

## INNOVATIONS AS A CRUCIAL FACTOR OF THE CATCH-UP ECONOMIC GROWTH

*Most developing countries, especially transitive economies, face the problem of incapability to significantly increase the value of the national product. This article provides arguments that a fruitful approach to elaborate its challenge is Schumpeter's theory of innovation economic development. Schumpeter's little-known methodological invention is analyzed, i.e. that 'innovations' are an isolated factor of the catch-up economic growth. Such an approach allows getting to better recognizing the leading role of the strong innovation activities in the catch-up economic policy. The successful economies confirm this invention of Schumpeter and demonstrate that innovation activities provide the desired economic development of the emerging countries. The main findings of this article reveal a conceptual meaning of Schumpeter's category of 'innovations' as an isolated crucial factor of economic development which creates a new added value and distinguishes the phenomenon of 'innovation' as a separate factor of economic development in traditional models of economic growth. It becomes very important to recognize the crucial role of the innovation economic policy that supports enterprises with new advanced technology and promotes the high-tech industries development in order to reach dynamic economic growth and to overcome the problem of the 'middle income trap' for the emerging market economies, including Ukraine. The methodological possibility to use the innovation policy as a special factor of the catch-up processes in order to enhance country competitiveness is demonstrated.*

**Keywords:** factors of economic growth, Schumpeter's theory of economic development, the catch-up economics, innovations, total factor productivity.

**JEL classification:** O11, O25, O38, O47, O57

**Introduction and Research Problem.** The distinction Schumpeter's theory of economic development from the majority of other known conceptions is characterized by Schumpeter's category of 'Innovation' as a separate fraction of the added value creation. Such approach was developed more than 100 years ago [1]. Nonetheless traditionally, in many publications, including those by Schumpeterian followers, 'innovations' are analyzed and considered as a means of increasing the labour productivity or multi-factor productivity of given resources such as the Capital and Labour. The factor 'Technology' ('Technological change') in the neoclassical aggregate production function was recognized as an indicator of Total Factor Productivity (TFP). But mainstream publications do not consider the ideas of Schumpeter's about the phenomenon of 'Innovations' as independent generator a new added value and corresponding resources to create this value in quality of separate 'input' among the mentioned canonical aggregate production factors.

On the contrary, during the last decades many scholars and analytical publications were focused on the investigations which disclosing the crucial role of

'innovations' in modern economic development. It can be illustrated by recognized periodical analytical reports of powerful international think-tank organisations: The Organisation for Economic Co-operation and Development [2], The World Bank [3], The United Nations Conference on Trade and Development [4], etc. There are thousands of scholar publications for the innovation subject on macro, micro, and mezzo levels of economic management and regulation. Nonetheless the neoclassical domination in modern economic theory with the virtually absent the discourse about innovations as the isolated factor of aggregate production function does not allow to get recognizing the leading role of strong innovation activities in the catch-up economic policy.

**Recent publications analysis.** Analyzing the popular university textbooks of economic theory it is hard to find a broad presentation the Schumpeter's innovation theory [5]. As a rule it can be possible to meet short reference on well-known metaphor that innovation is "creative destruction" and also that theory of Schumpeter supports the entrepreneurship development. The econometric models of

Schumpeter's theory mostly tried to put the factor of 'innovations' into existing neoclassical models with the aggregate production factors [6–8], etc. But as isolated factor the category 'Schumpeter's innovation' in many recognized fundamental books in economic theory has not been used.

The thought that innovations affect the economic development either through increasing labour productivity or through increased volume and productivity of capital is dominating in the conceptual economic literature [9–11].

The Neo-Schumpeterian approach of innovation development [12; 13] tries to develop predictable future economic circumstances which are the existing today but will determine the future economic development. Thus today it is very important to provide policy in which the main priorities of the strategy of economic development concern to formation and effective using the knowledge resources for producing innovations. In this sense the Neo-Schumpeterian conception of technological paradigms is very fruitful and is proved by practice.

Our more detailed analysis has shown that the weak attention to the category of '*Schumpeter's innovations*' in the main macroeconomic theories can be understandable with recognizing situation that such theories are not considering category of '*innovations*' in the sense of an isolated specific factor influencing the dynamic economic growth [14].

**Unsolved parts of the problem.** The Schumpeterian invention has caused in the economic theory the emergence of two contradictory methodological approaches in order to explain the nature of economic growth and business cycles – Neoclassical and Schumpeterian. The first approach, so called 'mainstream', recognizes as main aggregate production factors the traditional variables of growth models: Capital, Labour, and the Productivity of these factors, including increasing such productivity from 'innovations'. The implicit faith in the effectiveness of market driven forces has led to ignoring the importance of structural policy to take into consideration the contemporary technological development and challenges.

Theory of economic development of Schumpeter had considered technological innovations as the main driving force of economic growth. Such logic has led to the recognising of the crucial role of structural economic policy and distinguishing the leading innovation industries and traditional ones in order to reach dynamic economic growth. This attitude denotes necessity of dynamic structural changes in economy. In first issues of Schumpeter's fundamental doctrine he called 'innovation' as a 'new combination' that are not predictable. According to this theory the

long-term economic growth is dependent on scale of creating new production structures of economy with using prospective innovation technology. The existing technological structure of economy supports statically processes of general equilibrium, but rank of development has caused by innovation activities.

**Research goal and questions.** The variables of capital, labour and their productivity as 'Total factor productivity' (TFP) are still the main factors in the analysis of economic development. It could also be mentioned that in these models TFP is impossible without the productivity indices for existing labour and capital because this variable represents the changes in productivity of these factors. This approach is also applied in the endogenous theories of economic growth where innovation factors are identified as individual endogenous variables, though they are still linked to traditional resource variables of the production function.

Today the practical disadvantage of this approach is reflected in the inability of the neoclassical theorists to explain such acute issues as "the productivity paradox" [15; 16] and "the middle income trap" [17–21]. The gap between the productivity levels of emerging and developed countries has significantly escalated over recent decades during which the gap widened in many cases instead of narrowing as it was suggested by the neoclassical theory. The following theoretical and practical question became crucial again: how can low- and middle-income countries substantially increase the value of their national product with a growth rate making it possible to narrow the gap in per-capita GDP?

**Main findings.** It may seem that the answer is known, but if we look in the modern textbooks on economic theory, we will find out that they only deal with the problem of correct calculation of the existing GDP Indices. The aggregate production functions statistically estimate the shares of the national product connected with the previously mentioned production factors. But these functions are obtained from the existing production structure and that is why in the neoclassical interpretation the traditional exogenous variables lead to a decline in productivity in the long run period. The basic theories do not explain the paradox that productivity growth of the resource factors at a micro-level lowers the production cost, and in the context of the saturated traditional markets with weaker effect of the economy of scale it means that the total cost of production can decrease.

In our opinion it is possible to explain the problems of "the productivity paradox" and "the middle income trap" within the framework of Schumpeter's theory of economic development. This approach demonstrates evidently that

economy with traditional production structure, or “Statics” economy, will inevitably approach a financial and economic crisis, because there is no real development in this case. Schumpeter’s theory proves that the economy based on conservation of traditional production structures is unable to obtain substantial increase in national wealth. Economic policy focusing on modernization of production on the traditional competitive market restrains creation of new added value. According to the concept of innovation economic development, sustained growth of the national economy (added value) can only be achieved with a permanent innovative growth. Schumpeter calls this type of economy as “Dynamics” that based on other methodological framework than the type “Statics” economy. This methodological approach is not represented practically in modern economic literature but it must play a crucial role in identification of the current economic problems in emerging countries.

Schumpeter’s theory allows explaining the “middle income trap” in which many transitive economies got caught. This “trap” lies in the fact that economic policy is focusing on production increase in traditional industries even through labour productivity growth. Such a policy does not provide powerful resources for dynamic long-run development. Schumpeter’s theory gives a new insight into underlying factors which are necessary to undertake effective economic reforms in the middle-income countries in order to narrow the wealth gap between them and the developed countries. It is crucial to consider economic reforms not as repair or modernization of the historically formed economic structure of production but as progressive and innovative technological changes leading to progress in the future.

The ‘Schumpeter’s innovations’ must be considered as a special factor for economic growth that generates the increasing the aggregated added value of a country separately from the processes related to productivity growth of the existing traditional manufacturing resources. In this sense such a factor becomes the main determinant of the successful catch-up processes. The Schumpeter’s methodological approach allows substantiating the possibility of accelerated economic development of a country without historically formed resource limitations. Such scenario can be implemented only with innovation-driven growth. Experience of the successful dynamic countries confirms this conclusion.

In the historical context, the principal economic doctrines mainly focused on the impact of the

category of *innovations* on the economy in the context with increasing productivity of already existing manufacturing resources. That is why the mainstream theories did not link the increase in the wealth of a country with ‘*Schumpeter’s innovations*’ which were the specific separated production factors existing along with the traditional production factors, labour and capital, whose productivity had been measured through the post-hoc data analysis for construction of the aggregated production functions. The history of economic thought shows that in methodological constructions without ‘*Schumpeter’s innovations*’ there was always a crisis of economic theory itself. That happened because while the ‘*Schumpeter’s innovations*’ (appearance of new resources, products and corresponding production functions) were ignored as an individual factor, the dominant mainstream concepts one after another quickly became explanatory impotent in the context of reality and lost their practical value.

Many branches of economic theory methodologically “overlooked” the fact that technological innovations always saved the economy of different countries during recessions and that this factor ensured continuous progress of human civilization. If we look at it in the historical context, we can see that the global economy was constantly developing in spite of regular crises and pessimistic prognoses, and global wealth never stopped increasing. However, individual countries had different historical fates in that positive civilization trend. Different states showed diverse dynamics of economic development; some countries became rich while the others got poorer. That diversity of results also gives rise to serious questions and claims against the dominant economic theories because their methodological framework is unable to explain the diversity in the development of the countries with the same policy prescriptions based upon the conclusions of those theories.

The numerous empirical studies demonstrate the economy which focuses on recovery and development of traditional production structure (pattern of “Statics”), i.e. on distribution of available resources, cannot significantly increase its wealth and social wellbeing in the long run because the development of traditional competitive markets eventually restricts the formation of new added value. Microeconomic theory confirms this conclusion, with regard to certain product markets – marginal profit in such markets should tend toward zero. Therefore, sustainable growth of the national (gross) added value can only ensure innovative development which, actually, shall determine the type of economic development called “Dynamics” by Schumpeter.

A mere increase in scopes of output of traditional productions, even in the mode of increase in labour productivity, shall not provide a strong long-term resource for dynamic development of the country or its regions. It is difficult to percept Schumpeter's ideas mostly due to a belief in neoclassical canon, in which attainment of an equilibrium state of Pareto-efficiency is the ultimate aim and the objective function of a successful economy. However, the format of analysis of economic "Statics", i.e. economic development on the basis of traditional production structure, reflected in empirically found production functions (i.e. functions found according to data of previous periods), still remains a methodologically weak spot of neoclassical theories of economic growth. Such methodology of analysis of economic processes cannot predict (and explain) the state of the economy occurring on the basis of the innovation technologies that change the production function itself.

An increase in productivity of the given labour and capital resources (TFP) is the central production factor representing innovation activity in these models. In endogenous theories, such an increase in productivity shall be specified as factors of human capital, patent activity, financing of research and development etc. However, the growth in productivity of traditional resources shall be determined with regard to comparative products (pre-existing products). Therefore, this refers to economic "Statics" again. That is why modern Neo-Schumpeterian conceptual approaches assume that such an economy shall definitely come to a crisis of relative overproduction and start to degrade, and its rescue and development would be ensured only by the evolutionary innovation leaps in the form of technological revolutions [22]. Innovative technological changes shall alter the production function itself and, therefore, Neo-Schumpeterian theories shall justify the importance of holding innovative restructuring of the economy as a central direction of the country's economic policy. In view of the above, the state management of processes of structural changes related to different types of technologies, particularly, with an emphasis on developing high technologies, is deemed extremely important.

As the events of the last quarter of the 20<sup>th</sup> century demonstrated, Neo-Schumpeterian theories can adequately explain the nature and driving forces of modern post-industrial economic development. In this regard, attention can be paid to the fact that this is paradoxical enough: Schumpeterian conceptual approach is rarely studied in University programs, but de-facto it lays at the heart of economic strategies and current policies of developed and dynamic

successful countries. The economic strategy of the European Union is a vivid example. Ten-year strategies – the Lisbon strategy (2000–2010) and next the "Europe 2020" strategy – actually represent the Schumpeterian and Neo-Schumpeterian concept, where new knowledge and innovations are recognized as the main driving force of economic development [23; 20]. These strategies make an emphasis on the fact that along with implementation of traditional goals of macroeconomic policy – attainment of macroeconomic stability, improving the efficiency of available resources and support of employment – today the leading role is assigned to those challenges associated with facilitating an accelerated transition to an innovative knowledge economy.

In order to assess the competitiveness of national economies and innovation activity we used multi-criteria ranking methods. In fact, such methods represent a completely different analytical approach than in neoclassical methods of strategic forecast. It is not a search of functional dependency between certain economic indicators in order to have a possibility of extrapolation of variables of certain statistical function for future periods, but the search and assessment of key characteristics for the social and economic system that will provide an advantage for one country (region) over the others in the future.

The ranking approach has a weak point associated with a big list of indicators used in assessment. This stipulated the demand to form an integral index of many parameters. The question of the existence and identification of a major competitiveness factor is very important to identifying systemic economic problems and finding solutions to them. Historical analysis shows that, despite the enormous variety of forms of socio-economic processes, only a few characteristics are used to define the main directions of a country's economic policy.

From Francis Bacon's mono-recommendation to train a strong army for external conquests – he classified economic science as a "Science of State Expansion", and all the way to the "Washington Consensus" that includes 10 prescriptions for building a market economy, when we talk about overcoming a crisis and future growth, three or four priority policy directions are in the main provided. Financial stability and the attraction of foreign investment are frequently named among such priorities.

The above-mentioned methodological approach is heuristically applied, since, in our opinion, experts, intentionally or otherwise, have come to correctly believe that economies, just like living organisms, must have so-called "stem cells" which contain, by analogy, biological codes and mechanisms for the

formation of other cells and organs. Biologists have proven that embryonic stem cells can turn into all the other cells of a mature organism under the influence of certain biological signals and programs.

Adhering to J. Schumpeter's theory of economic development and developing it further, we saw that '*Schumpeter's innovations*' might be such a "stem cell" of economic growth. This methodological approach derives from the historical tradition of the development of political economy, when the main theories were formed on the genetic matrix of a certain key factor ensuring the country's wealth. The practical significance of this conclusion is that there can be no other socio-economic policy in the modern conditions of the new technological revolution and globalization of markets than the accelerated formation and implementation of an innovative model of economic growth. The formation and practical application of incentives for the development of *Schumpeterian innovations* as the "stem cells" of the country's economy will ensure the formation of a competitive state, which will develop dynamically and overcome the current crisis and future crises.

#### **Conclusions and further research proposals.**

The '*Schumpeter's innovations*' must be considered as a special factor for economic growth that generates the increasing the aggregated added value of a country separately from the processes related to productivity growth of the existing traditional manufacturing resources. In this sense such factor becomes the main determinant of the successful catch-up processes. The Schumpeter's methodological approach allows substantiating the possibility of accelerated economic development of a country without historically formed resource limitations. Such a scenario can be implemented only with innovation-driven growth. Experience of the successful dynamic countries confirms this conclusion.

A distinctive feature of the innovation economy is the production of new products and services that had not been produced earlier. Schumpeter's theory of economic development and the Neo-Schumpeterian concepts as well as actual economic practice of the last decades proves that a dynamic economic development of the country is possible only in an innovation model of economic growth. Preservation and conservation of traditional production structure, i.e. reproduction and development only of pre-existing enterprises, even of the very successful ones, may have only a short-term positive effect. In the long run, such policy shall lead to economic crisis and stagnation.

Analyzed features of innovation economy can be also generalized in theoretical terms as the following

representations: neoclassical attitudes describe the economic processes and policy regarding pre-existing markets and phenomena, while the Schumpeterian theory of innovation development tries to develop visions and tools to manage processes and phenomena which do not exist today, but will emerge tomorrow and will determine the future economic development at both macro and micro levels. Thus it is very important to provide policy in which main priorities of the strategy of economic development concern to formation and effective using the knowledge resources for producing innovations.

It is important to recognize of objective character of Schumpeterian theory in order to build effectiveness the catch-up policy. The progress of the advanced countries is primarily ensured by the development of innovative production structures that belong to current and future technological paradigms. In a broader sense, the history of human civilization shows that those countries which tried to maintain their competitiveness only due to expansion and improvement of the existing production structures, even if they were highly competitive at a particular time, became outsiders of the world economic system. In contrast to this, the focusing policy actions on generating and mastering of innovation technologies, which create conditions to produce new commodities and services, allowed ensure the dynamic economic development.

It is necessary to strengthen the development strategy for new industries of economy and perspective production structures. Major attention in this strategy shall be paid to the formation of resource potential for generation of innovations that cause the formation of new companies, create new jobs in the regions and new markets in the international context, rather than to recover traditional production structures. For this purpose the first role shall be assigned to measures aimed at developing innovation potential, strengthening of education and science, formation of infrastructure for transferring innovative technologies, support of innovative activity in all the areas as well as its wide international integration in education, research and innovative areas.

The above the catch-up processes may be effective if supported by creation of favourable institutional environment for the growing number of cooperative relationships between companies, universities and research institutions of the region, country and the world. In this process the role of incentive instruments, which may be offered by the state, increases by far. Tax benefits must create incentives for not a mere company, but a whole production system.

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## ІННОВАЦІЯК ВИРІШАЛЬНИЙ ФАКТОР НАЗДОГАНЯЛЬНОГО ЕКОНОМІЧНОГО ЗРОСТАННЯ

Метою дослідження є розробка проблеми нездатності багатьох висхідних країн, включно з Україною, подолати розрив ВВП на душу населення з розвинутими країнами. Методом дослідження стало застосування теорії економічного розвитку Й. Шумпетера, зокрема її маловідомого концептуального положення про «інновації» як ізольований чинник економічного зростання. Такий підхід дає змогу запропонувати нову методологію вивчення економічної природи вирішальних факторів наздоганяльного економічного зростання, серед яких головну роль відіграє активна державна інноваційна політика.

Основні результати проведеного дослідження пов'язані з обґрунтуванням концептуального значення категорії «інновацій Шумпетера» як ізольованого чинника економічного розвитку, який створює нову додану вартість. Показано, що в традиційних моделях економічного зростання, які належать до неокласичного напрямку економічної теорії, феномен інновацій не розглядається як відокремлена від традиційних агрегованих факторів економічного зростання рушійна сила економічного розвитку.

Практичним наслідком такої методологічної позиції стає недооцінка важливості інноваційної політики як головного пріоритету наздоганяльної економіки. Традиційний пакет рекомендацій для таких країн не містить рецептів щодо створення потенціалу для розвитку інноваційної економіки, а пов'язаний тільки з підвищенням ефективності вже наявних ресурсів. У статті обґрунтовано висновок про важливість визнання і теоретиками, і політиками висхідних країн вирішальної ролі інноваційної економічної політики у разі запровадження моделі наздоганяльного розвитку та розв'язання проблеми «пастки середнього доходу», а також підтримки та стимулювання підприємств з інноваційними технологіями.

**Ключові слова:** фактори економічного зростання, теорія економічного розвитку Шумпетера, економіка наздоганяння, інновації, загальний фактор продуктивності.

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