Innovations and Their Role in Economic Growth

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Abstract: Current economic growth is characterized by leading part of high-tech progress and intellectualization of key factors of production. In developed countries the portion of new knowledge embodied into technologies, equipment, staff education, organization of production stands for 70-85% of GDP increment. The article describes main characteristics of innovative society, modern scientific theories devoted to economic development based on innovations are investigated; ways of development of national economy on the base of innovations are defined.

Key words: Economic growth • Development • Innovations

INTRODUCTION

At present time a transition of world civilization to post-industrial stage of development takes place, in the framework of which efficiency of functioning of any socio-economic system (state, region, enterprise) will depend on its readiness to implement innovations, in other words, on the ability to provide conditions for constant renewal of activity forms in accordance with external and internal changes taking place under influence of globalization which "itself becomes a key epoch innovation of XXI century" [1].

The main characteristics of innovative society are as follows:

- Systematic investment in creativity in the form of innovations' costs in different spheres (economy, science, technologies, arts, social sphere, politics etc.);
- Growth of practical return while innovating;
- Growth of the number of professionals doing creative work in different areas;
- Development of venture capital;
- Development of innovation infrastructures (techno-parks, innovation-technological centers and complexes, innovations venture companies, business-incubators) [2].

Main industries of innovative economy: informatics, bio-and nano-technologies, research and development (R and D), architecture, design, cinema, music etc. They produce intellectual ownership objects in the form of goods, technologies, patents, author's rights, trademarks, original inventions.

All this demands critical and positively arranged analysis of corresponding concepts of socio-economic development, reasoning of new approaches to formation of the strategy of economic growth, elaboration of mechanisms and methods of its most effective implementation which must correspond to natural, scientific and technological, human and intellectual potential of our country and the tasks to restore its key positions.

Economic theory gives 2 key approaches to investigation of economic growth phenomenon, which can be identified as: 1) reproductive, 2) functional-macro-economical [3]. Reproductive approach originates from the works of classics of political economy and later works on Marxist political economy, from the works of national economists of XIX-XX centuries. Functional-macroeconomic approach in integral form was originally presented in the works of J. Keynes and his followers, then it was developing as "main stream" of economic thought. In our opinion we must use both to investigate problems of economic growth in the most comprehensive way. Functional-macroeconomic approach
allows to evaluate contribution of separate factors into economic growth in terms of quantity. Reproductive approach allows to show better the relationship between economic growth and other forms of economic dynamics, to perform subordination of factors of production and growth.

Notions "development" and "growth", "economic development" and "economic growth" must be differed. While the theories of development explain the reasons of structural and other changes, fluctuations of economic activity in national economic system in time (wave-like curve) growth theories investigate factors and conditions of gradual sustainable growth as long-term trend in development of national economy (linear dependence). Ordinary economic growth which is manifested in increase of traditional macro-economic indicators can not be regarded as developmental process because it does not bring new-in-quality phenomena, but only gives an urge to the processes of their adjustment. Development can be viewed as series of sequential stages of economic growth. Besides that the difference between "development" and "growth" lies in possible difference of directions of economic processes. It would be appropriate to mean "development" when there is no growth at all, or, on the contrary, a decrease is observed. Process of development closely correlates with the cycles. Growth means just increase in economic values for every next period of time in comparison with the previous one.

Evaluation of factors which determine economic development is based, in its enlarged form, on 4 key theoretic focuses: spatial-geographic, innovation-technological, socio-humanitarian and institutional-evolutionary. If the last 2 focuses are still being formed, the role of scientific-technological progress in economic growth is recognized by everybody. However, organizational and functional mechanism of development of economic systems under influence of innovations has not been studied up to the end. Role of every kind of innovations in activation of economic activity of corresponding entities is determined in general form only, which is based on systematic interaction of the processes of R and D, use and final consumption-diffusion of different in their nature innovations [4].

Innovative transformations in economy are the condition and the result of changes in production forces, production relations and all the rest part of institutional system. Innovations form the foundation of social processes of labour division and, correspondingly, economic development, that is why innovations are not new phenomenon in economy.

Innovative process from “point” economic phenomenon is gradually transforming into dominating factor of economic development. Innovative character is a key feature of developed economic systems where active formation of new economy began-"economy of knowledge". Economy and social spheres of developed countries of Western Europe, the USA, Japan are undertaking transformation corresponding to this phenomenon [5].

The term “innovations" itself is vague in its character. First it appeared in XIX century in the works of culturologists, literally denoting inclusiveness of elements of one culture into the other. Underlying patterns of technical innovations and their influence on economic development was in the focus of scientific community in the beginning of XX century. In particular, in 1911 Austrian economist J. Schumpeter in his work "Theory of economic development: capitalism, socialism and democracy" first used the notion "innovation" meaning the changes with the purpose of implementation and use of new kinds of consumers' goods, new production means, markets and forms of industrial organization [6].

On the base of the analysis 5 approaches to innovations as a system can be emphasized: (N. Lapin, A. Muraviev), process (B. Twiss, B. Santa, V. Kabakov, G. Gwishiani, V. Makarov); change (F. Valenta, yu. Yakovets, L. Voldachek); mean (P. Drucker); result (A. Levinson, S. Beshelev, F. Gurvitch, L. Gokhberg).

In our opinion only results can be considered as concise and methodologically specific essence of innovations because this notion operates by lexically one-meaning word "result" which provides clearness of the needed term in the system of categorical tools of innovation management theory.

Classical approach to economic theory gives 2 hypotheses which explain origination of innovations: "demand call" and "technological urge". The first was based on the postulate of possibility to satisfy current demand only for short-term, this demand grows in quality, as reflection of general law of dialectics of social development. The second hypothesis was presented by G. Mensch [7]. In his opinion the origin of innovations is underlying patterns of production. During period of macro-economic decrease, so called technological pat, the conditions are formed for mass implementation of radical innovations. During this period clusters of basic innovations are formed which symbolize the beginning of intense development of economy and improvement of its key indicators. Position of G. Mensch. being in its character similar to J. Keynes’ position, is based on cycles theory. Indeed, an incentive for birth of next
generation of innovations is the end of current cycle of existing technologies. Triggered by it depression facilitates radical renewal of physical capital and corresponding organizational forms. However cyclic recession refers not only to basic technologies. Shorter demand cycles lead to appearance of big range of product innovations. Here we observe return to micro-economic level of the demand call which is characteristic of classical approach in economic theory and is connected with impact of market forces.

In the framework of institutional theory of J. Shumpeter innovation in its 5 forms is related to entrepreneurship and competitive character of individual's behaviour. Innovative activity here is viewed as the result of uneven distribution in time of big high-tech innovations (then we shall point out to spatial concentration of innovations and turning them into driving force of economic growth). Their appearance breaks existing economic balance, resulting in economic growth in some industries and recession in the others. Periodic character of these events is a key factor which determines cycle character of economic growth and development as a whole [6].

The most important and complicated task is identification of degree of influence of every type of innovations on the process of economic development. In order to do that we shall form basic methodological principles. First, innovative activity, as a particular case of general process of development, must be considered in terms of system approach. Secondly, innovations must be used as a product having special characteristics. Thirdly, innovations must be used as catalyst of new life cycles, correlated elements of economic system [4].

Studies of economic growth on the base of innovations originate from literature devoted to the impact of scientific and technological progress on economic growth. To some extent all models of this approach are based on the use of industrial functions of exogenous and endogenous technological progress. For the purposes of this study the most interesting are the models which allow to measure innovation and absorption ability of a country and discover factors influencing efficiency of innovations’ creation and their imitation (for example, D. Acemoglu, P. Aghion, F. Zilibotti, V.M. Polterovitch, A.S. Tonis ) [8].

The models of such kind are useful for general estimates of impact of innovative activity on socio-economic development, but they do not provide opportunity to discover mechanisms of this impact and identify specific bottle-necks of innovative activity.

Elimination of contradictions of economic development caused by demographic and ecological problems can be achieved at the expense of use of technological and economic factors, first of all, innovative-technological factor. Determining impact of non-economic factors actualizes innovative activity.

Increase in significance of non-economic determinants was proved while investigating the types of economic growth, which were identified on the base of quantitative criteria [delta]-rate of increment of GDP per 1 person per year. Trends in changes [delta] were established which happened in 1960-1992. They are characterized by big spread (0-8%), increase in value of gap [delta] for developing countries and decreasing of such gap for developed country, value [delta] of which lies in range 2-3%.

In this connection a hypothesis about multiplicity of determinants of economic growth (economic, social, political, world-view) was put forward which go beyond traditional growth factors transforming economic dynamics. Empirical studies were performed which paid extra attention to the factors associated with technological progress: the level of scientific development, knowledge, education; direct dependency of economic growth on these factors was discovered. Thus, portion of tech-progress factor in economic growth of developed countries is much bigger than in developing countries. Since 1950 the portion of tech-progress in economic growth of such countries as the USA is steadily high. The idea of “economic growth quality” which was introduced in that time meant changing of economic characteristics in developed and developing countries and explained the difference in results of formal and actual economic growth, gave opportunity to achieve really higher economic growth with little rate of economic development thanks to its innovational component.

New theory of economic growth (1980s) started to solve problem of finding relationship between steady economic growth and behaviour of economic entities. (AK-model). Other studies of this period were devoted to: influence of unevenness of state economic policy on economic growth; how the process of knowledge circulation in innovation system impacts economic growth [6].

At present time there are several scientific theories of economic development based on innovations which use system approach and identify institutional factor as one of the key factors of economic growth of territories [9].
The concept of technological modes which exists for 50 years can be theoretical base of patterns of social development, of all economic, social and cultural institutions of society. Different approaches share common position in regard to 5 key technological modes but their boundaries in time are different with every approach (since 1780 till now). During every structural crisis and each depression which accompany substitution of one technological mode with another, new opportunities of economic success appear. Thus, economic dynamics is interpreted as uneven process of sequential substitution of technological modes.

The next approach to territorial economic development with the use of innovations is described by the theory of clusters. The greatest contribution into clusters theory was made by M. Porter [11]. His theory is based on the idea that the most competitive on international scale companies of one industry are usually concentrated in one region, this is connected with wave character of innovations which are spread by the most competitive companies and influence the suppliers, consumers and the competitors. Therefore, competitiveness of the country must be viewed through the prism of international competitiveness of its clusters, it means that companies of different industries are united and mutually influence the competitiveness of every company.

Concept of formation of national (state) innovative systems (NIS) was popular in 80-90s of XX century. Key founders of NIS were (K. Freeman, B. Lundwall, R. Nelson) [12]. The notion NIS is interpreted as “combination of interrelated organizations (structures) which are producing and selling scientific knowledge and technologies within national boundaries”.

General economic growth and the rate of innovations’ development become more and more interrelated now. On the one hand innovations’ development is a source of economic growth through increase of productivity of all production factors in all sectors of economy, expansion of markets and increase in competitiveness of products through creation of new industries, increase of innovative activity, growth of population's incomes and consumption volumes. Experts believe that since 2015 innovations’ development will provide additional 0,8 percentage points of annual economic growth in comparison with inertia scenario of development. On the other hand economic growth will give new opportunities to produce new products and technologies, will allow to increase investments by the state into human capital (first of all, into education and fundamental science), in support of innovations which produce multiplicative impact on rates of innovations’ development.

REFERENCES