THE IMPACT OF INTELLECTUAL CAPITAL ON THE FINANCIAL PERFORMANCE OF DEPOSITARY BANKS IN TURKEY

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ABSTRACT

The purpose of the study is to analyze the impact of intellectual capital on the financial performance of the depository banks in Turkey. The intellectual capital is calculated by using Value Added Intellectual Capital Coefficient (VAIC) method. For measuring the financial performance of the banks, return on equity (ROE), return on total assets (ROA), growth in revenues (GR) and employee productivity (EPR) ratios are used. The effect of intellectual capital on the financial performance is tested for the years 2003-2008 on first 10 depository banks according to their asset size. The results of the hypothesis testing support that firms' intellectual capital has an impact on the financial performance.

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LIST OF ABBREVIATIONS

BSC	: Balanced Scorecard
CCE	: Capital Employed Efficiency
CEE	: Capital Employed Efficiency
EP	: Economic Profit
EPR	: Employee Productivity
GR	: Growth in Revenues
HCE	: Human Capital Efficiency
HCE	: Human Capital Efficiency
IASC	: International Accounting Standards Committee
ICD	: Intellectual Capital Disclosure
ICR	: Internal Capital Reporting
ISE	: Istanbul Stock Exchange
OECD	: Organisation for Economic Cooperation and Development
ROA	: Return on Total Assets
ROE	: Return on Equity
SCE	: Structural Capital Efficiency
SME	: Small to Medium Sized Enterprises
SSE	: Shanghai Stock Exchange
VAIC	: Value Added Intellectual Capital Coefficient

1. INTRODUCTION

The rise of the today's economy is driven by information and knowledge. Until the second half of the twentieth century, the most important source of production was tangible assets. Today especially in service and knowledge intensive sectors intangible assets like intellectual assets became more important than tangible assets. Especially the increasing gap between firms' market and book value has created attention to the invisible assets.

In the first part of the study, the intellectual capital concept is tried to explain first by attracting attention to the increasing importance of knowledge and economical changes in the world. Secondly the emergence of the intellectual capital concept is explained which is followed by mentioning the definition and components of intellectual capital. Moreover the importance of managing the intellectual capital is highlighted. At the end of the first part there is a brief literature review of the studies conducted on intellectual capital in last years.

In the second part of the study the importance of measuring the intellectual capital is highlighted and some generally accepted measurement methods are explicated.

In the third part of the study the impact of intellectual capital on the financial performance of the depository banks in Turkey is analyzed. In this study intellectual capital was calculated via Value Added Intellectual Capital Coefficient (VAIC) method. For measuring the financial performance of the banks, return on equity (ROE), return on total assets (ROA), growth in revenues (GR) and employee productivity (EPR) ratios were used. For testing the effect of intellectual capital on the financial performance hypothesis analysis was used.

2. INTELLECTUAL CAPITAL CONCEPT

2.1 Increasing Importance of the Information and the Information Society

According to a conventional definition, information is real and verified beliefs. Or more concretely, we may compare it to gravitation and say that "information is a concept which we cannot see with the eye, but whose effects we can observe" (Hunt, 2003) Although there is no unanimous agreement on what information is, there is consensus on the fact that information is a prioritised issue today for competition (Dzinkowski, 2000).

Information has constituted an important place in the social lives and activities of people from the past until today and in recent years its importance has even further increased. In the past, individuals who possessed physical power, owned land and later a factory were considered as strong. When we think of an individual, an enterprise or a state, the source of power has shifted from the above to information. Individuals, enterprises and nations who use information strategically can be one step ahead of their competitors. According to Drucker (1992); the increase that occurred in the efficiency of labourers in the last century put its mark on the industrial revolution. In this century, the enterprises have to realise the same efficiency increase in their information employees in order to remain competitive.

Until today; the history of humanity has passed through various stages economically and socially. These stages are; the primitive society that is dependent upon nature and hunting, settled life, the agriculture society, industrial society starting with the start of use of steam power in industry, and information age and society which emerged upon gaining of importance

of information as a resource and developments in information technologies (Öğüt, 2001). The transition from the agriculture society to industrial society took a long period of time, while the transition from industrial society to information society was much faster. The fundamental reason is the pace of development of new technologies and highness of flexibility of compliance with these technologies (Erkan, 1988).

Information has recently become an important production factor that provides competitive superiority in economy. Technology and globalisation, rapid change in share values have been the three driving forces in the emergence of the information economy (Barutçugil, 2002).

It is necessary to mention the fundamental qualities that distinguish information society from industrial society in order to better understand the social transformation. It is possible to briefly summarise these fundamental characteristics as follows:

Information and informed individual constitute the most fundamental data of economy in the information society. The social life over which information dominates has emerged as a process in which there is rapid increase in the flow of information, fast communication, new technologies involving information as the fundamental power and source, from economy to other social matters, involving rapid change and development, influencing all the sides of life. The high number of information resources or information channels provides contribution to the quality and integrity of information within the context of corporations that gain competitive power (Öğüt, 2001).

Information is an abstract concept. In the new economy which is called information economy, the importance of non-physical, abstract entities increase rapidly. A research that was conducted by B. Lev in 1997 in USA on diversity of investments revealed an interesting perspective. In 1929, it was seen that approximately 70% of investments were being made

in physical assets, 30% in abstract assets. However, up to 1990s, this table has considerably changed. Investments are made today in abstract assets such as research-development, training and competencies, information technologies, software and internet (Edvinsson, 2000).

The real revolutionary effect of the information revolution has started to be felt recently and these show that biggest changes are still almost in front of us (Drucker, 2002).

2.2 Emergence of the Intellectual Capital Concept

When the process of emergence of the concept of intellectual capital and intellectual capital management is analysed, it is seen that no studies have been made directly aimed at studying and revealing it. Quality and its meaning were grasped later on. When we look at the historical development, it draws out attention that there exist many conceptual thinkers. All have contributed differently to the concept of intellectual capital. The concept of intellectual capital is based on three origins that are distinct and different from each other.

Between 1957 and 1997, numerous academic researchers and economists have set out new operation strategies based on resource efficiency instead of the generally-accepted theory of competitive powers. Resource-based perspective claims that all enterprises have their own specific fundamental competencies and talents (Sullivan, 1998). However, the thought that information is, on its own, one of the resources of an enterprise, and that it should be managed with the care shown in the management of other assets, and that there is the need to make investments in information is new (Davenport & Prusak, 2001).

The term Intellectual Capital was first used by Michael Kalecki in 1975, by referring to the economist John Kenneth Galbraith. Kalecki has said that; “How many of us are aware of the intellectual capital we acquired during the last decades.”

The concept of intellectual capital first emerged in the study of Hiroyuki Itami published in Japan in 1980 entitled “Mobilizing Invisible Assets”. This study mentioned the importance of management of invisible assets, in other words, abstract assets, for enterprises in Japan and contributed to the formation of an infrastructure for determining the value of such assets.

Secondly, Penrose, Rumelt, Wemerfelt and other economists have been the first thinkers on the concept and method of intellectual capital, with their article “Commercialised Technology”, after organising a seminar which they merged with the study of David Teece in UC Berkeley in 1986, and in their search for a different viewpoint to the company theory.

Lastly, the study of Swedish Karl-Erik Sveiby in his own language emphasised the human capital in intellectual capital. He argued that competencies and information of the employees is a potential enrichment resource for an enterprise, and therefore, can be used for measuring the performance of a company.

It is acknowledged that the intellectual capital which has started to be discussed again with the currently developing information economy trend was first brought to the agenda in this sense in the article “Brainpower” written by Thomas Stewart in June 1991. Stewart defined intellectual capital in his article as; the whole of everything known by the employees of an enterprise, and that give competitive advantage to the enterprise in the market.

In a research conducted by Sveiby in 1998, by using the data pertaining to whole of the enterprises that are listed in Dow Jones Industry Index, the intangible assets were compared to the book values and it was determined that the ratio of intangible assets to the book values had never been this high in any period of the market (www.sveiby.com/articles/EmergingStandard.html, 2009).

When the enterprises are analysed basically, it will be seen that they are comprised of physical, financial and intellectual assets. Intellectual assets are the sole abstract assets of an enterprise. Therefore, intellectual capital emphasises that enterprises can create more value with their intangible assets than with their tangible assets (Akdemir, 1998). Tangible and financial assets lose their influence in the long term success of enterprises. Hamel (1996) says that "the fuel of voyage to the future is not money, but is the emotional and cognitive energy of those who do the business".

Basic points that help increase of the importance of intellectual capital can be listed as follows:

Revolution in the information technology and information society.

Rise of knowledge and knowledge based economy.

Change in the relationships among people and in the structure of the networks and novelty and creativity being the most basic indicator of competence.

Evaluation of intellectual capital with the currently acceptable accounting understanding leads to wrong results. Concepts of "information capital, non-financial assets, intangible assets, lost assets, invisible assets, intellectual capital" have started to be used increasingly by both the regulators and academicians while the assets which had effect on the market value of enterprises and which could not be seen to a large extent in the accounting records used to be defined as "goodwill" or "unearned increment" until 1980s (Edvinsson & Malone, 1997).

2.3 Definition and Components of Intellectual Capital

2.3.1 Definition of Intellectual Capital and Difficulties Incurred by Defining the Concept

An accurate and appropriate definition of intellectual capital will facilitate its method, strategic use and naturally its measurement to a large extent. There is no single definition of intellectual capital on which all the academicians and regulators who work in this field unanimously agree.

In the International Intellectual Capital Management Conference held in Canada, 85 participating experts stated jointly that it was yet early to say something regarding the definition of intellectual capital (Seetharaman, and others, 2002). However, when the literature is reviewed, it is seen that the opinions regarding the definition and classification of intellectual capital are close to each other and certain references are made. Therefore, it would be useful to review the definitions made by various writers.

Within this context, the definition that is mostly referred to in literature is the definition made by Thomas Stewart (1997) who made the greatest contribution to the emergence and development of the concept of intellectual capital. According to Stewart, intellectual capital is: “intellectual material that can be put in use in order to create prosperity. In other words, it is knowledge, information, intellectual property and experience”.

Definitions of intellectual capital, other than the one made by Stewart, are mostly focused on the contents. According to these definitions, intellectual capital is a combination of the assets that form it. Edvinsson and Malone (2001), the first person who has the title of intellectual capital manager, defined intellectual capital in Skandia Finance Company as; “the whole of professional abilities, customer relationships, organisational technology, experience and knowledge that will give Scandia competitive advantage in the market”.

According to P. Sullivan (1998) who had great contribution to the discussion of the intellectual capital concept in scientific platforms, it is made up of two components. These components are human capital and intellectual assets. The distinction made by Sullivan has been built on the value created by covered and explicit knowledge. The value created by knowledge located inside the mind of human beings and shared on a limited basis is human capital; the value created by open – coded knowledge is intellectual assets. Those which are under legal protection from among intellectual assets (intellectual property) are the assets that are among the intellectual assets.

Organisation for Economic Cooperation and Development (OECD) defines intellectual capital as the economic value of an organisation's capital. (International Symposium on Measuring and Reporting IC, OECD, Amsterdam, 1999) Here, organisational capital is the software systems, distribution network and support systems that are possessed. However human capital is the human resources, customers within the organisation, and other external resources that contribute to the organisation.

International Accounting Standards Committee (IASC) has defined intellectual capital as intangible assets and integrity of trademarks, brands, computer software, licenses, copyrights, patents, concession agreements, service and production rights, prototypes and formulae (Johanson, 1999).

In addition, specialists like Annie Brooking, Göran Roos, Nick Bontis who have contributed to the literature on intellectual capital, define intellectual capital as the integrity of the components that form them up, with small differences among them.

According to the findings acquired from these definitions, in summary, intellectual capital is hard to find, but once it is discovered and revealed, provides new resources to the company for competition (Bontis, Keow, Chua & Richardson, 2000), expresses the whole of invisible assets

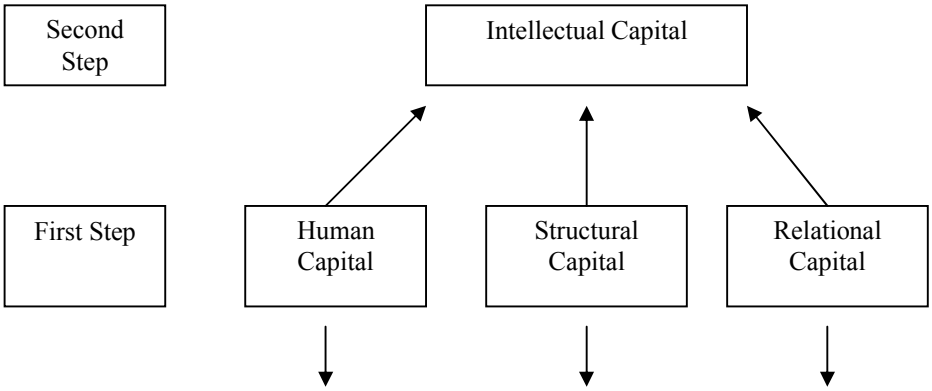
in the market, intellectual property, functions that are human-oriented and that help the company to do business (Bontis, 1998), covers the invisible assets and processes in the balance-sheets (Brooking, 1997) and is named as an element of the market value of the company (Roos, 1998).

Intellectual capital concept is comparable with goodwill concept in accounting. Dictionary definition of goodwill is the difference between the purchase price and the sum of the fair value of the net assets of the purchased company. Goodwill can only be recognized when an entity has acquired another entity, as goodwill cannot be purchased or sold as a separate item. Goodwill can only be interpreted as a part of the intellectual capital or an appraisement of intellectual capital. The main difference between them is that goodwill is calculated for a selling entity. However intellectual capital is calculated for an operating entity. Intellectual capital has a wider frame than goodwill (Uzay & Şaban, 2003).

2.3.2 Components of Intellectual Capital

It cannot be argued that there is a unanimous opinion on establishment of the components of intellectual capital. However, it can be argued that there are certain elements or components on which there is agreement. The most generally agreed points are human and structural capital. Hubert Saint-Onge and Leif Edvinsson classify intellectual capital under three main headings, which are human capital, structural capital and customer capital. There is unanimity that intellectual capital is comprised of generally-accepted three main components. These are human capital; structural capital and relational capital (Ordonez de Pablos, 2002) Nick Bontis classify intellectual capital under three groups, which are human capital, structural capital and relational capital (Arıkboğa, 2003). Bontis is the first academician who acquired an academic title by making studies in the field of intellectual capital. A form which deals with the conceptual structure of intellectual capital of Bontis from various sides has been given below.

Figure 2.1: Components of Intellectual Capital



Core	Intelligence	Routines	Relations
Scope	Personnel of the company	Connections in the company	Connections outside of the company
Parameters	Volume	Efficiency	Durability
Coding Difficulty	High	Medium	Highest

Trust Culture

All the elements have connection with the mind which constitutes the core of human capital, routines which constitute the core of structural capital, and the relations which constitute the core of relational capital. These three elements come together and form up the concept of intellectual capital with the synergy that forms among them. If there is not a full conductivity in the relations among these elements, a healthy intellectual capital output will not be obtained (Arıkboğa, 2003). Analysis of intellectual capital is also significant in respect of strategic management of enterprises. The criteria that are necessary for measurement of strategic performance are also present in the approach of intellectual capital. Therefore, analysis of intellectual capital elements shall turn into an indispensable performance report card for the executives.

Intellectual capital is a network of relations. A company may manage these assets and obtain profit from them only when it comprehends joint ownership. Operation of these three elements in harmony will develop creativity, openness towards novelties, cooperation and feedback within the corporation. When this fact was recognised, it became necessary that the intellectual capital within the company is unveiled, revaluated, balanced and identified and the company should develop its talents for creating value using all of these (Akdemir, 1998).

2.3.2.1 Human Capital

The people of an organisation form the human capital of that organisation. Human capital is comprised of the knowledge, skills and talents of employees. We can define the human capital in a modern and comprehensive sense as follows. Human capital is the ability to produce solutions that will meet the customers' needs, talents and intellectual structures of employees. Human capital is the source of novelties (Arıkboğa, 2003).

According to H.D. Luthy, human capital is the self of the human. Therefore, organisations may not have human capital, they may only rent them. So when the employees leave the work, human capital leaves, too (www3.bus.osaka-cu.ac.jp/apira98/archives/pdfs/25.pdf, 2009). For this reason, studies were made on human capital for long years and many definitions were made, but no serious steps were taken regarding its accounting and reporting.

Human capital is important since it is the source of novelties and discoveries. Therefore, the competencies of employees who are in the status of producers of knowledge, their analytical and conceptual thinking skills, harmony with team work, creativity, problem-solving skills, adaptability to changes, ability to use initiatives, self-confidence, education levels, occupational competencies, and the added value they create by sharing the

information they possess shall proportionally increase the value of the human capital (Saruhan & Sulaoğlu, 2001).

Human capital is the knowledge, skills and talents of those who do business individually in providing solutions to customers. The enterprises should aim to employ those who have high level of knowledge or to recruit them as consultants in order to utilise their knowledge temporarily, to train the employees continuously, and to ensure that the conditions and ambiance that is needed for keeping the qualified personnel are suitable, with an aim to increase human capital. Accordingly, the enterprises should train human capital continuously with a sustainable training approach in order to be able keep pace with change.

Sub components of human capital can be listed as know-how, training, and characteristics specific to business, business assessment, knowledge related to work, competition related to work, power of entrepreneurship, innovation, and ability to comprehend before and after the process, changeability (IFAC, 1998). The power of human capital possessed by companies is expressed by the knowledge of employees, the type of employees possessed by the companies, and the speed of sharing of the created knowledge (Edvinsson & Sullivan, 1996).

A questionnaire study was made on 71 companies from among the biggest 1000 companies registered with the Istanbul Commercial and Istanbul Industrial Chambers. As a result of the study, it was scientifically proved that there was a positive correlation between human capitals and market/book value of companies which operate in Turkey (Bozbura, 2003).

2.3.2.2 Structural Capital

It denotes the organisational values that are necessary for an enterprise to continue its activities and that support the human capital. Among these, organisation's culture, documentation, data bases in which information belonging to customers and the market are stored, production

processes, quality control and management systems, patents and copyrights computer networks, and information systems, management tools that have been applied or will be applied for improving the efficiency and profitability of the enterprise, improvement techniques, information technology systems, R&D efforts, emblems form up all the organisational infrastructure values (Akpınar, 2002).

According to Bontis, Keow and Richardson (2000) if an organisation owns poor systems and processes to reach its objectives, it will not be able to increase its potential intellectual capital in has in the end to the highest level. Enterprises which have a strong structural capital will provide the supportive intra-corporation culture that is necessary for their employees to start something new, to be successful or to lose.

Structural capital is more permanent assets that remain when intellectual assets arising out of customers, employees and strategic partnerships are ignored. At this point, structural capital is the capacity of an organisation to engage in and achieve a business with its information and corporate culture. It is not possible for enterprises to fully possess the human capital. Even if human capital can be thought of as an internal element that is possessed, knowledge and skills of employees can only be rented, their ownership cannot be acquired. However relational capital is an external element. However, structural capital is an internal element that exists in the organisation which is more long term but which is quite difficult to gain (Leliaert, Candries & Tilmans, 2003). For example; Thomas Edison has, by founding the company which converted into General Electric later on, transformed its own human capital into structural capital. Individual capabilities, discoveries or successes should enter under a corporate roof. Every new information that is earned to the corporation both contributes to the structural capital and enriches the intellectual capital of the corporation.

2.3.2.3 Relational Capital

Customer capital is the organisational relational value among people with whom the enterprise is in relationship with, including the suppliers. Measurable elements of customer capital are customers' and suppliers' fidelity, target market, continuity of relationships and the satisfaction acquired from the customer (Akpınar, 2002).

Customer capital is an external element. Its ownership does not fully pass to the organisation itself as is the case in human capital. Relational capital has been surrounded by external income of the enterprise. As well as things such as the image of the brands owned by an enterprise before the public, strategic cooperation, customer relations distribution channels are also among the important elements of relational capital. When the name Coca-Cola is launched for sale, it will worth much more than that of only a generic brand, by virtue of its distribution channels world wide (Seetharaman, Low & Saravanan, 2004).

Intellectual capital actually reflects the capacity of an enterprise to do business in the future rather than the current value of the enterprise. In other words, it reflects its future value. However, there is factor which cannot be ignored. Intellectual capital is without doubt valuable on the basis of elements. However, it acquires its actual value by virtue of the full conformance of these elements with each other.

When the matter is looked at from this viewpoint, the first point that attracts attention is the relationship between human capital and structural capital. These two reinforce each other in organisations where there is a common purpose, which are flexible, where it is possible to disclose opinions openly, which have not been exhausted with hierarchic levels. Whereas in human capital and customer capital, these two elements shall work effectively in organisations where employees can assume responsibility, where they can intervene in the customers' needs fully and on

time, and where the employees can also become internal customers. An effective correlation between customer and structural capital can be said to exist only if in an enterprise the sales responsible to which the customer were attached leave the company and this does not affect the customers and customers remain loyal to such company (Stevart, 1997).

2.4 Managing Intellectual Capital

Intellectual capital and information are subjects for which much thinking has been done, for which methods of effective use have been sought, management structures of which have been tried to be developed for the last 10 years. Establishment of a suitable structure for management of the intellectual capital is quite difficult and at the same time involves different characteristics for different enterprises (Arıkboğa, 2003).

According to Bradley (1996), current management theories are far from fully explaining the new structure that is formed up of intellectual assets.

2.4.1 Differentiating Factors of Intellectual Capital Management

Today intellectual assets are used by many persons and corporations, continually develop and grow. Furthermore some of them can be reproduced in a cheap manner through media such as internet. The reasons that create this change can be summarised as follows (Arıkboğa, 2003).

- Erosions that Occur in the Boundaries of an Enterprise: Along with the management of intellectual capital, it is observed that boundaries of enterprise which have been strictly defined have started to disappear (Bradley, 1996). In conventional enterprises, there are strict boundaries between the enterprise and the customer. Information and know-how which constitutes the core of modern enterprises can be easily communicated to outside the enterprise through electronic mail, fax or internet. Naturally, this

change makes it difficult to use the conventional working methods (Arıkboğa, 2003).

- Price Determining Effect of Information: In fields where information is fundamental, a small difference in the information or skill created significant changes in results. Frank Lichtenberg measured in one of his studies, the income from an investment made with physical elements and an investment which has been made through research and development tools on a comparative basis. It was found out that the investment which was made for research and development yielded an income that was eight times more than the investment that was made in machines (Stevart, 1997).

- Formation of monopolistic structures: Fixed costs in information-intensive enterprises are quite high while floating costs are quite low. For example, fixed costs are high in research and development activities, and in computer programs. Lowness of floating costs help easy growing of enterprises founded on knowledge, and at the same time helps formation of monopolistic structure in the markets, and at the same time, causes standardisation in the markets.

2.4.2 Intellectual Capital Management

When enterprises that are successful in intellectual capital are reviewed, it is seen that there are differences in their organisational structures, contributions of employees, customers and suppliers to the enterprise, leadership characteristics of executives (Arıkboğa, 2003).

- Organizational Structure: According to Drucker (1999), after a company experiences transformation in many subjects such as decision processes, management structure, manner a job is done after the moment on which a company passes from data to information. The first difference that emerges in transformation is the one related to organisational structure. In enterprises which make efforts to be organised in the information environment, at least half of management levels, usually 60% have been

cancelled (Drucker, 1994). In these enterprises, the existing hierarchic structure in management levels has been broken, and there is no need especially for medium level executives who do not produce information but who are only responsible for control and communication. In today's enterprises where information is the fundamental asset, where creativity is supported and where employees are expected to produce new solutions continuously, there is the tendency that the structure rapidly transforms into information-based organisations.

In organisational structures, hierarchy is alienated and horizontal relations become more powerful. Plain and network organisation structures come to the forefront.

- Organisational Culture: Culture influences the manner of conduct of the employees significantly. Enterprises which aim to create and develop intellectual capital need to have a corporate culture that meets and supports such expectations. According to Drucker (1994), regardless of how culture is described, it is very durable and lasting. Today most of the habits which have become deep-rooted in many of the enterprises need to be changed. According to Drucker (1994), what is important is not to change the whole of the culture but only the habits. Change of habits and conducts can only be possible if they are based on the existing culture.

- Management Style: In today's information-intensive production environment, management styles and in parallel characteristics of the executives have changed. Instead of the type of executive who conducts the duties of planning, organising, coordination and control in the classical management approach, the type of executive who has leadership skills allowing him to challenge the changes, give direction to and realise the change comes to the forefront. Management is to handle complex matters, whereas leadership is to handle change. In management of intellectual capital, as management styles, mostly Total Quality Management and

coaching and mentoring which are widely used in learning organisations provide efficiency (Arıkboğa, 2003).

2.4.3 Principles of Intellectual Capital Management

Steward (1997) has stated that ten basic principles concerning management of intellectual capital can be developed when the characteristics of human capital, structural capital and customer capital are considered. These principles can be listed as follows.

- Enterprises are not the owners of human and customer capital. They share the ownership of these assets with their employees in human capital and with customer sand suppliers in customer capital. In order to be able to manage these assets and to acquire profit, it is necessary to acknowledge joint ownership.

- In order for an enterprise to be able to create the human capital it will use, it should support and develop the team work and social forms of learning. Enterprises can seize and formulate the talents and add them to capital by virtue of teams among disciplines. Because sharing of information gives it a quality that is less dependent on the individual.

- All intelligent and talented employees do not carry the quality of an asset. The employees who create corporate richness are those whose work cannot be done by anyone else any better, and who have the strategic skills to reveal the value of the work consideration of which is paid by the customers. Investment should be made in persons having such characteristics.

- Structural capital is a talent that is directly owned by enterprises and it can be easily controlled. However, many of the customers give little value to it. Therefore, it is necessary that it should be manages such that the customers can easily cooperate with the employees of the enterprise.

- Structural capital serves to stock the information stocks supporting the studies to which customer give value and to accelerate the flow of these information within the enterprise. Therefore, if the things that are needed are things that are ready to use, that may be needed, they must be easily available.

- Information and knowledge should replace the physical and financial assets which are expensive.

- Knowledge should be made specific to customers. Therefore serial production solutions do not yield high profits.

- Each enterprise should re-analyse the value chain of the sector in which it is involved in order to see which information has the biggest importance, scrutinising it from the raw materials to the end user.

- Managers should focus on information flow instead of flow of goods, because in the new century information is the business itself.

- It is not meaningful to invest in humans, customers and systems separately, because human capital works together with structural capital and customer capital. These three types of capital may influence each other adversely as well as they also influence each other positively. Therefore, the direction and size of interaction should be very well defined.

Intellectual capital is a very important value for today's knowledge-intensive enterprises and its development, its management so as to create competitive advantage for the enterprise, will help enrichment of both the enterprise and also the markets in which business is conducted (Arıkboğa, 2003).

2.5 Studies Conducted about Intellectual Capital in Last 5 Years

Detailed information on the findings of studies recently made in the field of intellectual capital in international literature has been given below.

Year 2004

In the study conducted by Abeysekara and Guthrie (2004), the financial statements of years between 1998-1999 and 1999-2000 of the top 30 companies listed in stock exchange market in Colombo were analysed by using the content analysis method. It was revealed that most of the accounting classes reported during these periods depended upon external capital and secondarily to human capital. It was determined that there was increase in the frequency of intellectual capital within the last two periods. Furthermore, it was also revealed that the components of individual intellectual capital in each capital category reported by these companies in Sri Lanka were different from the other countries.

In the study of Wingren (2004), a conceptual homogeneous structure has been developed for joint measurement and management of abstract and concrete assets. The connection between the concrete and abstract assets was set out. Again in order to provide for joint measurement of concrete and abstract assets, and how the BSC' (Balanced Scorecard) should be structured was set out.

In the research of Nilsson and Ford (2004), the concept of intellectual potential that is expressed as a later stage of intellectual capital was introduced in terms of 4 fundamental principles (strategic management, process, responsiveness). A tool was developed for strategic management of the organisation's abstract assets in order to increase income and capacity in the long term and with the case study of Alfa Laval, it was described how intellectual potential added value to management tools.

Carson, Ranzijn, Winefield and Marsden (2004) stated in their study that researchers who claim that the concept of intellectual capital is explained more according to accounting and management principles used the psychological and sociological sciences in explaining the intellectual capital. Furthermore, they have also explained how human capital

transforms into structural capital by studying the human capital and structural capital which are components of intellectual capital.

Year 2005

The research of Watson (2005) has revealed the effect of franchising practises on intellectual capital and information management in retailing organisations. It has revealed the existence of positive correlation between "Franchising" performance and top management structure, between "franchising" performance and communication strategies, between the wish to be a "franchisor" and acceptance of "franchise" novelties and system performance.

The study conducted by Lin and Huang (2005) investigates what type of role the social capital has on human capital and career results. As a result, it was observed that social capital has full effect on development potential of human capital.

Year 2006

In the study of Wang (2006) it is examined the relationship between intellectual capital and market value in the Taiwan electronic industry. The intellectual capital approach of Skandia Navigator System was reviewed for its intellectual capital indicator selection. Moreover the Ohlson model was utilized for the framework of this study. Significant relationships between human capital and market value of the company, customer capital and market value of the company, innovation capital and market value of the company, and intellectual capital and market value of the company are indicated.

This study of Bozzolan, O'Reagen and Ricceri (2006) explores the hypothesis that differences in intellectual capital disclosure (ICD) practices can be explained, by industrial sector (traditional; knowledge intensive) and nationality of origin (Italy; UK). Annual reports of high-technology and

traditional non-financial firms in Italy and the UK are reviewed. It is found that the size and industrial sector are predictors of levels of ICD. However any relation between nationality of origin and ICD is not found.

Year 2007

A methodology for intellectual capital reporting is described in the paper written by Bornemann and Alwert (2007) which is tested in Germany. The paper is specially focused on developing a list of intellectual capital drivers for management intervention. It is found the possibility of identifying and assessing intellectual capital drivers for corporate results and arranging them according to marginal economic contribution.

In the study of Nazari and Herremans (2007) it is intended to develop the current models to provide observations about the role of IC in organizational performance. It is expressed that recognizing the influential elements of IC on organizational performance would help organizations to understand better their organizational capabilities.

First scope of the paper written by Cohen and Kaimenakis (2007) is to specify relations among the different categories of intellectual assets of small to medium sized enterprises (SME). And the second scope is to explore the impact of IC on corporate performance of SMEs. It is found that the interaction of some categories of intellectual assets in SMEs in some aspects is different from large companies. Additionally evidence is found on the positive contribution of intellectual capital on to corporate performance.

Another paper of Abeysekara (2007) aims to highlight the differences in internal capital reporting (ICR) practice between developing and developed nations. It is reviewed the types of intellectual capital items reported by firms in Sri Lanka and in Australia. Because of the differences in ICR identified between two countries it is highlighted the need for a uniform ICR definition and a reporting framework that provides comparative and consistent reporting under the control of a regulatory body.

The study of Kamath (2007)seeks to estimate and analyze the Value Added Intellectual Coefficient (VAIC) for measuring the value-based performance of the Indian banking sector for a period of five years from 2000 to 2004. This paper represents an attempt to understand the implications of the business performance of the Indian banking sector from an intellectual resource perspective.

The paper written by Yalama and Coşkun (2007), aims to measure the intellectual capital performance of quoted banks on the Istanbul Stock Exchange Market (ISE) in Turkey for the period 1995-2004 and test the effect of the intellectual capital performance on profitability. As a result it is assumed that intellectual capital is a more important factor than physical capital for banks.

Year 2008

Huang and Wangs's (2008) study is an extension of Ohlson's model. It is adapted Economic Value Added (EVA®) for excess earning abilities to Ohlson's model and added intellectual capital for firms listed on Taiwan Stock Exchange. It is found that intellectual capital provides incremental information for the evaluation of stocks.

The study of Xiao (2008) examines the annual reports of each of the top 50 firms listed on the Shanghai Stock Exchange (SSE) in 2007 by using the content analysis method. It is found that the companies in China do not give importance on the intellectual capital (IC) information. The most reported IC information was human capital and the least reported was external capital.

Another paper of Kamath (2008) aims to study the relationship between the intellectual capital components and measures of the performance of the company. It is found that the domestic firms seem to be performing well and efficiently utilizing their intellectual capital. The empirical analysis found that the human capital was the one which was seen

to have the major impact on the profitability and productivity of the firms over the period of study.

The determinants of intellectual capital performance in UK banks over the period 1999-2005 are examined in the study conducted by El-Bannany (2008). As the result of the study it is found that bank profitability, bank risk, investment in information technology systems, bank efficiency, barriers to entry and efficiency on investment in intellectual capital variables have impact on intellectual capital performance.

Year 2009

The paper written by Tovstiga and Tulugurova (2009) is about the examination and comparison of competitive impact of intellectual capital on small innovative enterprises. (SIE) These enterprises are located in four geographical regions: St Petersburg in the Russian Federation, the Black Forest region of Germany, the Medicon Valley, situated between Copenhagen in Denmark and Malmo in Sweden, and Silicon Valley in the USA. As a result of the study it is determined that the impact of intellectual capital on enterprise performance are similar than different across the regions studied.

The study conducted by Nazari, Herremans, Isaac, Manassian and Kline (2009) is about examining the relation between organizational characteristics and intellectual capital in Canadian and Middle East contexts. The results indicated differences in organizational characteristics and intellectual capital management between Canada and the Middle East.

The paper written by Deol (2009) is about a case study of the Indian banking industry. The responds of different banks to deregulation and industry reforms in terms of developing their intellectual capital are examined.

3. MEASUREMENT OF INTELLECTUAL CAPITAL AND VALUE ADDED INTELLECTUAL CAPITAL COEFFICIENT

3.1 Measurement of Intellectual Capital

3.1.1 Importance of Measuring Intellectual Capital

"You cannot manage what you cannot measure". This phrase which has entered the literature of management emphasise that as a result of increasing importance of intellectual capital for enterprises, it is necessary to manage intellectual capital, and fort his, to measure intellectual capital.

One of the most promising developments in the field of management recently is the attempt for measurement, utilisation and development of intellectual capital which is the most important asset of a company. For organisations that do not have profit purposes these attempts have a special potential to increase efficiency. The reason of this is the intensiveness of human capital of these organisations. At this point, there are views that the information which has become an important asset, in other words, human capital should be measured and managed like the tangible assets in the balance sheets (Marr & Chatzgel, 2004).

Intellectual capital management will provide important contribution to the long term success of a company. Consequently, with the necessity for measurement within management, companies have started to search for the answers to these questions. Are the levels of recovery of research and development costs satisfactory? Are the value of patents renewed?...etc. In order to reach the answers of many questions like these, and for the companies to protect their status in the market and to achieve a competitive advantage, there has emerged the necessity for them to measure and manage

their intellectual capital (http://business.queensu.ca/knowledge/consortium2002/ModelsofICValuation.pdf, 2009).

World Trade Organisation has been organised under three main groups, namely, trade of goods, trade of services and trade of intellectual property. The future and complexity of increasing global trade is most significantly focused on subjects related to intellectual property such as patents, software, copyrights. Therefore, in order to reveal the value and to increase it, it is compulsory to have new language. This new language for unveiling intellectual capital must be supported by figures. For example, saying that customer data base is large does not display a visible result. But if one says that customer data base has increased by 40% in a period of 12 months, the invisible becomes visible. Other than this, figures indicate a global language which is very usable for financial analysts and other third parties (Leif, 1997).

3.1.2 Intellectual Capital Measurement Methods

Since the values that are calculated in the dimension of financial capital are monetary values, it is easy to calculate their book value. However, measurement of intellectual capital is made difficult by not always applying a similar approach to intangible assets (Pike, Philip & Stephan, 2001).

There are various models used by various enterprises for measurement of intellectual capital. Since the studies made in this field are quite recent, it is not possible to mention a single and definite method. On the other hand, the subject makes it possible to be interpreting by various methods in various enterprises by reason of its nature. Fort his reason, it would be appropriate for enterprises to review different implementations and to develop a model that is specific to themselves (Arıkboğa, 2003).

3.1.2.1 Market Value Book Value Ratio

Method is based upon the assumption that the value which will be obtained by subtracting the book value that will be achieved in the financial statements of enterprises from the market value to be reached as a result of multiplication of share price listed in stock exchange with the number of shares will show the value of intangible assets of the enterprise.

Intellectual Capital = Market Value – Book Value

Particularly in countries where operation of capital markets has not been fully settled, there are factors that develop outside the company, having influences in the market value of the enterprises. This leads to various problems. Firstly, stock Exchange is variable, and it usually gives strong reaction to factors that are out of the full control of the company's management. Secondly, there are findings which reveal that both the book value and the market value are shown much lower than the actual value. Thirdly, expression of the difference between the market and the book value only as a number will not provide much benefit to managers or investors. What is important is to look at the ratio between the two values, and not the raw number that will be obtained, and to reach meaningful results by comparing it to competitors in similar state or the averages of the sector in which it is involved (Stevart, 1997).

3.1.2.2 Economic Profit

Economic Profit method is a financial performance measurement method that has been developed by Stern Stewart. It analyses the difference between the net operation profit after tax and total capital cost of an enterprise. If this difference is positive, it shows that the enterprise created a positive value in favour of its shareholders, if this difference is negative; it shows that the capital invested in the enterprise lost value (http://www.sternstewart.com/evaabout/whatis.php, 2009).

EP = Net Operation Profit after Tax– (Capital x Capital Cost)

According to Erdoğan, Katırcıoğlu and Niyazi it is mathematically equivalent to discounted cash flow. (2000)

3.1.2.3 Tobin Q Ratio

Tobin's Q ratio is a ratio developed by Hames Tobin, who is an economist awarded with Nobel's prize. The method compares the market value of an enterprise with the replacement cost.

q = Market Value / Cost of replacement of Enterprise's Assets

If the ratio is bigger than one, revenue higher than replacement cost is obtained. Tendency for investment increases and the reason of high ratios can be explained as intellectual capital. The enterprise may not make new investments if the ratio is smaller than one, which means the value of the assets is smaller than replacement cost (Stevart, 1997).

The model which is very similar to the method of Market Value Book Value is criticised for involving external effects that support the market value. In addition, comparison of different sectors which are compared according to this method might lead to problems. Since the costs of replacement of the assets in a production company will differ from the costs of replacement of assets in a service company, their comparison might be misleading. Therefore, making comparison among results of the companies in the same sector will increase the success of the model.

3.1.2.4 Balanced Scorecard

Balanced Measurement Card model has been introduced in 1992 by R. Kaplan and N. Nortan in an article that was published in Harward Business Review. It is expression of the mission and strategy of an enterprise by converting them into physical measures.

Kaplan and Norton (1999) determined 4 elements for this measurement card. These elements are;

- Financial Dimension
- Customer Dimension
- Intra-company Processes
- Learning and Development Dimension

Financial Dimension; uses financial measures to summarise the measurable economic results of the businesses conducted and the current status related to these events. It sets out whether or not the strategy of a company and the practices made for such strategy contribute to the development of the company.

Customer Dimension; defines the customer and market segments in which the company will compete and the measures of the performance the company will show in such target segments.

Dimension of Internal Processes; during this dimension, managers determine which internal operation methods should be developed and made perfect. It is a dimension that starts with production, that continues with reaching of the products to the customer, and that ends with the after sales services.

Learning and Development Dimension; determines the infrastructure necessary for a company to grow and develop in the long term. It is related to formation of purposes and criteria that will provide learning and development.

Within the framework of elements specified as a result of this method the integrity performances of the enterprises are measured. However, a key template that can be valid for each enterprise cannot be

formed and each enterprise may use this method by making adaptations when necessary according to the strategies it has developed, according to its own operating structure. Therefore this is a method which has been developed not to measure and publish intangible assets but to look at the internal performance measurement of the enterprises from a different viewpoint.

3.1.2.5 Scandia Navigator

Skandia which is an insurance and finance company based in Sweden has realised one of the first studies for measuring and reporting intellectual capital. Skandia Guide Model has been introduced by Leif Edvinson who worked for this company and who had the title of intellectual capital manager for the first time in the world and it was first used in 1993. Later on, it was adapted and implemented by many enterprises (Edvinsson, 1997).

Novelty and development are focused on five subjects, namely, customer, process, human, financials.

This model can be seen as a house. Financial focus from the roof; customer and process focuses form the walls; human focus forms the soul of the house and renewal-development focus forms the floor. One of the fundamental purposes of the model is to develop an accounting language that can show the actual existence of an enterprise (Önce, 1999).

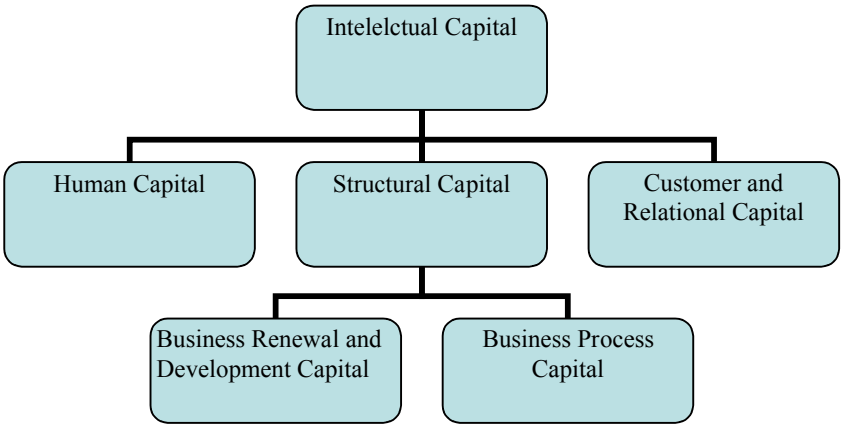
Reporting on the basis of elements is the advantageous side of the model. However, an important criticism to the model can be that the indicators to be selected among sectors and enterprises may be different and these differences limit the possibility to make comparison.

3.1.2.6 Intellectual Capital Index

Intellectual capital index is a method that was first developed by Goran and Johan Roos and it was used in 1997 also by Skandia. Intellectual

capital index is a method that tries to minimise different indicators to a single index and to build a relationship between the changes that occur in the intellectual capital and the changes that occur in the market (Samiloğlu, 2002).

Figure 3.1: Elements of Intellectual Capital according to Goran and Johan Ross in the method of intellectual capital index



Source: (A van den Berg, Herman, "Models of Intellectual Capital Valuation: a Comparative Evaluation", *Queens University Web Pages* http://business.queensu.ca/knowledge/consortium2002/ModelsofICValuation.pdf: 20)

The criticism to the method is that the indicators selected in the method do not carry a Standard characteristic for each enterprise.

3.1.2.7 Calculated Intangible Value

It is a method that has been developed by NCI Research for calculating the intellectual capital as a monetary value. According to the method, the value of intangible assets is equal to the power of showing a better performance than an average competitor having similar tangible assets.

The steps that need to be followed in the method have been listed below (Stevart, 1997).

Steps, Action to be taken

1st Step: Average profit before tax for three years is calculated.

2nd Step: Average tangible asset values are taken from the balance sheets of the period end and the average of three years is calculated.

3rd Step: Average tax is divided by average value of tangible assets and the revenue of tangible assets is reached.

4th Step: Rate of revenue of tangible assets of the sector for these three years is calculated.

5th Step: Excess revenue is calculated. The average revenue rate of the sector is multiplied by average tangible assets of the enterprise. This number shows the amount that can be earned from tangible assets of this size of an average enterprise in the sector. The number that is obtained is subtracted from the earnings before tax that was calculated in the first step.

6th Step: Average tax of the three years is calculated and this is multiplied with the additional revenue. The result is subtracted from the additional revenue in order to calculate the revenue after tax. This number is the premium that will be referred to intangible assets.

7th Step: Net current value of the premium is calculated. For this, capital cost of the enterprise can be taken as basis. The advantage of the method is that it makes it possible to make comparisons by using audited financial data. In addition, the method can be criticised fort he inability to make suggestions for the future performance of the enterprise since retroactive data are used in the method.

3.1.2.8 Intangible Asset Monitor

Intangible Asset Monitor is a method for the measurement of intellectual capital that was developed by Karl Eric Sveiby and that was first implemented in the enterprise named Celemi which gives software and consultancy services (Sveiby & Barchan, 2000).

In the intangible asset monitor, he analysed intangible assets in three groups, namely external structure, internal structure and individual talents. According to Sveiby, the total market value of a company is formed up of the total of visible assets and the three intangible assets. The visible value of a company is formed by the book value. Abstract assets have been classified into two groups, which are firstly the external structure and information capital. Information capital is then classified as internal structure and individual competencies (http://business.queensu.ca/knowledge/consortium2002/ModelsofICValuation.pdf, 2009).

This model which is similar to the balanced measurement card of Kaplan and Norton is important since it adds information dimension to the performance assessment system having conventional accounting foundation. However there is no definite template that is applicable to all the enterprises, enterprises can make changes in certain elements depending on their own structures. Therefore, this prevents making a comparison among sectors.

3.1.2.9 Real Options Pricing

The most well-known real option model is the Black-Scholes model. According to the Black Scholes (European call option) model, we can formulise the call option of an asset as follows (Sudarsanam, Sorwar & Marr, 2003).

$$C = S\,N(d_1) - E\,e^{-rt}\,N(d_2)$$

$$d_1 = [\ \ln(S/E) + (\ r + {}^1/_2\ \sigma^2)t]\ /\ \sqrt{\sigma^2}\ t$$

$$d_2 = d_1 - \sqrt{\sigma^2}\ t$$

C = European type call option value

S = current price of an asset

E = transaction price of the option

r = rate of interest without interest

t = period until the end of the maturity of the option

σ^2 = variance of the annual revenue of the asset

e^{-rt} = minimization of the price of the option to the current value

The model gives flexibility to the company (Keeffe, 2001). This means that the right which you possess and which you never have to use when the time comes is your assurance.

It is an approach that aims to assess the opportunities arising out of intellectual capital. The model focuses on nonfinancial assets contrary to other financial approaches. Real option approach has been developed with an aim to produce a solution to the insufficiency of human being in the future which is difficult to estimate. It aims to form up a variable structure by removing definite lines of company boundaries and realising different forms of projects (http://business.queensu.ca/knowledge/consortium2002/ModelsofICValuation.pdf, 2009).

This approach provides serious support to managers for making decisions for the future and may at the same time market the uncertain future more predictable. However, its dependence on complex mathematical formulae prevents it from being used easily and widely.

3.1.2.10 Technology Broker

Technology Questionnaire is a method developed by the consultancy company Technology Broker in the leadership of Annie Brooking in 1996. Brooking analyses the concept of intellectual capital under four fundamental components; market assets, human centred assets, intellectual property assets and infrastructure assets (Brooking, 1997).

In this model, with the help of an intellectual capital questionnaire, intellectual assets of enterprises are questioned and as a result of the questionnaire, the intellectual assets that are determined to exist in the enterprise are assessed according to cost, market and revenue approaches (Bontis, 2001).

It is important since it calculates the intellectual capital of the enterprise on a monetary basis. However, one of the most important criticisms against this method is that it reaches directly to the monetary values of the assets from the qualitative responses to the questions in the survey.

3.2 Value Added Intellectual Capital Coefficient (VAIC)

The foundation of the conventional operation analyses is based on the accounting system that takes into consideration only the physical and financial capital. Here, the success of all the enterprises is associated with revenue and profit. Are income and profitability sufficient today for demonstrating the company's success? Many studies that were conducted revealed contrary results. Now, indicators of success in the business circles of today have changed, new value creation elements have started to gain

importance as indicators of success (www.vaic-on.net/downloads/cro%20banke.pdf).

As it was emphasised by Peter Drucker, contribution to capital can be provided with the increase of works based on information and increase of information employees in the 21st century. Therefore, the most valuable assets of the 21st century are information employees and their efficiency. Here the efficiency of intellectual capital which gains importance can be understood by measuring it (Public, 2004).

VAIC method is a method that measures how and to what extent the intellectual capital is efficient, the value created by intellectual capital and the used capital, and whether these elements are the final resources for the success of the enterprise (www.vaic-on.net/downloads/ftse30.pdf).

VAIC is the total of three indicators specified below.

Capital Employed Efficiency CCE

Human Capital Efficiency HCE

Structural Capital Efficiency SCE

VAIC can be expressed by using the below formula;

$$VAIC_i = CEE_i + HCE_i + SCE_i$$

$VAIC_i$ = intellectual added value coefficient of enterprise i,

CEE_i = capital employed efficiency coefficient of enterprise i,

HCE_i = coefficient of efficiency of human capital of enterprise i,

SCE_i = coefficient of structural capital efficiency of enterprise i,

In order to calculate CEE, HCE, SCE values, it is first necessary to calculate the total value created by the enterprise (Value-Added-VA). This calculation should be made as follows.

$VA_i = I_i + DP_i + D_i + T_i + M_i + R_i + WS_i$

Here; the following abbreviations mean the following:

VA_i = the sum of value added for enterprise i,

I_i = interest expenses of enterprise i,

DP_i = depreciation expenses of enterprise i,

D_i = dividends of enterprise i,

T_i = corporate tax of enterprise i,

M_i = equity of minority shareholders in net income of subsidiaries of enterprise i,

R_i = profits retained of enterprise i,

WS_i = sum of wages and salaries of enterprise i

Capital Employed efficiency used in this method (CEE) is calculated by dividing the total added value by the employed capital. The capital employed is the book value of the assets of the enterprise.

$CEE_i = VA_i/CE_i$

The abbreviations mean the following;

CEE_i = means the coefficient of efficiency of capital employed in enterprise i,

VA_i = means the sum of value added for enterprise i,

CE_i = means book value of net assets of enterprise i (book value of assets)

In this method, human capital efficiency coefficient (HCE) is acquired by dividing the total added value by the total salaries and wages the enterprise paid to employees.

$HCE_i = VA_i/HC_i$

HCE_i = means human capital efficiency coefficient of enterprise i,

VA_i = means the sum of value added for enterprise i,

HC_i = means the sum of wages and salaries of enterprise i

In this method, efficiency coefficient of structural capital (SCE) shall be reached by subtracting the human capital from the total added value, and dividing the calculated structural capital value by the total added value.

$SC_i = VA_i – HC_i$

Here;

SC_i = means the structural capital of enterprise i,

VA_i = means the sum of value added for enterprise i,

HC_i = means the sum of wages and salaries of enterprise i

SCE_i can be calculated as follows.

$SCE_i = SC_i/VA_i$

Here;

SCE_i = means the structural capital efficiency coefficient of enterprise i,

SC_i = means the structural capital of enterprise i,

VA i = means the sum of value added for enterprise I (www.vaic-on.net/papers.html)

The advantages of this method over other methods can be summarised as follows (Ercan, Ozturk & Demirgunes, 2003).

- The method provides for a standardised, consistent and fixed measurement. In this manner, effective and comparable analyses can be made by using a mass of samples in which various sectors have been included.

- All the information that is used is based on audited data. Therefore, the calculations made are objective and verifiable. In other intellectual capital measurement methods, it can be more difficult to reach the information used in calculation of the indicators.

- It is a method that is easy to calculate. Certain criteria in other methods can be calculated within the framework of data that are difficult to obtain for even companies. Since alternative intellectual capital measurements depend on information obtained from a specific group of companies, their usage is limited since they require certain arrangements to ensure their conformance to the profiles of individual companies.

4. EMPIRICAL EVIDENCE: THE IMPACT OF INTELLECTUAL CAPITAL ON THE FINANCIAL PERFORMANCE OF DEPOSITORY BANKS IN TURKEY

4.1 Purpose

The study is about measuring intellectual capital of the depository banks in Turkey and analyzing the impact of their intellectual capital on their financial performance.

4.2 Data and Methodology

In the study the data from the depository banks in Turkey is used. For measuring the intellectual capital, Public's Value Added Intellectual Capital Coefficient is used. Regression models are constructed to examine the relationship between intellectual capital and banks' financial performance. The data about the depository banks in Turkey between the years 2003-2008 are gathered form Türkiye Bankalar Birliği (www.tbb.org.tr) and Bankacılık Düzenleme ve Denetleme Kurumu (www.bddk.org.tr) websites. Only first 10 banks according to their asset size are considered in the calculations. The data of first 10 banks according to their asset size is gathered from Türkiye Bankalar Birliği. The data used in this study belongs to the banks listed below;

1. T.C. Ziraat Bankası A.Ş.

2. Türkiye İş Bankası A.Ş.

3. Türkiye Garanti Bankası A.Ş.

4. Akbank T.A.Ş.

5. Yapı ve Kredi Bankası A.Ş.

6. Türkiye Vakıflar Bankası T.A.O

7. Türkiye Halk Bankası A.Ş.

8. Finans Bank A.Ş.

9. Denizbank A.Ş.

10. ING Bank A.Ş.

The position of these 10 banks in the Turkish banking sector is shown on the table below. For the important balance sheet items the proportions in the whole sector are shown.

Table 4.1: The Position of Banks in the Sector

Bank	Asset	Credits	Deposits	Stockholders Equity	Paid In Capital	Net Interest Income	Net Profit
T.C. Ziraat Bankası A.Ş.	14,79%	8,40%	18,51%	8,90%	6,77%	13,30%	17,16%
Türkiye İş Bankası A.Ş.	13,82%	12,98%	14,02%	11,43%	7,46%	11,73%	11,36%
Türkiye Garanti Bankası A.Ş.	12,60%	13,60%	11,63%	11,45%	11,37%	10,30%	13,66%
Akbank T.A.Ş.	12,13%	12,09%	11,52%	13,55%	8,12%	11,30%	13,02%
Yapı ve Kredi Bankası A.Ş.	9,03%	10,54%	9,20%	8,29%	11,77%	7,83%	8,44%
Türkiye Vakıflar Bankası T.A.O.	7,39%	8,31%	8,19%	6,86%	6,77%	6,40%	5,85%
Türkiye Halk Bankası A.Ş.	7,24%	7,04%	8,81%	5,19%	3,38%	6,89%	8,00%
Finans Bank A.Ş.	3,76%	4,87%	3,52%	3,43%	4,06%	5,53%	3,17%
Denizbank A.Ş.	2,72%	3,48%	2,21%	2,46%	1,94%	3,55%	2,07%
ING Bank A.Ş.	2,34%	3,01%	2,21%	1,95%	3,58%	2,63%	1,17%
Total	**86%**	**84%**	**90%**	**74%**	**65%**	**79%**	**84%**

The financial data of these banks which are used for the formulas are gathered from their yearly official financial results and annual reports.

The effect of inflation is not taken into consideration in the study.

Although the measurement of IC is still a debatable issue, numerous methods have been developed to measure it. In this study, the Value Added Intellectual Capital (VAIC) method, developed by Ante Public was used.

VAIC method is formulated as follows:

VAIC = CEE + HCE + SCE

CEE : capital employed efficiency coefficient

HCE : human capital efficiency coefficient

SCE : structural capital efficiency coefficient

The first step in calculating CEE, HCE and SCE is to determine a firm's total VA.

$VA_i = I + DP + D + T + M + R + WS$

VA : the sum of value added

I : interest expenses

DP : depreciation expenses

D : dividends

T : corporate taxes

M : equity of minority shareholders in net income of subsidiaries

R : profits retained

WS : sum of wages and salaries

CEE is the ratio of total VA divided by the total amount of capital employed (CE).

CEE = VA/CE

CEE : capital employed efficiency coefficient

VA : the sum of value added

CE : book value of net assets

HCE is calculated as the ratio of total VA divided by the total salary and wages spent by the firm on it employees.

HCE = VA/HC

HCE : human capital efficiency coefficient

VA : the sum of value added

HC : total salary and wage expenditure

In order to calculate SCE, it is first necessary to determine the value of a firm's structural capital (SC). Public proposes a firm's total VA less its human capital is an appropriate proxy of a firm's SC.

SCE = SC/VA

SC = VA – HC

SC : structural capital

VA : the sum of value added

HC : total salary and wage expenditure

SCE : structural capital efficiency

For the purpose of this study, four financial ratios are selected as proxy measures for a company's performance. These are return on equity (ROE), return on total assets (ROA), growth in revenues (GR) and employee productivity (EP). In the article "An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance" these ratios are used for measuring company's performance. In this article, the method is applied on all listed companies in Taiwan (Chen, Cheng & Hwang, 2005).

ROE = Pre-tax income / Average stockholders' equity

ROE represents returns to shareholders of common stocks, and is generally considered an important financial indicator for investors.

ROA = Pre-tax income / Average total assets

ROA represents earnings generated from invested capital (assets). It is an indicator of how profitable a company is relative to its total assets.

GR = (current year revenues / last year revenues) – 1

GR measures the changes in firms' revenues. Increases in revenues usually are a signal for potential growth.

EPR = Pre-tax income / Number of employees

EPR is a measure for the net value added per employee, reflecting employees' productivity.

For examining the relationship between intellectual capital and banks' financial performance the below mentioned assumption is tested via hypothesis testing. The hypothesis is as follows;

"Companies with greater intellectual capital tend to have better financial performance contemporaneously."

The methodology is applied on 10 banks mentioned above for the years 2003 – 2008. The original data of the years 2003 and 2004 are in TL currency. However they are converted to YTL in order to standardize the data.

4.3 Findings

Calculation of VAIC is as follows;

Table 4.2: VA

	2003	2004	2005	2006	2007	2008
T.C. Ziraat Bankası A.Ş.	13355049000	9062597000	8004296000	8751673000	10981910000	12988121000
Türkiye İş Bankası A.Ş.	3880939000	3971545000	5056404000	7132663000	8251905000	9477756000
Türkiye Garanti Bankası A.Ş.	2930209000	2560082000	2568108000	4269455000	5933811000	7742493000
Akbank T.A.Ş.	3616083000	2906604155	4324753000	5567059000	7090430000	8284205000
Yapı ve Kredi Bankası A.Ş.	3373382000	2583651000	2387373000	4055419000	5235677000	5807997000
Türkiye Vakıflar Bankası T.A.O.	2683517000	2668379000	2960232000	3902858000	4878520000	5422476000
Türkiye Halk Bankası A.Ş.	4726567000	3796378000	4066079000	4553544000	5568883000	6352823000
Finans Bank A.Ş.	734534000	800856000	1127374000	1519077000	1878267000	2714755000
Denizbank A.Ş.	641158000	646857000	700719000	958246000	1391762000	1738685000
ING Bank A.Ş.	864176000	786686000	783709000	1171950000	1476833000	1775118000

Table 4.3: CEE

	2003	2004	2005	2006	2007	2008
T.C. Ziraat Bankası A.Ş.	2,011303	1,795640	1,370599	1,330244	1,521462	1,764451
Türkiye İş Bankası A.Ş.	0,608179	0,519836	0,544406	0,757975	0,778198	1,003042
Türkiye Garanti Bankası A.Ş.	1,050261	0,807769	0,668655	0,914173	0,862082	0,817661
Akbank T.A.Ş.	0,629913	0,466775	0,680265	0,787933	0,668856	0,739109
Yapı ve Kredi Bankası A.Ş.	0,841975	0,556862	1,503748	1,212797	1,067689	0,847506
Türkiye Vakıflar Bankası T.A.O.	2,010009	1,326098	0,677806	0,869731	0,933459	0,956177
Türkiye Halk Bankası A.Ş.	1,616728	1,261705	1,232441	1,204691	1,270543	1,481250
Finans Bank A.Ş.	0,860160	0,764889	0,746630	0,705012	0,715291	0,955961
Denizbank A.Ş.	1,090683	0,756970	0,656323	0,774983	0,956430	0,854752
ING Bank A.Ş.	1,434029	1,101103	0,779379	1,199991	1,158442	1,102437

Table 4.4: HCE

	2003	2004	2005	2006	2007	2008
T.C. Ziraat Bankası A.Ş.	17,894247	12,949897	11,576337	11,336760	14,026037	14,192682
Türkiye İş Bankası A.Ş.	5,489181	5,412461	6,177292	7,613127	7,605400	7,571278
Türkiye Garanti Bankası A.Ş.	9,306830	6,946457	5,785943	8,026378	8,482750	8,040673
Akbank T.A.Ş.	11,772751	8,348592	10,254596	10,124724	11,511373	9,936030
Yapı ve Kredi Bankası A.Ş.	8,755641	6,506380	5,764958	6,367774	6,641369	6,647458
Türkiye Vakıflar Bankası T.A.O.	9,153044	9,004451	9,126181	10,733313	10,671456	9,734044
Türkiye Halk Bankası A.Ş.	15,190931	13,521309	10,753978	11,394371	12,411371	12,525356
Finans Bank A.Ş.	6,436223	5,108119	4,202229	6,512070	4,814958	5,843222
Denizbank A.Ş.	7,873829	5,662065	4,303536	4,357922	4,543921	4,662791
ING Bank A.Ş.	6,709181	5,912398	4,975235	5,983244	5,459339	5,511591

Table 4.5: SCE

	2003	2004	2005	2006	2007	2008
T.C. Ziraat Bankası A.Ş.	0,944116	0,922779	0,898610	0,897575	0,928704	0,929541
Türkiye İş Bankası A.Ş.	0,817823	0,815241	0,838117	0,868648	0,868514	0,867922
Türkiye Garanti Bankası A.Ş.	0,892552	0,856042	0,827167	0,875411	0,882114	0,875632
Akbank T.A.Ş.	0,915058	0,880219	0,902483	0,901232	0,913129	0,899356
Yapı ve Kredi Bankası A.Ş.	0,885788	0,846305	0,826538	0,842959	0,849429	0,849567
Türkiye Vakıflar Bankası T.A.O.	0,890747	0,888944	0,890425	0,906832	0,906292	0,897268
Türkiye Halk Bankası A.Ş.	0,934171	0,926043	0,907011	0,912237	0,919429	0,920162
Finans Bank A.Ş.	0,844629	0,804233	0,762031	0,846439	0,792314	0,828862
Denizbank A.Ş.	0,872997	0,823386	0,767633	0,770533	0,779926	0,785536
ING Bank A.Ş.	0,850951	0,830864	0,799004	0,832867	0,816828	0,818564

Table 4.6: VAIC

	2003	2004	2005	2006	2007	2008
T.C. Ziraat Bankası A.Ş.	20,849665	15,668317	13,845546	13,564579	16,476203	16,886674
Türkiye İş Bankası A.Ş.	6,915184	6,747538	7,559815	9,239750	9,252113	9,442242
Türkiye Garanti Bankası A.Ş.	11,249643	8,610268	7,281765	9,815961	10,226946	9,733966
Akbank T.A.Ş.	13,602868	10,109031	11,837345	11,813888	13,093358	11,574495
Yapı ve Kredi Bankası A.Ş.	10,483404	7,909547	8,095245	8,423531	8,558487	8,344530
Türkiye Vakıflar Bankası T.A.O.	12,053800	11,219493	10,694413	12,509877	12,511207	11,587489
Türkiye Halk Bankası A.Ş.	17,741831	15,709057	12,893429	13,511299	14,601343	14,926768
Finans Bank A.Ş.	8,141013	6,677242	5,710890	8,063520	6,322563	7,628044
Denizbank A.Ş.	9,837509	7,242421	5,727492	5,903437	6,280277	6,303080
ING Bank A.Ş.	8,994160	7,844365	6,553618	8,016102	7,434608	7,432592

For the year of 2008, in terms of efficiency in utilizing human capital, T.C. Ziraat Bankası A.Ş. topped the list with a HCE of 14.19, followed by Türkiye Halkbankası A.Ş. (HCE of 12,52), Akbank A.Ş. (HCE of 9,93) and Türkiye Vakıflar Bankası T.A.O. (HCE of 9,73). A HCE of 14.19 means for every YTL invested, T.C. Ziraat Bankası created 14,19 YTL from its human capital.

T.C. Ziraat Bankası A.Ş. was also the best performer for CEE and SCE. As a whole, the banks analyzed have relatively high HCE, compared to CEE and SCE. This means most of the value created in these banks was attributed to human capital. This is not surprising because in service sectors as banking sector customer services rely on human capital.

With regards to VAIC ranking, T.C. Ziraat Bankası A.Ş. has the highest efficiency ranking with VAIC of 16,88. In other words, this bank is the most efficient bank of the analyzed banks in the year 2008. With VAIC of 16.88, for every YTL invested by T.C. Ziraat Bankası A.Ş., 16,88 YTL is generated. The least efficient bank is Deniz Bank A.Ş. with a VAIC of 6,30.

The variables used for VAIC calculation is gathered from the balance sheets of the banks. However in one hand the variables from balance sheet are showing the situation on 31.12, on the other hand variables from income statement are showing the sum of the year. Time difference between variables is a constraint of this study.

Financial performance indicators are calculated below;

Table 4.7: ROE

	2003	**2004**	**2005**	**2006**	**2007**	**2008**
T.C. Ziraat Bankası A.Ş.	0,312	0,441	0,459	0,339	0,452	0,317
Türkiye İş Bankası A.Ş.	0,089	0,144	0,137	0,119	0,170	0,151
Türkiye Garanti Bankası A.Ş.	0,138	0,151	0,207	0,250	0,404	0,228
Akbank T.A.Ş.	0,303	0,250	0,237	0,244	0,216	0,158
Yapı ve Kredi Bankası A.Ş.	0,046	-0,003	-1,083	0,212	0,174	0,196
Türkiye Vakıflar Bankası T.A.O.	0,198	0,381	0,172	0,228	0,241	0,163

Türkiye Halk Bankası A.Ş.	0,318	0,236	0,180	0,240	0,235	0,277
Finans Bank A.Ş.	0,310	0,224	0,287	0,404	0,231	0,177
Denizbank A.Ş.	0,166	0,206	0,230	0,280	0,186	0,161
ING Bank A.Ş.	0,126	0,175	0,283	0,168	0,126	0,147

Table 4.8: ROA

	2003	**2004**	**2005**	**2006**	**2007**	**2008**
T.C. Ziraat Bankası A.Ş.	3,9	3,9	4,1	3,8	3,7	2,6
Türkiye İş Bankası A.Ş.	1,6	2,9	2,6	2,2	2,6	1,8
Türkiye Garanti Bankası A.Ş.	1,4	2,6	2,6	2,6	4,1	2,4
Akbank T.A.Ş.	6,9	4,3	4,0	3,4	3,6	2,4
Yapı ve Kredi Bankası A.Ş.	0,8	-0,1	-13,3	1,5	1,7	2,1
Türkiye Vakıflar Bankası T.A.O.	1,4	3,2	2,3	2,8	3,0	1,8
Türkiye Halk Bankası A.Ş.	4,2	2,8	2,8	3,2	3,5	2,5
Finans Bank A.Ş.	4,0	3,0	4,1	5,0	3,1	1,9
Denizbank A.Ş.	2,7	2,2	2,8	2,7	1,8	1,7
ING Bank A.Ş.	1,4	1,9	2,8	1,4	1,4	1,1

Table 4.9: GR

	2003	**2004**	**2005**	**2006**	**2007**	**2008**
T.C. Ziraat Bankası A.Ş.	6,267857	0,253890	0,205748	0,137595	0,119524	-0,092301
Türkiye İş Bankası A.Ş.	0,549679	0,319288	0,829126	-0,045692	0,534240	-0,113056
Türkiye Garanti Bankası A.Ş.	1,788818	0,312670	0,600905	0,474676	1,177020	-0,244051
Akbank T.A.Ş.	1,199789	-0,323186	0,437287	0,090947	0,246284	-0,145285
Yapı ve Kredi Bankası A.Ş.	-0,832336	-1,318783	-0,961847	2,012285	0,384481	0,470140
Türkiye Vakıflar Bankası T.A.O.	-0,242842	1,362505	-0,154433	0,459002	0,339041	-0,269236
Türkiye Halk Bankası A.Ş.	0,034267	-0,045937	0,049460	0,559156	0,309834	-0,099664
Finans Bank A.Ş.	-0,060199	0,081753	0,869691	1,068841	0,543246	-0,343892
Denizbank A.Ş.	0,944220	0,137508	1,251990	-0,257136	0,029052	0,316402
ING Bank A.Ş.	0,920741	0,602856	1,692663	-0,662760	0,293537	0,035267

Table 4.10: EPR

	2003	**2004**	**2005**	**2006**	**2007**	**2008**
T.C. Ziraat Bankası A.Ş.	110177,16	105502,42	132150,78	131502,61	141101,96	127470,77
Türkiye Halk Bankası A.Ş.	109329,65	63581,43	76195,55	102880,57	134421,25	81680,84
Türkiye Vakıflar Bankası T.A.O.	36044,22	107492,15	105147,61	133446,04	159535,76	96883,89
Akbank T.A.Ş.	234590,52	144650,30	189593,43	157124,71	182264,83	136267,58
Türkiye Garanti Bankası A.Ş.	45188,36	75327,50	90853,47	112248,84	191934,92	132865,54
Türkiye İş Bankası A.Ş.	36337,23	68468,02	109326,77	87760,39	109279,35	86634,58
Yapı ve Kredi Bankası A.Ş.	17589,68	-1518,61	-168638,45	52700,14	59883,79	90241,04

Denizbank A.Ş.	45518,38	33534,63	52918,80	56901,07	40824,20	44461,01
Finans Bank A.Ş.	67567,24	46655,56	77780,57	114601,34	61986,09	50301,47
ING Bank A.Ş.	18461,72	27605,47	51298,44	30811,84	29365,98	29297,09

For the hypothesis testing, below listed descriptive statistics are needed.

Table 4.11: VAIC Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
VAIC year 2003	10	6,9152	20,8497	1,198691E1	4,3611573
VAIC year 2004	10	6,6772	15,7091	9,773728E0	3,4299626
VAIC year 2005	10	5,7109	13,8455	9,019956E0	3,0352205
VAIC year 2006	10	5,9034	13,5646	1,008619E1	2,6271142
VAIC year 2007	10	6,2803	16,4762	1,047571E1	3,5489513
VAIC year 2008	10	6,3031	16,8867	1,038599E1	3,4028752
Valid N (listwise)	10				

From these statistics it is observed that between the years 2003 – 2008 the intellectual capital coefficient of the banks is maximum in 2004 and minimum in 2006.

Table 4.12: EPR Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
EPR year 2003	10	1,7590E4	2,3459E5	7,208042E4	6,5927470E4
EPR year 2004	10	-1,5186E3	1,4465E5	6,712989E4	4,3480770E4
EPR year 2005	10	-1,6864E5	1,8959E5	7,166270E4	9,3715410E4
EPR year 2006	10	3,0812E4	1,5712E5	9,799775E4	4,0465801E4
EPR year 2007	10	2,9366E4	1,9193E5	1,110598E5	5,9671742E4
EPR year 2008	10	2,9297E4	1,3627E5	8,761038E4	3,7694232E4
Valid N (listwise)	10				

From these statistics it is observed that between the years 2003 – 2008 the employee productivity of the banks is maximum in 2006 and minimum in 2007.

Table 4.13: GP Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
GP year 2003	10	-,8323	6,2679	1,056999E0	1,9874868
GP year 2004	10	-1,3188	1,3625	,138256	,6802136
GP year 2005	10	-,9618	1,6927	,482059	,7526749
GP year 2006	10	-,6628	2,0123	,383691	,7455675
GP year 2007	10	,0291	1,1770	,397626	,3172035
GP year 2008	10	-,3439	,4701	-,048568	,2585107
Valid N (listwise)	10				

From these statistics it is observed that between the years 2003 – 2008 the growth in revenues of the banks is maximum in 2003 and minimum in 2008.

Table 4.14: ROA Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ROA year 2003	10	,8000	6,9000	2,830000E0	1,9073251
ROA year 2004	10	-,1000	4,3000	2,670000E0	1,2074307
ROA year 2005	10	-13,3000	4,1000	1,480000E0	5,2380658
ROA year 2006	10	1,4000	5,0000	2,860000E0	1,0741405
ROA year 2007	10	1,4000	4,1000	2,850000E0	,9395625
ROA year 2008	10	1,1000	2,6000	2,030000E0	,4620005
Valid N (listwise)	10				

From these statistics it is observed that between the years 2003 – 2008 the return on assets of the banks is maximum in 2006 and minimum in 2005.

Table 4.15: ROE Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ROE year 2003	10	,0460	,3180	,200600	,1031129
ROE year 2004	10	-,0030	,4410	,220500	,1240155
ROE year 2005	10	-1,0830	,4590	,110900	,4289148
ROE year 2006	10	,1190	,4040	,248400	,0805953
ROE year 2007	10	,1260	,4520	,243500	,1041199
ROE year 2008	10	,1470	,3170	,197500	,0584508
Valid N (listwise)	10				

From these statistics it is observed that between the years 2003 – 2008 the return on equity of the banks is maximum in 2006 and minimum in 2005.

Hypotheses are defined as follows;

H_0: There isn't a significant relationship between banks' intellectual capital and the relevant financial performance criteria.

H_1: There is a significant relationship between banks' intellectual capital and the relevant financial performance criteria.

Table 4.16: The Relationship between VAIC and EPR

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	VAIC	1,028808E1	10	3,2950700	1,0419926
	EPR	8,459016E4	10	4,8468667E4	1,5327138E4

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	VAIC & EPR	10	,189	,600

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	VAIC - EPR	-8,4579869E4	4,8468043E4	1,5326941E4	-1,1925182E5	-4,9907920E4	-5,518	9	,000

Correlations

		VAIC	EPR
VAIC	Pearson Correlation	1	,189
	Sig. (2-tailed)		,600
	N	10	10
EPR	Pearson Correlation	,189	1
	Sig. (2-tailed)	,600	
	N	10	10

At the result of the hypothesis test it is determined that the error of rejecting H_0 is ignorable. Thus the result “There is a significant relationship

between banks' intellectual capital and the employee productivity" is reached.

The relationship between VAIC and EPR is 18% therefore it can be stated that the relationship is week.

Table 4.17: The relationship between VAIC and GR

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	VAIC	1,028808E1	10	3,2950700	1,0419926
	GP	,401677	10	,3270747	,1034301

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	VAIC & GP	10	,336	,343

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	VAIC - GP	9,8864031E0	3,2000600	1,0119478	7,5972181	12,1755882	9,770	9	,000

Correlations

		VAIC	GP
VAIC	Pearson Correlation	1	,336
	Sig. (2-tailed)		,343
	N	10	10

GP	Pearson Correlation	,336	1
	Sig. (2-tailed)	,343	
	N	10	10

At the result of the hypothesis test it is determined that the error of rejecting H_0 is ignorable. Thus the result "There is a significant relationship between banks' intellectual capital and the growth in revenues" is reached.

The relationship between VAIC and GR is 33% therefore it can be stated that the relationship is week. However this relationship is stronger than the relationship between VAIC and EPR.

Table 4.18: The relationship between VAIC and ROA

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	VAIC	1,028808E1	10	3,2950700	1,0419926
	ROA	2,447120E0	10	1,4879575	,4705335

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	VAIC & ROA	10	,422	,225

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	VAIC - ROA	7,8409604E0	2,9895028	,9453638	5,7023990	9,9795219	8,294	9	,000

Correlations

		VAIC	ROA
VAIC	Pearson Correlation	1	,422
	Sig. (2-tailed)		,225
	N	10	10
ROA	Pearson Correlation	,422	1
	Sig. (2-tailed)	,225	
	N	10	10

At the result of the hypothesis test it is determined that the error of rejecting H_0 is ignorable. Thus the result "There is a significant relationship between banks' intellectual capital and the return on assets" is reached.

The relationship between VAIC and ROA is 42%. It can be mentioned that the relationship between VAIC and ROA is stronger than between VAIC and EPR, GP.

Table 4.19: The relationship between VAIC and ROE

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	VAIC	1,028808E1	10	3,2950700	1,0419926
	ROE	,203565	10	,1186621	,0375243

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	VAIC & ROE	10	,520	,124

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	VAIC - ROE	1,0084516E1	3,2350056	1,0229986	7,7703323	12,3986994	9,858	9	,000

Correlations

		VAIC	ROE
VAIC	Pearson Correlation	1	,520
	Sig. (2-tailed)		,124
	N	10	10
ROE	Pearson Correlation	,520	1
	Sig. (2-tailed)	,124	
	N	10	10

At the result of the hypothesis test it is determined that the error of rejecting H_0 is ignorable. Thus the result "There is a significant relationship between banks' intellectual capital and the return on equity" is reached

The relationship between VAIC and ROE is 52%. The relationship between VAIC and ROE is the strongest relationship that the other three financial performance criteria.

The results can be compared to some other studies in the literature about the impact of intellectual capital on financial performance. All of these studies confirm the positive impact of intellectual capital on financial performance of firms. The result of the study conducted by Chen, Cheng and Hwang (2005) about the relationship between intellectual capital of

listed companies in Taiwan and their financial performance supports that the companies with greater intellectual performance tend to have better financial performance. Another result of the study is that value of the firms with higher intellectual capital is higher for the investor. Also the study conducted by Tan, Plowman and Hancock (2007) supported the evidence that intellectual capital and company performance are in a positive relation. This study also shows that the impact of intellectual capital on the performance of the company differs by industry. Finally the result from a study from Turkey conducted by Yalama and Coskun (2007) supported the evidence that intellectual capital has a positive effect on financial performance of the firms. In this study three different portfolios were constructed and at the end of the study the portfolio based on intellectual capital had the highest return. The methodologies of the studies are different from each other but the results are very similar. Thus the results of the study in this dissertation are in the same direction with other studies in the literature.

CONCLUSION

This study investigates the impact of intellectual capital on the financial performance of the depository banks in Turkey. It is demonstrated that banks' return on equity ratios are strongly related to intellectual capital of the banks. Our findings underline the importance of intellectual capital in enhancing bank profitability and revenue growth.

Banks need to give importance on intellectual capital in order to obtain competitive advantage in today's global market. An indicator of this is the shift of profitable sources from physical assets to intellectual assets. This is especially true in knowledge-driven sectors, such as banking, where the value added of corporations, organizations and individuals is directly related to their knowledge and intellectual capital.

It is important for banks to enhance measure and manage their intellectual capital. One of the findings of the study is that the investment realized in intellectual capital especially in human capital for service sector affects the financial performance. The investment in human capital tends to yield a relatively higher return than investment in physical and structural capital.

After the comparison of individual results for the banks, it is observed that Ziraat Bankası A.Ş. has the highest VAIC which has the highest ROE, ROA, EPR and GP. When the relationship between VAIC and these four performance criteria is compared it is observed that the strongest relationship is between ROE and VAIC and the weakest relationship is between EPR and VAIC. However other factors which can have effect on this VAIC calculation are not taken into account. In another study these factors can be determined and eliminated for the calculation.

This study is not without its limitations. The study can be applied on a wider time interval in terms of years and on more banks. Additionally in order to observe differences between knowledge intensive sectors with other sectors in terms of the effect of their intellectual capital on their financial performance the study can be applied on a non knowledge intensive sector. A comparison can be made on the results from two sectors. The intellectual capital is not reported officially by the banks in Turkey. Reporting of intellectual capital can be added to the studies.

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