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## THE OBJECTIVE LAWS OF ENTERPRISE INNOVATIVE AND INVESTMENT ECONOMIC DEVELOPMENT UNDER CONDITIONS OF FORMING THE NEW TECHNOLOGICAL MODE

UDC 330.341.2

**O. Popov**  
**Y. Kalinina**

The theoretical approaches to determining the key factors of providing the innovative development are generalized. The conceptual features of linear and nonlinear theories of innovative development are defined. The sequence of the stages of innovative cycle of economic development is proved. The role and importance of explicit and implicit knowledge in the process of innovative development are determined. The interconnection between the system of explicit and implicit knowledge and forms of scientific and technical progress (evolutionary and revolutionary) is considered. The objective laws inherent to different stages of innovative cycle of economic development are determined. The peculiarities of making innovative decisions by innovative entrepreneurs are substantiated.

*Keywords:* innovation, investment, linear theories, innovative cycle, economic development.

**ЗАКОНОМІРНОСТІ ІННОВАЦІЙНО-ІНВЕСТИЦІЙНОГО ЕКОНОМІЧНОГО РОЗВИТКУ ПІДПРИЄМСТВА В УМОВАХ ФОРМУВАННЯ НОВОГО ТЕХНОЛОГІЧНОГО УКЛАДУ**

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Узагальнено теоретичні підходи до визначення ключових факторів забезпечення інноваційного розвитку. Визначено концептуальні особливості лінійних та нелінійних теорій інноваційного розвитку. Обґрунтовано послідовність етапів інноваційного циклу економічного розвитку. Встановлено роль і значення знань експліцитного та імпліцитного походження в процесі інноваційного розвитку. Розглянуто зв'язок між формуванням системи знань експліцитного та імпліцитного походження і формами науково-технічного прогресу (еволюційною та революційною). Визначено закономірності, притаманні різним етапам інноваційного циклу економічного розвитку. Обґрунтовано особливості прийняття інноваційних рішень підприємцями-новаторами.

*Ключові слова:* інновації, інвестиції, лінійні теорії, інноваційний цикл, економічний розвиток.

**ЗАКОНОМЕРНОСТИ ИННОВАЦИОННО-ИНВЕСТИЦИОННОГО ЭКОНОМИЧЕСКОГО РАЗВИТИЯ ПРЕДПРИЯТИЯ В УСЛОВИЯХ ФОРМИРОВАНИЯ НОВОГО ТЕХНОЛОГИЧЕСКОГО УКЛАДА**

УДК 330.341.2

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Обобщены теоретические подходы к определению ключевых факторов обеспечения инновационного развития. Определены концептуальные особенности линейных и нелинейных теорий инновационного развития. Дано обоснование последовательности этапов инновационного цикла экономического развития. Установлены роль и значение знаний эксплицитного и имплицитного происхождения в процессе инновационного развития. Рассмотрена связь между формированием системы знаний эксплицитного и имплицитного происхождения и формами научно-технического прогресса (эволюционной и революционной). Определены закономерности, присущие разным этапам инновационного цикла экономического развития. Обоснованы особенности принятия инновационных решений предпринимателями-новаторами.

*Ключевые слова:* инновации, инвестиции, линейные теории, инновационный цикл, экономическое развитие.

Activating the processes of structural and innovative transformations is a necessary prerequisite for rapid integration of the national economy into the global world economy and ensuring sustainable economic growth in Ukraine. Implementing the chosen strategy of intensification of national economy innovative development primarily involves the arrangement of favourable organizational and economic conditions for the intensification of innovative and investment activities of domestic manufacturers, forming a perfect mechanism for strategic changes management. Therefore, developing modern complex economic tools for intensification of innovative development nowadays is one of the most important theoretical and practical problems, the successful solution of which requires examining the assumptions and factors of deployment of dynamic processes of innovation generation, selection and implementation.

The study of theoretical and practical aspects of innovative development management was carried out in the works of many domestic and foreign scientists such as O. Annenkova [1], V. Heets [2; 3], A. Hrynov [4], S. Illiashenko [5], M. Kyzym [6], A. Kinakh [2], I. Matiushenko [6], I. Nikolaieva [7], Ye. Ponomarenko [1], V. Semnozhenko [2], V. Cherednik [6], N. Chukhray [8], F. Yansen [9] and others. However, some important questions, in particular connected with coordinating concordance and providing the optimal combination of enormous variety of factors and forces of innovative development of an enterprise under market conditions, as well as with determining the tools of activating the innovative and investment processes, by this time have not been properly covered in scientific researches.

The purpose of the research in this paper is the theoretical substantiation and development of recommendations in

relation to the improvement of innovative processes management basing on the principles of generalization of the objective laws of interrelation of factors of innovative and investment development of enterprises.

Innovative development (ID) is a difficult socioeconomic process during which present productive forces are improved on the basis of principles of mastering and practical application of the latest scientific and technical achievements. So, in S. Illiashenko's opinion [5, p.18], the innovative activity itself affects all the aspects of society's development, changing even the environment of life and activity of a person.

The leading role of innovations in the process of socioeconomic development of enterprises and the enormous variety of factors of innovative activity stipulate the origin of numerous views and ideas concerning the determination of economic essence and objective laws of innovation introduction,

among which one should mark out two main approaches, the difference between which is the indicator of recognizing the cause and effect character of objective laws of ID (Table).

The conceptions of linear type proceed from marking the objective dependence of the dynamics of ID on the process of transformation of certain range of relevant preconditions, factors and forces objectively existing in management environment [9, pp. 26–35]. In accordance with the dependence of this type, the trajectory of ID is considered to be the almost linear derivative from the changes of manufacturer's needs in updating the worn-out and out-of-date capital assets, economic interests of entrepreneurs, market demand fluctuations, scientific and technical advance and so on. The supporters of nonlinear theories of innovative development, on the contrary, insist on the existence of more complicated connections between the dynamics of innovative processes and the changes of management environment.

Table

The description of basic conceptions of innovative development

The group of conceptions	The theory (conception)	The essence of theory (conceptions)	Key factors of providing the innovative development
Linear	Industrial cycles theory	The dynamics of innovative and investment activity is a derivative from the objective processes of updating the fixed assets in industry	The efficiency of using the fixed assets
			Moral and physical wear of the fixed assets
			The dynamics of market demand for goods and services
	Entrepreneurial theory	Innovative and investment activity (IIA) is the process of creating new scientific and organizational combinations of existing and the latest productive factors, which is motivated by an innovative entrepreneurial spirit	The dynamics of scientific and technical advance
			The dynamics of market demand for goods and services
			Economic interests, motives and personal qualities ("force of personality") of an innovative entrepreneur
	Market theory ("causing the demand")	Modern competition implies competition for implementing the innovation (unlike a rivalry for material resources, inherent to pre-industrial and to the primary industrial stages of production development)	The dynamics of scientific and technical advance
			The level of scientific researches and innovative activity development
			The perception of innovation of a certain type by enterprise personnel
	Scientific and technological theory	Innovative activity is one of the major stages of a complex cycle "science technique production", and the dynamics of innovative development is determined mainly by scientific and technical advance	The scale of influence of innovation on the competitive edges of an enterprise
The dynamics of scientific and technical advance			
The level of development of infrastructure of scientific researches and innovative and investment activity			
Intellectual theory ("the economy of knowledge")	The motive force of ID is interpersonal intellectual cooperation, an exchange of integral informative and sign models between separate individuals	The scientific and technical and organizational levels of production at an enterprise	
		The level of informative exchange ("circulations of knowledge") infrastructure development	
		The inclination and ability of the personnel of an enterprise in relation to the perception of innovation of a certain type	
Nonlinear	The theory of dynamic development	While choosing the ways of ID the enterprises have considerable freedom the limits of which are determined by the unique combination of their individual differences. The process of ID does not have conscious character, and the choice of innovations is made on the basis of casual combinations of participants' interests	The dynamics of scientific and technical advance
			Organizational routines which determine the individual features of choosing innovations at the enterprises
			The perception of certain innovations by top management and personnel of an enterprise
			Technological perfection and degree of accordance of innovation with the state of certain factors of internal environment of an enterprise
	"United" (coupling) theory of innovations	The innovative dynamics is the reflection of different combinations of market needs and technological possibilities (separated according to the stages of innovative process), the combination of which takes place within the limits of "innovative firm"	The dynamics of scientific and technical advance (it is considered to be almost unforeseeable)
			The dynamics of scientific and technical advance
			The level of development of infrastructure of scientific researches
			The level of development of infrastructure of innovative and investment activity
	Integration theory	The choice of innovations is dictated both by the unique internal features and difficult system of cooperation relations of business entities with other (external) participants of innovative process	The perception of innovations of a certain type by the personnel of an enterprise
			The level of development of infrastructure of financial and investment activity
			The state of financial market and the loan capital availability
			The perception of certain innovations by top management and personnel of an enterprise
			The competition strategy and special purpose competitive edges of an enterprise

The demonstrations of such complicated connections are, on the one hand, the establishment of the existence of the internal objective laws of development, inherent only to the innovative processes, and, on the other hand, the recognition of considerable degree of freedom of entrepreneurs while choosing certain variants of innovative decisions among the enormous amount of accessible strategic alternatives.

However, despite the existing differences in determining of preconditions of ID, most linear and nonlinear conceptions proceed from recognizing some cyclicality in the origin, selection, perception, introduction and distribution of innovations. The nature and objective laws of cyclic innovative transformations are usually explained by complication and changeability of combining the influence of numerous factors of ID, namely: scientific and technical advance the development of which serves as a source of generating and accumulating the possible variants of innovations; changes of public needs in producing qualitatively new goods and services, supported by effectual demand; the emergence of an innovative entrepreneur, inclined to implement innovations, to share his innovative activity experience with less initiative businessmen ("clustering innovators"); existence at the financial market of large amount of free capital which can be invested in the development of production ("free capital pressure") and others.

In authors' opinion, the development of the process of innovative transformations under modern market conditions has the following sequence (Figure).

Scientific and technical advance as a primary motive force of innovative development, continuous spread of scientific and technological advance allowing to determine the perspective lines of improving the subjects of labour, forms and methods of organization of production and labour. As an obligatory basis for such expansion fundamental (exposure, study and systematization of the objective phenomena and laws of nature and society development) and applied (working out the ways of practical use of the results of fundamental investigation in the certain area of scientific knowledge) scientific researches serve [10; 11]. The primary objective of the scientific search is first of all acquiring new knowledge: for fundamental researches it is the scientific information (opening the laws and common factors categories and phenomena effects, substantiating the theories, principles and ways of their practical use), and for applied ones it is the branch information (developing the process regulations, technical requirements, methods and recipes, projects and so on).

However, research activity is not only the means of creating certain advanced technical and technological achievements but also the powerful source of the emergence and spread of new knowledge, that is the basis for forming the intellectual and cultural space, favourable in relation to the generation and perception of any innovations (not only economic or technical but also social, cultural, political and other).

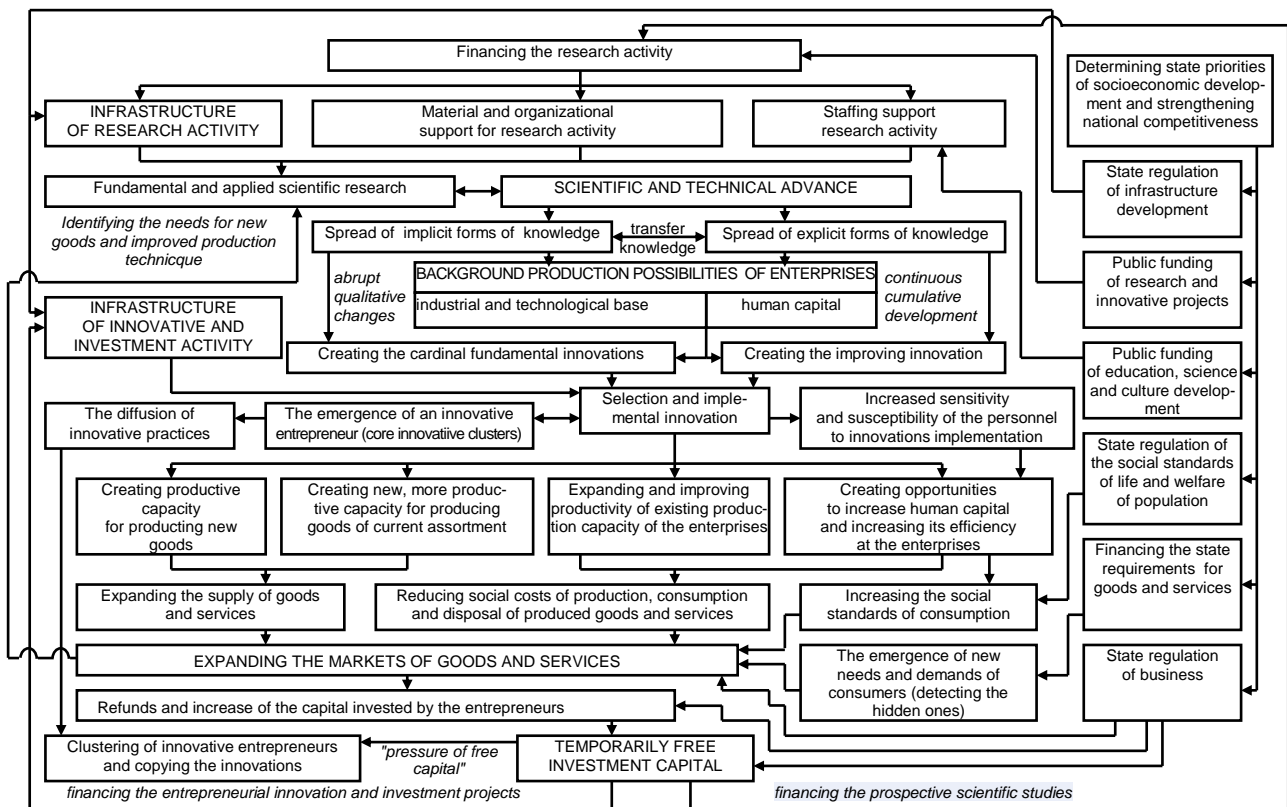


Fig. Innovative cycle of economic development

Knowledge can take explicit (easily transmitted in communications, formalized, without considerable losses of sense) and implicit (based mainly on the experience and personal values, difficult to formalize) forms. Knowledge can transfer from implicit form into explicit one and vice versa, but the implicit knowledge is usually less

suitable for any codification. The existence of implicit knowledge is the fundamental peculiarity of human capital, which determines the impossibility of its complete appropriation by the entrepreneur, corporation or government, and which is the source of many difficulties arising while copying or reproducing [11].

The development of scientific and technological advance can take two main forms: evolutionary (gradual and continuous process of improving the traditional techniques and technologies, accumulation of these improvements) and revolutionary (the emergence of a revolutionary situation to achieve qualitatively new, higher productivity of social labour and qualitative changes in material and technical basis of production). Evolutionary form of scientific and technical advance is rather time-consuming process, the implementation of which ensures continuous improvement of production economic results (especially at the early stages). The reason of the revolutionary situation is the accumulation of technical innovations, which, on the one hand, is not quite effective, and, on the other hand, form the necessary resource base for implementing the fundamental transformations of the productive forces.

The evolutionary form of scientific and technological advance is usually a source of expanding the explicit knowledge that is the basis for routine search of "improving" the innovation primarily aimed aimed at increasing the efficiency of economic management in a short period of time due to making minor changes in equipment, technology, organization, management and others. The revolutionary form of scientific and technological advance leads to expanding the implicit knowledge, which, on the one hand, allows the scientists (due to some changes in their outlook) to come to new fundamental conclusions as for the nature of the phenomena studied, and, on the other hand, forms a prerequisite for the perception of some radical innovation by the entrepreneurs basing on the rethinking of traditional technologies and methods of production, i.e. the basic fundamental innovation. Thus, both forms of knowledge during the process of their fruitful cooperation and mutual enrichment to some extent determine the changing ability of the society as a whole and its individual members, concerning the perception of new ideas, principles, concepts, approaches, etc. An important factor of the expansion of this capacity on the basis of integration of implicit and explicit forms of knowledge is first of all the educational system, the functioning of which should be directed not only to ensuring the acquiring by people who study a system of formal knowledge, but also to the formation of creative abilities, enabling the flexible perception of any innovations.

The other primary factor of innovative transformations is the material base of public production, the embodiment of which in the economic sphere is the initial productive possibilities (productive potential) of domestic enterprises. The productive and technological base of an enterprise as an existing complex of operations of transforming of the subjects of labour on the basis of the use of certain technological knowledge and practical skills of workers (accumulated explicit and implicit knowledge) and accumulated human capital can serve as the basic elements of initial productive possibilities [12].

The development of scientific and technical advance produces double effect on productive potential of enterprises: continuous cumulative development (the basis of which is new explicit knowledge) results in gradual creation and introduction of improving innovations; saltatory qualitative transformations of implicit knowledge form the range of possibilities in relation to the cardinal basic innovations. Thus, the process of innovative development is determined by the steady and continuous character, however the speed and intensity of its running directly depend on the state of investment factor's, i.e. the existing possibilities concerning the financing of innovative and entrepreneurial projects i.e. personal motivation and individual features of a property owner and entrepreneur or the person authorized by him), that stipulates quite possible nonlinearity of innovative transformations of the enterprises.

The introduction of innovations is quite expensive and risky process, that is why making a decision in relation to the

choice of innovations for practical realization directly depends on the proper complicated motivational complex of the investors, who assume most risks of investing in realization of innovations. The given motivational complex is divided into two basic constituents: the complex of portfolio investors and creditors reasons (external crediting of innovative process) and the complex of entrepreneurs reasons (reinvestment, internal self-finance of the development).

In the first case of decision-making concerning the expedience of financing (introducing) the innovations corresponds to the subjective idea of a potential investor about the comparable profitability of investments, the estimation of which is carried out taking into account an alternative profitability, to the risk of investments, the level of competition in the financial market, subjective expectations of the investors. Eventually an integral factor, reflecting its state is so-called "pressure" of free investment capital, which is in the financial market and must prove the acceptable level of profit for its owners.

The innovative decision-making by an entrepreneur is usually to a great extent based on the personal qualities of an innovator (one's strength of fortitude, risk perceptive capability, intuition, resolution etc.), whose individual features predetermine the choice of concrete variants of ID. The ability of a businessman to provide susceptibility of internal environment of an enterprise to innovations, as well as to give an example for other, less skilled businessmen, and to stimulate them to copy for intensification of innovative processes most successful innovation ("clustering innovators") is of great importance. Thus it should be noted that possible innovations in most cases can occur and be accumulated during the objective process of science and technology development, regardless of innovative entrepreneurs (while the functions of an inventor and an entrepreneur are radically different). Therefore, the function of an innovative entrepreneur is the selection and purposeful realization of existing possibilities of improving the production.

The result of complex influence of the mentioned internal factors is made by an enterprise choice of a market potential development for increasing the competitiveness of an enterprise: creation of new efficient capacities for manufacturing new goods; creation of new, more productive production capacity for manufacturing goods of the current range; the expansion and increase of current production facilities and so on.

The expansion of market outlets and, as a result, increase of producers' income are the top (having a special purpose) incentive factors of innovative development. Such increase, on the one hand, becomes the source of rewarding the efforts of investors and indemnifying the risks of investment accepted by them, and, on the other hand, assists the formation of more optimistic vision of the expedience of the further financing of innovative projects. The market outlets expansion creates also considerable possibilities for exposing and realizing by the market players the existence of new (recent) requirements for goods and new improved production technique. The increase of social wealth owing to successful realization of innovative projects, in its turn, creates favourable preconditions for initiating the next cycle of innovative transformations, the motive forces of which can be the change of state priorities of socioeconomic development, the expansion of the market for goods and services, the emergence of new achievements of scientific and technological advance and others like that.

Innovative development is the difficult sequence of different phenomena and processes, related to the generating, selecting and introducing the innovations. An innovative cycle embraces the numerous spheres of public life (research, economic, socio-cultural, political and legal), within the limits of which the basic stages of innovative process are developing, namely: fundamental and applied scientific researches; forming of favourable sociocultural environment of innovative and investment activity;

forming the infrastructure of research activity; forming the infrastructure of IIA; forming the proper government control of IIA; the transfer of knowledge; the optimization of structure of initial production capabilities (potential) of enterprises; generating and selecting innovations; the introduction of innovations; the exposure and realization of new market opportunities; financing the innovation; the diffusion of innovations and the clusterization of innovative entrepreneurs. Each of these inherent stages is characterized by its own objective law stipulating the dynamics of corresponding organizational and economic, as well as socio-cultural processes which accompany ID, in the same way the cooperation and fruitful integration of various factors serving as motive forces of innovative process at its different stages are determined by the only individual character.

The peculiarities of forming the motivational mechanism of innovative and investment activity of enterprises at each stage of innovative development require additional cycle research.

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