

Knowledge-Based Economy: Case of Kazakhstan

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Abstract

Most advanced economies have undergone significant structural changes in recent years. One of the key characteristics of the changes is the growing importance of knowledge in all sectors of economic activities. These economies have developed from an agricultural economy in which land is the key resource, then to an industrial economy in which natural resources and labour are the main resources, and now to a knowledge-based economy in which knowledge is the key resource. The term knowledge-based economy results from a fuller recognition of the role of knowledge and technology in economic growth. Knowledge, as embodied in human being (as human capital) and in technology, has always been central to economic development. This paper has two objectives first to understand what knowledge economy is? And then to uses some parameters like: Innovation System, Information and Communication Technology (ICT), Human Resources Development and Business Environment to measure the degree to which Kazakhstan is knowledge based economy.

Keywords: Knowledge Based Economy, Innovation, Higher Education and R&D, Human development, Communication.

What is Knowledge Based Economy?

The term knowledge-based economy was first coined by OECD and defined as “economies which are directly based on the production, distribution and use of knowledge and information” (OECD, 1996). The APEC then extended this idea to state that in a knowledge-based economy “the production, distribution and use of knowledge are the main drivers of growth, wealth creation and employment across all industries” (APEC, 2000). While the knowledge-based economy ideal encompasses concepts like innovation, higher education and R&D, it is broader than this. It highlights the importance of knowledge in all aspects of the economy. Knowledge-based economy is also referred to as the New Economy or Modern Economy which is somehow separate from a stagnant “old economy”. However, in a truly knowledge-based economy, all sectors have become knowledge-intensive, not just those usually called “high technology”.

Traditional production functions focus only on labour, capital, materials and energy with knowledge and technology being considered as external influences on production. The new growth theory can be seen as an extension of the importance attached to knowledge and technological change as the key driver of economic growth.

More and more analytical approaches are being developed so that knowledge can be included more directly in production functions. There is growing belief that knowledge can do more than increase economic growth. It can lead to structural

change in an economy and therefore society. Such change differs from the incremental changes to which all economies are constantly subjected.

In 1999 OECD started a two-year study called "Growth Project" to analyze the causes underlying differences in growth performance in OECD countries and identify factors, institutions and policies that could enhance long-term growth prospects (OECD, 2000a, 2000b and 2001a). The Project suggested that, in some aspects, there is a "New Economy" and that some of the features associated with the "New Economy" can actually be observed. It then look beyond the business cycle and asked what structural shifts, if any, have taken place in growth patterns in OECD economies in recent years. The questions led to an investigation of the underlying sources of growth. The Project concluded that there were divergences in the growth patterns of the OECD countries and attributed this to new capital investment particularly that on ICT, increased use and rising quality of labour, and greater efficiency in how capital and labour were combined or multifactor productivity.

Thus, all these elements are regarded as the fundamental characteristics of knowledge based economy.

Knowledge-Based Economy of Kazakhstan

To help understand the degree to which an economy is a knowledge-based, relevant statistical indicators have been constructed. In 2001, APEC conducted a study to examine what are the fundamental underpinnings of the New Economy. They concluded that the four dimension of knowledge-based economy success are necessary conditions for the New Economy (APEC, 2001). The four dimensions so deduced are that:

- (i) Innovation and technological change are pervasive and should be supported by an effective national innovation system;
- (ii) Human resources development is pervasive;
- (iii) An efficient infrastructure operates, particularly in ICT; and
- (iv) The business environment is supportive of enterprise and innovation.

Another statistical indicator has also been proposed by Stephen K.C. Leung 2004 here the dimensions can be broadly grouped into the following four dimensions:

- (I) Innovation System
- (II) Information and Communication Technology (ICT) *ICT investment*
- (III) Human Resources Development and
- (IV) Business Environment

We shall now examine above dimensions as indicator to understand the level of Kazakhstan as a knowledge base economy:

Innovation System— In a knowledge-based economy, the primary competition is to innovate. Countries that show more evidence of innovation are richer and grow faster and companies that show more evidence of innovation post better financial performance. Innovation is an expression of the productive use of knowledge. More formally, it has been defined as "the application in any organization of ideas new to it, whether they are embodied in products, processes, services, or in the systems of management and marketing through which the organization operates"

(Maguire, Kazlauskas and Weir, 1994). Alternatively, innovation has also be defined as “innovation if the creative process through which additional economies value is extracted from knowledge; the additional economic value is obtained through the transformation of knowledge into new products, processes and services” (OECD, 1997).

Table 1: Data on Research and Development/Innovations in Kazakhstan

	2002	2003	2004	2005
Total number of R& D institutions	267	273	295	390
Number of specialist engaged in research and development (thsd. persons)	10.7	11.2	11.5	13.2
Volume of research and development work (mln. Tenge)	13763.1	14374.6	18549.5	29591.3
Volume of innovation produced (mln. Tenge)		65020.3	74718.5	120408.3

Source: Statistical yearbook of Kazakhstan (2006)

Research institutions regardless of their branch are engaged in research activities including fundamental and applied researches and developments in all branches in science and also in rendering scientific and technical services.

Research and enterprises institutions in Kazakhstan, engaged in research activities include research institutes, design and prospecting organizations, higher education establishments, scientific and technical units of industrial enterprise engaged in research.

Table 1 shows increase in total number of scientific organizations and also increase in volume of research and development and innovations produced in the republic. This indicates the quality and rate of knowledge and information production in the economy of Kazakhstan is increasing.

Information and Communication Technology– a KBE is characterized by the need for continuous learning of both codified information and the competencies to use this information. As access to information becomes easier and less expensive along with the advancement in ICT, the skills and competencies relating to the selection and efficient use of information become more crucial. Capabilities for selecting relevant information and disregarding irrelevant information, recognizing patterns in information, interpreting and decoding information as well as learning new and forgetting old skills are becoming very important in a KBE.

Table 2: Data on Communication activity in Kazakhstan

	2002	2003	2004	2005
Number of internet users at the end of the year. (Units)	133700	184966	203000	301600
Number of connected subscribers' radio stations of cellular network.	912800	1317000	2447000	5398200
Number of phone sets general service network or having connection to it. (thsd. Units)	2238	2512	2550	2708

Source: Statistical yearbook of Kazakhstan (2006)

Table 2 shows that there is an increase in number of internet users and cellular network subscribers and phone connection indicating that knowledge and information is efficiently and effectively distributed in the economy of Kazakhstan. **Human Resource Development** – indicators to reflect the quantity and quality of individuals equipped to access and use of knowledge and information for further production/creation and distribution of knowledge and information in the economy.

Table 3: Data on Human development/ Education in Kazakhstan

	2002	2003	2004	2005
Number of higher educational establishment	177	180	181	181
Number of students enrolled for higher education	514738	597489	658106	747104

Source: Statistical yearbook of Kazakhstan (2006)

Table 3 shows an increase in higher education establishments and a steady increase in number of students availing the higher education facility. This indicates that there is an increasing number of individuals equipped to access and use of knowledge and information for further production and distribution of knowledge and information in the economy of Kazakhstan.

Business Environment – indicators to reflect a business environment conducive to the production/creation and distribution of knowledge and information in the economy.

Table 4: Data on Economic indicators in Kazakhstan

	2002	2003	2004	2005
Gross domestic product (GDP) mln. Tenge	37762773.3	4611975.3	5870134.3	7590593.5
GDP per capita	254152.7	309341.7	391003.8	501127.5
Exports of goods and services	1771087.2	2228327.1	3065511.1	4064637.7

Source: Statistical yearbook of Kazakhstan (2006)

Table 4 shows that the Economy of Kazakhstan is growing stronger because the exports, GDP and per capita income have increased this reflects that the business environment of Kazakhstan is conducive to the production and distribution of knowledge and information.

Conclusion

Thus this paper concludes that the term 'knowledge economy' is used to describe the emerging economic structure and represents the marked departure in the economics of the 'information age' from those of the twentieth century industrial era. In today's global, information-driven society, economic success is increasingly based upon the effective utilization of intangible assets such as knowledge, skills and innovative potential as the key resources for competitive advantage. Statistics show that Kazakhstan has a growing knowledge base, it also has a range of competitive industries, not only in agriculture and mining but in the service sector and in some niches of manufacturing; has a record of rapid uptake of new technologies and is in a strong position to transit to the new economy.

The transformation from a resource-based to a knowledge-based economy involves substantial structural adjustment and requires explicit transition strategies thus to fully emerge as a knowledge economy Kazakhstan should adopt progressive policies relating to:

1. Science and technology: industry and education with new emphasis on the role and importance of innovation systems.
2. The development of human capital: the development and nurturing of an entrepreneurial climate, and the promotion of broad access to skills and competencies – especially the capability to learn. This will include-providing broad based formal education, establishing incentives for firms and individuals to engage in continuous training and life-long learning, and improving the matching of labour supply and demand
3. Communication technology: With increasing use of integrated computer aided design and manufacturing systems with increase use of information technology- including development of web network and satellite communication.
4. Business environment: Governments will need to continue to focus on creating an attractive business environment, in such a way as to attract the sorts of investments, corporations, asset 'bundles' and cultures that fit with the vision for the development of knowledge economy.

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Түйін

Бұл мақаланың екі негізгі мақсаты бар. Біріншіден, білім экономикасының мағынасын анықтау. Екіншіден, инновациялық жүйелер, ақпараттық және байланыс технологиясы, адам ресурстарын және бизнес ортамын дамыту параметрлерін Қазақстан экономикасын зерттеу бағытында қолдану.

Резюме

Данная статья имеет две основные цели. Во-первых, дать определение экономики познания. Во-вторых используя такие параметры, как инновационные системы оценить степень экономики познания в Казахстане.

Özet

Bu makalenin amacı iki çeşit olarak, birincisi bilim ekonomisi açıklamak. Diğer taraftan bilgi sistemlerinin araçlarını kullanarak Kazakistan'daki bilgi ekonomisinin seviyesini tespit etmek.