

The Theory of Economic Development of J.A. Schumpeter: Key Features

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Abstract. This paper comprises translation into English the preface of Iurii Bazhal to the first Ukrainian edition of Joseph Schumpeter's famous fundamental book "The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle" that was translated in Ukrainian and published in 2011 in commemoration of its 100th anniversary. The paper reveals the contemporary significance of this classical book as the challenger on replacing the neoclassical approaches in capacity to become the mainstream of modern economic theory. It is shown the Schumpeter's approach gives a new vision of driving forces for economic development where a crucial conceptual place belongs to category the innovation. Second part of the paper reviews modern Neo-Schumpeterian approaches which have substantiated the importance of the structural innovation technological change of national economy for economic development. The government must permanently analyze a compliance of the actual production structure in the country with the current and future technological paradigms.

Key words: *Schumpeter, Dynamics of economic development, Innovation theory, Technological paradigm, Innovation policy*

JEL Classification: B31, O11, O30, O40.

1. Introduction

The “Magnum Opus” of Joseph Schumpeter is his second book “The theory of economic development: an inquiry into profits, capital, credit, interest, and the business cycle”, which was first published in 1911 and main parts of it were written on the Ukrainian ground, when J. Schumpeter was professor of Chernivtsi University. This book is refers to the most outstanding works on economic theory and its value is close to the major works of Adam Smith, Karl Marx, Leon Walras, Alfred Marshall, John Maynard Keynes. Without familiarity with this classic work it is difficult to adequately understand the nature and mechanisms of innovation model of economic growth, goals, content and tools of the modern knowledge economy. In many respects, this book provides keys to understanding the deep nature of modern financial and economic crisis.

Mentioned book was translated in Ukrainian and published in 2011 in commemoration of its 100th anniversary. The paper reveals the contemporary significance of this classical book as the challenger on replacing the neoclassical approaches in capacity to become the mainstream of modern economic theory. It is shown the Schumpeter’s approach gives a new vision of driving forces for economic development where a crucial conceptual place belongs to category the innovation. The second part of the paper reviews modern Neo-Schumpeterian approaches.

2. The Main Book of Schumpeter’s Theory of Economic Development

It might be difficult to find a work on economic theory of more concern than this research made by Joseph A. Schumpeter is for the modern Ukraine. It is our opinion that you can find in this book answers to major problems, which the young market economy of the young Ukrainian state has faced. We can say today that the question “Why did twenty-year-long market transformations result in that one of the most developed and, according to experts, one of the most promising economies among countries of the former ‘socialist camp’ not simply ended up in the last but one place in Europe and that Ukrainian people are suppressed with social pessimism about opportunities of changes for the better?” has no explanation.

The answers, which national and foreign experts suggest to the said question, amaze how far shiftless they are. Their recommendations have remained the same during the entire transitional period, yet the situation does not change. Each new president or prime-minister heard the same ‘advisory’ instructions from the International Monetary Fund, from numerous expert groups, etc. Nonetheless, the

usual set of drawbacks of the Ukrainian economy remains the same. What is wrong? Seek for subjective causes or hope that change in ruling personalities would tackle the problems did not come up with a result. It is my belief that the core methodological error arising from the Ukrainian policies adopted was that the underlying theme of the Ukrainian policy was development of such a state of economy, to which Schumpeter assigned the notion “Statics”. The correct policy must have been commitment to development of the state of economy, which Schumpeter called “Dynamics”. In fact, his theory of economic development is the theory how such economy is developed. This book is dedicated to reveal the nature of differences between the two states of economies, and to prove the argument that the country would be able to avoid financial crises and achieve social boom only on the conceptual foundation of ‘dynamic economy’.

It would be unfair to accuse mentioned experts of their biased attitude to Schumpeter’s theory. If we review basic ‘best’ textbooks in macroeconomic theory, which students around the world used before and use today during their studies, we will find it that the neoclassical theory dominates, yet almost will not find a smooth and full presentation of Schumpeter’s theory. So, the economic thought of many people, of not only scientists and analysts, is formed accordingly. For example, it is most likely that majority of readers are convinced that rising of an average salary is impossible without increase in labor productivity; and such conviction stems out of the neoclassical economic education. This maxim is constantly reminded to all Ukrainian governments, which, in their turn, ‘explain’ it to the people. Given the fact that labor productivity almost does not increase in a country in terms of macroeconomics, the result of such approach is that salary rise is restrained. Today, the Ukrainian salary and wage level is the lowest in Europe.

It all seems to be clear. However, it was Schumpeter 100 years ago who showed in his book you are holding that an economy which was based on reproduction and development of an traditional production structure (i.e. the “Statics” type of development) was unable to obtain substantial increase in national wealth and social welfare because development of conventional competitive markets eventually restrains production of a new added value of a country. Microeconomic neoclassical theory also proves the argument through markets of single products – the marginal revenue at such markets must going to zero. Schumpeter’s analysis presented in the book shows that innovation development only is able to increase national (gross) added value, which, in fact, is the underlying cause of the type of economic development that Schumpeter called “Dynamics”. This approach explains the trap, in which Ukraine’s economics got caught as demonstrated in the abovementioned example of the labor productivity/salary collision. In macroeconomics, the productivity indicator can dynamically grow, primarily, due to new values produced by innovation products. A mere increase in output of conventional productions, even with increase in labor productivity, does not produce powerful resources for dynamic development of a country. History of

economics and the modern age offer plenty of convincing examples proving that the arguments, which were given by Schumpeter 100 years ago, yet remain burning today, are reasonable.

Modern economic policy and practice of successful countries, the concepts of which considerably differ from those presented in University textbooks with mainly neoclassical contents, is an apparent proof that Schumpeter's theory of economic development is reasonable. Let's consider the example of European Union. You can easily find in this example that the two development strategies for ten-year periods, which were adopted in the 21st century, i.e. the Lisbon Strategy (for years 2000-2010) and contemporary Europe 2020 (for years 2011-2020), in fact, implement the Schumpeterian conceptual paradigm. In this paradigm, economic growth is leveraged by generation of new knowledge that will sustain effective innovational development. These strategies lay the emphasis on both traditional goals of the macroeconomic policy – achieving macroeconomic stability and sustaining employment, and priorities of activities that encourage transition to the smart economics. Such transition means that substantially more importance is put on the policy of innovational reorganization of the European Union economy. Today's implementation of this strategy is large-scale and consistent.

Having read the foregoing, the reader might naturally ask why Schumpeter's theory of economic development remains little-known in academic and political communities while being so burning. Why have neoclassical approaches become the mainstream of the economic theory? There is no common answer to this question. We may only be amazed how things develop and assume our own answers. Thus, we are under the impression that the main reason is the one, which Schumpeter studied as regards emergence (and formation) of a specific type of people, i.e. innovative entrepreneurs. The bafflement relates to the natural property of people to explore, adopt and develop a certain conventional behavior pattern, especially if it appeared to be effective. This is why sudden transitions into a new quality, new unfamiliar reality obviously encounter resistance. The neoclassical theory is largely based on a positive approach, when facts are learnt on a wide scale in order to reveal mathematical regularities of their existence. Today, implementation of such a goal has substantially extended its scale. Tens of thousands of scientists around the world apply and update the methodology of mathematical statistics and econometrics, search for representative statistical ensembles (regression equation) that would explain the nature of a variety of economic phenomena. However, the statistics of facts, which exist or existed, cannot demonstrate and foresee emergence of fundamentally new facts and phenomena, including in particular Schumpeter's innovations. No attempt to reveal statistical ensemble for quality jumps have been successful, though such attempts are constantly made concerning innovational processes. Schumpeter's theory of economic development itself is a jump into a new quality.

The method, with which the author explains the nature of his theory as a scientific paradigm of a different quality, may be characterized by Schumpeter's metaphor. By that metaphor, Schumpeter notes that 'add successively as many mail coaches as you please, you will never get a railway thereby'. In his book, a mail coach is the orthodox neoclassical theory, the core of which is the equilibrium at all markets. Schumpeter draws attention that economic flows generate a continuous circular flow under such circumstances; development processes do not find any place in this flow. This model is well known to everybody who studied macroeconomics by any textbook – a model of circular flow of income and expenditure between firms and households. This model explains the methodological nature of basic macroeconomic identities, i.e. aggregate income is equal to aggregate expenditure; money stock circulating in an economy is equal to the value of gross domestic product of a country. Throughout the pages of his book, Schumpeter supports the argument that the development is impossible within the bounds of a stationary circular flow. His own theory disproves this argument. The theory underpins the argument that a genuine economic growth is possible only when such phenomena, which are known as innovations today, emerge. In the book presented, such phenomena are mainly called 'new combinations'. In his later works Schumpeter finally started to use the term 'innovation' for his category of new combinations. Today, this term has become commonly used in the meaning suggested by Schumpeter's economic theory. Thus, this book expresses constant comparison of the two theories – the neoclassical theory, that uses such terms as circular flow, economic theory, theory, on the one hand; a new theory of economic development originated by Schumpeter, the core of which is economic relations arising in connection with appearance and operation of 'new combinations', and which is also called "our (my) theory", "new theory". Besides, the abovementioned types of an economic system can be assigned to these theories respectively, i.e. "Statics", which means development within the bounds of a stationary circular flow, "Dynamics", which means an innovation development underpinned by new combinations.

The analysis in this book begins with an insightful explanation whether the existing economic theory (neoclassical economic model of circular flow) was apt to explain the phenomenon of economic development. Especially burning is the argument that it is impossible to explain the nature and mechanism of the economic development phenomenon within the bounds of such methodology. For instance, the book presents a proof that savings cannot be a financial source for economic growth in the economic model of stationary circular flow. At first glance, such theoretical generalization looks paradoxical. However, Schumpeter's conclusion, that savings become a source for development only when new methods of production, i.e. new combinations, are financed, is proved by facts.

Schumpeter provides a theoretical presentation of his own theory using arguments supporting the conclusion that economic development is a separate

phenomenon in the economic mechanism how a market economy functions. The author persists in distinguishing the static and dynamic forms of development. The two types represent a development of equilibrium of continuous circular flow and a development based on the disruption of equilibrium by new combinations, i.e. innovations, appearing and implemented in the economic life, respectively. Schumpeter does not consider the first type to be an economic development at all and gives appropriate arguments. Such consideration is based on that macroeconomic disturbances, which occur in the economic model of circular flow due to change in size of resources (capital, labor quantity) and domestic product (wealth), must be eventually offset by a new equilibrium produced by market forces, yet on old principles, i.e. production functions and proportions. Only the second type of development, whereby revolutionary technological changes take place due to the launch of new combinations (innovations) of resources alongside disturbance of equilibrium and establishment of new production relationship that permanently alters the previous equilibrium, is referred to by Schumpeter as economic development.

Such reference is made based on his assumption that this is the only case when actual growth of macroeconomic productivity of an economy takes place. This is proved by both the reasoning of the theoretical analysis and reference to the economic history, in which during the capitalist epoch, in his opinion, fundamental shifts of productivity of economies occurred nearly simultaneously through discreet and spontaneous revolutionary technological changes, and this process is not smooth or an adaptation. Therefore, Schumpeter's theory of economic development is a second type of development.

The fundamental contribution made by Schumpeter to the theory of market economy is argumentation of the crucial role of an innovative entrepreneur in implementing mechanisms of genuine economic development, i.e. development based on carrying out of new combinations, or innovations. We may say that Schumpeter introduced a new economic category of an innovative entrepreneur as a factor stimulating economic growth. In his opinion, it is only due to such a factor of production that, in terms of development perspectives, a market economy has a considerable advantage over command administrative system (as we call it today), where, inasmuch as it is natural for this type of economy, governmental managers carry out distribution, re-distribution and even increase in available resources within a stationary circular flow, i.e. within "Statics". According to Schumpeter's theory, such actions cannot ensure a long-term economic growth in terms of social welfare, i.e. increase in prosperity of the entire country rather than individual persons who gain prosperity at the cost of other people going poor. It is the stratum of innovative entrepreneurs, who are referred to by Schumpeter as genuine entrepreneurs, who carry out new combinations and provide for economic development of a country.

This aspect of Schumpeter's theory is exceptionally important for Ukraine. In this country, the role of entrepreneurship is commonly perceived in the context of primarily tackling unemployment, i.e. creation of jobs of whatever type and formation of a middle class. The latter target, however, is not achieved due to the reason, among others, that a prosperous middle class is formed, that is, wealth of a country increases, when the stratum of innovative entrepreneurs exists and operates with effective output. A good example for such a vision would probably be well-known "bazaars" – employment is sustained, scales are overwhelmingly large, yet countries remain poor because other conditions are not altered.

Paradoxical development of Schumpeter's economic theory concerns the category of credit in terms of its impact on genuine economic development. The conclusion is that, in economic sense, credit is reasonable only if it is granted to an innovative entrepreneur that forces the economic system into new channels. Furthermore, it is the only way (granting of a credit) that economic development can arise from the stationary circular flow in perfect equilibrium. An exceptional sense of a credit system to sustain boom of the prosperity of a country stems out of the said argument. Another conclusion, which is overwhelming to many people, is derived from that only credit funds granted against future benefits can become a financial resource of the innovational process. This responds to the 'eternal' question addressed by politicians and most experts regarding a possibility to implement an innovation-based model of economic growth "Where shall we take money for innovational development from?" The typical answer, or at least typical for Ukraine, is that, let's say, we first need to develop in the production structure that exists today, accumulate money and afterwards invest the money so accumulated in the innovational development. The actual practice shows so far that such logic is wrong, because innovation funds are not accumulated, and the innovation is extinguished. Schumpeter's answer is that new combinations provide financial resources on their own by creating a new purchasing power of entrepreneurs to introduce innovations. In this case it is important, however, that such innovations are true, but not an imitation to be reported.

Schumpeter applies his paradigm-based logic on the economic development phenomenon in the analysis of the category of capital. Again, we receive a relatively paradoxical argument that this term may be connected exclusively with factors of development. The category of capital in Schumpeter's interpretation does not exist in the economic system without development. The economist perceives that in the stationary system of circular flow, which other scientists call a capital, cash flows are simply exchange media. According to Schumpeter, a capital is identical to newly created means of payment to maintain the function of entrepreneurship to carry out new combinations. Thus, the principal function of the capital market is trading in credit for the purpose of financing economic development, and so the capital market becomes a market for sources of future incomes generated by structural changes. This aspect compels us to give more

attention to substantial improvement of the Ukrainian stock market, because it is bound to maintain the existing circular flow rather than the needs of long-term economic growth.

Schumpeter applies his concept of economic development to offer reasoning to solve one of the most concealed puzzles of the economic matter – nature and source of added value. Where can profit and interest on capital originate from, when, according to the neoclassical theory, the entire income is the value (and price) of factors of production used? How can the added value be created as a gain to the wealth of a country, when the law of price and expense identity is applied? The way to leave this ‘magic circle’ lies again in separating the economic development as a phenomenon that differs from the stationary circular flow. Schumpeter defines “Without development there is no profit, without profit no development”. The profit and entrepreneur itself constitute, according to Schumpeter, categories that exist only when carrying out new combinations, i.e. innovations. These are the conditions when an added value (profit) appears in a country that is a price exceeding expense whereby there are no commitment to cover the latter.

The same nature – the said exceeding of a price over expense, or an excess value – is inherent to the interest on capital. Schumpeter believes that there would be no interest at all without development. He gives the following metaphoric definition – “Interest is an element of those huge waves in the sea of economic values generated by development”. We can find exemplary the associated analysis and conclusion given by Schumpeter about the interest existing in the “communist or generally non-market society”. The conclusion is that since free entrepreneurship based on new combinations is not available in such a type of society, there is no interest as a separate value phenomenon. In this view, Schumpeter’s theory looks reasonable as proved by the history of all the communist societies. Income as a source of long-term and dynamic social development of an entire country rather than individual people can exist only in a market economy, which sustains effective innovative entrepreneurship. This argument is an express practical recommendation for modern managers of the Ukrainian economy.

The last part of the book is dedicated to the theory of business cycles. This part presents Schumpeter’s innovation theory as a scientific justification of existence of fundamental internal factors of risk (depression) in a market economy. Discussions, which have arisen on the problem how to explain the reasons and respectively offer recipes to overcome the last economic crisis in 2008-2009 and probably still continue, prove how burning this presentation is. As if foreseeing dominating conceptual arguments on the nature of the modern global crisis, 100 years ago Schumpeter voiced criticism of approaches that explain the crisis with external occasional events, both subjective and objective. By developing M. I. Tugan-Baranovsky’s theory of business cycles, Schumpeter builds up reasoning to

prove those cycles are inherent to a market economy due to the specific nature of the processes of development that are leveraged by creation and carrying out of new combinations (innovations) in a national economy. Which is why a crisis, or depression, is a specific mechanism of a re-organization of an economy, when new enterprises displace old ones, when transition to a new wave of development is prepared, which by its nature will not be a mere reproduction of a new old stationary equilibrium of circular flow.

A small part of this book has become a paradigmatic foundation, which further underlay the development of the Schumpeterian theory of business cycles by the author himself. Later J. Schumpeter wrote a separate large book on this topic. The entire branch of the economic theory was assigned with the name of Neo-Schumpeterian economics, which claims to become a mainstream economic theory of the 21st century.

3. Neo-Schumpeterian heterodox approaches

The history of development of the economic theory of XX century testified about the controversial perception of the mentioned Schumpeter's ideas. This was in many ways conditioned by the belief in the neoclassical canon, according to which the achievement of the Pareto efficiency equilibrium is the key goal and the target function of successful economic development. Keynes only improved this canon for short-term period, when the market mechanism fails to provide efficient self-regulation, but the factor of innovations per se was not regarded as the critical factor of stable growth. If we look at more recent neoclassical theories of economic development – the base model of Solow-Swan, different endogenous theories - one can make a conclusion that they convincingly prove the importance of the technological change that determine the growth of existing factors productivity. But growth that was conditioned by innovation activities itself practically has not been considered.

The central production factor which can present innovation activity in these models is the parameter of the labor productivity or so call TFP (total factor productivity) or "the Solow Residual", which are specified in endogenous models as human capital, patent activity, R&D funding, etc. However, the growth of TFP is presented by the traditional products that can be comparable for calculations of resources productivity. The methodological weakness of these neoclassical theories of economic development is determined by the main subject of their analysis: the general equilibrium and economic development on the basis of traditional structure of production (using the given main production functions). Such kind of thinking operates without setting the problem of the necessity of economic growth on the basis of implementation and stimulation of innovation evolutionary changes in production structure.

The Schumpeter's theory shows the economy with unchanged structure is *Statics economy* that will surely arrive at the crisis of relative overproduction and start to be ruined. Only evolutionary innovative "jumps" as technological revolutions give salvation and ensure further development of the market economic system. This scenario is not specified in neoclassical models, that's why they do not show a critical necessity of creation and development of innovations and new branches that belong to new technological paradigm.

The essence of Schumpeterian approach is that the technological innovations change the production function itself (evolutionary jump), that's why Neo-Schumpeterian theories substantiate the importance of high-tech structural reconstruction of economy to ensure economic growth (*Dynamics economy*). In frame of Neo-Schumpeterian theory was elaborated concept of technological paradigm, which proves the importance of structural technological changes according to implementation of basic or radical innovations. Such requirement is the main precondition to ensure the stable economic development of the country. This theory also believes the structural technological change must belong to specific technological paradigm and this appearance relate to fundamental factor of evolutionary dynamics.

One of the central categories in Schumpeter's approach is the so-called evolutionary "creative destruction", when technological innovations simultaneously ruin the old branches of production and create new ones. In this context, it is important to clearly single out "old" and "new" branches in the analysis for the formation of economic policy, and also to solve the problem of "leading sectors". The Neo-Schumpeterian theories have showed the influence of technological revolutions on the economic development. They have established a tight connection between implementation of the basic R&D and technological innovations and the long-run cyclical fluctuations during economic development.

Above mentioned approaches can be also classified as the economic theory of technological dynamics. We consider this theory among latest achievements of economic thought connected with the development of new paradigmatic path of Schumpeterian tradition – evolutionary technological dynamics (Nelson, 1995; Freeman and Louka, 2001; Perez, 2002; Dosi, 2001; Malerba *at al.*, 2003; Andersen, 2009). Technological changes are regarded here as the main material object – the species that dynamically develops by itself and determines the ways of evolution of the human civilization. Waviness of this process is described by Kondratyev's theory of "long waves" (Tylecote, 1992; Freeman, Clark, and Soete, 1982; Freeman and Louka, 2001; Rumjantzeva S., 2003) but we consider more productive the approach which concentrates less on the fixation of precise time-points of phases of this wave, studying the essence of the process and its reasons. In this sense it is more important to recognize the technological changes which

condition structural reconstruction of the economy as a main factor that have been causing the “long wave” of economic development.

The cyclical periodicity depends on the frequency of appearance and putting into operation of basic innovations, leading to the creation of branches-locomotives of the general development and their further spreading in the economy. Today among such “locomotives” we see the branches that are connected with information technologies (Castells, 1996-1998: 2000-2004). The Development of the Neo-Schumpeterian conception created a theoretical basis for a new vision of the basic principles to ensure a countries’ economic development and set new requirements to the state economic policy (Elgar Companion to Neo-Schumpeterian Economics, 2007). This new vision is connected with perception of the national economy’s structure as a phenomenon occurring from the different waves of technological complexes. But in many cases of policy analyses we can meet domination of more traditional vision under consideration the characteristics of structural change.

As a rule it is structure of enterprises according a form of property, dynamics in the context of interrelations of various economic indicators and sectors: commodity or service production, creation of added value, investments, such kinds of activity as the capital flows, final consumption, export, import, etc. Such analysis reveals connections between different parameters of the economic system, establishes certain regularities suitable for international comparisons, etc., but it is limited for the tasks of strategic planning of the state economic policy as it does not give a clear vision of the influence of the innovation structural processes on ensuring the country’s economic future. So a more modern instrument of analysis is the vision of structural dynamics of production through regularities of innovation technological change.

Development of this Neo-Schumpeterian approach and recognizing the economic structure of technological system as the basement of long-run economic growth are the central points of the modern economic policy that ensure sustainable growth of national economy. Such assessment connects with the names of G. Mensch (Mensch, 1979), C. Freeman (Freeman, 1982, 1987), D. Dosi (Dosi, 1982, 1984, 2001), C. Perez (Perez, 2002), Andersen, 2009. By developing the Schumpeter’s ideas regarding to the influence of basic scientific and technological innovations on the long-term economic dynamics, C.Freeman, Clark, J, and L.Soete introduced the notion of a technological system, the change of which happens as a technological revolution which creates a new technological system (Freeman, Clark, and Soete, 1982). The technological revolution results a drastic changes the state economic system and establishes new technological paradigm that influence all important sides of economic functioning (Perez, 2002).

The sequential change of technological paradigm on the time axis is considered to be the reasons for Kondratiev’s “long waves”. That’s why numeration of

technological paradigms corresponds to the numeration of the "long waves". The six paradigms of this kind may be singled out (five realized ones and the sixth one is still ahead, the year of the beginning or the end means the point of reference of the time period), where the key factors are: for the first long wave (1790-1850) – substitution of machinery for handwork in weaving; for the second long wave (1851-1895) – coal mining and the steam engine; for the third long wave (1896-1946) – iron industry; for the fourth long wave (1947-1989) - energy (oil and organic chemistry products); for the fifth long wave (1990-2040) - microelectronics; for the sixth long wave (2041- ?) - Biotechnology. It should be noted that the key factor of a certain paradigm is also effective for the technologies that appeared in previous paradigms through changing their technical quality.

The key factor concerns mass demand for corresponding technical changes. That's why the leaders of the global community master these technologies in advance. The branches that actively use the key factor and adapt its most successfully to the requirements of the corresponding production organization, are the main investors in advanced technologies and form the technological paradigm of the society. In this context, these branches play the role of priority branches. Understanding of the main peculiarities of development and change in technical and economic paradigms and their connection with institutional structure of the society is an important factor of economic policy formation. Specific features of the new technological paradigm, having been determined, show the way of looking for goals and ways of strategic support of its development in the country.

The developments of Neo-Schumpeterian approach have created a theoretical basis for a new look at the economic development of countries and formulated new demands for the state economic policy. This new look is related to the vision of the structure of national economy as a product of realization of different waves of technological complexes. Theory of technological paradigm has also created a conceptual basis for a new looks at the cyclical nature of economic development and formed specific requirements for the goals and methods of an anti-crisis policy of the state. It is related with the statement of the availability of macroeconomic life cycle of a definite production structure of the national economy. This cycle is directly dependent on the genesis, development and degradation of the technological basis of social and economic evolution, which is changing in the course of time in a cyclic way, when every sinusoidal wave is caused by a life cycle of the new technological paradigm.

The most common explanations in the expert evaluations of the nature of the present-day financial and economic crisis concern the extent of different types of credit expansion during the last pre-crisis years. That is, the situation is conceptually seen in such a way that the main problem is the gap (the formation of excess) between the volume of broad money supply and the volume of production in the real sector, both in the world in general and in separate countries, including

Ukraine. But in reality, money always has a credit nature ("money is the future" – J.M. Keynes), and this is especially true of modern money that technically may be created in unlimited quantities. So the search for the causes of the crisis only in the financial and credit sphere cannot give correct orientation. In this context, the Neo-Schumpeterian theory of technological paradigm turns the attention of politicians to the problems of production sphere, the reconstruction of which may be hindered by the lack of innovative perspective for the creation of absolutely new productions and industries. The theory of technological paradigm links the way out of crisis with the absorption of the mentioned excess money supply by new innovative productions (*"Dynamics"* pattern), as it cannot be done by traditional companies within *"Statics"* pattern.

4. Conclusion.

Thus, an important instrument of analysis and methodology of anti-crisis policy formation is the evaluation of the structural technological dynamics of the macroeconomic processes and regularity of development of technological systems, which are presented in the modern statistics by evaluations of technological levels of economic activity by the degree of innovation and scientific capacity.

The conclusions given may be directly attributed to Ukraine. The conducted analysis showed that the main crisis-forming problem is the lack of structural technological reconstruction of the economy. According to the principles of the theory of technological paradigm, the anti-crisis policy should be concentrated on progressive structural changes that will be taking place in the economy under the influence of new innovative technologies. It was found that there is a close link between implementation of basic scientific and technological innovations into production and long-run fluctuations of cyclical development, when new technologies (innovations) oust the old branches of production from the structure of the economy by creating new ones. In this context, it is important to clearly identify the "old" and "new" branches in the analysis and formation of economic policy in terms of their scientific capacity and innovative technologies used.

References

- Andersen E. S. (2009). Schumpeter's Evolutionary Economics: A Theoretical, Historical and Statistical Analysis of the Engine of Capitalism. - Anthem Press.
- Breschi S., Malerba F., Orsenigo L. (2000). Technological regimes and Schumpeterian patterns of innovation. *Econ J* 110(463):388–410.

- Castells M. (1996-1998; 2000-2004). *The Information Age. Economy, Society and Culture*. Oxford; Malden, MA: Blackwell.
- Dosi G. (1982). *Technological Paradigms and Technological Trajectories: A Suggested Interpretation of the Determinants of Technical Change*. *Research Policy* 11: 147–62.
- Dosi G. (1984). *Technological change and industrial transformation*.- Macmillan.
- Dosi G. (2001). *Innovation, organization and economic dynamics: selected essays*. Edward Elgar, Cheltenham Northampton
- Elgar Companion to Neo-Schumpeterian Economics (Elgar original reference), Ed. H.Hanusch and A.Pyka. (2007). Ed. Elgar Pbl.
- EUROPE 2020: A strategy for smart, sustainable and inclusive growth. - EUROPEAN COMMISSION, Communication from the Commission COM(2010) 2020, Brussels, 3.3.2010.
- Fagerberg J., D. Mowery, and R. Nelson (eds.). 2006. *The Oxford Handbook of Innovation*. Oxford; New York: Oxford University Press.
- Freeman C. (1982). *The Economics of industrial innovation*. The MIT Press. Cambridge (Massachusetts).
- Freeman C. (1987). *Technology Policy and Economic Performance. Lessons from Japan*. - N.Y.
- Freeman C. and Louca F. (2001). *As Time Goes By: From the Industrial Revolution to the Information Revolution*. Oxford: Oxford University Press.
- Freeman C. and Soete L. (1997). *The Economics of Industrial Innovation*, 3rd edition. London: Pinter.
- Freeman C., Clark J., and Soete L. (1982). *Unemployment and Technical Innovation. A Study of Long Waves and Economic Development*. London: Frances Pinter.
- Kondratiev N. (1925). 'The Static and Dynamic View of Economics'. *Quarterly Journal of Economics*, 39: 575-83.

- Malerba F, Nelson R, Orsenigo L, Winter S. (2003). Demand, innovation and the dynamics of market structure: the role of experimental users and diverse preferences. CESPRI WP No. 135.
- Mandel E. (1980). Long Waves of Capitalist Development. Cambridge.
- Mensch G. (1979). Stalemate in technology: Innovations overcome the depression. Ballinger. Cambridge (Massachusetts).
- Nelson R. (1995) 'Recent Evolutionary Theorizing about Economic Change'. Journal of Economic Literature, 32/1: 48-90.
- Nelson R.R. (ed.). (1993). National Systems of Innovation: A Comparative Study, Oxford: Oxford University Press.
- Perez C. (2002). Technological revolutions and Financial Capital. The Dynamics of Bubbles and Golden Ages. Ed. Elgar Pbl.
- Rosenberg N. (Ed.). 1992. Technology and the Wealth of Nations. Stanford, CA: Stanford University Press.
- Rosenberg N. 1982. Inside the Black Box: Technology and Economics. Cambridge, MA: Cambridge University Press.
- Rumjantzeva S. Iu. 2003. The Long Waves in Economy: Multivariate Analysis. S.-Peterburg University. Sankt-Peterburg. (in Russian)
- Schumpeter J. (1934). Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle. Harvard University Press, Cambridge, MA.
- Schumpeter J. (2011). Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle / Ukrainian translation by V.Starko. - Kyiv, Publishing House of "Kyiv-Mohyla Academy" (in Ukrainian).
- Schumpeter J. (1939). Business cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process. MacGraw Hill, New York.
- Tylecote A. (1992), The Long Wave in the World: The Current Crisis in Historical Perspective, London and New-York: Routledge.