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A comparative between the effect of physical capital and intellectual capital in improving university performance

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Abstract

Nowadays, regarding increasing number of colleges and competitiveness of business areas, achieving competitive advantage is considered as one of the major concerns of colleges. Obtaining competitive advantage entails specific requirements that intellectual capital –human capital, structural capital, and customer capital- is regarded as one of the most important factors. Efficient management of these kinds of capitals can be insurance for survival and continuous operation of universities. In colleges, human capital includes skills and expertise of the faculty members and employees. Structural capital consists of inventions and intellectual property laws, and customer capital comprises the ability to admit and maintain college students. Statistical population of this study was 67 college teachers who were selected by simple random sampling. After distributing the questionnaires and collecting them, the data analysis was done by SPSS. It was suggested that intellectual capital and physical capital have correlation with improving college performance. In addition, to improve university performance, correlation coefficient of physical capital reporting is greater than the correlation coefficient of intellectual capital.

Keywords: Intellectual Capital, Physical Capital, Reporting, university Performance.

Introduction:

The present age which is known as 'information age' and 'post-industrial age', has replaced the industrial age. In information age, organizations have drawn most of their attention to knowledge assets and intellectual capital, whereas, in industrial age, organizations focused mainly on tangible assets such as

machinery and equipment. The present organizations have found out intangible assets like intellectual capitals, experiences, organizational knowledge, and information result in their success and survival, therefore, it can be said that the main challenges of accounting management , in recent years, is shifting the focus from hard assets to soft assets. Nowadays, obtaining the raw materials and converting them into manufactured goods, is not considered as the main source of creating wealth and assets among most of the organizations, but they believe that wealth and assets are created by employee's thoughts and knowledge (Berousack, 1999,25). Today, intangible assets and knowledge assets comprise the main parts of market value of the corporations and their importance is growing increasingly. So, it is necessary to pay particular attention to these types of assets and adopt appropriate management approaches. In 'information age' organizations are busy doing business in dynamic environment where achieving sustainable competitive advantage is one of the basic requirements. From 1990 onward, organizations have focused on using efficient approaches that may give them the necessary opportunity and ability to manage the effects of ambient business environment on their activities. Based on the philosophy of the efficient approaches, the organizations should have accountability, timely reactions, and flexibility to provide better and valuable services to their customers. In today's know ledged-based economy, knowledge and its proper management may affect all activities of an organization, and by using a knowledge-based management system, organizations can get such advantages as innovation, creativity, efficiency and expert-orientation. To get knowledge of the competitive advantage of each organization, the following questions must be addressed carefully. What is the knowledge of the organization? How does it use its own knowledge? And how can it create (invent) new things? Knowledge management can lay the right foundation for innovation. Creativity can play an efficient role in inventing new products, developing new processes, or improving the current process. By creating new processes or improving the efficiency of preceding processes, expenses can be reduced. Organizational knowledge is the basis of innovation, thus it can be said that innovation and organizational knowledge are two inseparable categories (Damanpour & GolpazAkershinan, 1998,:25). Strategic management of the intellectual capital is the requirement of today's organizations since in this case organizations can formulate, implement, and evaluate relevant strategies with intellectual capital and create a sort of coordination between strategies of intellectual capital and macro strategies of the organization in order to achieve competitive advantage in today's fiercely competing markets.

Statement of the problem

From the second half of the 20th century onward, the difference between book value and market value of the companies has always been on growing trend, such that, based on Lure studies- from 1977 to 2002- market value of 500 top American companies has been from 1 to 5 times especially when compared to their book value. In other words, based on this study, financial statements of some of these companies have reflected only 20% of their real value in the studied period. The main reasons of this difference are, emphasizing the role of intellectual capital in continuous functioning process and profitability of the companies. But, unfortunately, the current financial statements are incapable of their reporting. Nowadays, intellectual capital is one of the most important source of achieving competitive advantage. In addition, organization's performance is greatly influenced by this factor (Riahi, Belkovi, 1993). A lot of research has been done on identifying and originating the difference between book value and market value. Taking these two factors into account, we can provide useful information for managers and decision-makers. (Table1). In this study, college performance is measured by three criteria including 'financial performance', educational performance and research performance. Also, in this study we are going to answer this question: "Does the reporting of intellectual capital and physical capital bring about college performance? Also, "Which reporting of these two factors has the greatest effect on improving college performance?

Table 1-The proportion of intellectual assets to total assets in some of the most successful companies (2005)

company	Market value (billion dollar)	Book value (billion dollar)	Share of physical capital (%)	Share of intellectual capital (%)
Coca cola	104.8	11.8	11	89
Microsoft	264.9	55.8	21	79
I.B.M	138.2	22.8	16	84
General Motor	277.4	63.9	23	77
Intel	112.3	35.3	31	69
Nokia	71.1	15.4	22	78

Source: Associate in Insurance Accounting and Finance (AIAF)

Although, traditional ways of accounting can be significantly useful in perceiving the process of business value in a knowledge-based organization institutes in which knowledge forms greater part of a product value and an organization wealth-these traditional ways are inadequate because they are based on tangible assets and they use historical information to value intellectual capital- which is the most valuable assets in modern organization (Sullivan, 2000). The approach of intellectual measurement is based on designing new mechanisms of measuring and reporting qualitative or non-financial variables- including intellectual capital (IC) along with classical qualitative or financial data (Jonson et. al, 1999).Universities are main source of knowledge in any country. Growth and developments of other parts are partly dependent on their dynamism. The most important asset of any college is human resources (faculty members, staffs and students), organizational process and relationship networking. These resources form major parts of intellectual capitals and despite their importance; they have not been given so much attention on part of universities. However, only a small number of colleges around the world are busy designing efficient systems to measure, manage and report their own IC (Antony, Rojas, 2003 -7). One of major challenges of today's IC management in universities is how to redevelop human capital to structure capital and give more importance to relationship capital. Given removing Entrance Examination of Universities in the following years, the competition for top students is increasing among Iranian universities, and taking intellectual capital management into consideration as a competitive advantage is necessary. Iranian universities do not have comprehensive information about their own intellectual capitals and cannot manage them appropriately. Therefore one of their top priorities would be measuring and reporting IC. To this end, the main point is identifying and proper using of the methods that can measure and report IC all over the country based on conditions and requirements. The aim of this study is to design a right system of measuring and reporting IC in the universities so that decision making process, diagnosing and position of IC can be improved for education decision makers in our country.

The evolutionary (developmental) trend of IC:

It can be said that IC has been for a long time, but organization didn't attach high importance to it. For the first time the IC term was introduced in scientific circles in 1969 by an economist called Kent Galbiraithin order to explain the gap between book value and market value of institutions. The first report about IC was published in 1995 by Scandia company- which is the biggest finance and insurance company in Scandinavian countries. Arthur Anderson and Ernest Indian institutes were the first auditing companies which tied to prepare reports about IC for their bosses. In 1996, American Security Exchange Commission held a conference entitled IC. Riahi is among the experts that addressed the relationship between IC and financial performance of multinational business companies. In their studies Malan and Edison defined the value of IC as the difference between company's book value and market value. Paluma Sanchez considered management and reporting of intellectual capital in Madrid University. In his

opinion, transparency and accountability are obvious results of intellectual capital and reporting. Paluma highlights cases like college independence and government ruling and formulated a framework for IC reporting in colleges. This framework, in turn, brings about serious challenging issues among authorities. Antony Rejas studied criteria related to IC and considered it's scientific principles and characteristics of colleges and could propose approaches for reporting and measuring IC which is compatible with college needs. European Union and European universities have been pioneer in taking IC and its reporting into account and has achieved significant results. Spanish universities have also emphasized the key role of IC in efficient management of colleges and can obtain great success by devoting part of their studies to this issue.

Theoretical basis of research:

The concept of Intellectual Capital (I.C)

Different definitions of IC are introduced in literature review of IC and so there is no single or same definition for it. Some of the important definitions are as follows:
IC is a source of intangible asset that are not often reflected in balance sheet (Edvinsson, 1997). IC is intellectual knowledge, information and assets that can be used in creating values by which an organization can achieve competitive advantage and guarantee its functioning (Anderson, 2007). In general, most experts agree that IC has three aspects: human capital, structural capital and relationship capital. Here each of which is described briefly.
Human capital: human capital represents staffs (employee)'s knowledge of an organization (Bontis et al, 2002). Human capital underlies the intellectual capital and without which IC may not be accomplished (Chen et.al, 2004).Without human capital little innovation is done in products, service and trading process (RiahBelkoui, 2003). In other words, human capital is the skills, knowledge and abilities of the organization, staffs which can be applied in solving organizational problems. Given that human capital belongs to an organization employee, it can be claimed that it is not under the ownership of a specific organization and thus this capital departs when the employees go out of the organization. So, organizations try to prevent IC from leaving them by redeveloping this kind of capital into other forms of IC.
Structural (organizational) capital
Organizational knowledge is institutionalized knowledge that belongs to an organization and it is saved in cases like databases and instructions. Ross et al, (1997) believe that structural capital refers to" whatever left in a company after the employees go their homes". They believe that structural capital entails organization capital such as intellectual and cultural assets, innovation, processes and also renovating and development capital like patent right of products and educational endeavors. This capital is under the ownership of the organization and by supporting human capital, the foundation is laid for right doing of jobs on part of the employees.
Customer or relationship capital
Customer capital refers to proper use of market information to attract and maintain customers. This kind of capital also includes the capital of internal and external environment of an organization and also is the form of relationship that the organization has with customers, rivals, suppliers, trading associations and government (Bontis, 2004). Instances like customer's satisfaction and their loyalty, marketing qualification, bazaar intensity, facilitating credit supply etc. can be regarded in relationship capital; therefore, the growth of customer capital depends on supporting human capital and structural capital (Chen et al, 2004).

Measuring and reporting IC

In management discourse, it is believed that whatever can't be measured and reported, it cannot be managed. Of course many attempts have been made in measuring and reporting IC but these kind of endeavors are at the starting point and to achieve a great success in this regard, we have a long way to go. So far, more than 30 methods to measure IC have been put forward, which can be classified into four categories:

A-Direct IC methods: these methods predict Rial value of IC by identifying their component parts. Upon doing so, the component parts can be evaluated directly and constantly or they can determine the final value of IC of organization in combination.

B-Market investment methods: these methods focus on calculating the difference between company's market value and book values of its share and the calculated difference is classified as intangible assets or IC. For example, if the current value of a company shares (stock), in a security market, equals 10 billion Rails and book value of its share is 1 billion rials, then rial value of IC of this company equals 9 billion.

C- Asset return methods: in these methods income averaging, before tax deduction of a company, in a given company is divided by value averaging of a company physical asset in the same period. Then the result number is compared with the averaging of asset return of the industry. If the final difference is Zero or negative, the company doesn't have extra IC to industry averaging and it is supposed that company has extra IC to industry averaging and it is positive. This positive difference is multiplied in value averaging of physical assets of the company in the same period so that the averaging of annual extra income may be determined. By dividing the final annual extra income on average cost of company asset, an estimate of IC value of the company is achieved.

D-Scorecard methods: in these methods different parts of intangible assets or IC are identified and some criteria are defined for each of them. Scorecard methods are similar to direct IC methods; the only difference is that in these methods no estimate is made of rial values of intangible assets.

Each of the mentioned methods has its own advantages and disadvantages, which are not discussed in this article. Various methods have been proposed to report IC, the major ones include:

A) Intangible source and IC in accounts and balanced sheets of an organization; B) providing IC statement as an appendix to financial statements;

C) Preparing two balance sheets, one for reflecting traditional assets and the other for representing intangible source of organization such as intellectual property, brand etc. The authorities have not reached a consensus over the above mentioned solutions; therefore, there are no national or international guidelines about IC reporting.

Importance of taking intellectual capital into consideration in universities

Knowledge-based organization should identify their own intellectual capital to achieve sustainable competitive advantage and should try to manage them efficiently. So, designing and administering an appropriate approach to manage intellectual capital, that is, human capital, structural capital and relationship capital) is of greatest importance. Nowadays, products and organizations live on and die away based on knowledge. The most successful organizations are those who use their intangible assets effectively. According to recent findings, in the process of value creating, the role and importance of traditional assets (money, land (premises), machineries), is decreasing day-to-day and in contrast, the significance and value of intellectual capital is growing fast. The term of knowledge-based organization is used to describe organizations that put emphasis on their own knowledge assets. In such organizations competitive advantage is achieved by knowledge assets. It is necessary to diagnose and manage them effectively. In addition, in such organization, profit is the result of commercializing new ideas and innovations- which is due to interaction between human capital and structural capital, so that it

determines the value of the organization. Managing intellectual capital is one of the major challenges of modern organizations. Since the proceedings colleges and higher education centers is largely intangible, so raising awareness of the founders and decision-makers of institutes can have a great role on highlighting knowledge management in them. At the present time, the major part of college and university budget is provided by the public or government centers; therefore, performance transparency of such centers is a public demand and the importance of measuring and reporting intellectual capital in them is on the rise. Because most of the college activities are qualitative (like research and development activity), thus there is still no comprehensive, international standards to report such activities. However, in recent years, some of the famous universities of the world have designed new management tools voluntarily and spontaneously. As a result, these approaches may help them to manage knowledge assets. Because of the greater share of tangible assets in proportion to total assets of colleges, the management of intellectual capital in universities may have greater applicability. But ,so far, due to some reasons like lack of appropriate measuring methods and complexity of intellectual capital field, little if any attempt or approval was made to manage intellectual capital in most organizations and especially colleges.

A framework for measuring and reporting intellectual capital in colleges

A-Measuring intellectual capital in colleges:

Theoretically, there are different models for measuring intellectual capital. Some of which are models that have been designed and implemented in a given company, while others have pure theoretical aspects ad are not regarded as reliable models(Esvibi, 1997,& Scandia, 1994). In other words, none of the present models for measuring intellectual capital can have strong scientific and reliable record to be used at national and international level. In recent years, some of the organizations have tried to develop new criteria to measure their intellectual capital. The major point in this regard is that these criteria should be designed in ways that have comparability quality among the firms of an industry. For example, the criterion of the number of articles in ISI publications does not represent high comparability measure, because publishing articles in these magazines is much easier for researchers whose native language is English and clearly the ISI magazine are come out in English. So, in developing any criterion, many factors need to be taken into consideration (Sanchez, Palouma & Ellena, 2006). Since some of the working factors of intellectual capital measuring are qualitative, it is better to apply scaled questionnaire like LikertScale. In this kind of questionnaires, a value is given to each scale and by multiplying the value of each scale in sample number; the right index can be measured. Financial accounting approach is significantly different from intellectual capital approach in the following ways:

A-Financial accounting approach is past-oriented while intellectual capital approach is future-oriented.

B- Measuring in intellectual capital approach includes soft realities (qualities), while measuring in financial accounting consists of hard realities (quantities).

C- The focus of intellectual capital approach focuses on creating values, whereas financial accounting approach emphasizes the outcome of former operations and cash flow. As time passes on, it becomes clear that traditional (classical) accounting can't provide the right information in strategic decision-making and it should be complemented or replaced by intellectual capital approach. In that way, managers can be well-informed of the present situation of intellectual capital of their organization (Their weaknesses and strengths).

Nowadays, one of the serious discussions in companies that measure their intellectual capital is reporting. But there are no guidelines about intellectual capital reporting at either national (country) or international level. However, some of the pioneering companies in intellectual capital reporting have tried to do reporting by using their own experience. Among the forerunner companies in intellectual capital measuring and reporting are European companies' especially Danish and Swedish corporations.

The important point is that the idea of I.C measuring and reporting starts from management area and then spreads to other areas including accounting. Most organizations agree that I.C is divided into three parts: human capital, structural capital, and relationship capital. However, each report of I.C is considered as a 'special' one. Factors like numbers of applied criteria in measuring each part of I.C, classification each part of collected data about creating criteria and collected information in the area of organization investment, in each part, bring about difference in the content of I.C reporting. Some of the companies publish related reports to intellectual capital, along with their annual financial statements and others publish it separately.

Research methodology

This study has a primary hypothesis and three secondary hypotheses.

Main Hypothesis: There is significant relationship between intellectual capital reporting and physical capital reporting with improving college performance.

The first secondary hypothesis: There is significant relationship between intellectual capital reporting and physical capital reporting with financial performance of college.

The 2th secondary hypothesis: There is significant relationship between intellectual capital reporting and physical capital reporting with educational performance of college.

The 3th secondary hypothesis: There is significant relationship between intellectual capital reporting and physical capital reporting with research performance of college.

	financial performance	Intellectual Capital	physical capital
financial performance	1	0/437	-0/036
Intellectual Capital	0/437	1	0/049
physical capital	-0/036	0/049	1

		Std.Error	beta	R	Rsquare	sig	t
financial performance	2/842	1/874	0/440	0/441	0/194	0/134	1/517

	educational performance	Intellectual Capital	physical capital
educational performance	1	0/655	0/069
Intellectual Capital	0/655	1	0/049
physical capital	0/069	0/040	1

		Std.Error	beta	R	Rsquare	sig	t
educational performance	-1/570	1/666	0/454	0/656	0/431	0/350	-0/942

	Research performance	Intellectual Capital	physical capital
Research performance	1	0/620	0/049
Intellectual Capital	0/620	1	0/049
physical capital	0/049	0/049	1

		Std.Error	beta	R	Rsquare	sig	t
Research performance	-1/272	1/737	0/619	0/620	0/385	0/467	-0/733

Research tools

From the purpose point of view, this is an applied research, and from data collection approach, this is a kind of survey-descriptive study. The independent variables of the study are I.C and physical capital reporting in college and dependent variable is improving college performance at three levels of financial, educational and research. The applied sampling method is simple random sampling. Statistical population was 67 college teachers who were chosen randomly and a questionnaire was sent to them. The questionnaire consisted of 15 questions about the variables of the study whose orders were as follows: 3 questions with financial performance subject, 3 questions on educational performance, 3 questions with research performance and 6 questions had to do with physical capital. The answer to the questions was such that the respondents first fill out the personal details and then they should express their own ideas about each of the questions- on a five scale value of Likert- which was 1 to 5for rarely agree to strongly agree respectively. After collecting the questionnaire, data analysis was done by SPSS.

Conclusion:

In knowledge-based economy- in which the intangible assets has a key role in value-creating process in an organization- it is necessary to manage the I.C efficiently. These intangible factors-known as intellectual capital today- are the major components of capital in knowledge-based organizations and universities. Some of the main challenges of modern days are managing the intellectual capital in colleges, admitting and maintaining human capital, and improving and modifying these capitals to sustainable capitals like relationship and structural capitals. Considering that the Entrance Examination

of Universities is to be removed in the following years, there may be fierce competition among Iranian universities to admit (top) students. Thus it is necessary to pay particular attention to the management of I.C as an important competitive advantage. So, it is suggested by strategic management of I.C, Iranian universities can take a great step to act responsibly and transparently. They should also report and measure I.C and give a delightful image and perception of the college and thereby enjoy competitive advantage. Given the result of data analysis and hypothesis testing, it is implied that the correlation of physical capital with college performance is greater than the correlation of intellectual capital (0.850>0.568). The correlation between financial performance, educational performance and research performance with intellectual capital is more than correlation with physical capital. Meanwhile the correlation of educational performance with intellectual performance is greater than correlation of financial and research performance (0.655>0.620>0.437).

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