

Sergii M. Illiashenko, Yuliya S. Shipulina, Nataliia S. Illiashenko

## KNOWLEDGE MANAGEMENT AS A BASIS FOR COMPANY'S INNOVATIVE DEVELOPMENT<sup>1</sup>

*The article contains elaboration of conceptual bases of production management, accumulation and commercialization of current knowledge as the basis for innovative development of the company. The types of knowledge that allow to choose effective strategies for company's innovative growth are defined and codified. Strategies of innovative development were systematized depending on the degree of novelty of the product innovation for the industry, as well as the type of business of the innovator enterprise. The approach to providing coordinated interaction of different knowledge types was offered to follow in the process of enterprise's innovative development.*

*Keywords: knowledge management, knowledge production, commercialization of knowledge, innovative enterprise development, outstripping development, innovation strategies.*

Сергій М. Ілляшенко, Юлія С. Шипуліна, Наталія С. Ілляшенко

## УПРАВЛІННЯ ЗНАННЯМИ ЯК ОСНОВА ІННОВАЦІЙНОГО РОЗВИТКУ ПІДПРИЄМСТВА

*Розроблено концептуальні засади системи управління продукуванням, накопиченням і комерціалізацією актуальних знань як основи інноваційного розвитку підприємства. Визначено і систематизовано види знань, які дозволяють обрати ефективні стратегії інноваційного зростання підприємства. Виконано систематизацію стратегій інноваційного розвитку залежно від ступеня новизни продуктових інновацій для галузі, а також типу інноваційного бізнесу підприємства-інноватора. Розроблено підхід до забезпечення узгодженої взаємодії знань різних видів в процесі управління інноваційним розвитком підприємства.*

*Ключові слова: управління знаннями, продукування знань, комерціалізація знань, інноваційний розвиток підприємства, випереджальний розвиток, інноваційні стратегії.*

*Табл. 2, Рис. 2, Літ. 20.*

Сергей Н. Ильяшенко, Юлия С. Шипулина, Наталья С. Ильяшенко

## УПРАВЛЕНИЕ ЗНАНИЯМИ КАК ОСНОВА ИННОВАЦИОННОГО РАЗВИТИЯ ПРЕДПРИЯТИЯ

*Разработаны концептуальные основы системы управления продуцирования, накопления и коммерциализации актуальных знаний как основы инновационного развития предприятия. Определены и систематизированы виды знаний, которые позволяют выбрать эффективные стратегии инновационного роста предприятия. Выполнено систематизацию стратегий инновационного развития в зависимости от степени новизны продуктовых инноваций для отрасли, а также типа инновационного бизнеса предприятия-инноватора. Разработан подход к обеспечению согласованного взаимодействия знаний различных видов в процессе управления инновационным развитием предприятия.*

*Ключевые слова: управление знаниями, продуцирование знаний, коммерциализация знаний, инновационное развитие предприятия, опережающее развитие, инновационные стратегии.*

**Problem statement.** Last decades of the twentieth century introduced changes in the ratio of economic growth. Leading positions were taken by innovations based on information and knowledge. They are the driving force and the limiting factor for economic development. The

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<sup>1</sup> The work was performed in the framework of budgetary funds of MON of Ukraine provided for research "Fundamental bases of innovative culture's development management of the industrial enterprises"

knowledge economics began to form (post-industrial by A. Toffler (1970), in which competitiveness of national economies and individual businesses are increasingly determined by the ability to produce and use knowledge. Under these circumstances, there appeared an urgent problem of production management and commercialization of knowledge at both the state and individual businesses. Its solution will determine priority areas for the knowledge production regarding global trends and available capacity and to select effective ways of commercialization: implementation of new products and technologies, their development and production, methods of production management and marketing.

**Recent research and publications analysis.** The issue of knowledge production management and commercialization has been studied in the works of many foreign and domestic scholars. T.M. Koulopoulos and C. Frappaolo (2008) cover general approaches to knowledge management. K. Janetto and A. Willer (2005) study the issue of developing and implementing of corporate strategies of knowledge management. A.L. Haponenko (2008) investigates methods of knowledge capitalization.

I.e. Golyshева et al. (2014), T.G. Myasoedova (2007), D.S. Suslov (2012), B.Z. Mylner (2003) explore some aspects of the formation of knowledge management system of modern enterprise. I.P. Moyseyenko (2004) highlights approaches to the construction of some elements of the knowledge management system and intellectual assets, also notes the need to create an organizational culture and structure of knowledge management. Y. Vovk (2013) studies the role of staff in the knowledge management at the enterprise, showing the role of knowledge in providing enterprise development.

V. Tomakh (2014) proves knowledge to have a key role in providing enterprise adaptation to changes of environmental conditions, identifies the stages of knowledge management. I.V. Cherkasova (2010) explores the role of knowledge in forming the innovation potential of the company. O.V. Vostryakov and O.M. Grebeshkova (2009) showcase the central role of knowledge in strategic management, analyze the practical aspects of knowledge management in enterprises.

**Unsolved issues.** The results of the available literature analysis displays these studies considering mainly the overall perspective of knowledge management at enterprises. Though, they do not highlight the characteristics of their transition to innovative development. What suffers the lack scientists' attention is the research on analysis of the role of knowledge in providing innovative growth of companies and specification and coordinated interaction of knowledge types. They are necessary for elaboration of innovative development strategies, knowledge management at innovation-oriented enterprises and so on. Resolving these issues enables management of the production and commercialization of current knowledge at the enterprise, choosing effective directions of innovative development regarding the external and internal conditions.

**The article aims** at developing principles of management production, accumulation and commercialization of current knowledge as the basis for the company's innovative development. Main tasks:

- Identify and classify kinds of knowledge that enable to choose effective strategies of the company's innovative development;
- Perform the systematization of innovative strategies depending on the degree of novelty for the branch of product innovations, as well as the type of innovative business of the innovator enterprises;
- Develop an approach to the coordinated interaction of different types of knowledge in management of the innovative enterprise development;
- Develop the principles of knowledge management system forming at innovation active enterprises.

**The main research.** A systematic analysis of the literature and the practice of management has allowed to identify the main types of knowledge that allow to choose an effective strategy of innovative development. The article deals with knowledge as the ability to use a certain set of facts and rules to solve problems in a particular subject area, they are intelligent product and object of market exchange.

Consideration of knowledge is advisable to conduct according to the stages of the innovative development strategy:

- The essence of the stage;
- Procedure of works at the stage;
- Types of knowledge (scientific: ideas, theories, hypotheses, scientific laws, regularities, concepts, etc., including theoretical and empirical; technical: patents, inventions, know-how, algorithms, processes, technology, drawings etc., professional: know-how, skills, abilities, experience, etc. (S.M. Illyashenko and Y.S. Shypulina (2013);
- The results of operation phase.

1. *Prediction of promising development directions of industry (market) in which the enterprise operates.* Prediction of this kind involves the following procedures: marketing prediction to identify the most likely trends in consumer demand for the products of the industry; expert assessments of the state of science and technology to identify opportunities for implementation of existing and future groundwork in sector analyzed (or related) into new products, technologies of their production and promotion that meet customers' needs.

The implementation of these procedures requires knowledge of the following types:

- Knowledge of the micro environment: the current situation at the industry market and trends; enterprise's market positions; current and future market opportunities and threats etc.
- Knowledge of the macro environment and its individual components: political and legal; socio-demographic; economic; ecological; technical and technological (vector of NTP);
- Knowledge of the current phase of the economical cycles (Kondratieff - 40-60 years. (N.D. Kondratieff (2002), Kuznets – 25 years (S.S. Kuznets (1930), Juglar - 7-11 years (C. Juglar (1862), Kitchin - 3-3.5 years (J. Kitchin (1923) and place manufacturing industry analyzed them.

As a result, commercially promising areas of scientific and technological development of the analyzed area (market) can be singled out.

2. *Identification of priority areas of innovation development of market opportunities for the enterprise.* To do this one should analyze correspondence between the internal capacity of the enterprise for innovation and external defined in the previous step. The analysis provides evaluation of subsystems and components of innovative development potential and comparing them with critical values. Such an analysis is performed for each perspective direction of innovation development, as a result directions that meet external and internal conditions are identified.

The analysis requires knowledge of subsystems of innovative development potential (the possibility of the company):

- Market (marketing), as the availability of consumer demand for innovation sustained by purchasing power, or the possibility to form it;
- Innovative as possible implementation of science and technology in product, technological, other innovations that can satisfy consumers' demands;
- Productive as the technical ability and economic feasibility to develop, produce and promote innovation at the market, including its components: financial, human resources, technology, marketing, organizational management.

As a result the perspective directions of the company's innovative development are determined.

3. *The elaboration of an innovative development strategy.* At this stage, the type of innovation development strategy is chosen (Ch. Freeman (1982) supplemented with authors):

- Offensive, which involves the creation and active implementation of innovations (if the company has strong scientific, research and design departments);
- Defensive, which involves improving the product, technology of its production, promotion methods, etc. (if the company has a strong marketing departments);
- Simulation, which involves the acquisition of licenses and the subsequent deployment of production innovation, or acquisition of patents and technical preparation of innovation production, followed by the sale of licenses for its production (the company alone does not create innovation);

- Dependent strategy which is adhered by enterprises that manufacture components for innovative products to other businesses (kind of offensive or defensive);
- Traditional, which involves only minor product improvements (company manufactures unique products or has unique technologies);
- Niche Strategy (it used by companies that manufacture innovative products that address the specific needs of small groups of consumers);
- Licensing, which involves the search of partners for implementation or selling the innovation (patents, licenses, etc.), it is typical for small companies of innovative businesses which are limited in their capabilities;
- Mixed as a combination of different strategies for different target markets or their segments.

The strategy type choice is stipulated for awareness of the stages of the innovative and life cycle of new products (at scale of industry). These products are supposed to be produced and commercialized within each of the promising areas of innovation development selected at the previous step. Thereby the products may be new for the analyzed company, but already common for the industry. The selection scheme is presented in Table. 1.

**Table 1. Variants of the innovation cycle and the corresponding types of innovative business and innovation strategies, authors**

Strategy type	Innovational business type	Stages of innovative cycle				Stages of life cycle			
		Generating ideas and developing new product concepts	Business analysis	Producing	Market tests	Introducing to the market	Increasing market volumes	Maturity	Withdrawal from the market
Licensing	Venture								
Simulating									
Licensing									
Simulating	Explorant								
Niche	Patient								
Traditional defensive	Violent								
Niche	Communitant								
Simulating	Combined								
Offensive									
Defensive									

Summarizing paragraphs 1-3, a bigger scheme of interaction of knowledge complexes in the process of forming the innovation strategy was developed (Fig. 1). From Fig. 1 follows, that during the work process of steps 1-3, an analysis of feasibility of new knowledge producing and direction of their commercialization is performed (selling of formalized knowledge in the form of a patent or license; implementation of knowledge into new products, technology, etc.). The feasibility of producing a certain type of knowledge (scientific, technical, technological, professional, etc.) is determined by the assessment of the sufficiency or inadequacy to implement promising areas of innovation development of market opportunities. In addition, new knowledge empower enterprises

(promote the growth of its innovative development potential - IDP), so updating existing knowledge and its production is a major prerequisite for the innovative development of the enterprise.

In this context, it is not so much about professional knowledge of personnel management of which is sufficiently investigated, and more about scientific and technical knowledge that will encourage selection and implementation the existing and future directions of innovative development of market opportunities. These include:

1. Scientific knowledge concerning: cyclical economic development and approaches to determining the phases of economic cycles; methods of prognostication of trends in the external macro environment; methods of prognostication of science and technology trends of the industry in which the analyzed company employs, related industries, and their impact on the sector (industry) and so on.

2. Scientific and technical knowledge concerning: discoveries; the latest scientific and technological advances in the industry which are recorded in the industrial property rights (patents, utility models, designs, know-how, etc.), scientific books and articles published in scientific conferences; employees innovations; sources, algorithms and procedures for search, analysis and selection of scientific and technical information; methods and procedures for diagnosis of the IDP condition at enterprises and so on.

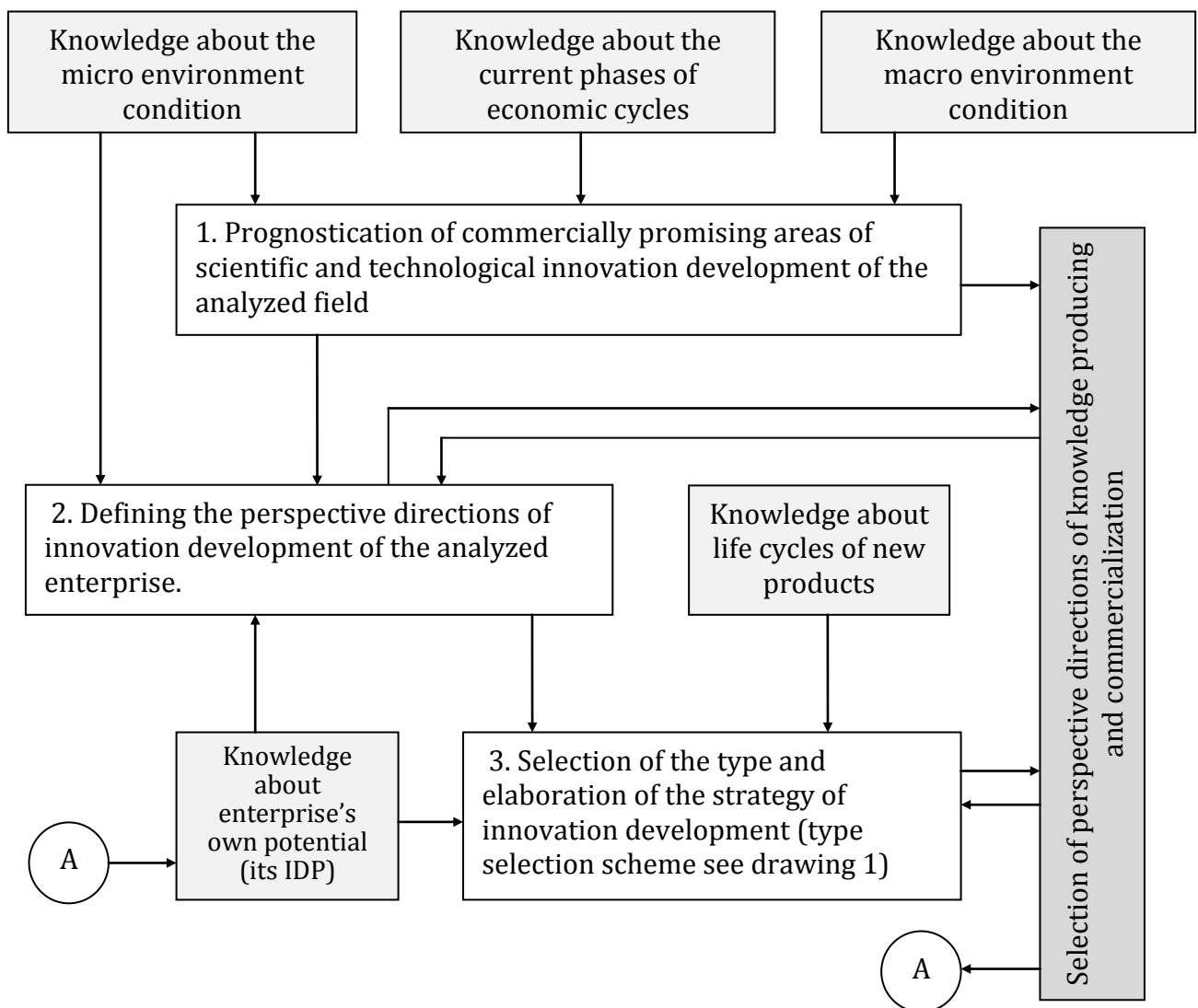


Figure 1. Scheme of knowledge complexes interaction in the development of company's innovative strategy, authors

Indicated knowledge combined with knowledge of enterprises' IDP allow to choose rational ways of implementing and strengthening existing competitive advantages, which, as shown N.S.

Illiashenko (2014), make the basis for outstripping innovative development. This will keep from repeating the path others have gone and won a strong position in the global market, but choose one's own way, realizing own potential benefits, occupying leading positions in industries with necessary and sufficient conditions.

The necessity in acquiring or producing knowledge in a particular area can be identified by analyzing the problems that hinder its development. For example, in the energy sector: search of replacement to exhaustible power medium. The choice of the priority directions of production and commercialization of knowledge (at the enterprise level) can be made due to prognosticating trends in science and technology in industry of the enterprise and variations of consumer demand due to changes in the external micro and macro environment.

Hence, the success of enterprise's innovative development depends on the effectiveness of the production and commercialization of the staff's knowledge. And the effectiveness is determined by the level of enterprise's innovation culture, which is a part of the corporate culture. The last one characterizes the degree of availability and predisposition of individual employees, groups of employees (units) and the organization as a whole to innovations, their willingness to apply innovations in new products, technologies, management decisions, etc. In fact, the innovative culture is an essential component of innovation-friendly environment at the enterprise.

Subject to this, the scheme of knowledge management in the innovatively developing company was proposed (Fig. 2).

According to Fig. 2 knowledge management system includes three interrelated subsystems: education, knowledge production, knowledge application. Knowledge management is based on the organizational structure of the company, communication system, corporate culture and innovative culture as its component. In the process of knowledge management these subsystems are modified and adjusted.

Correlation of the role and importance of knowledge management subsystems depends on the type of innovative business of the enterprise (see. Table. 1), the choice of which depends on the IDP of the enterprise and the market conditions.

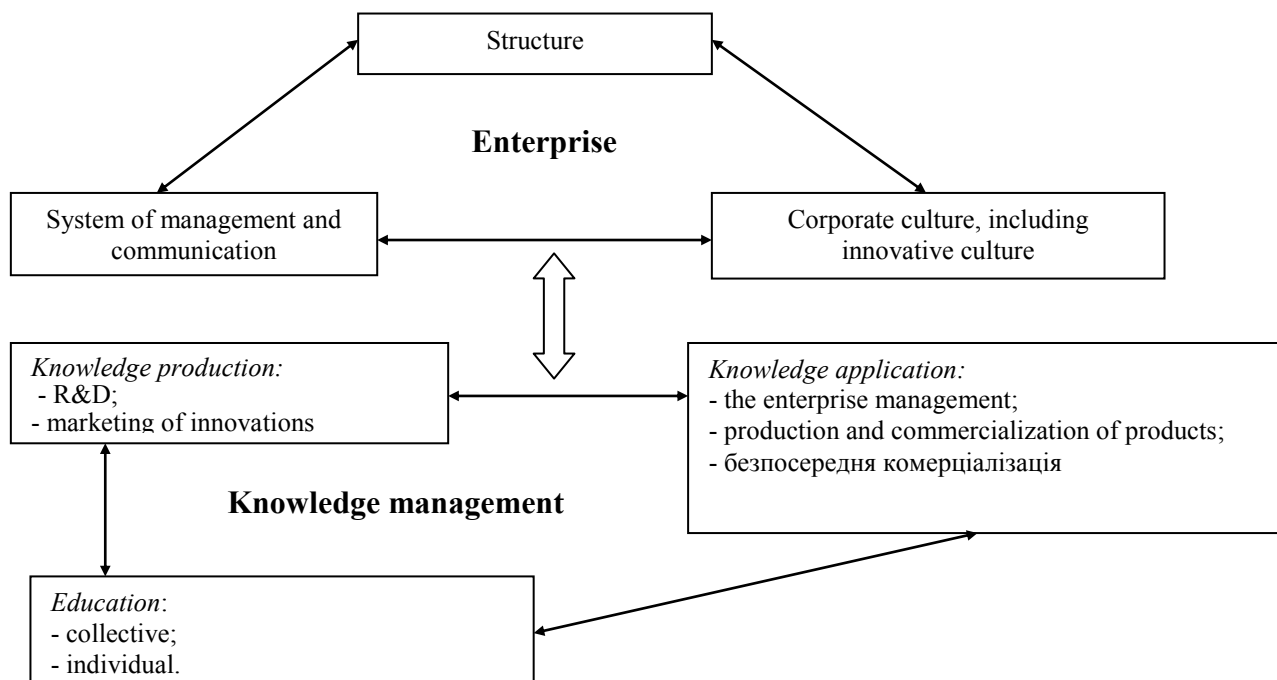


Figure 2. Structure of knowledge management at the enterprise-innovator, authors

Table. 2 presents the author's vision of tasks of knowledge producing subsystems on the stages of the innovation cycle. On the basis of Tables 1 and 2 one can prioritize knowledge management subsystems for different types of innovative businesses.

**Table 2. Objectives of research and development and marketing of innovations on the stages of the innovation cycle, authors**

Innovation cycle stages	R&D	Marketing of innovations
Generating ideas and developing new product concepts	Methods: of the generation and selection ideas prototype analysis, brainstorming, synectics, eliminating "dead end" situations morphological maps and more. Prognostication of technical and economic characteristics of product innovation	Analysis of the current and future customers' and other market participants' demands. Conformity assessment of new products with market participants. Searching ways to enhance market appeal of product innovations.
Business – analysis	Specification of technical and economic characteristics of product innovation. Forming a business idea, the main aim and tasks of the innovative project. Technical and economic grounding of the project.	Complex market research, strategy and marketing program development to promote a new product on the market. Evaluation of the marketing potential of the company.
New product development	Design and technical documentation development, working off the technology, preliminary tests of a prototype, state tests (if necessary).	Specification of the target market, estimation of product innovation competitiveness, development of the market testing program.
Market tests	Correcting the design of product innovation and its production technology on the results of market testing.	Testing marketing method
introducing the innovation to the market	Complex market research for improvement of new products and production technologies.	The implementation of the marketing innovation. The analysis of the market adequacy of new products and market conditions ..

**Conclusions.** The generalization of the above leads to the following conclusions:

1. The main knowledge types were systematized and the scheme of their interaction in the development of the company's innovative strategy was produced.

2. Innovative development strategies were systematized. According to this systematization one can choose an appropriate strategy to apply depending on innovation cycle of particular products innovations, as well as the type of innovative business of the enterprise.

3. The author approach was introduced to building a conceptual model of knowledge management in the innovatively developing company. The structure of the knowledge management system was worked out.

4. Tasks of knowledge production subsystem components (research and development and marketing of knowledge) on the stages of the innovation cycle were defined and systematized. An approach to the prioritization of knowledge management sub-systems at the company was offered, depending on the type of innovation business.

The results show that the transition of the enterprise to innovative development requires actual knowledge about conditions and trends of external macro- and microenvironment and its innovation development potential. Coordinated interaction of these knowledge complexes in the process of adjusting internal and external factors for development is the basis for the innovative strategies effective implementation.

Authoring significantly deepen the conceptual foundations of innovation management in the formation of effective mechanisms for knowledge management (production, accumulation, application) at innovative enterprises as the basis of their development. Their practical implementation will reasonably determine priorities of knowledge production based on world trends and available potential and also to chose effective ways of their application through the creation of product, technology, management and others innovations.

Further research should focus on the creation and the scientific grounding of formal methods and procedures of knowledge management in the process of effective strategies production for outstripping innovative development of the company.

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