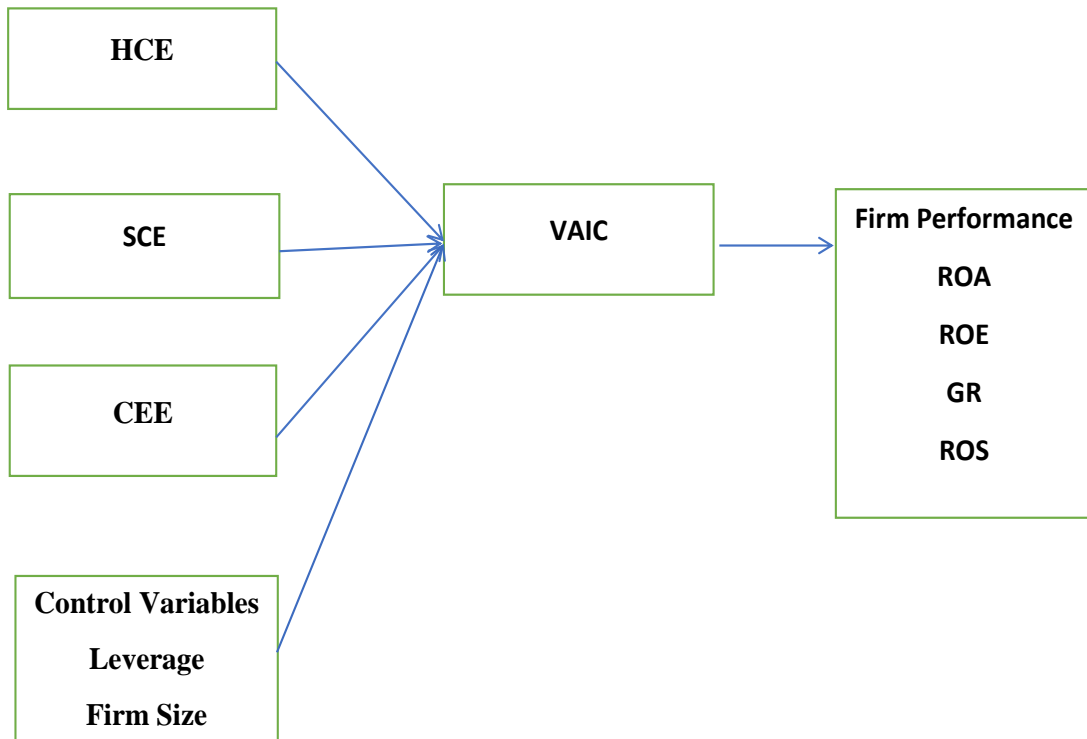


FIGURE 1.1: Theoretical Framework

1.8 Organization of the Study

The first chapter is discuss about overview of intellectual capital and its constituents. This chapter also discusses about the theoretical background, problem statement, research objective and significance of the study. Chapter two shows the detailed discussion about literature review of intellectual capital and its constituents that is human capital efficiency, structural capital efficiency and capital employee efficiency. Third chapter talks about the data, sample and methodology design. In chapter number four method has been used to run the final results and also presented the discussion related to the final result. In this chapter descriptive statistics, correlation and determinants of variables has also been explained in it. The last chapter that is chapter number five discusses about the conclusion and the future recommendation.

Chapter 2

Literature Review

2.1 Intellectual Capital

The growth of the new economy, one primarily determined by information and knowledge, has directed to better interest in intellectual capital (IC). Intellectual capital is becoming the well-known assistance for growing financial wealth. Tangible assets such as property, plant, and equipment continue to be essential elements in the production of each goods and services. However, their virtual importance has reduced via time as the significance of intangible, knowledge-based assets has increased. The term capital was firstly introduced by John Kenneth Galbraith in 1969. Feiwal (1975) considered that intellectual capital meant extra ordinary skills and capabilities than just intellect as pure intellect instead of incorporating intellectual action. In that manner, intellectual capital is not only a constant intangible asset per se, but known as an ideological process; a method to an end. If businesses need to sense intangible assets, they will reveal them within the financial statement like different assets. He argued that intellectual capital is the prevailing information in business which will be able to create competitive advantage. He defined intellectual capital as the mixture of an organizations patents, processes, employees skills, information technology and info concerning customer

and suppliers. He described IC as total of the whole thing, everyone in your company is aware of that requires you a competitive edge in the marketplace (Stewart, 1991).

Stewart (1997), defines IC as intellectual material, knowledge, information, intellectual property and experience - which will be used to create wealth. Mostly, the term IC is represent as intangible assets of an organization, which will have a necessary effect on its performance and standard organization achievement. He similarly defined intellectual capital as "the sum of all the component regarded by using each person in an organization that will help the firm to gain competitive advantage in the market. While they are now not fully listed in the balance sheet (if so, then under the term goodwill). The intellectual capital has been acknowledged by many current researcher and policy makers. The organizations success and survival is based on human skills, competencies and their experiences, innovation practice and technology. Intellectual capital defines as a valuable intellectual asset which is the essential competency to enhance the increase of the organization. He recommends three measures of intellectual capital at the business enterprise level: market-to-book ratio, Tobins q, and calculated intangible value. The normal notion of these measures is to decide what cost the inventory market offers an organization compared with the price given the organization as indicated on the companys balance sheet. The primary contribution of steward is to provide the definition of intellectual capital and the focus to evaluate intellectual capital.

Stewart (1999) stated that information is the foremost vital portion of present day production. Subsequently intellectual capital is one of the crucial issues for corporate administration and governance. According to Thomas A. Stewart, an author and a broadly renowned expert on information administration characterizes information resources in book. He explains that how knowledge is made, bought and sold and where the cash is. The moment offers a useful four-step handle for overseeing the resources, from recognizing them to making steps for their productivity. The author addresses such vital issues as how companies ought to reorganize to maximize the execution of their information and compensate individuals appropriately. He incorporates a great think amount on the deficiencies of bookkeeping

for intellectual capital.

An asset is something that changes raw materials into finished goods (or benefit) that's more profitable than the total of the raw materials alone. Generally, the resources that comprised raw materials were essentially physical capital machines, plants, stockrooms, trucks, etc. In any case, nowadays, numerous merchandise and administrations are made through the application of more intangible assets including human capital (the aptitudes and information of the organizations individuals), structural capital (licenses, forms, databases, and systems), and capital employee efficiency (relationships with consumers and sellers).

The intangible resources are invisible assets that incorporate a wide choice of doings such as innovation, customer believe, brand reputation, corporate culture and administration skills (Itami, and Roehl, 1991). IC is elusive , in any case once it's found and misused, it have to offer a firm with latest resource-based knowledge that will help to compete and win (Bontis, 1996). Bontis. (1998), IC is accomplished as a group of intangible assets (resources, capabilities, competitive) that characterizes structure performance and value creation. Intellectual capital gives an opportunity to form and encourage the network between all sets of skill, intelligence and competencies in inner and outer of an organizations (Cabrita, Maria and Bontis, 2008). The rise of information of employees, data innovation and the acknowledgment of the relation among intellectual capital, innovative advancement and competitive advantage moved both the scholastic world and administration towards a more intellectual capital-based sight of the company by replacing the conventional physical resource based view. The intangible perspective of economy has been set up based on intellectual capital, and its main source is information and knowledge (Cabrita et al, 2008).

Intellectual capital is the combination of the four components: market resources, human centered resources, intellectual property resources and infrastructure resources. Market resources of an organization are due to market-related number such as brands, clients, collection, legitimate dispersion channels, contracts and agreements such as licensing and franchises. Human-centered resources are

the shared information, inventive and problem-solving capability, authority, risk-taking and administrative abilities epitomized by workers of the organization. Intellectual property resources have the lawful instrument for securing numerous corporate resources, and foundation resources including know-how, copyright, patents, design rights and different plans. At last, infrastructure resources rises to those information technology , techniques and forms which permit the organization to operate including corporate culture, techniques for surveying chance, and strategies of man, financial structure, databases of information on the market and strong communication systems (Brooking , 1996).

The researchers highlight the significance of intellectual capital in an organizations by paying consideration to the things of measuring and administration approaches of intellectual capital. They encourage to describe intellectual capital as an information that can be changed over into valuable resources. It is the totality of human and structural capital. It incorporates the regular experience, organizational innovation, client network and professional aptitudes that give the competitive advantage for the company within the marketplace (Edvinsson and Malone, 1997).

Roos, Edvinsson and Dragonetti, (1997) see the intellectual capital as a dialect for considering, talking and doing something concerning the drivers of companies future profit. It also consists of social network with clients and partners, technological advancement, company infrastructure and also knowledge and abilities of the organizational members.

Intellectual capital is included in recent financial, managerial, innovative, social science improvements with an approach which was already obscure. (Petty and Guthrie, 2000) claim that whether or not these advancements are analyzed through the channel of the information society, the knowledge-based economy, the organize society, or development. There are abundant things to boost the confirmation that IC is effectively participating inside the assurance of company worth and national financial progress.

Sullivan, (2000) expressed that intellectual capital is the information that can be changed over into benefits. Accomplishing benefit is the most important concern of

business and while the definition might appear compact its reality maybe clouded. It doesnt offer any sign of wherever the data may be found or how transformation is accomplished.

Since 1970s, there has been a rapid change within the outlay of the financial development, encompassed by the innovation, communications, computers, web etc. As the world has moved from the industrial age into the knowledge age, there has been an extraordinary importance on the estimation and administration of more intangible resources such as information, aptitude and client network. At the same time there has been a broad affirmation of this wonder and bookkeepers have strived to discover suitable strategies by which to both measure and manage these intangible resources, commonly known as intellectual capital (Chen, Zhu, and Xie, 2004).

The work on the value of intangible resources to the firms were originally published in Japanese in 1980, but not published in English until 1987, with the title Mobilizing invisible assets. They found that individuals were concerned about intellectual resources, that coordinated to their endless commitment to the field of intellectual capital and intangible resources (Itami and Roehl, 1987).

Sveiby (1988) is the creator of the "Swedish Development" in information administration and intellectual capital. In 1986, he published his book, in which he revealed the way to oversee the fast developing field of information firms, by managing with the information and creativity of their employees. In 1989, he published the outcomes of the Konrad working bunch, prescribing a hypothesis for measuring information capital by separating it into three categories: customer capital, individual capital, and structural capital. Sveiby, (1997) created The intangible Resource Screen as an introduction arranged that appears indicators for inward administration data purposes. It acknowledges the thought of Intangible Assets instead of IC. The three sorts of intangible resources are taken into consideration in his show: Intangibles characterized by competency of employees education, skills and experience. Intangibles related to the inner structure of the organization (the organization: management, legal structure, manual systems, its

attitudes, Research & Development); and those related to the outer structure including company's brand image and relationships of company with suppliers and customers.

Sullivan (1998) is one of the creators of the IC. Development gathering has motivated firms and individuals included with value extraction to share data and to similarly creating choice forms, strategies, and frameworks that turned out in useful results. Harrison and Sullivan investigation separated the intellectual capital into four primary elements: Human capital: refers to basic capabilities of the organization, structure capital: alludes to exchanging the human capabilities into items and administrations, market capital: refers into the power to manage the external factors with the inner capabilities and at last creativity capital: refers to the abilities which makes a difference to improve and create the capabilities and environ intellectual components.

Edvinsson and Malone (1997) was responsible for making ways in which to depict what Skandia Confirmation and financial services referred to as "the hidden values" and create an intellectual capital administration model for an organization. He was motivated by Intellectual Capital and Business performance. He has distributed intellectual capital into two sorts which contain both human capital and structural capital. The HC comprises of information, experience, ability and the workers capacity to create arrangements for its clients. For the structural capital, it comprises of capital employee effectiveness and structure capital that's divide into advancement capital that produce property rights and process. This classification specified that the value of market for any organization has two divisions, substantial (financial capital) and intangible (IC). This classification was criticized since it doesn't think about the property rights as intangible resources, while it is considered as intangible by law and the value may fairly be determined.

The IC has comprised of four categories of resources: Market resources, includes brands, client, and trade collaboration and dispersion channels. Intellectual property resources comprises of copyrights and secrets of trade. Human resources, which contain instruction, learning and work-related information and capabilities

and finally infrastructure resources consists of administration forms, data innovation system, organizing and financial frameworks (Brooking, 1996).

Chen, Zhu, and Xie (2004) outlined an investigation through a qualitative list framework and they found that there's a noteworthy relationship between the four components (customer, creativity, structural and human capital) of IC and its business performance. Besides, they proved that there's a remarkable relationship among the components of IC. Skandia strategy is considered the premise for most scholars about that dealt with measuring and describing the intellectual capital. This classification expressed that IC is broader concept than the conventional point of view for the intangible resources. It is additionally expressed that intellectual capital is composed through the inner interaction between its fundamental components (Human, structural and relational) and the worth of the organization. In other words, intellectual capital will not be established as a result of one of the components alone but, through the interaction between all of them.

2.1.1 Intellectual Capital and Firm Performance

Stewart (1991), in his article brain power wrote that intellectual capital is the entire information of everything everybody in your company knows that it'll give a company competitive edge over the other companies within the market. Stewart makes intellectual capital as qualities of an organization, and depicts intellectual capital as the elements impact of individuals judgment skills. These resources are inconspicuous since they don't appear up on the adjust sheet of companies. At the same time, as business diaries and magazines prove day by day that numerous senior administrators realize that fruitful companies will be those who do the most excellent work of capturing, supporting and leveraging employees information.

On a hypothetical level, well known scholars contend that IC is the value driver of all companies and information administration may be a core organizational issue in which organizational information is at the center of each viable competitive advantage (Nonaka and Takeuchi, 1995). However, experimental prove is uncertain and distant from accomplishing a strong scientific agreement. The research has

found a positive relationship between intellectual capital and financial performance of the company, whereas Bontis et al. (2000) concluded that, notwithstanding of industry, the advancement of structural capital includes a positive and noteworthy effect on firm excellence and progress.

A research showed in a Basque locale of Spain, where the information collected from the 114 new firms out of 364 and the outcomes shown that human capital of the business (i.e. education, business involvement and level of inspiration), structural capital (i.e. firm capacity to embrace rapidly to changes and the capacity to actualize effective techniques) and capital worker proficiency (i.e. improvement of profitable business network and an direct access to partners) are serious intangible resources and related emphatically to firm performance (Pena, 2002).

The initiative is taken to conduct a case to see the effect of intellectual capital on the financial and non-financial performance of West Cement Company of Kermanshah, Iran. The variable considers within this investigation were intellectual capital as measured through human capital, structural capital and capital employee efficiency, organizational slanting capability and firm performance; which were measured through financial and non-financial performance. The research study found an inter-relation between all three measurements of intellectual capital. All three measurements of intellectual capital moreover yielded a coordinate relationship with organizational biasing ability, budgetary and non-financial accomplishment (Jalilian, Hassani, Ghanbari and Moradi. 2013).

The study was conducted to calculate the IC performance and its effect on financial performance of 32 cars companies recorded in Stock exchange of shanghai. The experimental discoveries uncovered that all the determinants of VAIC have positively significant impact on financial performance of 32 automobiles companies (Ji-jian, Nai-ping. and Yu-sheng, 2006).

Tan, Plowman and Hancock, (2007) have studied the relation among intellectual capital and financial performance of 160 recorded firms within the Singapore stock market. The results proposed that intellectual resources of the company are more responsible for efficiency of financial capital instead of physical capital.

Theoretical and empirical research to date on the relationship between intellectual capital and corporate performance has not been concluded. They have suggested that the combined impact of intellectual capital components encompasses a more prominent impact on corporate performance than combined effect of human capital, social capital and organization capital. Typically backed by researchers that intellectual capital makes value through coordinated efforts of human, social and organization capital. In the past studies it has been examined that the combined effect of intellectual capital components on corporate performance found a positive relationship (Youndat, Subramanian and Snell, (2004); Cabrita and Bontis (2008).

The reason of this study was to examine experimentally the association between the value creation effectiveness and firms financial performance. Utilizing information from Taiwanese recorded firms. The value added intellectual Coefficient (VAIC) demonstrate as the productivity assessment of capital employed and intellectual capital, the creators made relapse models to look at the association between company value creation productivity and firm market-to-book value proportions, and to investigate the association between intellectual capital and firms current as well as future performance of financial affairs. The outcomes show that firm intellectual capital has a positively significant effect on financial performance (Chen, Cheng, and Hwang, 2005).

The results were taken from the firms of the Stock Exchange of Hong Kong from 2001 to 2005. The VAIC strategy was utilized within the estimation of IC by Public. Regression models were utilized to study the association among IC and the particular financial performance. The outcomes of the examination uncovered no certain prove to bolster an authoritative relationship between IC, as measured by VAIC, and the four measures of financial performance within the test companies studied in Hong Kong. A reasonable relationship was recorded between IC and the profitability assessment. The study encourage that physical capital is exceedingly analyzed by the companies studied for progressing market valuation, effectiveness and productivity (Hang Chan, 2009).

Pew Tan, Plowman, and Hancock, (2007) assessed the observational association of IC with current and future progress of an organizations by utilizing VAIC model

and appear that intellectual capital have positively significant impact on development rate and future progress of companies whereas IC commitment to an organizations progress differs from organization to organization. Intellectual capital is measured as one of the foremost valuable strategic assets for organizations. They too found that SCE is slightest imperative in these divisions and has positive impact in this setting.

Intellectual capital is the set of intangible resources which enhances not as it were firm performance but moreover upgrade organizational value with the value of market which is equal to value of book furthermore intellectual capital, with book value, normally as it were the tip of the mass of resources. It moreover makes a difference in assessment of the contrast between the book and market value of knowledge-intensive firms (Schiuma and Lerro, 2008).

Clarke, Seng, and Whiting (2011) contend that the influence of IC within the market value is similarly important in developed nations comparatively developing or frontier nations. The researcher examined the effect of IC on the financial performance of firms in Australia and discover that IC efficiency (VAIC) is specifically related to the financial performance of the firms, particularly in terms of human capital and physical capital productivity. Using annual report data of Australian publicly traded firms from 2003 to 2008, he moreover measures the productivity of IC and their relationship with the financial performance of an organizations. Four execution measures, ROA, ROE, revenues growth and employee productivity, were utilized in their investigation. The results show that, developing significance of IC for an organizations, physical capital still rules the financial performance of firms in Australia.

2.2 Human Capital Efficiency

Human capital is the heart of intellectual capital. It is one of the strategic assets for organization and considered as path for success. Its theory was introduced by Schultz in which he established the theory in his study *Investing in People*, presented the theory of human capital. He further stated that capabilities and

information are elements of human capital and capital is considered investments product. The concept of human capital includes to invest in the training of people as well as in their learning abilities. He has made comparison of achievement of capabilities and information to acquire productions and effectiveness means. He further argued that to invest in the human capital leads to a growth in human productivity which helps to increase return on investment and overall performance of organization (Schultz, 1961).

Bontis (2001), say that human capital signifies the employee knowledge and helps to effectively utilize the resources of an organization. He stated that human capital as the organizations collectively capable for better results from the information of an individual. Inappropriately, workers withdrawal from organization leads it towards loss and become a risk for the organization performance. The old school of thought suggested that withdrawal of some employees in an organization, may be considered well, since it encourage firms to hire new employees from the replacement of old employees.

Brooking (1996) suggested that with the usage of people assets are valuable, but it has also positive effect of property which is owned. The assumption is that, assets play a major contribution in the shape of skill and expertise, but they are backed challenges that need to pay reimbursement for their facilities.

Fletcher, Guthrie, Steane, Roos and Pike (2003) refers to human assets and in this manner shown the standard approach of assets being on the line of land labor and capital as fundamental to control a business. The researchers utilize the classification of human capital later in research article. Human centered resources and human assets may be classifying as variety on the term human capital.

Bontis (1999), human capital is considered important because it is a foundation of creativity and strategic restoration, reengineering modern forms and making improvement in personal capabilities. The importance of human capital is the pure brainpower of the managerial member. According to (Bontis, 1998), if a business has deprived systems and measures through which identify its actions, the overall performance of intellectual capital will not succeed its fullest prospective. A strong structural capital in organizations will have an understanding culture

which permits employees to try different things, to acquire, and to fail. It is the essential association that permits IC to be dignified at the managerial level of investigation. On the other hand, Human capital characterizes the employee knowledge as an asset of organization as represented by its employees (Bontis, 2001). Employees information, capabilities and intelligence, human capital is considered as the source and force of insurgency and development. A business which contribute in human capital and join significance to workers tend to appreciate superior business returns or competitive edge. He assists contended that human capital is the foremost critical viewpoint of Intellectual capital, and the foremost critical influencing indicator for organizational performance. In this way, human capital might serve to provide performance of firms (Seleim, Ashour, and Bontis, 2007). The utilization of person competence centers on the commitment of each worker instead of taking an all-encompassing view of the commitment of workers. He focuses all resources and structures whether tangible or intangible as the outcome of human actions. The researcher is expressing that without the input of individuals their information thoughts and the capacity to improve the tangible resources would stay inactive which the working of an organization relates more to the creation of information structures than to material productivity. He recognizes intangible resources has turn out to be more commonly alluded to as intellectual capital (Sveiby, 1997).

HCE is considered as gigantic commitment within the field of innovations and development subsequently, its importance cannot be ignored within the information base economy. There has been a developing consideration that labor is considered as a fundamental asset for organizational victory and survival, which convey the premise for competitive advantage in energetic business environment. These are the intellectual capacities of organizations high management being utilized for making vital choices. Human Capital is the information, involvement, ability and mastery of firms representatives (Edvinsson and Malone, 1997). However (Edvinsson and Richtner, 1999) stated that human capital can be portrayed as the employees capability, relationship ability and values and work on human capital frequently centers on changing person into collective competence and more

persevering organizational capital.

Information progresses in several shape, from special, creative capacity, resourcefulness, to the training experience. As time advances human capital measurements account for workers wellbeing, inspiration and capacity to make physical and non-physical resources which contribute to the stable gathering of truths and concepts. Contrasting structural capital, human capital bounded to the person who has it. As vital highlights of human capital, resourcefulness, collaboration capacity, adaptability, inspiration, learning capacity, and instruction contribute emphatically to Intellectual Capital (Cabello-Medina, Lopez-Cabrales, and Valle-Cabrera; 2011).

To meet the organizational objectives, it is essential to have skillful resources which is known as human capital, states that workers of the organization contributes in value creation process which is comprised of the capability, boldness and intelligent agility (Marr and Roos, 2005). He elaborate capability as precise information grounds that include the implicit features, intelligence control, understanding, aptitude to figure individual systems, and capacity to contribute in individual networks. Likewise, the boldness incorporates interactive personalities comprising societal intelligence, inspiration, wisdom of determination and resolution. Interchangeably, human capital is the knowledge a worker obtains on the job via involvement and training therefore developing his or her marketplace value (Roos and Roos, 1997).

Subramaniam and Youndt, (2005) HCE are particularly vital in todays competitive environment meanwhile it is the total of workers ability to practice unique and intangible resources by applying their information and suggestions. These suggestions will make value for the institute and help to support the company to have a competitive advantage in the market. Moreover, not at all like structural capital is that retained by the business, human capital rooted within the people of an organization, and the institute loses these capitals when employee leaves an organization. Human capital can furthermore be made or bought (Youndt, Subramaniam, and Snell, 2004).

They argue that employees ought to be able to work in groups and to organize in arrange to encourage information sharing inside the organization. If human capital isn't organized, shared or channeled through connections, it offers small benefits to the organizations in shapes of development. Consequently, social skills are a vital element following to the extra effort relevant skills to grow a range of innovative capabilities (Subramaniam & Youndt, 2005).

2.2.1 Human Capital and Firm Performance

The researchers examine the observational association of IC with financial performance of 96 recorded companies in Stock Exchange of Athens and contended that Human capital efficiency has positively significant relationship with firms performance that is return on equity (Madinios, Chatzoudes, Tsairidis and Theriou, 2011).

The researchers have examined that Human capital efficiency (HCE) has shown positive relation with firms financial performance and shows negative relation with performance of Indian Stock Exchange of different divisions (producing, services and innovation). They moreover found that SCE is slightest vital in these segments, whereas capital employee efficiency (CEE) have significantly positive impact (Singh and Narwal, 2016).

The researchers inspected the observational association of IC performance and financial performance of Australian hotel industries with the time period of four years from 2004 to 2007 conducting value added intellectual capital (VAIC) technique. They determined that human capital efficiency (HCE) has positive relation with financial performance which is return on assets (ROA) of hotel business (Laing, Dunn and Lucas, 2010).

The researchers presented an empirical investigation on Turkey information technology division and decided that all the firms as an entirety have generally high HCE than SCE and CEE. The outcomes discovered that elements such as human capital efficiency, leverage and firm size forecast the productivity well. Human capital efficiency had shown the maximum influence. Moreover, capital employed

efficiency were discovered to be an important interpreter of both efficiency, ROE and firm size (Calisir, Gumussoy, Bayraktaroglu and Deniz, 2010).

Mention & Bontis (2013) the association between IC and its instruments with the performance of the banks situated in Luxembourg and Belgium. The discoveries appear that human capital influences banks performance straightforwardly and by implication, while SC and CEE has shown immaterial positively insignificant impact on performance of the banks.

It has been studied that the relation among human capital and organizational performance of software companies. They found a positively significant association among human capital and firm performances. In todays trade world HC are measured as an important concept since it recognized that employees of the firms should be treated as assets, instead of as expenditure.

2.3 Structure Capital Efficiency

Bontis (1998) says that the Structural capital is the sort of information, which remains inside the companys property resulting to the commitment constrained by the human aptitude. He advances that those institute which has poor structural capital will have trouble to reach the complete utilization of intellectual capital. Structural capital comprises of procedures which will support workers in their work and increase their efficiency and performance of the company. It will enhance value to the progress of an organization.

The Skandia AFS marketplace value theme outlined by (Edvisnsson and Malone, 1997). They proposes a two elements approach to intellectual capital i.e. human capital and structural capital. Structural capital is split into capital employed efficiency and organization capital in spite of the fact that the characteristic classification might oppose this idea client capital is situated as an isolated part by a few analysts (Fletcher et al.2003; Steward, 1997) while SC may be a term already utilized by diverse researchers. (Sveiby, 1997) well-known observed that structural capital falls into patents, concepts, models and body systems.

Structural capital contains all the non-human storage facilities of information in firms, which have the databases, basic charts, strategy guides, techniques, schedules and something whose value to the business is unbelievably extraordinary (Bontis, 1999). The organizations have deprived frameworks and strategies by that to follow its activities, the intellectual capital won't reach its fullest potential. Organizations which have extreme structural capital can have a authenticate culture that permits their workforce to attempt unused things, to be supervised to apply those things (Bontis et al. 2000).

Stewart (2001), examined that structural capital can be built on a stage which empowers workers to require steps towards building up creative thoughts inside the organization. He moreover contended that, structural capital would make a strong environment for rapid data distribution, collective information advancement, improve time proficiency and make more development among people. The structural capital is aiming to share data successfully, to raise open mindfulness, learning, and to reduce the period of time and move forward the efficiency of human capital. It is obligatory to share data and encounters on day by day premise and to permit instruments such as generation portrayals, instruction manuals and the Web utilize a dependable and inventive organized way (Stewart, 1999).

2.3.1 Structural Capital and Firm Performance

On the other hand, those organizations which do not have effective basic framework will not accomplish its fundamental target. (Bontis, 2001) concluded that, solid structural capital organizations have a solid culture that will allow its human capital of an organization to persistently enhance and learn and hence would help the organizations within the value creation procedure. The organizational capital contains structures, framework and entire physical assets.

Bontis et al. (2000) has shown their results that are taken from 107 firms of Malaysia which shows that intellectual capital has significantly constructive association with business performance of the industry sector. They showed that

human capital is significant nevertheless of the industry type and has more noteworthy impact on how a business have to be organized in non-service compared to benefit businesses, customer capital has significant impact over structural capital irrespective of industry improvement of structural capital features a positively significant relation with the business performance of the industry.

The relation between value added intellectual coefficient (VAIC) and the firm financial performance in term of improvement, profit, competence and market-to-book value. The analysts utilize firm size, leverage, ROE and industry sort as controlled factors to capture their impacts. Developing evidence measured from the annually reports of 75 public recorded firms on the Johannesburg stock exchange South Africa for the year 2000, the analysts utilized VAIC to estimate IC efficiency. Despite of numerous investigations describing a solid positive relation association amongst IC and a firm's financial performance, (Firer and Williams, 2003) report ambiguous assumptions. There is a practical relationship between structural capital and profitability. This study has used period of one year. They propose that further research that encourage investigate were required to know more about the association among IC and financial performance of the organizations especially in emerging economies.

Bontis et al. (2000), argue that poor SC hampers the consumption of the HC and consequently creating a SC which can offer assistance in enhancing the value creation process of the organizations. Structural capital signifies all the nonhuman warehouses of knowledge including organizational charts, prepare manuals, procedures, schedules and approaches. A business which have durable structures and strategies to utilize its specialists can offer assistance them accomplishing their objectives.

Building up an information bank empowers the reuse of information. Capital structure of an organization have to make a few plans for making IC assets for occurrence, it must offer assistance to the staff to understand where they would explore for information or who has the finest ability. He further argued that an individual can have a high level of intellect, but if the organization has poor

systems and procedures by which to track his or her actions, the overall intellectual capital will not reach its fullest potential (Bontis and Fitz-Enz, 2002).

Consequently, organizations uniting structural capital in their overall industry procedures it would not just creatively enhances within the way in which they collect, make and transmit information, furthermore pick up a well position to deliver better quality, low price and more information driving to enhanced operational performance (Aramburu and Saenz, 2011; Zangoueinezhad and Moshabaki, 2009).

2.4 Capital Employee Efficiency

Capital employee efficiency is the organizational association with inside and outside partners of the firm, which include customers, employees, suppliers, industry associations, stakeholders, and strategic coalition partners. Capital employee efficiency includes image of the company, loyalty of customer, customer satisfaction, and employees collaboration with the suppliers, negotiating capacity, proper delivery channels, franchising and licensing agreement with other companies.

Bontis (1999) highlights the significance of any information movements from outside sources to interior and vice-versa. So, he established the thought considered as consumer capital which comprised all the types of external interrelations such as dealer, joint venture and business relationship. He also observed that capital employee efficiency is surveyed as function of life span and guards that its conceptualization develops from the market orientation.

The association of firm with stakeholders, including clients and investors, strategic partners, and Customers-Suppliers Relations (CSR) characterizes Capital employee efficiency (Roos, Ross, Dragonetti, and Edvinsson, 1997; Bontis, 1998). As a consequence, this capital works as an increasing asset that makes value by joining all components with other partners. They named CEE as a relations with clients and suppliers. It has been analyzed by the researcher that the capital employee efficiency have notable economic benefits for the business when they are appropriately accomplished. There is a strong relation between customer relationships and cash Inflows. The Company should sustained respectable relationship

with the customers and to make them satisfied with what the business provides, to help the company. It is necessary to achieve the competitive edge in the market. Furthermore, (Edvinsson and Malone, 1997) determine that the customer relationships are the start of cash streams, not the bookkeeping department.

Chen et al. (2004) support that without customer capital, market value or organizational performance can't be achieved. In long run, the dispersal of this insights must be done parallel and vertically inside the institute so that a capability in organization-wide action or approachability to market changes can be created. The researchers argued that the associations between workforces are surrounded in characteristics like a common code or a common example that enables a mutual thoughtful of cooperative goals and appropriate ways of performing in a collective structure. One of the two outer fundamentals of capital employee efficiency was the relations with consumers that frequently are mentioned to the market orientation concept and interaction with customers, for a numerous of diverse purposes, including reaction and issue recording (Tsai & Ghoshal, 1998).

Cheng, Lin, Hsiao, and Lin (2010) contends that the association of consumers with the business are an important aspect in competitive advantage which outcomes are based on the growth of company performance. The capital employee efficiency is acknowledged as the relations with clients, dealers and investors which can impact the firms life span.

2.4.1 Capital Employee Efficiency and Firm Performance

It has been acknowledged that Capital Employee Efficiency are interlinked between firms and their customers (Roos et al., 1997). It effects the business and their consumers. The term intellectual capital has been clarified as information of clients and their encounters which influence the capabilities and they are the source of organization. It is vital for the representatives to assist their clients.

To focus on the relationship between employee capabilities and customer satisfaction, employee must have aptitudes, information and capacity to assist client requirements effectively (Stewart, 1997).

The firm needs to discover and improve new ways to do business for building Capital Employee Efficiency with customers or partners and also need to be more inventive by knowledge from participants advanced capabilities. It is mandatory for the business to increase its level of quality by improving its products designs and features, cost benefit analysis, high productivity and quality management over the new visions resulting from its strong Capital Employee Efficiency. A business highlighting strategic relationships almost predictably emphasis on the relationship with their investors (Hsu and Wang, 2012).

Current investigation has recommended that Capital Employee Efficiency may decrease business costs, increase collaboration, allow entrepreneurship and the formation of start-up firms, and building up the supplier relations, regional invention systems and inter-firm education (Cabrita and Bontis, 2008).

The current studies on the impact of financial performance of pharmaceutical firms in India, the researchers comprehend the original VAIC model through containing a new Variable called Capital Employee Efficiency (CEE). The researcher outcomes reveals a positive relation among IC and firm performance but the new variable CEE does not produce the significant relation. ROA is the dependent variable over ROS (Return on Sales). They stated that including further variables to the VAIC model and using new substitutes to assess the variables. The researcher also recommend that including more companies and nations to simplify the outcomes since their research was restricted to 22 firms in the industry of Indian pharmaceuticals (Vishnu and Kumar Gupta, 2014).

Chapter 3

Research Methodology

3.1 Sample and Data

The current research purpose was to inspect the effect of intellectual capital on firm performance of Pakistan. The study used panel data of 100 non-financial firms of Pakistan. The sample used in this data were from the year 2007 to 2016.

The data were taken from Annual Financial Reports of non-financial companies listed in Pakistan stock exchange. For this particular study secondary data was used. In Pakistan Stock Exchange (PSX) there are two types of firms present financial companies or non-financial companies, the non-financial companies has been the largest companies listed in PSX as compared to financial firms. The samples of the firms which were selected are non-financial firms. This data covers 100 non-financial companies on the bases of market capitalization. Panel data define as data collected from a small number of observations covering a large numbers of units. Panel data is the set of cross sectional and time series data. Cross sectional data defines as Different variables from the different individual. Time series data define as the data varies with respect to time.

The information is gotten from little and vast number of perception over a period and number of cross sectional units. Panel data involves measurements over some period of time which refers to multi-dimensional data.

The study used panel data because the population of industries of same or different nature have different variables which varies with respect to time. The model that is used in this paper to find the result was ordinary least square regression.

3.2 Hypothesis for Model

H₁ VAIC has positive impact on firm performance of Pakistan.

H₂ HCE has positive impact on firm performance of Pakistan.

H₃ SCE has positive impact on firm performance of Pakistan.

H₄ CEE has positive impact on firm performance of Pakistan.

3.3 Independent Variables: Intellectual Capital

One needs to evaluate the intellectual abilities of the firm if they want to understand their intellectual capital. Through proper understanding one can work towards the efficiencies in the calculating the tangible and intangible assets of the firm; Chan (2009) shows a benefits of this method as given below:

- Value added Intellectual Coefficient. (VAIC)
- Human Capital Efficiency. (HCE)
- Structural Capital Efficiency. (SCE)
- Capital Employed Efficiency. (CEE)

Through use of these coefficients stakeholders, in firm, can properly measure the financial position and evaluate the firm's performance. The firm personnel can adjust to these coefficients and use them on their job, if there are used to the traditional accounting information.

3.3.1 Value Added Intellectual Coefficient (VAIC) MODEL

Pulic (2000) was a first one to use Value added Intellectual Coefficient (VAIC) for measuring productivity of intellectual resource. It also helps in realizing the efficiency of organization by understanding and monitoring value creation, through tangible and intangible resources (Shiu, 2006). VAIC helps to proficiently survey and assess the value adding activities that centers around the products instead of focusing cost controls (Shiu, 2006; Pulic 2000; Boremann, 1999). There are two main value adding assets in organizations, Capital Employed and IC, according to Pulic (IBEC, 2003). If input is removed from the output what we get left with is the value added. If sales revenue is taken as the firm's output than input is all the resources that the company obtains from the outside to make the product or deliver services.

Conventionally speaking accounting deals with the controlling of expenses but now it is moved towards value creation (Pulic, 2000). He realized that to monitor the value creation there a need to quantify the end goals and well an estimation device is there to check the value creation in the assets. The reason for all of this is to have a technique that can quantify the asset's productivity for any firm without being bound by location.

VAIC system was meant to calculate economic income by treating labor expense as value added activity instead of cost. Following are the main points to consider:

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1. To figure out the value added, all the work costs are to be ignored.
2. Work costs should be looked at as human capital i-e benefits.
3. Value added per unit is estimated by how much is spent on the employees.
4. Work costs does not come under any of the balance sheet accounts but instead are considered as the advantages on it.

There are only three sorts of intellectual capitals considered as value added activities; human capital, structural capital and capital employed (Pulic, 2000). The

(HC) must be realized by the cost of work incurred while the structural capital is the average of all the assets owned by an organization. He could find the quantity of the IC and the value added, helping achieve capital employed productivity (CEE), human capital effectiveness (HCE) and structural capital efficiency (SCE). In conclusion to estimate the effectiveness, he included the following productivity measures:

$$\mathbf{VAIC = HCE + SCE + CEE}$$

Value is added to firm by using their human, structural and financial capital. The more powerfully these capitals are utilized a better will be the VAIC.

VAIC and its three components, Human Capital, Structural Capital and Capital Employed Efficiency (Chen et al., 2005). Value Added can be calculated by removing input value from the output value. In an organization the inputs are bought in materials and cost of good sold while the output is net sales revenue.

$$\mathbf{VA = OUTPUT - INPUT}$$

$$\mathbf{VA = I + NI + DP + W + T}$$

Where:

NI = Net income

DP = Depreciation expense

I = Interest expense

D = Dividends

T = Taxes paid

W = Wages

3.3.2 Human Capital Efficiency (HCE)

Human capital includes the skills, experiences, productivity, knowledge and reliability of the personnel to determine whether or not if they are fit for the job. In

VAIC model, human capital is referred as cost of wages (Pulic, 1998). Whereas observation for size, higher wages intermediary for a work force with bigger abilities that would add extra cost to the company than workers on lower wage rates. HCE calculated as.

$$\text{HCE} = \text{VA} / \text{HC}$$

HC = C = Cost of employee salaries & wages

3.3.3 Structural Capital Efficiency (SCE)

Thus, VA is impacted by the proficiency of Human capital and Structural Capital. SC is reliant upon HC, and HC converts into enhanced inner structures (Nazari & Herremans, 2007). HC and SC are inversely related (Tan et al., 2008).

$$\text{SC} = \text{VA} - \text{HC}$$

When HCE rises it means that SCE rises. It is measured by dividing structural capital with value added (Pulic, 1998).

$$\text{SCE} = \text{SC} / \text{VA}$$

3.3.4 Capital Employed Efficiency (CEE)

CEE includes productivity that SCE and HCE neglect to catch. (Pulic, 1998) puts extraordinary importance on the discussion that IC can't build value all alone, it must be joined with capital employed (CE).

$$\text{CEE} = \text{VA} / \text{CE}$$

CE = Total Assets – Intangible Assets

3.4 Dependent Variable: Firm Performance

It can be calculated on following method; Return on assets (ROA), Return on Equity (ROE), Growth Revenue (GR) and Return on Sales (ROS), which depends on knowledge. The intangible assets are known as an important factor in making maintainable competitive edge in the market (Barney, 1991).

ROA: it is estimated as profit before tax divided by total assets, which demonstrates how much an organization's incomes outperform over expense (Chen et al., 2005).

- **Return on Assets (ROA) = Profit Before Tax / Total Assets**

It is an indicator of how productive an organization is in connection to its overall resources. It gives an impression that how compelling the company is to utilize resources for making profits. It is estimated as profit before tax divided by total equity of an organization, it has shown that profits are accessible to the stakeholders and is usually considered as one of the most vital financial measure for stakeholder (Najibullah, 2005).

- **Return on Equity (ROE) = Profit Before Tax / Total Equity**
- **Return on Sales (ROS) = EBITDA / Net sales**
- **Growth Revenues (GR) = (current-previous / previous)*100**

Growth revenues are conventional measures which shows the growth in a firms.

3.5 Control Variables

3.5.1 Leverage

The great amount of debt could lead an organization to mainly focus in debt holders requirements (Williams, 2000). Which is regularly not according to the

investors presumed by VA and VAIC. However organization that are completely dependent on debt could lack the security needed to draw in stakeholders and it can possibly have greater interest expenses, reflective on the risk and return of an organization. Consistent with previous studies (Firer & Williams, 2003; Shiu, 2006a, 2006b; Chan, 2009a, 2009b).

$$\text{Leverage} = \text{Total Debt} / \text{Total Assets}$$

3.5.2 Firm Size (FSIZE)

FS was calculated by utilizing the natural log on total assets of an organization, incorporated into request to control the organizations' size with the end goal to make wealth (Riahi-Belkaoui, 2003; Abidin, Kamal, and Jusoff, 2009).

$$\text{Firm Size} = \text{Total Assets of the Company}$$

3.6 Statistical Model

Model

$$\begin{aligned} perf_{it} = & \alpha_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \beta_4 \ln(Size)_{it} \\ & + \beta_5 Lev_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

$$perf_{it} = \alpha_0 + \beta_1 VAIC_{it} + \beta_2 \ln(Size)_{it} + \beta_3 Lev_{it} + \varepsilon_{it} \quad (2)$$

Where, i indicates firms (i= 1, 2 3 . . . 100), time denoted t (t = 2007, 2008 . . . 2016) and Ln=natural logarithms. α and β , are parameters to be evaluated. ε_i ; error term, α_0 = Constant. The control factors are LEV = Leverage; SIZE=firm Size.

Chapter 4

Data Analysis

4.1 Descriptive Statistics

The descriptive details demonstrates conduct of data which will help to explain the basic aspect of the data and present easy and simple summaries about the sample and measures. Standard deviations and values of means were also reported in Descriptive Statistics. Statistical behavior of 10 years of panel data for a period from (2007 to 2016) were mentioned below in given table.

TABLE 4.1: Descriptive Stats

	Mean	Median	Max	Min	Std Dev	Skewness	Kurtosis
ROA	0.1156	0.0915	0.8915	-0.191	0.1175	1.3673	6.8069
ROE	0.2390	0.1881	3.254	-0.869	0.2931	2.8725	23.057
GR	13.625	10.472	390.28	-91.55	32.382	4.0577	38.732
ROS	0.1979	0.1360	18.159	-2.341	0.6773	22.280	568.39
VAIC	5.8899	4.2200	82.046	-1.840	6.3727	5.6499	50.018
HCE	4.9437	3.2566	80.977	-1.072	6.2668	5.8664	52.809
SCE	0.6688	0.6936	4.8685	-2.166	0.3265	2.7555	65.148
CEE	0.2774	0.2501	1.4796	-0.029	0.1569	1.9812	11.923
LNF	15.985	15.864	20.194	12.61	1.4333	0.3239	2.7497
LEV	0.5090	0.5309	0.9449	0.030	0.1866	-0.2652	2.3004

In Table 4.1 the average return on assets (ROA) was 0.1156 whereas standard deviation of ROA was 0.1175. The most center value of ROA was 0.915. In ROA the maximum value were 0.8915 whereas minimum value was -0.191. However the mean of ROE was 0.2390 while its standard deviation was 0.2931. which complies that the risk of return on equity is greater than the risk on return on assets. Similarly the average mean ROE is more than ROA which fulfill the general notion of finance “higher the risk higher will be the return”. The mean of ROS was 0.1979 with medium value of 0.1360. the maximum value was 18.159 and minimum value was -2.341.

The growth revenue demonstrates that company’s income developed by roughly 13% every year over the time of ten years under this examination. The mean of constituents of VAIC that were human capital efficiency (HCE), structural capital efficiency (SCE) and capital employee efficiency (CEE) are (4.437, 0.6688, and 0.2774). As indicated by this outcomes one can state that HCE has more viable in issue of significant worth creation than SCE and CEE. VAIC has a mean of 5.889 with minimum value of -1.840 and maximum value of 82.046. The standard deviation in independent variable is highest in HCE that was 6.2668 and in dependent variable growth revenue (GR) is higher that was 32.382. The mean of FS were 15.598 whereas minimum value were 12.61. The max value were 20.194. The standard dev was 1.4333, which recommends a generally high state of scattering in the total resources among the tested firms. The kurtosis value of firm size and leverage shows that they are platykurtic in nature because there sharpness is less than 3 which was 2.7497 and 2.3004. The rest of the variables are leptokurtic because there value lies above 3.

4.2 Correlation Analysis

A correlation has been used to find the results which were mentioned in table 4.2. The analysis of correlation values must be within 1.0 and -1.0. The relation between the variables are find out by peerson correlation. If the value in correlation are negative so its means that the variables are negatively correlated with each

other. If the sign between two variables are positive it means that the variables are positively correlated. If value are zero so there are no relationship between them. The value added intellectual capital components HCE, SCE and CEE were positively insignificant correlated with an organization performance.

The relation between return on equity (ROE) and return on assets (ROA) were positively insignificant. It also shows that ROA and ROE has the strongest relationship. ROA shows the positive but insignificant relationship with all except leverage which shows negative relationship with ROA.

The return on equity (ROE) shows positively insignificant relation with other variables but at the same time it has shown the significant relationship with leverage (LEV). Growth revenue (GR) has positively insignificant relation with HCE, SCE and LEV. However, it also shows significantly positive relationship with CEE and LNF.

TABLE 4.2: Correlation Model 1

	ROA	ROE	GR	ROS	HCE	SCE	CEE	LNF	LEV
ROA	1								
ROE	0.8464	1							
GR	0.1140	0.1198	1						
ROS	0.1216	0.0659	0.1467	1					
HCE	0.1969	0.1848	0.0820	0.1395	1				
SCE	0.2549	0.2086	0.1103	0.0752	0.3118	1			
CEE	0.7584	0.6674	0.0584	0.0457	-0.0344	-0.0080	1		
LNF	0.0755	0.0871	0.0141	0.0866	0.4148	0.3553	-0.2391	1	
LEV	-0.3210	0.0322	0.0648	-0.0978	0.0612	0.0287	-0.1551	0.0605	1

The relation between ROS and CEE has positively significant relationship. While it has negative and insignificant relationship with the LEV. The return on sales has positive and insignificant relationship with the HCE, SCE and LNF.

The HCE and SCE shows positively insignificant relation with one another except capital employee efficiency (CEE) which has significantly negative relationship with HCE and SCE. The relationship between LEV and HCE were positive and insignificant. The relation with SCE and LEV was positive and significant.

TABLE 4.3: Correlation Model 2

	ROA	ROE	GR	ROS	VAIC	LNF	LEV
ROA	1						
ROE	0.846431	1					
GR	0.114058	0.119889	1				
ROS	0.121634	0.065983	0.146737	1			
VAIC	0.225404	0.208870	0.087781	0.142211	1		
LNF	0.075521	0.087114	0.014119	0.086669	0.420306	1	
LEV	-0.321085	0.032264	0.064828	-0.097876	0.057838	0.060509	1

In model 2 of correlation value added intellectual coefficient (VAIC) are positively and insignificantly correlated with the firm performance of Pakistan. There are positive relationship present between the firm performance of Pakistan (ROA, ROE, GR and ROS).

4.3 Effect of Intellectual Capital on Firm Performance

The data in this chapter analysis the empirical results which used the method of ordinary Least Square regression which provide the relationship between dependent variables which are firm performance that is return on assets (ROA), return on equity (ROE), growth revenue (GR) and return on sales (ROS) with independent variables that have discussed previously in literature reviews that are value added intellectual coefficient (VAIC), human capital efficiency (HCE), structural capital efficiency (SCE) and capital employee efficiency (CEE). Each dependent variable have been taken individually for better results and to find the positive impact of independent variables with firm performance of Pakistan non-financial firms. There are also two control variables leverage (LEV) and firm size (FS) which are using in this research paper. The natural log is apply in firm size for the smoothness of data. There are two statistical models using in this research paper.

In Table 4.4 shows that the result for rate of return that is dependent variable with the independent variables by using ordinary least square regression model. Ordinary Least square method has been used for the evaluation of the results.

The sign of coefficient represent that either the variables is positively impacting the dependent variables or negatively. If the value of t-statistics are above than 2 so its mean that the variables is significantly impacting the dependable variables and if the t-statistics of independent variables are below 2 than it shows that the variable is not significant. Probability value should < 0.05 . If the value is less than 0.05 than it means that variable is significant and if value were > 0.05 then variable were insignificant.

The work of F-statistics is to see the strength of instruments of independent variables that have been taken in the analysis. If f-statistics prob are smaller than 0.05, it will shows that the overall model is correctly specified. The hausman test is used to find the results. Hausman result demonstrated that FEM are more proper than REM.

TABLE 4.4: Determinants of Return on Assets

Dependent Variable				
ROA				
Panel A:Model 1				
Independent Variables	Co-efficient	Std-Error	t-Stats	Prob
Constant	-0.203979	0.027992	-7.28712	0.0000
HCE	0.002173	0.000373	5.828292	0.0000
SCE	0.072731	0.007201	10.09982	0.0000
CEE	0.524432	0.013172	39.81457	0.0000
LNF	0.011954	0.001753	6.819366	0.0000
LEV	-0.149424	0.011393	-13.1155	0.0000
R-Squared	0.698643			
Adjusted R-Squared	0.694360			
F-statistics	163.1105			
Prob (F-statistics)	0.0000			
Panel B:Model 2				
Independent Variables	Co-efficient	Std-Error	t-Stats	Prob
Constant	0.216235	0.041884	5.126755	0.0000
VAIC	0.004604	0.000593	7.757336	0.0000
LNF	-0.001123	0.002684	-0.41822	0.6759
LEV	-0.215284	0.018951	-11.5800	0.0000
R-Squared	0.179644			
Adjusted R-Squared	0.169670			
F-statistics	18.01135			
Prob (F-statistics)	0.00000			

(HCE) represent the human capital efficiency. In model 1 the coefficient value

of (HCE) was 0.002173 and t-statistic value was 5.828292 while the p-value was 0.0000. HCE was positively impacting dependent variables and significantly impact on return on assets (ROA).The t-statistics of (HCE) was 5.828292 which is greater than 2 it means that variables has significantly impacting on dependent variable (ROA). The second independent variable is structural capital employee (SCE) whose coefficient value was 0.072731 and t-statistics was 10.099. While p-value was 0.0000 so its shows that (SCE) has positively and significantly impact on independent variable (ROA).The third independent variables is capital employee efficiency (CEE).the coefficient value of (CEE) was 0.524432 and t-statistic was 39.814.The p-value was 0.0000.its mean that capital employee efficiency (CEE) is positively and significantly impact on (ROA).The RSquared is 0.6986 and adjusted R-Squared was 0.6943.They shows the strong connection among independent and dependent variables. The prob of F-statistics was 0.0000 which means that the model was good fitted. So hypothesis H2, H3 and H4 are accepted.

The coefficient of value added intellectual capital was 0.004604 and t-statistics was 7.757336 while p-value was 0.0000.It shows that VAIC has positive and significantly impact on dependent variable which is (ROA).Its RSquared is 0.17964 and Adjusted Rsquared are 0.169670 which show weak relation among variables. The value of f-statistics is 0.0000 which means that model was good fitted.

TABLE 4.5: Determinants of Return on Equity

Dependent Variable				
ROE				
Panel A:Model 1				
Independent Variables	Co-efficient	Std-Error	t-Stats	Prob
Constant	-0.804731	0.087477	-9.19934	0.0000
HCE	0.004419	0.001165	3.792927	0.0002
SCE	0.140630	0.022505	6.248953	0.0000
CEE	1.244418	0.041163	30.23115	0.0000
LNf	0.030352	0.005478	5.540341	0.0000

LEV	0.189806	0.035604	5.331072	0.0000
R-Squared	0.520557			
Adjusted R-Squared	0.513742			
F-stats	76.39049			
Prob (F-stats)	0.0000			

Panel B:Model 2

Independent Variables	Co-efficient	Std-Error	t-Stats	Prob
Constant	0.204768	0.111394	1.838222	0.0663
VAIC	0.009802	0.001578	6.210482	0.0000
LNF	-0.002654	0.007140	-0.37176	0.7102
LEV	0.034823	0.049445	0.704275	0.4814
R-Squared	0.054705			
Adjusted R-Squared	0.043212			
F-stats	4.759868			
Prob (F-stats)	0.0000			

In Table 4.5 the coefficient value of (HCE) was 0.004419 and t-statistics was 3.7929 while p-value was 0.0002 .It means that human capital efficiency have positively significant impact in (ROE).The (SCE) coefficient was 0.140630 and t-statistics was 6.2489 while p-value was 0.0000.It mean that (SCE) has positive as well as significant effect on dependent variable that is return on equity (ROE).CEE represents the capital employee efficiency. Its value of coefficient was 1.244418 and t-statistics was 30.2311. The p-value was 0.0000.It means that (CEE) have significantly positive effect on rate of return. The value of R-Squared was 0.520557. Adjusted R-squared was 0.513742.The strong relationship present within independent and dependent variables. The prob of f- statistics was 0.0000 which indicates that model is good fitted. The hypothesis H2, H3 and H4 is accepted.

The coefficient value of VAIC is 0.0098 and t-statistics is 1.83822. The p value is 0.0000. It means that value added intellectual coefficient has significantly positive impact on dependent variable which is return on equity. The prob of f-statistics was 0.0000 which indicates that model is good fitted. It has cleared that VAIC has positive relationship with performance of companies so hypothesis H₁ is accepted.

In Table 4.6 Model 1 the coefficient value of (HCE) was 0.289223 and t-statistics was 1.52578 while p-value was 0.1274 so its mean that human capital efficiency have positively insignificant effect in growth revenue (GR). The structural capital efficiency coefficient was 8.291158 and t-statistics was 2.3313, while p-value was 0.0200. Its mean that (SCE) has positive and significant impact on dependent variable that is growth revenue (GR). CEE represents the capital employee efficiency. Its value of coefficient was 13.6950 and t-statistics was 1.9431. The p-value was 0.0523. Its means that (CEE) has significantly positive impact on (GR). The value of R-Squared was 0.0648 while Adjusted Rsquared was 0.0510. The prob of f-statistics was 0.0000 which means the model is good fitted. The hypothesis H₂, H₃ and H₄ is accepted.

In second model results of VAIC has shown. The coefficient value of VAIC was 0.4277 and t-statistics was 2.3228. The p value was 0.0204. It means that value added intellectual coefficient has significantly positive impact in dependent variable which is growth revenue. The prob of f-statistics value was 0.0000 which means that the model is good fitted. So hypothesis H₁ is accepted.

TABLE 4.6: Determinants of Growth Revenue

Dependent Variable				
GR				
Panel A: Model 1				
Independent Variables	Co-efficient	Std-Error	t-Stats	Prob
Constant	0.487176	14.34265	0.033967	0.9729
HCE	0.289223	0.189558	1.525780	0.1274
SCE	8.291158	3.556333	2.331378	0.0200

CEE	13.63506	7.047752	1.943181	0.0523
LNF	-0.087398	0.893953	-0.09776	0.9221
LEV	7.388790	5.849184	1.263217	0.2068
R-Squared	0.064806			
Adjusted R-Squared	0.051053			
F-stats	4.712162			
Prob (F-stats)	0.0000			

Panel B:Model 2

Independent Variables	Co-efficient	Std-Error	t-Stats	Prob
Constant	8.532433	13.03658	0.654500	0.5130
VAIC	0.427798	0.184170	2.322844	0.0204
LNF	-0.017445	0.834850	-0.02089	0.9833
LEV	5.603631	5.818676	0.963042	0.3358
R-Squared	0.055115			
Adjusted R-Squared	0.043384			
F-stats	4.698211			
Prob (F-stats)	0.0000			

In Table 4.7 (HCE) represent the human capital efficiency. In model 1 the coefficient value of (HCE) is 0.01234 and t-statistic value is 3.3873 while the p-value is 0.0007. Human capital efficiency (HCE) is positively impacting the dependent variables and significantly impact on return on sales (ROS). The t-statistics of (HCE) is 3.3873 which is greater than 2 it means that variables has significantly impacting on dependent variable (ROS). The second independent variable is structural capital employee (SCE) whose coefficient was 0.0699 while t-statistics were 0.9942. While value of p is 0.3204 so its shows that (SCE) has positively but insignificant impact on independent variable (ROS). The third independent variables is capital employee efficiency (CEE). The coefficient value of (CEE) was 0.16704 and

t-statistic was 1.2977. The p-value was 0.1947. Its mean that capital employee efficiency (CEE) is positively but insignificant impact on (ROS). The R-Squared was 0.0407 and adjusted R-Squared was 0.0270. The prob of F-statistics was 0.0001 which means that the model was good fitted. According to model 1 the (SCE), (HCE) and (CEE) shows positive relationship with company performance which is return on sales (ROS) so hypothesis H2, H3 and H4 are accepted.

TABLE 4.7: Determinants of Return on Sales

Dependent Variable				
ROS				
Panel A: Model 1				
Independent Variables	Co-efficient	Std-Error	t-Stats	Prob
Constant	-0.036180	0.273549	-0.13226	0.8948
HCE	0.012342	0.003643	3.387345	0.0007
SCE	0.069966	0.070374	0.994211	0.3204
CEE	0.167049	0.128722	1.297747	0.1947
LNF	0.015018	0.017131	0.876664	0.3809
LEV	-0.317826	0.111336	-2.85464	0.0044
R-Squared	0.040721			
Adjusted R-Squared	0.027087			
F-stats	2.9866			
Prob (F-stats)	0.0001			
Panel B: Model 2				
Independent Variables	Co-efficient	Std-Error	t-Stats	Prob
Constant	0.074478	0.248354	0.299888	0.7643
VAIC	0.013517	0.003519	3.841183	0.0001
LNF	0.013440	0.015918	0.844310	0.3987
LEV	-0.338965	0.110237	-3.07486	0.0022

R-Squared	0.03859
Adjusted R-Squared	0.026905
F-stats	3.301739
Prob (F-stats)	0.0001

The coefficient of value added intellectual coefficient was 0.01351 and t-statistics was 3.8411 while p-value was 0.0001. It shows that VAIC has positive and significantly impact on dependent variable which is (ROS). Its value of R-Squared was 0.038 and Adjusted Rsquared was 0.026. There were weak relationship present between the variables. The value of prob f-statistics was 0.0001 which means that model was good fitted. Hypothesis H1 is accepted because value added intellectual capital (VAIC) shows positive relationship with firm performance of Pakistan.

According to the previous results of Chan et al., (2005) VAIC, HCE, SCE and CEE has positive connection with companies' performance that are ROA, ROE and GR. They have taken companies from Taiwanese stock exchange from period 1992 to 2002. On the other hand, these outcomes are conflicting with businesses in South Africa, Taiwan and Hong Kong, where negatively significant connections found among HCE and their performance measures were founded. They also show the positively significant association among SCE, CEE as well as distinctive performance methods like ATO, EP and MB.

In this study VAIC has positively significant impact on dependent variables ROA, ROE, GR and ROS. These effects indicates that VAIC has better explaining power rather than their components. According to the case of Pakistan VAIC plays significant role in enhancing company's performance which are HCE, SCE and CEE. Furthermore, the return of assets and return on equity has a strong relations because of their R-squared was between 0.50 and 0.70. They both shows strong explanatory results because of their adjusted R-squared was 0.69 and 0.51. In case of growth it has weakest relationship between the independent and dependent variables because its R-Squared was 0.04. The growth revenue have minimum explaining power (adjusted-R² is 0.027). The R-squared of return on sales shows the weak

relationship between independent and dependent variables which was 0.038. The overall models are good fitted because of their probability (f-statistics) which is less than 0.05. The examination recommend that it is essential for an organizations to utilize physical, money related , human capital and capital employee efficiency to create higher profits.

Chapter 5

Conclusion and Discussion

5.1 Conclusion

The firm value has considered greater than physical capital. For instance, Intangible assets, IC have played a vital role to estimate the performance of firm, however recent studies suggested that IC has always remain the backbone of firm performance without IC firm can never achieve its benchmark and goal. Through various measurement tools, this relationship has been investigated in various countries. VAIC is giving simple access to data on a company's IC proficiency. The relation between intellectual capital and Firm performance were not properly examined in context of Pakistan. This examination looks at the practical suggestions of IC in Pakistani firms, examination dependent on four principle assumptions with respect to the connection among IC and firm performance.

The research has made a massive contribution in examination region for a developing country like Pakistan to provide the experimental evidence where the flow of knowledge and human resource management is the biggest problem and challenge. The established relationships in this study would provide the guidelines to the practitioner and human resource managers about managing the men power intellectually and effectively and making them valuable resource for increasing organization performance and productivity. The investigation inspected the pattern

examination of the relationship among IC and firm execution in Pakistan non-financial organizations. It will help the managers to understand the importance of allocating their valuable resources to encourage IC and financial performance; because IC is an important tool for the companies to bring high financial return than physical assets. Through the systematically managing IC, managers would be able to control their resources and making better position of the company in long run. It will help them to take corrective action before any consequences occurs.

This study shows that firm performance like ROA, ROE, GR and ROS has positive and significant impact on intellectual capital of non-financial companies of Pakistan. It means that those companies who give more importance to the intellectual capital will increase their profitability and gain competitive advantage in the market of Pakistan.

1. Human capital have shown a positive effect on the profitability as well as productivity of the company. It signifies that in order to increase profitability, managers have to provide proper training to employees. They must select the right person for the right job.
2. The findings of structural capital have shown positively significant effect on company financial performance in model 1 and model 2 recommending the improvement in financial performance. The objective be able to proficient by providing the personnel's with new technology and give them a capable business strategies for doing their work and having a proper chain in command in the organizations.
3. The outcomes demonstrate that capital employee efficiency have positively significant impact on financial performance. The firm performance contributes incredibly in enhancing the profitability of the non-financial organizations of Pakistan. They have to focus on the relationship between employee capabilities and customer satisfaction, employee must have aptitudes, information and capacity to assist client requirements effectively.

5.2 Implication of Findings

This investigation uncovers that IC has positive effect on financial performance of non-financial firms of Pakistan. Hence, these outcomes have a suggestions for scholars, administrators, executive and government. There are two sort of suggestions one for academics and other one for industries.

5.2.1 Academic Implications

1. The aftereffects of this investigation could be helpful for the scholars and experts examining IC and firm financial around the world. The discoveries of this examination will persuade them to further explore the area of intellectual capital and promote it for the advancement of intellectual capital, particularly to collect more facts and findings from different corporations and countries.

5.2.2 Industrial Implications

1. The consequences of this investigation will warn the executives and administrators of organizations to consider the competence of IC to help the company in expanding the financial performance of Pakistan non-financial organizations. The discoveries of this investigation would give insights to various organizations which confront the trouble dealing with the intangible resources comparing to the globalization period of innovation and information based economy. It would likewise help the Pakistani non-financial firms and managers to evaluate the variables in for well financial performance. The companies of Pakistan has to spend more in intangible resources other than putting resources into old style factors of productivity. The organization have to invest more in intellectual capital and its components for the better productivity and profitability in the future.

5.3 Direction for Future Recommendations and Limitations

In this study we have examined the non-financial companies of Pakistan. There was a lot of difficulties occurred during collection of data from the annual report of non-financial firms listed in Pakistan stock exchange. A portion of the information was not specified in organizations annual reports. This research was just used information for 10 years from 2007 to 2016. The research with the long duration of panel data will provide various different findings and further steady results. This examination utilized four variables that are ROA, ROE, GR and ROS which would help to estimate the financial performance of a non-financial firms. Studies can likewise be done on consumer industry by utilizing more measurement for the better financial performance of the organization. The discoveries of our present examination offer more opportunities for further examinations. In Future the research could utilize information from various countries and distinctive businesses, dependence on IC with direction to give additional proof on the effect of intellectual capital and non-financial firms. The researchers in the future can likewise indulge in comparing the results of non-financial companies with financial institutions to check the dependence of intellectual capital with the end goal to give more investigation.

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Appendices

Appendices - A

Components of Intellectual Capital

Component of Intellectual Capital	Research Studies
<p>Human Capital</p> <p>Knowledge contributed by people in an organization</p> <p>Alternative Classification</p> <p>Human Centered Assets</p> <p>Individual Competence</p> <p>Human Resources</p>	<p>Edvinsson and Malone (1997), Stewart (1997), Roos et al. (1998), Allee (1999), Sullivan (1999), Saint Onge (1999), Sullivan (2000)</p> <p>Brooking (1996)</p> <p>Sveiby (1997)</p> <p>Fletcher et al. (2003)</p>
<p>Structural Capital</p> <p>Knowledge owned by the organization</p> <p>Alternative Classification</p> <p>Infrastructure Assets</p> <p>Innovation Capital</p>	<p>Edvinsson and Malone (1997), Stewart (1997), Roos et al (1998), Allee (1999), Saint Onge (1999), Fletcher et al. (2003)</p> <p>Brooking (1996)</p> <p>Joia (2000)</p>

Internal Structure	Sveiby (1997)
Intellectual Assets	Sullivan (1999)
Structural Assets	Sullivan (1999) Harrison and Sullivan (2000)
Additional Components	
Intellectual property Assets process Capital	Brooking (1996), Joia (2000)

Appendices - B

Previous research results (some examples, 2000-2012) (source: compiled by authors)

Author	Data	Results
Pulic 2000	30 FTSE companies (random sample)	Positive correlation between intellectual capital amount and company market value.
Bontis, Keow, Richardson 2000	107 Malaysian companies	Positive relationship between intellectual capital and company performance in all researched sectors. Influence of each intellectual capital component is different in different sectors
subramaniam, Youndt 2005	93 American companies	Positive complementary impact on innovation activities
Wang, Chang 2005 IT	IT companies from Taiwan Stock exchange in period 1997-2001	Human capital positive influence, but only in connection with other intellectual capital components. Other intellectual capital positive influence on company performance.
Chen, Cheng, Hwang 2005	4254 public companies in Taiwan in period 1992-2002	Intellectual capital amount, R&D and advertising expenditures positive influence on return on assets.

Gohberg 2010	1000 companies in manufacturing industry	Positive influence of separate intellectual capital components on productivity is observed.
Clarke, Seng, Whiting 2011	Australian companies	Physical and financial capital provides strongest significant influence on enterprise performance
Komnencic, Pokrajcic 2012	37 Serbian companies in period 2006-2008	Human capital has significant positive effect on the profitability and productivity, but structural capital has positive impacts on return on equity.

Appendices - C

Previous Studies investigating the relationship between IC and Firm Performance

<p>Firer and Williams (2003)</p>	<p>South African</p> <p>2001</p> <p>(1 year)</p>	<p>$ROA = \frac{\text{Net Income less preference dividends}}{\text{BV Total Assets}}$</p> <p>$ATO = \frac{\text{Total Revenue}}{\text{BV Total Assets}}$</p> <p>$MB \text{ Ratio} = \frac{\text{Market Capitalization}}{\text{BV Net Assets}}$</p>	<p>Size = Natural Log of Market Capitalization</p> <p>Leverage = Debt / BV Total Assets</p> <p>$ROE = \frac{\text{Net Income less preference dividends}}{\text{Total Shareholders Equity}}$, Industry Type</p>	<p>HCE between ATO, MB</p> <p>SCE + between ROA</p> <p>CEE + between MB</p>
<p>Chen et al., (2005)</p>	<p>Taiwan Stock Exchange</p> <p>1992 2002</p> <p>(11 Years)</p> <p>Tests 3 year lag</p>	<p>Measure of Market Valuation</p> <p>$MB \text{ ratio} = \frac{MV \text{ Common Stock}}{BV \text{ Common Stock}}$</p> <p>Measures of Performance</p> <p>$ROE = \frac{\text{Pretax Income}}{\text{Average Stockholders' Equity}}$</p>	<p>For R&D and Advertising Expenses</p> <p>BV Common Stock</p>	<p>VAIC + between ROA, ROE, MB, GR, EP</p> <p>HCE + between ROA, ROE, MB, GR, EP</p> <p>SCE + between ROA, MB</p> <p>CEE + between ROA, ROE,</p>

		<p>ROA = Pretax Income / Average Total Assets</p> <p>Revenue Growth = ((Current Revenue / Prior Years Revenue) - 1) X 100%</p> <p>Productivity = Pretax income / Number of Employees</p> <p>Additional measures</p> <p>R&D Expenses / BV Common Stock</p> <p>Advertising Expenses / BV Common Stock</p>		MB, GR, EP
Shui (2006b)	<p>Taiwanese Listed Companies</p> <p>2003</p> <p>(1 year)</p> <p>Also tests 1 year lag</p>	<p>ROA = Net Income / BV Total Assets</p> <p>ATO = Total Revenue / BV Total Assets</p> <p>MB Ratio = Market Capitalization / BV Net Assets</p>	<p>Size = Natural Log of Market Capitalization</p> <p>Leverage = Debt / BV Total Assets</p> <p>ROE = Net Income / Total Shareholders Equity</p>	<p>VAIC + between ROA, MB</p> <p>HCE between ATO, MB</p> <p>CEE + between ROA, ROE, MB, GR, EP</p>
Appuhami (2007)	Thailand	Capital Gain on Shares =	None	VAIC + between MR

Chan (2009b)	2005 (1 Year) Hong Kong Stock Exchange	$\left(\frac{\text{Market Price per Share (PPS) Prior Years Market PPS}}{\text{Prior Years Market PPS}} \times 100 \right)$		CEE between MR
	2001-2005 (5 Years)	$\text{MB Ratio} = \frac{\text{Market Capitalization}}{\text{BV Common Stock}}$ $\text{ROA} = \frac{\text{Operating Income}}{\text{BV Total Assets}}$ $\text{ATO} = \frac{\text{Total Revenue}}{\text{BV Total Assets}}$ $\text{ROE} = \frac{\text{Net Income}}{\text{Total Shareholders Equity}}$	$\text{Size} = \text{Natural Log of Market Capitalization}$ $\text{Leverage} = \frac{\text{Debt}}{\text{BV Total Assets}}$	VAIC + between ROA, ROE HCE between ATO, MB SCE + between ROA, ROE CEE + between ROA, ATO, MB, ROE
Ting & Lean (2009)	Malaysia 1999-2007 (9 years)	$\text{ROA} = \frac{\text{Profit after Tax}}{\text{Total Assets}}$	None	VAIC + between ROA HCE + between ROA CEE + between ROA

Where: MB = Market to Book Ratio, MV = Market Value, BV = Book value, ROA = Return on Assets, ROE = Return on Equity, GR = Revenue Growth, EP = Employee Productivity, ATO = Asset Turnover, MR = Capital Gain on Shares