Educational System Influence on Knowledge Economy Formation

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Abstract: Today we can observe the formation of a new development model – knowledge economy. The knowledge economy development provides getting long-term competitive strengths. That's why it is important to detect factors which influence the structural changes in economic system. These factors can be both country- and region-specified. The authors suggest the hypothesis that the main factor which influences knowledge economy is the maturity of educational system. This hypothesis was confirmed on the basis of structural and mathematical modelling (basing on the materials of regions of Central Federal District of Russia). There were suggested measures on educational system development, aimed at stimulation of the knowledge economy formation.

Key words: Knowledge economy · Innovations · Education · Social-economic development · Regional economy.

INTRODUCTION

The transfer of economy to the innovation-based development is the most important task, which is being solved by many countries today including Russia. In economic science there is a viewpoint that the industrial development model has exhausted its potential. The formation process of a new post-industrial economic model is taking place in the world - the formation of innovation, information and knowledge economy. This opinion is shared by such competent authorities as D. Bell [1], P. Drucker [2], F. Machlup [3], D. Rooney and co-authors [4] and others.

The main resource and in the same time the main product of the new economic model is knowledge. However it should be emphasized that the development of new economy is taking place not on the basis of denial of the industrial development principles but on the basis of their qualitative transformation. Types of economic activity, connected with the generation of new knowledge, their keeping, translation, visualisation and so on (education, science, information and communications technologies, etc.) develop more quickly comparing to the traditional businesses (industry, building industry, agriculture). Because of this the relative share of branches, connected with knowledge economy, increases.

From the point of view of economic analysis it is necessary to point out the differences between such notions as "information" and "knowledge". Not all the information in knowledge. Only information that has got personal interpretation in human mind and, as a result, has transferred into industrial factor, can be called knowledge. That's why not the information and communications technologies, which are accepted only as a process media for information distribution, but the infrastructure of knowledge reproduction prevails in knowledge economy. Education plays here an integral role.

New type economy formation needs a successful solution of two interrelated tasks - increasing of experts’ number and their qualification and human resources development. Educational services market plays an important role in solving these tasks. Under such conditions the role of professional education increases, since the competitive opportunities of the country and its regions, competitive ability of economic entities (enterprises, corporations) and separate worker, engaged in economy depend on educational level of society, its human potential, knowledge based capital and effectiveness of their use in social-economic processes.

The requirements to the specialists training are formed beyond the system of education. They come out of the general economic and social aims of humane development. The task of educational system is to adjust...
to these aims. From the other hand, the educational system itself transforms from social sub-system, as it used to be, into the element of economic mechanism. It starts to have a significant influence on the formation of knowledge economy elements. From both the theoretical and practical viewpoint (for social and economic policies) it is important to evaluate the interrelation of educational system and knowledge economy.

**Structural Modelling of Educational System and Knowledge Economy Interrelation:** The results of researches, previously made by the authors, allow to develop structural models, which define the consistent place of education in knowledge economy (Figure 1) and mechanisms of influence of educational services market on knowledge economy formation (Figure 2).

As it is shown in the model on Figure 1, educational system is the primary element in the replenish chain of knowledge economy. We do not consider here the scientific activity of universities, which is also important. We speak about the fact, that mass economic processes need a significant number of specialists, who not only have knowledge but also can generate this knowledge in social-economic activity. This task is the key one in modern educational system. The competitive ability of both separate educational establishments and regional and national educational systems depends on whether this task is success or not.
The activity of educational organizations assumes market nature under modern conditions. The educational services market becomes one of the key elements of knowledge economy (Figure 2). With the help of it the traditional economic resources transform into human and knowledge based capital, which is the leading production factor in knowledge economy.

The above discussed structural models have general character. They describe educational system and knowledge economy interrelation. At the same time it is necessary, besides the graphics simulation, to build economic and mathematical models for clearer understanding of the above mentioned interrelations. The uses of these models allow not only to visualize main elements of the subject field under consideration, but also to calculate their quantitative characteristics.

Quantitative Modelling of Educational System and Knowledge Economy Interrelation: It must be borne in mind that quantitative characteristics depend upon the specific nature of social-economic systems under modelling. This is of great importance for such country as Russia, which is characterised by a significant territorial differentiation. These differences have been investigated, in their separate aspects, by the authors of this article [6], V. M. Kotlyakov and co-authors [7], N. Bagautdinova and co-authors [8], S. Ledyaeva and M. Linden [9], V. Razumovskiy [10] and other specialists.

In this regard we have analysed the interrelation of educational and economic indexes in regional and social-economic systems of Central Federal District of Russia in order to substantiate the research results (it includes 18 regions - Belgorod, Bryansk, Vladimir, Voronezh, Ivanovo, Kaluga, Kostroma, Kursk, Lipetsk, Moscow, Oryol, Ryazan, Smolensk, Tambov, Tver, Tula, Yaroslavl regions and city with federal status Moscow).

An integrated index, which ties the level of social-economic development with the potential ability to create, accept and distribute knowledge, defined by educational system, is needed to evaluate and compare the level of economic knowledge development. We suggest calculating index of the synergetic effect of knowledge economy in the region on the regional level, which is the complex indicator. To calculate this index a technical approach of World Bank, specified by Knowledge Assessment Methodology.

The index of the synergetic effect of knowledge economy is supposed to be calculated as the average of 5 individual indexes - index of education, index of innovation, index of information and communication technologies, index of demographic tension, index of labour activity [11]. Each of these indexes in its turn was calculated as the weighted total of several indicators, mentioned in Table 1.

As indicators have different dimensions, primary data was normalized with the help of standard means within the range for 0 up to 10. Basing on the normalized valuations individual indexes were calculated as arithmetic average for each unit of indicators, then an integrated index of the synergetic effect of knowledge economy was calculated. Official data of the national statistical agency Rosstat were used for the calculations. Table 2 represents the calculations, which allow to evaluate the development of knowledge economy in the regions of Central Federal District in 2011.

| Table 1: Indicators of the index of the synergetic effect of knowledge economy (ISKE) |
|-----------------------------------------------|-----------------------------------------------|
| **Individual index** | **Indicators** |
| Index of education (IE) | Number of general education institutions |
| | Number of pupils in general education institutions |
| | Number of personal computers used for educational purposes in general education institutions per 1000 pupils |
| | Number of higher vocational education institutions |
| | Number of students of higher vocational education institutions per 10000 persons |
| | Number of personal computers used for educational purposes in higher vocational education institutions per 100 students |
| | Persons having higher education, in % to the total number of able-bodied population |
| | Permanent investments in education, million roubles |
| Index of innovation (II) | Number of organizations, which conducted scientific researches and developments |
| | Innovation activity of organizations |
| | Inner operating expenditures for fundamental researches |
| | Inner operating expenditures for fundamental researches for buying equipment |
| | Expenditures for technological innovations |
We can make a conclusion that Moscow (the capital of the country), being historically the biggest Russian and world educational, scientific and economic centre, takes the leading positions in Central Federal District. The three leaders, besides Moscow, are Moscow region, Voronezh region, Belgorod region.

We have made some calculations to calculate the correlation coefficient of individual and integrated indexes. It turned out that the tightest connection is between the index of education and the index of the synergetic effect of knowledge economy. This coefficient is 0.8851. This confirms the hypothesis that knowledge
economy is significantly influenced by educational system. Thus, we can draw a conclusion that the education is the most important factor in knowledge economy development.

CONCLUSION

Today we can observe the formation of a new development model – knowledge economy. Its establishing is irregular in different countries and regions. The pace of structural changes is defined by institutional, technical and economic, information-technological, sociocultural and other factors. From the viewpoint of national and regional competitive ability it is important to provide the speed-up of knowledge economy elements formation.

Basing on the compilation of knowledge economy development practices, we can point out fields that are prior for making efforts aimed at speed-up of formation of ints elements in knowledge economy. The work shows that the key field for such activity is education. Previously made structural and mathematical modelling confirmed this point of view. It is stated that the level of educational system development is the most significant factor for knowledge economy formation. But in market business model the transformation of educational potential into the results, connected with knowledge economy development, is made by means of educational services market. That's why it is necessary to stimulate its effective functioning.

This modelling allowed to define that the education is the most significantly influencing factor on establishing of knowledge economy; this factor corresponds the correlation coefficient and makes up 0.8851. In this regard the centre of modern Russian state social and economic policies should stimulate the development of educational services market by means of enlarging the composition of competitive strengths of educational establishments, increasing of their qualitative characteristics, build-up of resource potential, providing balance of supply and demand of both specialists on labour market and educational services. This allows to provide not only high rates of economic growth, but also the qualitative balance of social-economic development.

REFERENCES