The Role of Intellectual Capital in Knowledge-Based Economy

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Abstract: The increasing role of knowledge in economy has led to the emergence of the idea of the knowledge-based economy. A knowledge-based economy is an economy which is based on the production, distribution, application and the use of knowledge. There are different definitions for the knowledge-based economy, some of which are as follows. In the knowledge-based economy, the state's policies, in particular, the policies related to technologies, industry and education require more attention, and the role of economic firms, infrastructures, and creating motivation for investment and training and education is significant. In this respect, the state's policies should be directed towards creating a cooperative context among the state, the industry and the university, such that this cooperation strengthens, improves and encourages new technologies into all economic sectors and different firms, and facilitates the development of informational infrastructures.

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1. Introduction

Knowledge has always been the key core of economic development and social progress. It also has a fundamental role for growth and creating value-added in the developed societies. The increasing role of knowledge in economy has led to the emergence of the idea of the knowledge-based economy. A knowledge-based economy is an economy which is based on the production, distribution, application and the use of knowledge. There are different definitions for the knowledge-based economy, some of which are as follows.

- The Organization for Economic Co-operation and Development (1996) has defined the knowledge-based economy as an economy in which the production, distribution, and the use of knowledge are the main stimuli for growth, wealth creation, and employment in all industries [2].
- In Dolman's and Anderson's views (2000), a knowledge-based economy is an economy which encourages organizations and individuals to acquire, produce, diffuse and use knowledge in order to achieve a better economy and social development [3].
- A knowledge-based economy is an economy to realize economic development, which generates and diffuses knowledge [4].

In such an economy, innovation and investment in knowledge are vital, as these factors cause growth and productivity [5]; in other words, in this economy knowledge is the main stimulus for success. It also increases the value of economic products through increasing productivity and the application of new technologies and ideas, which in turn amounts to widespread changes in all sectors and markets [6]. Different aspects of traditional and knowledge-based economies can be compared as follows.

1- According to the concepts of a traditional economy, resources will be reduced as a result of their usage; while information and knowledge can be shared without being reduced.
2- Economic growth in the knowledge-based economy occurs through the accumulation of knowledge; whereas the neo-classical economists considered only labor and capital as the factors of the increase in production, but this attitude has now been changed, and knowledge has replaced capital.
3- Social structures, cultural contexts, and other factors influencing social relationships play a fundamental role in knowledge-based economies, while these relationships and structures lack any status in traditional economies.
4- Human capital counts as a key concept for creating value in a knowledge-based corporation, whereas there is less emphasis on human capital in traditional economies (Chavalla, 2006).

2.The Features and the Processes of knowledge-Based Economy

Generally, this term stems from the full comprehension of the role of knowledge and technologies in economic growth. The focus of such an economy is on the application of knowledge for generating wealth in economic activities. It is, in fact, a notion for developing new tools, using new marketing strategies, and developing new structures

for a corporation, in such a way that it leads to the workers' better performance and to their higher productivity [1]. Some of the most important features of the knowledge-based economy can be listed as follows.

1- It is focused more on intangible resources than on concrete ones.
2- Information is available to people more and in higher ratios that it is in other economies.
3- The exchange of intangible assets has an increasing growth in such an economy [12].
4- There are workers in this economy who are skilled in applying knowledge, and benefit from communication technologies.
5- The knowledge-based economy abound in resources: unlike resources which decrease by consumption, knowledge develops and expands through innovation and providing technologies.
6- Knowledge and skills are key assets: these two factors play a significant and undeniable role in achieving competitive advantage in this economy.

There are four main processes in knowledge-based economies: generating, distributing, transmitting and applying knowledge. The extent and the manner of these processes' relationships with each other distinguish modern economies from traditional ones. In traditional economies, the extent of these processes is low, and their relationship is linear; that is to say, at the outset knowledge is generated, then it will be distributed and transmitted, and finally it will be used. There is no direct relationship between the use of knowledge and its generation; but there is an indirect and one-way relationship through transmitting knowledge which does not guarantee any kind of dynamism.

The first three processes in the knowledge-based economy through their mutual relationship form the knowledge industry. The fourth process, the consumption of knowledge, indicates this industry's linkage with other industries and sectors of the modern economy. In fact, the dynamical nature of this process and its mutual relationship with the three processes of the knowledge industry warrant the emergence and the development of the knowledge-based economy. Knowledge streams from the process of generation into those of distribution and transformation through two channels. The knowledge which has reached the process of distribution would be diffused among the society's individuals through different educational levels [13].

3.The Effects and Consequences of the Development of Knowledge-Based Economy

The four factors which, in fact, are motors of the development of knowledge-based economy have significant effects on the performances of the market and economic behavior, which can be explained as follows.

1- Effects on Market Actives

- Managers of economic firms should extend their perspectives to recognize in time the advantages resulted from the application of knowledge in the production of goods and services, and to identify better the existing advantages of their firms, which can be utilized efficiently in line with this purpose.
- The workers and the staff should learn basic and fundamental skills, and to adapt themselves with new changes.
- Investors, finance providers, and financial institutions need also to acquire adequate knowledge of existing state of affairs, and equip themselves with new skills—alongside former skills which are more based on the evaluation of the value of physical assets--which are based on the evaluation of intangible assets and firms' potential capacities, to utilize knowledge and skills in order to provide knowledge-based firms with financial facilities. Knowledge-based firms, based on traditional measures, indeed might not be able to attain necessary facilities from financial institutions for developing their business, and might face liquidity problems which should be resolved rapidly.
- Market regulators should understand well the new changes occurred to the nature of competition among firms, and not to regulate and manage the knowledge-based economy on the bases of traditional views of competition and direction; rather, they should understand well the new challenges resulted from new technologies, and reflect them in market regulation.
- State policy makers should provide a suitable environment for knowledge-based firms' progress and development. They should also identify the industries which are knowledge-based; and this issue, of course, varies from a country to another. In England, for instance, financial services and communication, chemical and medicine industries, and space industries are identified as knowledge-based industries, and is invested on them. This very fact introduces new changes to a country's trade pattern. Therefore, special consideration should be paid in a country's development strategies to the identification of knowledge-based industries and services, because knowledge-based industries affect the country's patterns

of trade, development of sciences and technologies, its scientific policies, and even its patterns of education and training in primary schools, secondary schools and universities.

4.The Role of Intellectual Capital in the Knowledge-Based Economy

According to GAAP, intellectual capital is the value of firms intangible assets that aren't reflected on the balance sheet. Intellectual capital is defined in different ways : The OECD describes intellectual capital as the economic value of two categories of intangible assets of a company : (a) organizsational (structural) capital and (b) human capital. Structural capital can be further disaggregated into internal and external capital (Schneider and samkin, 2007). Roos et al (2005) define intellectual capital as all non – monetary and non – physical resources that are fully or partly controlled by the organization and that contribute to the organizations value creation (Peng et al. 2007).

According to GAAP, intellectual capital is the value of firms intangible assets that aren't reflected on the balance sheet. Intellectual capital is defined in different ways :

- Intellectual capital is a set of non- financial, non physical resources that procures a copmpetitive advantage for the enterprise (Jussupova, Mariethoz and Probst, 2007).
- Difference between company market value and its book value, or the resource created from internal learning and development of valuable relationship(De Pablos, 2003).
- Any monetary investments made by a company in expectation of future profits that are not immediately embodied in intangible from constitute an intangible asset and in most cases, an intellectual capital (Coakes and Bradburn, 2005).
- Mouritsen and Larson (2001) suggest that intellectual capital is the aggregate sum of intangible assets which comprise both human and structural capital.
- Roos et al (2005) define intellectual capital as all non – monetary and non – physical resources that are fully or partly controlled by the organization and that contribute to the organizations value creation (Peng et al. 2007).
- The OECD describes intellectual capital as the economic value of two categories of intangible assets of a company.
- Knowledge that can be converted into profit (Harison, Sullivan, 2000).
- Wood (2003) states that IC is information in people minds.
- Intellectual Capital is intellectual materials – knowledge, information, intellectual property, experience that can be put to use to create wealth (Stewart, T.A,1998).
- Brooking (1996) defined intellectual capital as the combination of intangible assets which enable the company to function.

Intellectual capital can be described as structureal capital, relational capital and human capital. sveiby (2004) first proposed a classification for ic into three broad areas of intangibles viz, human capital, structural capital and customer capital a classification that was later modified and externded by replacing customer capital by relational capital (bhasin, 2008).According to davis (2001) structural capital encompasses the hardware, software, database, systems, work processes, businessmodels, organizational structure, patents, trademarks, trade secrets and all other codified knowledge. Relational capital is defined as all resources linked to the external relationships of the firm, with customers, suppliers, or partners in research and development. it comprises that part of human and structural capital involved with the companys rwlations with stockholders (investors, creditors, customers, suppliers), plus the preceptions that they hold about the company (starvoic and marr). it also includes the image of the image of the organization in the market, its social identity and brand equity (mageza, 2004).

Schultz (1993) define the term human capital as a key element in improving a firm assets and employee in order to increase productivity as well as to sustain competitive advantage. Human capital is the combined capabilities, knowledge, skills, experience, innovativeness and problem – solving abilities of each individuls knowledge (davis and Harrison, 2001). Human capital involves processes that relate to training, education and other inverventions in order to increase the levels of knowledge, skills, abilities, values and social assets of an employee which will lead to the employees satisfaction and performance and eventually on a firm performance (Rizvi, 2010). Generally speaking, the contribution of intellectual capital to the creation of value-added and gross domestic production is significant, due to its role in producing knowledge and information, and thus, wealth generation in the knowledge-based economy [20]. The new economy (knowledge-based) has two main components, that is, high technology markets and human capitals. Competition in high technology market, unlike in the past, is based on changes in the prices of goods. The production ability undergoes innovation and invention for which countries and institutions invest heavily on research and development.

The second component of the knowledge economy is human capitals, that is, science, knowledge, skill and proficiency, or in other words, a highly skilled work force. The application of higher technologies and a higher competitive power in the market require the application and the increase in human capitals. Today, there is an increasing demand for the skills which can work with complex systems; as a result, human capitals, alongside material capitals, have attained significant importance; therefore, it is told that the highly skilled work force comprises the major part of producing factors and the new economy [21]. Exploring the human capital and its components enables us to consider the effects of knowledge and human creativity on the wealth creation.

The notion of human capital has been employed in economics in a restricted and in a wide sense. Human capital in a restricted sense points to the changes in the quality of the work force as a result of changes in their education and experiences; and in a wider sense, human capital points to knowledge and its stock in an economy, which influences economic growth by causing foreign savings in production and by increasing the productivity of producing factors (Bloom Storm, 2002).

Adam Smith [22] was the first classical economist who introduced the notion of human capital in his definition of capital. In fact, it is a long time since human capital has been recognized as a source of economic growth and progress. Due to the role of human capital in the knowledge-based economy, it is necessary to become acquainted briefly with its definitions and components as follows.

Bentis [23] has described human capital as the collective capacity of an organization to produce the best solution based on its people's knowledge. On the basis of the collected data on human resources, it is possible to allocate these resources effectively in organizations, and to assess their abilities easily. Human capital also facilitates potential and actual investors' access to more complete information [24]. Researchers have identified the constitutive elements of human capital as follows.

- Capability: Individuals' ability to perform activities, including both capacity and competence for performance, and acquiring opportunities for doing so.
- Capacity: points to what individuals have in their power to do.
- Opportunity: points to the options available to individuals to gain financial or personal rewards using their working capacity [25].

The improvement of human capital consists of a set of competencies which are necessary for using knowledge and skill in order to access outcomes of programs. These competencies include features such as creativity, flexibility, leadership ability, problem solving ability, holding constructive relationships with others, Entrepreneurship, and complex skills like "the knowledge of how to learn" [25]. Since human capital is considered as the main stimulus for growth in this economy, it can determine the competitive status of a country. The successful development of this economy considerably depends on the quality of education and the educational system.

A diverse educational system can react effectively to the different demands generated in the emerging economy via a selective approach in research and development, research and education, and comprehensiveness in research and learning. In fact, the comprehensive nature of research and education in the context of the knowledge-based economy should be extended beyond universities to include the entire educational system. It seems that the emphasis on education, and to some extent recreating its social and economic role, is a fundamental and principal issue. and at the same time encourages a way of life which improves learning through social interactions [26].

The realization of the growth of the knowledge-based economy requires some prerequisites as follows. The first requirement is public and practical education, such as life-time learning, trainers' education, and preparing educational programs which are suitable for the contemporary era. Furthermore, innovation requires the creation of a suitable environment and relationship between the world of business and that of university. Firms' managers should be able to manage the innovation process, and they should attach importance to the field of knowledge management including the production management, sharing and utilizing knowledge capital in an organization. Trust-building amounts to effectiveness, and to the elimination of barriers to organizational structures [27].

Education and investment on human capital is a long-term investment without which the knowledge-based economy would be unstable. In a developed knowledge-based economy, the main priority of the economy and the society is educational services which are largely provided to the people, without which it is not possible to develop other basic elements of national knowledge to meet the needs of the knowledge-based economy. Therefore, the main responsibility of the state is to guarantee the supply of such educational services. In the knowledge-based economy, the state's policies, in particular, the policies related to technologies, industry and education require more attention, and the role of economic firms, infrastructures, and creating motivation for investment and training and education

is significant. In this respect, the state's policies should be directed towards creating a cooperative context among the state, the industry and the university, such that this cooperation strengthens, improves and encourages new technologies into all economic sectors and different firms, and facilitates the development of informational infrastructures. Also, some policies are needed to improve the access to skills and abilities through official education, motivating economic firms and individuals to have education, permanent learning, and to coordinate between the supply and the demand of labor in terms of required skills (Rifer and Abert, 2002, quoted from Wisi and Nazouk Tabar, 2009).

5.Conclusion

Intellectual capital is an important factor in 21th century which is the era of the knowledge-based economy, as this factor serves a key role for corporations' achieving a constant progress and sustainable performance. Not only does the knowledge-based economy reduces unemployment, but also decreases inflation and increases revenues by improving productivity.

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