

Розділ 3

Інноваційний менеджмент

UDC 658.01:621:004.7

JEL Classification: M11, M21

Mykhaylo Voynarenko,

*Doctor of Economics, Professor, Emeritus of Science and Technologies of Ukraine,
Corresponding Member of the NAS of Ukraine,
Vice-rector in Research and Academic Affairs, Khmelnytsky National University (Khmelnysky, Ukraine);*

Larysa Dzhuliy,

*Candidate of Economic Sciences, Associate Professor,
Associate Professor of the Accounting, Audit and Taxation Department,
Khmelnysky National University (Khmelnysky, Ukraine);*

Olena Kuzmina,

*Candidate of Technical Sciences, Associate Professor, Associate Professor of the Economic Cybernetics and
Information Systems Department,
Vinnytsia Trade and Economic Institute of the KNTEU (Vinnytsia, Ukraine);*

Tetiana Yanchuk,

*Candidate of Economic Sciences, Associate Professor, Associate Professor of the Marketing Department,
Donetsk National University named after Vasyl Stus (Vinnytsia, Ukraine)*

MANAGING THE DEVELOPMENT OF INNOVATION BUSINESS PROCESSES WITH AUTOMATED INFORMATION SYSTEMS

The article analyzes management science development, examines the management process essence through the business processes allocation as a sequence of actions aimed at achieving the ultimate, measurable and concrete result. The definition of innovative business processes was provided. Their target direction and informational interconnection were distinguished. The scientific-methodical approach to assessing the effectiveness of the information technology implementation in the innovative business process, which involves the all costs and risks gradual account, is proposed. Constructed the enterprise innovative business processes management algorithm and it is substantiated that the use of IT provides shaping of an information management system for innovative business processes, construction of an effective mechanism for their implementation.

Keywords: information systems, automation, enterprise management, efficiency, business processes, innovation.

DOI: 10.21272/mmi.2017.4-12

Relevance of topic. The need to search for new approaches and methods for managing socio-economic objects becomes relevant as a result of increased competition, rapid pace of introduction of scientific and technological innovations, integration and globalization phenomena in the economy.

That is why the functioning of domestic enterprises is aimed at the production of high-quality products, profit making, the introduction of innovations, as well as the feasibility of applying a process approach to building a management system that will improve competitiveness and ensure the economic growth and development of the enterprise in the long term.

Analysis of recent research and publications. The theoretical basis of the research are scientific works of foreign and domestic scientists, which outlines fundamental provisions of processes management, the organization of business processes and the information systems introduction in the activities of industrial enterprises. Thus the sequence of goods production processes and the formation of their consumer value, with the highlighting of business processes, are covered in the works of M. Porter [15], M. Hammer [21], and others. The evolution of the concepts in the formation of strategies for innovation development, the goals and factors of business processes during forming of strategies for enterprise innovation development, assessing the financial aspect of the effectiveness of existing strategies, the impact of IT (information technologies) on improving of the efficiency of the management system were considered in the works of such scholars as O.F. Androsov [2], B.M. Andrushkov [1], M.P. Voynarenko [26], O.M. Polinkevich [13], L.M. Shulgina, V.V. Ekumenenko [23] et al. The advantages of orienting the enterprise management system to business processes were studied in the writings of such scholars as O.A. Belovodskaya [10], V.V. Lavrenenko [11], V.S. Ponomarenko [14], O.S. Fedonin, H.O. Shvydanenko [11], L.G. Shemaev [22] and others. However, some questions of the essence of innovative business processes and the widespread use of a process-oriented approach to enterprise management in the context of market transformations require the search for new mechanisms for implementation and further research.

Therefore, in order to solve the set issues, it is necessary to comprehensively consider the methods of implementation of innovative business processes, as well as to determine their essence and peculiarities in the conditions of application of IT.

Selection of previously unsettled parts of the general problem. Adaptation to the dynamic changes in the market and the choice of optimal development strategy nowadays are the central problems of domestic enterprises. In this regard problems of finding of efficient tools and management methods aimed at introducing results of scientific and technological progress into all areas of enterprise activities, which will reduce its costs and increase profitability, as well as increase of social standards of functioning remain.

Therefore, the organization of the enterprise requires the introduction of innovative business processes and building of an effective management system to reduce their inherent innovation and investment risks. Exactly the management of innovative business processes using IT in the context of innovation strategy will promote the company's entering to foreign markets on a partnership basis and will provide efficient profitable activities.

Formulating the goals of the article (statement of the task). The purpose of the study is to determine the peculiarities in management of innovative business processes of the enterprise, studying and grouping the methods of their improvement, as well as disclosing the essence and prove the need for a process approach to enterprise management, identifying the essence of the innovation business process and its place and role in enterprise management, under the conditions of use of IT technologies.

Main material. Dynamic technology change, increased competition, the struggle for the consumer and product quality are driving companies to actively seek for new approaches in building of an enterprise management system. In such a situation, modern methods of information processing and information provision formation play a key role in improving the efficiency of management of industrial and business activities of the enterprise.

Science and practice of management uses a number of approaches and methods that acquire characteristic informational features as a combination of different properties at the stage of development of the information society.

We believe that the approach to highlighting these theoretical aspects should be understood as the theoretical direction (position) of consideration of management process, which includes the presence of a certain set of purpose-oriented content principles and management methods. Therefore, the urgent

Розділ 3 Інноваційний менеджмент

problem of modern management science is the need to create and develop a theoretical concept that combines acquired experience and would enable the integration of "classical" approaches to form a universal management model capable of reflecting contemporary trends in the development of society and business. Science of management evolution is characterized by a large number of schools, trends, concepts, approaches, currents that can be dividing into two stages: the formation of individual management schools and modern integrated approaches (Table 1).

Table 1 – Stages of scientific schools formation and directions of their research
(developed by authors using [3; 7; 10; 11; 15; 26])

Period	Management theory approaches	Schools scientists and representatives	Research essence and directions
<i>Stage 1 - Systematization period (generalization of accumulated management experience, scientific schools formation)</i>			
1855-1960	Formation of scientific approaches and construction principles of management system, formation of management as a science		
1855-1920	School of scientific management	Frederik U. Taylor, Frank and Liliya Gilbert, Henry Gantt	Investigated the study of production management, processes, determination of ways to increase productivity workers, their capabilities assessment on the basis of motivation.
1899-1945	School of "Fordism"	Henry Ford	Investigated the management based on idea of flow-mass production ("terror of machines"), mechanisms of precise control and planning, effective motivation, conveyor assembly, continuous technological processes, innovative development, active administration were formed.
1899-1945	Classical (administrative) school of management	Henry Fayol, G.E. Emerson, C. Bernard, Max Weber	Conducted the research on management by type of activity, defined 14 administrative management principles, 12 performance principles, concept of rational bureaucracy developed.
1930-1950	School of human relations	Mary P. Follet, E. Meio, F. Rottlisberger, A. Maslow	Investigated the management formation based on the relationship assessment between employees, as attentive attitude to the subordinates increases productivity, improving the organization's activities by increasing the efficiency of using its labor resources through psychological impact and encouragement.
1950 to this day	School of behavioral science	Douglas McGregor, Chris Arjisis, Rensis Lickert, Frederick Herzberg	Developed the methods of managing people's behavior, methods for establishing interpersonal relationships, increasing the efficiency of human resources, forming teams for psychological compatibility, etc.
<i>Stage 2 - Information Period - Integrated Methods Use in Management Practices</i>			
1960 to this day	School of quantitative methods	R. Akkoff, S. Byr, D. Eckman, A. Enthoven, E. Kweed	Development of quantitative methods for justifying managerial decisions based on the use in the management of mathematics, cybernetics, probability theory, statistics and computer technology.
1950 to this day	System approach to management	C. Bernard, P. Drucker, N. Winner, K. Shannon	Consideration of the management processes in the relationship, their reflection in the system as a whole, the development of economic indicators regulation system for the enterprise.
1950 to this day	Situational approach to management	H. Denisson, M.H. Meskon, P. Drucker	The substantiation of theoretical approaches those different management methods suitability is determined by the situation.
1960 to this day	Process approach to management	Henry Faiol, Stoner	Consideration of management functions in the relationship, and each management function is a process that consists of interrelated actions

Traditional management schools, in contrast to modern ones, tried to determine their own unique way of improving the efficiency of management, perceived the process of management as separate influential actions to regulate the activities of the enterprise and did not consider the company as a complex economic system and the relationship between its elements, did not assess significant environmental effects.

In modern management theories approaches to the organization of management (Table 2) try to comprehensively take into account the peculiarities of the functioning of socio-economic objects as complex economic systems, their elements, and trends in the development of the environment in which they operate. Scientists R.S., Halekovic, V.I. Nabokova highlighted, in addition to the above mentioned (Table 2), such modern scientific approaches as administrative, reproductive, dynamic, integration, marketing, regulatory, behavioral [4, p. 25]. R.A Fatkhuddinov also provides logical, innovative, global, virtual, standardization, exclusive, structural, optimization, business, and others. [19, p. 71]. However, it is practically impossible to give a complete list of modern scientific approaches, directions, flows in a compressed systematized form because of their large number, so it is advisable to consider only the main ones. Thus, the orientation towards the needs of consumers, the implementation of flexible scientific and technical and industrial policy, and the desire for innovation are determined by new ideas of modern management, whose philosophy in the period of long-term development substantiates two basic approaches in the management of enterprises – functional and process [4, p. 35; 15, p. 27; 26]. Their combination and practical application form the integrated approaches, the choice of which allows implementing the optimal version of the functioning of the management system, taking into account the degree of complexity of production and economic objects. The essence of functional management is to ensure the performance of functions of production-economic system, with an orientation to certain ultimate goals. An alternative to a functional approach is a process approach, whose fundamental doctrine is proposed by P. Drucker “management of goals” [6]. The essence of process management is in the consideration of business process as a sequence of actions aimed at achieving the ultimate, measurable and concrete result.

Table 2 – Contribution to the modern science of managing the concepts of different approaches (developed by authors using [1; 2, p. 9-13; 4, p. 25; 5, p. 40-45])

Scientific approach 1	Contribution to the development of scientific management 2	Problematic aspects of the approach 3
Quantitative	It is in the transition from qualitative evaluation to quantitative through mathematical, statistical methods, expert evaluations, system of points, etc. Implies compulsory use of computer technology.	Quantitative evaluation does not always provide relevant information; therefore, not all objects should be measured and quantified.
System	Investigation of the enterprise as an integral system, the relationship between its elements, the effectiveness and response of the system to changes.	Considerable attention is paid to the connections between the subsystems of the enterprise; the influence of the external environment on the state of the enterprise is practically not taken into account.
Situational	The study of the specific conditions of the enterprise, with the most important point is the identification of key situational factors that have the greatest impact on the ability of the organization to be competitive.	It is impossible to identify all variables that affect the enterprise depending on various factors, therefore, they choose the most important ones for obtaining the enterprise's goal factors.
Process	Defines the management of a process in which activities aimed at achieving the goals of the organization are regarded as the sum of interrelated actions - management functions, and each of functions as a set of homogeneous actions, operations, procedures.	The application of a process approach to enterprise management involves a high degree of formalization, considerable amount and high cost of performed work.

Table 2 (Continued)

1	2	3
Socio-ethical	Focused on the managerial process to reduce the likelihood of a decision that can damage the objects in its sphere of influence (business partners, personnel, owners, society, etc.). If a decision is to be taken, it is envisaged that significant compensatory measures will be implemented. The extended system of motivation that takes into account the variety of labor values of the employee, as well as human values in a whole is expected.	Significant expenses for forecasting works, definition of timing, and correctness of definition of object of forecasting.
Synergistic	Approach in terms of the synergetic methodology of knowledge of economic and social phenomena, the source of creating additional and new value is the present or past (stated in innovations) intellectual work, in contrast to the mechanistic theory of the formation of additional value due to additional time spent. By the law of synergy, the sum of the properties of an organized whole must be greater than the sum of the properties of all the elements that it contains. At the same time the properties of the elements and the whole mean the change in various parametric characteristics, their interdependence.	Synergy could lead to very positive as well as to very negative consequences, many uncertainties, ambiguities and the lack of justification.
Stabilization	Stabilization management has the purpose of keeping the object of management within the specified values of parameters, or preventing the transition of this object to the zone of uncontrolled state.	Definition of approaches for substantiating parameters, limiting the functioning of objects by the given values of parameters.
Complex	Complexity is aimed at deepening the interaction of the subjects of management, their association, the strengthening of interaction and the relationship between components of the system.	Leveling out the results and potential capabilities of individual components of the control system.
Functional	Provides management of the functions that are characteristic of the object being studied in accordance with its purpose	It focuses on subsystems of the investigated object to perform certain functions assigned to them and does not allow orientation to the final result of all activities

According to the authors, the application of the process approach and the construction of a set of business processes are needed when using modern information technology management and the latest innovative approaches in all spheres of the functioning of social production systems. Application of situational, functional, complex and other integrated approaches indicated by the authors in Table. 1, allows to optimize current management decisions within the limits of the industrial enterprise and to form a single information space of its activity.

Thus, the innovative difference of the practical implementation of the process approach from the functional is that the focus of management is not on individual functions performed by different departments and officials, but on interfunctional processes that combine individual functions into common flows and ensure the achievement of enterprise goals [1; 2; 4, p. 25; 5, p. 40-45; 7, p. 97; 10, p. 119]. It is these process-oriented features that are capable of generating innovative ideas and creating a broad field for their implementation.

Consequently, the modern concept of process management involves the transformation of the business of the organization for closer coordination of its functional parts, increasing their flexibility and obtaining a synergistic effect, providing a successful environment for the implementation of production tasks and the introduction of various types of innovations.

In modern scientific thought there is no definite approach to the definition of the concept of "business process". Some scientists define the business process as a set of different types of activities, within which the planned types and amounts of resources used as the "input" and a product, which is a valuable to the consumer, is created as a result of this activity at the "output" [17, p. 11].

According to some scholars the business process is a set of logically interrelated actions performed to achieve a certain outcome of business activity [14, p. 5].

In our opinion, among the modern market positions all processes that are carried out to obtain the final results of the enterprise's business and ensure that they receive profits, related to business processes. Actually, if the process refers to any activity that includes a certain set of functions, and which uses resources at the beginning of the process and transforms into the final product before its completion [1, p. 94], then under business processes, one should understand the step by step systematization of the complex of activities that create values for the industrial enterprise and its target audience and provide profit.

Accordingly, under the process management system of production and economic objects, we mean a set of socio-economic and technical functions and their implementation tools that implements management processes within the existing business processes in order to achieve their goals. Thus, the process model of an enterprise consists of a well-defined set of business processes, which are represented by responsible executives, which provide management of business processes, as well as employees of structural subdivisions performing the production tasks according to the functional purpose of the business process. Therefore, an industrial enterprise can be considered as a business system in which all business processes are directed to implementation of the strategy of development and introduction of innovations in order to ensure its long-term competitiveness, profitability and ability to integrate into world economic processes. Such a business system must be in line with the innovative business model that the enterprise chooses for all its business activities in order to ensure their competitiveness and profitability based on innovation, with the distinction of the components of the formation of value added both separately for each product and aggregate business [10; 16].

Innovative model of business organization of enterprise is the basic condition for its functioning, since innovation activity is initiated by the development of scientific and technological progress and serves as one of the means of enterprises adaptation to changing environmental conditions [9, p. 57-61]. In this context it should be noted that for modern enterprises to increase profitability of their business, in addition to investing large amounts of financial resources in research and development, it is also advisable to ensure their effective use in accordance with the most successful innovation strategy. This strategy will substantiate the main directions, level and types of innovations in accordance with the potential of the enterprise and its main business processes [9, p.22-47; 20; 24]. According to the criteria of their efficiency and further development they should be determined by the level of production growth, profit, market share, etc., taking into account the potential of the enterprise and the stages of its life cycle [25].

Innovative business processes have a significant impact on the conditions of the functioning of enterprises, causing dynamic changes in its internal and external environment. In the internal environment of the enterprise preconditions are created for the application of modern tools for planning income and expenses of the enterprise, methods of conducting control procedures, modern methods of information support activities, software and hardware complexes of information security of innovative business processes, modernization of equipment and introduction of the latest technologies, etc.

In the interaction of the enterprise with the environment, prerequisites are created for long-term cooperation with suppliers and customers, entering of the enterprise to foreign markets, attraction of foreign investments, stimulation of innovation development.

Thus, taking into account the peculiarities of the essence and prerequisites of our innovative business organization model will allow us to form an effective system of management of innovative business processes that will ensure the interconnection of all elements of the innovation process during its progressive development from the initial stage of the formation of the innovative idea to the implementation of the original product, where Continuous interaction with all kinds of business processes of the enterprise is carried out.

Accordingly, we define the innovative business process as the newest system of consistent, targeted

and regulated activities that functions in conjunction with all business processes of the enterprise, in which, under the influence of management processes and resources, which are the inputs of the process are transformed into outputs - the results of the process that are capable of ensuring the implementation of innovations and income generation, the steady development of the enterprise and its ability to adapt to changing environmental conditions with a high level of competitiveness (Fig. 1).

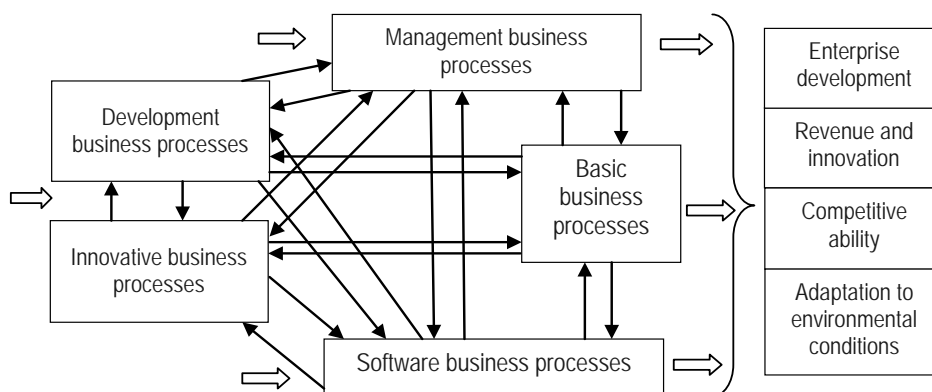


Figure 1 – Relationship between types of innovative business processes and their purpose (constructed by authors using [14, p. 8-12; 22])

We agree with the opinion of scientists [14, p. 8-12; 22] that business processes can be divided into core business processes, business processes of support, management and development. Core innovative business processes generate income of the company. These include processes focused on the production of innovative products or services, which are the target objects of enterprise creation and provide income generation. It is the core business processes that form the result and consumer qualities for which the company receives revenue. Business processes of support provide support for all other types of business processes, and may include innovative approaches that can support the implementation of the innovative goals of the core business processes.

Business processes of management are processes that cover the entire complex of management functions at the level of each business process and the enterprise as a whole. These are the processes of strategic, operational and ongoing planning, the formation and implementation of managerial influences, which may include managerial, technological, technical and other innovations as independent projects, or interconnected with the core ones.

Business processes of development are processes of improvement of products or services, processes of technologies development, processes of modernization of equipment, as well as innovative processes.

Consequently, we have chosen a process approach to the formation and development of an innovative management structure, based on the concentration of defining business processes as components of the whole, to determine their information and management relationships and optimize their structure. However, ensuring the efficiency of innovative business processes - is one of the main tasks of an industrial enterprise. In today's economic conditions, the implementation of this task is complicated by the influence of external and internal factors, which lead to increased costs and reduced revenue [11, p. 32; 12]. Therefore, reliable methods and tools are needed to counteract these negative factors.

Given the importance of ensuring efficiency for enterprises, there is a need for clarification,

systematization and formulation of the basic principles and methods for managing the efficiency of their activities.

In the context of the national information technology program of Ukraine, information technologies (IT) become the fundamental basis of innovative business processes of modern enterprises, promote the globalization of activities and entering of enterprises to external markets, provide a comprehensive reorganization of management work, turn into a source of added value of business entities. The modern society's informatization level and economy knowledge formation determines the use of the economic object's latest technical, technological and software tools in various information systems. Therefore, it becomes necessary to determine the automated information system as a set of information resources, economic and mathematical methods and models, technical, software, technological tools and specialists, designed to process information and make managerial decisions to achieve the goal. Consequently, the above factors cause the growth of the rate of using IT of Ukrainian enterprises [20, p. 336-340; 26].

The basis for its implementation should be an effective system for managing the implementation of information technology in the business processes of enterprises. The purpose of information technology implementation is to reduce the complexity of the processes of using information resources and increase their reliability and efficiency. The basis of qualitative assessment of information technology lies in the diversity of methods and methods of their design [11; 26]. The most important indicator is the degree of conformity of information technology to the scientific and technical level of its development. Before choosing one of the methods for assessing economic efficiency, it is necessary to determine the criteria by which the main result of the implementation and use of IT in the business process is expected to be achieved. The most common criteria for assessing the effectiveness of IT are the functional and resource criteria of saving social time and the criteria for the ratio of costs and output [17].

Functional criteria are those whose values characterize the degree of achievement with this technology of those desirable indicators of an information process that are necessary for the user, namely:

- 1) the value-time characteristics of the implemented information process (data transfer rate, memory capacity for storing information, etc.);
- 2) characteristics of the reliability of the implementation of the information process (the probability of a correct transfer or transformation of information, etc.);
- 3) parameters characterizing the degree of achievement of the main end result of the information process implemented with the help of this technology (correctness of the language or image, the quality of the formed graphic information, etc.).

The value of resource criteria characterizes the quantity and quality of different types of resources necessary for the implementation of this information technology. Resource efficiency criteria allow you to fundamentally compare different types of technologies. In addition, they provide an opportunity to quantify the effect of the use of these technologies in terms of their social usefulness in terms of saving the following types of resources:

- 1) material resources (technical and technological equipment necessary for the successful implementation of this technology);
- 2) energy resources (energy costs for the implementation of the information process or this technology);
- 3) human resources (number and level of personnel training required for the implementation of this technology);
- 4) time resources (amount of time required for the implementation of the information process with this technology of its organization);
- 5) information resources (the data and knowledge necessary for the successful implementation of the information process).

The criteria for saving social time are used as one of the most common indicators of the

development of society, including for a comparative quantitative assessment of the effectiveness of various types of information technologies. It is generally accepted that any savings, ultimately, can be reduced to time saving. This is the most common indicator of technology of any kind (production, social or informational).

Criteria of expenses/outcomes ratio are useful in analysis of data processing technology. The satisfaction of information needs of users or participants in business processes could be considered as an outcome then.

The effectiveness of IT implementation should be monitored on the basis of a single set of criteria throughout all stages of their life cycle. A general rule in determining the criteria for monitoring the effectiveness is a targeted approach, respectively, which is the level of achievement of the goal of managing business processes of the enterprise.

Proceeding from the fact that the purpose of implementation is the establishment of information technology to achieve certain goals, respectively, and effectiveness will be determined as the degree of their achievement [26, p.105-106].

An analysis of the practical experience of implementing IT for managing innovative business processes shows that the generally accepted approach to the interpretation of efficiency is the ratio of benefits (effects) and costs from the introduction of innovations [21; 26]. But focusing only on the evaluation of this indicator is a mistake, since measuring the effectiveness of the implementation of information technology in this approach is somewhat limited, as the impact of information technology on the profitability of the enterprise is mediated through improved management of innovative business processes of the enterprise, increasing the competence of employees, customer satisfaction. Measuring these effects in a financial dimension is complicated, and the value of the performance indicator will not provide accurate information on the effectiveness of the introduction of IT into the innovative business process.

Consequently, under these conditions, the effectiveness of the implementation of information technology means the adequacy of functional characteristics of technologies to specific goals and objectives of innovative business processes, which are determined when deciding to introduce or upgrade the enterprise information system. Therefore, the set of effects from the introduction of information technology and accordingly efficiency depends on goals of this introduction firstly.

The evaluation of the effectiveness of the implementation of information technology should be aimed at analyzing the potential benefits for the enterprise and, consequently, for such a project implementation, which will maximize this benefit [26].

Thus, on the basis of the above material, the authors came to the conclusion that it is expedient to apply the methodology for assessing the effectiveness of the introduction of information technology in the management of innovative business processes of the enterprise, which can be presented in stages.

At the first stage, the assessment of innovative business processes from the standpoint of determining their role for solving enterprise problems, which allows you to connect IT processes to solve the problem aspects of the enterprise. At this stage, the planning of the implementation of the innovation strategy of the company takes place, taking into account critical factors and indicators of success, identifying the most important elements of innovative business processes and developing a plan for their implementation.

At the second stage, the choice of IT solutions, which can improve the efficiency of innovative business processes, is made. At this stage, an analysis is carried out that identifies bottlenecks in each of the selected components of innovative business processes and justifies such a solution, which allows to eliminate the identified shortcomings and to obtain a qualitative result from the implementation of IT.

The third stage is prediction of risks. At this stage, the research determines and measures the risks inherent in IT solutions (taking into account the uncertainties that arise directly at the stage of evaluation).

The fourth stage is estimating the cost of IT solutions. At this stage, the amount of IT funding

required to achieve the goals is determined. Cost estimation consists of:

1) cost estimates for IT solutions (involves the definition of all capital and current costs associated with the implementation and use of information technology, namely:

a) estimation of direct costs for implementation of IT solution (V_P , UAH):

$$V_P = V_{TZ} + V_{PLP} + V_{OP} + V_{VSZ} + V_{PSO} + V_U + V_i,$$

$$V_{TZ} = \sum_{i=1}^n V_{TZi}, \quad i=1, \dots, n,$$

$$V_{PPZjn} = \sum_{i=1}^m (V_{PPZjn} + V_{PPZjc}), \quad j=1, \dots, m,$$
(1)

where V_{TZ} – purchase of equipment, UAH; n – number of types of purchased technical equipment, pcs; V_{TZi} – costs for purchase one technical equipment, UAH; V_{PPZ} – purchase and maintenance of software, UAH; m – the number of types of purchased software, pcs; V_{PPZjn} – expenses for the purchase of j -software, UAH; V_{PPZjc} – expenses on support of j -software, UAH; V_{OP} – staff salary, UAH; V_{VSZ} – social events, UAH; V_{PSO} – outsourced services, UAH; V_U – expenses for IT management, UAH; V_i – other direct expenses for IT implementation, UAH.

b) estimation of indirect costs for IT implementation (UAH);

c) estimation of expenses for maintenance of IT during their life cycle, which predicts the annual cost of maintenance of information technologies during the period of their useful use. Annual expenses on IT maintenance (V_{UTR} , UAH):

$$V_{UTR} = V_{OP} + V_{VSZ} + V_{PSO} + V_i,$$
(2)

where V_{OP} – payment for support and upgrade of IT, UAH; V_{VSZ} – expenses for social events, UAH; V_{PSO} – payment for outsourced services, UAH; V_i – other expenses for maintenance of IT, UAH;

d) estimation of possible losses from the introduction of IT (P , UAH), where it is planned to determine the losses from failures and downtime (planned or unplanned), losses from elimination of failures at work and others. Determining the value of potential losses is based on statistical data on the implementation of such IT, or based on data accumulated in the enterprise. Thus, the total cost of IT solutions (V_{IT} , UAH) will be determined by the formula:

$$V_{IT} = V_P + V_N + V_{UTP} + P;$$
(3)

2) assessing the validity of the determined cost of IT solutions, which is carried out by: comparing costs with the average indicators of enterprises in one industry; Determining the economic efficiency of IT solutions.

The fifth stage evaluates the effectiveness of the implementation of information technology in the innovative business process. For this purpose, one of the above-mentioned methods for assessing the effectiveness of IT implementation is determined and evaluated for expected implementation benefits.

In order to ensure the completeness and reliability of assessing the effects of the introduction of information technology, the mandatory condition is to take into account the influence of external factors that affect the innovative business processes of the enterprise and determine the current level of efficiency of innovative business processes. This approach will determine the level of efficiency of automation of innovative business processes of the enterprise. The peculiarities of the formation of IT support of the management system for innovative business processes in the context of the introduction of IT are presented in Fig. 2

The main types of modern software products that can be used to model and develop innovative

business processes include: BPM-systems (Business Process Management) – this is the concept of organization process management (business process management), which complements enterprise class systems ERP, CRM; BPMS programs (Business Process Management System) that provide modeling, automation, monitoring, management and optimization of business processes. These systems also include software products based on the integration of CASE-technologies and simulation models: Arena – simulation of the production process, physical phenomena, etc.; ARIS – network technologies; Vensim, iThink, Powersim, AnyLogic - modeling the business process structure, rebuilding BPR (business process reengineering), etc. The main purpose of these systems is to provide software support for the concept of enterprise process management (both existing processes and innovative business processes).

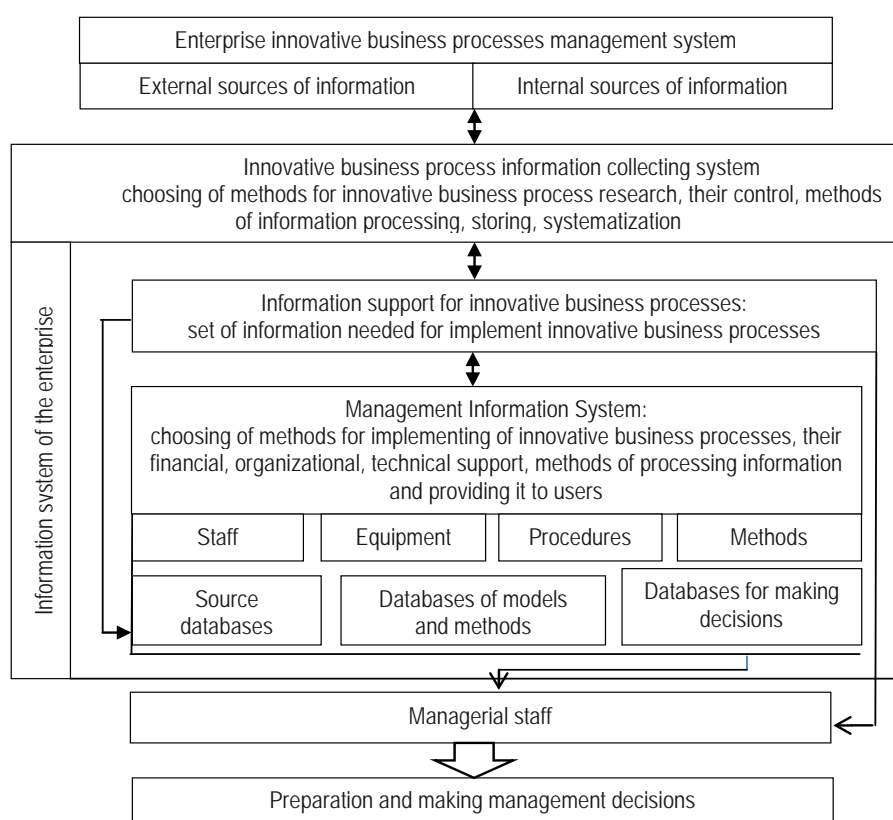


Figure 2 – The main elements of the information support of the management system of innovative business processes of the enterprise (constructed by authors using [17, p. 95; 18, p. 18-40; 26])

Thus, at this stage of economic transformations in Ukraine the primary task of domestic industrial enterprises is the formation of a system for managing the strategy of innovative business processes and mechanisms for meeting the information needs of management personnel in an unstable environment and growing competition of foreign manufacturers, which should not only take into account changes in the environment but actively influence them as well.

Such an active innovation policy coupled with modern management technologies can provide an increase in the company's profit without attracting investment from the outside. Consequently, the innovative approach to socio-economic development of an enterprise involves the formation of an innovative strategy, the implementation of which is provided by innovative business processes, using modern computer technologies, which require constant monitoring, systematization and control in order to achieve the goals of the enterprise, increase its profitability and competitiveness.

As innovative business processes are characterized by a certain degree of uncertainty and risks that are also inherent in IT, there is a need for their continuous monitoring, state diagnostics, flow control and identification of ways to effectively implement and improve. The mechanism of innovative business processes management of the enterprise should be aimed at fulfilling the tasks, the sequence of implementation of which reflects the proposed algorithm (Fig. 3). Here, the first stage involves conducting system diagnostics of innovative business processes of the enterprise, which allows to establish qualitative and quantitative characteristics that determine the degree of efficiency of management of innovative business processes [9; 14, p. 69-82].

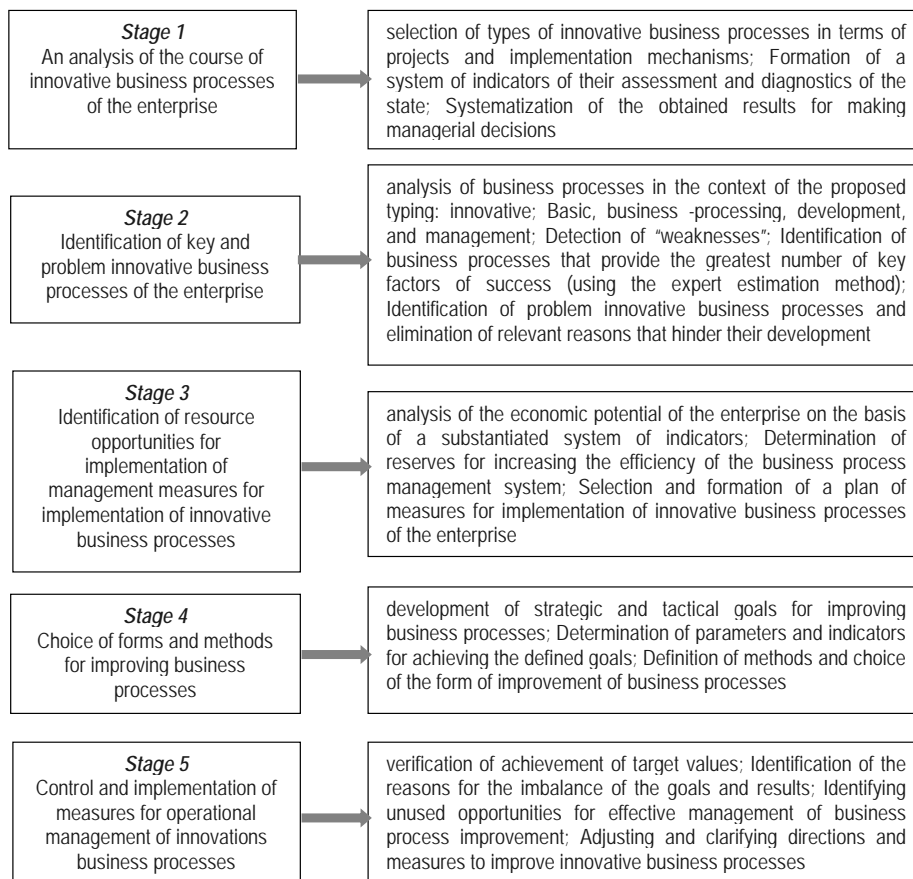


Figure 3 – The algorithm of the enterprise innovative business processes management (constructed by authors using [8; 14, p. 69-82; 16, p. 20-24])

The proposed system of key performance indicators identifies business processes as well as IT implementation measures that are to be improved and developed to enhance competitive advantages.

In the second stage, using methods of qualitative analysis, one should highlight the most problematic components of business processes, and define their "bottlenecks". The result of the diagnostics should be the formalization of the problem and the identification of the causes of inefficient management of innovative business processes, as well as factors that cause the emergence of these reasons [7; 14; 16].

The third stage involves conducting a qualitative and quantitative assessment of the resource capabilities of the enterprise to implement measures to manage innovative business processes. The results of the integrated assessment of innovative business processes and the identification of resource capabilities of the enterprise will be the basis for the fourth stage - definition of measures for their improvement.

The main purpose of the fifth stage is to determine the economic effect of introducing the proposed measures of innovative business processes in the IT environment, calculating the integral effect, as well as monitoring and implementing measures to improve the innovative business processes of the enterprise in the context of the introduction (use) of IT [3; 18; 26]. Conclusions By the results of the study of socio-economic objects management concepts evolution, we came to the conclusion that the process approach to building a management system allows modern management to focus on interfunctional processes that combine individual functions into common flows and ensure achievement of enterprise goals.

It is these characteristic features of the process approach that ensure the implementation of the enterprise innovation strategy through the introduction of innovative business processes in all its areas of operation. This allowed to highlight the preconditions and peculiarities of functioning of an effective innovative business processes management system and to substantiate their essence and their own definition.

IT is becoming increasingly important for the effectiveness of the introduction of innovative business processes, the feasibility of which can be justified based on an assessment of their implementation efficiency, which involves the gradual inclusion of all costs and risks. The use of IT provides the formation of an information management system for innovative business processes, the construction of an effective mechanism for their implementation.

Conclusions and perspectives for further researches. Consequently, the modern concept of process management involves the transformation of the enterprise business for closer coordination of its functional parts, increasing their flexibility and obtaining a synergistic effect, providing a successful environment for the implementation of production tasks and the introduction of various types of innovations. In order to increase the efficiency of activities and achieve strategic goals, domestic enterprises need to reorganize the management system based on a process approach and pay special attention to the development and improvement of innovative business processes in the context of the introduction of modern IT.

1. Андрушків Б.М. Формування системи бізнес-процесів підприємства у контексті сталого розвитку / Б.М. Андрушків, Л.М. Мельник // *Theoretical and Practical Aspects of Economics and Intellectual Property*. – 2015. – Issue 2 (12). – Volume 1. – С. 92-98.

2. Андросова О.Ф. Трансфер технологій як інструмент реалізації інноваційної діяльності : монографія / О.Ф. Андросова, А.В. Череп. – К. : Кондор, 2007. – 356 с.

3. Антонов В. М. Інтелектуально-математичний менеджмент: кіберакмеологічна концепція : монографія / В.М. Антонов. – К. : КНТ, 2007. – 528 с.

4. Галькович Р.С. Основы менеджмента / Р.С. Галькович, В.І. Набокова. – М. : ИНФРА-М, 1998. – 189 с.

5. Гордієнко Л.Ю. Управління організаційними трансформаціями: теоретико-методологічні засади та управлінський інструментарій / Л.Ю. Гордієнко. – Харків : Вид. ХНЕУ, 2011. – 440 с.

6. Друкер П. Управление, нацеленное на результаты / П. Друкер. – М. : Прогресс, 1992. – 548 с.
 7. Дудар В.Т. Ефективність інноваційного розвитку агропромислового виробництва: монографія / В.Т. Дудар, А.В. Шумський, Б.О. Язлюк. – Тернопіль : Астон, 2013. – 260 с.
 8. Економічне обґрунтування реінжинірингу бізнес-процесів виробничих підприємств : монографія / авт. тексту Біловодська О.А. та ін. ; заг. ред. Л.М. Таранюка. – Суми : Мрія-1, 2010. – 440 с.
 9. Ліщук В.П. Стратегія управління бізнес-процесами машинобудівних підприємств через реінжиніринг та перепроєктування / В.П. Ліщук, О.М. Полінкевич, І.П. Іщук // Економічний часопис – XXI. – 2015. – № 1-2 (160). – С. 57-61. – [Електронний ресурс]. – Режим доступу : <http://soskin.info/ea/2015/1-1-2/57-61.html>.
 10. Механізм стратегічного управління інноваційним розвитком : монографія / за заг. ред. О.А. Біловодської. – Суми : Університетська книга, 2012. – 432 с.
 11. Новітні тенденції розвитку управління підприємствами : монографія / Федонін О.С., Швиданенко Г.О., Лаврененко В.В. та ін. – К. : КНЕУ, 2011. – 257 с.
 12. Орликовський М.О. Новітні концепції управління ефективністю діяльності сучасних підприємств / М.О. Орликовський, Д.І. Трокоз // Ефективна економіка. – 2014. – № 5. [Електронний ресурс]. – Режим доступу : <http://www.economy.nayka.com.ua/?op=1&z=3034>.
 13. Полінкевич О.М. Управління бізнес-процесами в системі інноваційного розвитку підприємств / автореф. дис. на здобуття наук. ступеня д-ра. екон. наук : спец. 08.00.04 «Економіка та управління підприємствами» / О.М. Полінкевич. – Хмельницький : ХНУ, 2015. – 40 с.
 14. Пономаренко В.С. Теорія та практика моделювання бізнес-процесів : монографія / В.С. Пономаренко, С.В. Мінухін, С.В. Знахур. – Х. : Вид-во ХНЕУ, 2013. – 244 с.
 15. Портер М.Э. Конкуренция : уч. пособие / Майкл Э. Портер ; пер. с англ.; ред. Я.В. Заболоцкого. – М. : Изд. дом "Вильямс", 2005. – 608 с.
 16. Рогоза М.Є. Стратегічний інноваційний розвиток підприємств: моделі та механізми : монографія / М.Є. Рогоза, К.Ю. Вергал. – Полтава : РВВ ПУЕТ, 2011. – 136 с.
 17. Тодорова О.В. Інновації в комунікаціях. Інноваційний PR-інструментарій в соціальних комунікаціях сучасного бізнесу : монографія / О. Тодорова – К. : Інтерконтиненталь-Україна, 2015. – 176 с.
 18. Управління розвитком діяльності промислових підприємств : монографія / Г.В. Назарова, О.В. Іванісов, О.Ф. Доровської. – Харків : Вид-во ХНЕУ, 2010. – 240 с.
 19. Фатхутдінов Р.А. Система менеджмента : уч.-практ. пособие / Р.А. Фатхутдінов. – 2-е изд. – М. : "ЗАО "Бизнес-школа "Интел-Синтез", 1997. – 352 с.
 20. Філіппова С.В. Інноваційний розвиток вітчизняних промислових підприємств: основні проблеми та тенденції / С.В. Філіппова, П.В. Воронжак // Економічні інновації : зб. наук. пр. Ін-ту проблем ринку та екон.-еколог. дослідж. НАН України. – О. : ІПРЕЕД НАН України. – Вип.60, кн. III. – 2015. – С.336-341.
 21. Хаммер М. Реінжиніринг корпорации. Манифест революції в бізнесі / Майкл Хаммер, Джеймс Чампи ; пер. с англ. Ю.Е. Корнилович. – М. : Манн, Иванов и Фербер, 2007. – 288 с.
 22. Шемаєва Л.Г. Управління якістю бізнес-процесів на підприємстві : монографія / Л.Г. Шемаєва, К.С. Безгін та ін.; Харківський нац. екон. ун-т. – Харків : Вид. ХНЕУ, 2009. – 240 с.
 23. Шульгіна Л.М. Інноваційний розвиток підприємств: формування стратегій : монографія / Л.М. Шульгіна, В.В. Юхименко; Нац. техн. ун-т України "КПІ". – К. : Uninvest PrePress, 2015. – 212 с.
 24. Armstrong M. Strategic Human Resource Management / M. Armstrong. – London, 2006. – 196 p.
 25. Gonchar O.I. Management potential of the company with regard flock business life / O.I. Gonchar // Науковий вісник Полісся. – 2016. – № 3 (7). – С.190-196.
 26. Voynarenko M. Development of information systems and modeling of their implementation in the business / M. Voynarenko, V. Dzhuliy, L. Yemchuk // Problems and Perspectives in Management. International Research Journal. – 2016. – № 3. – Vol. 14. – P. 102-107.
1. Andrushkiv, V.M., & Melnyk, L.M. (2015) Formuvannya systemy biznes-protsesiv pidpriemstva u konteksti staloho rozvytku [Formation of Business Processes System in the Context of Sustainable Development]. *Theoretical and Practical Aspects of Economics and Intellectual Property (Vols 1), Issue 2(12)*, 92-98 [in Ukrainian].
 2. Androsova, O.F., & Cherep, A.V. (2007). *Transfer tekhnologii yak instrument realizatsii innovatsiinoi diialnosti. [Technology transfer as an instrument for the realization of innovation activity]*. Kyiv: Kondor [in Ukrainian].
 3. Antonov, V.M. (2007). *Intelektualno-matematychnyi menedzhment: kiberakmeolohichna kontseptsiiia [Intellectual-mathematical management: cyber-chemistry concept]*. Kyiv: CST [in Ukrainian].
 4. Halkovych, R.S., & Nabokova, V.I. (1998). *Osnovy menedzhmenta [Fundamentals of management]*. Moscow: INFRA-M [in Russian].
 5. Hordiienko, L.Yu. (2011). *Upravlinnia orhanizatsiinymy transformatsiiamy: teoretyko-metodolohichni zasady ta upravlinskyi instrumentarii. [Management of organizational transformations: theoretical and methodological principles and managerial tools]*. Kharkiv : Vyd. KhNEU [in Ukrainian].
 6. Druker, P. (1992). *Upravlenie, natselennoe na rezultaty [The results-oriented management]*. Moscow: Prohress.

Розділ 3 Інноваційний менеджмент

[in Russian].

7. Dudar, V.T., Shumskyi, B.O., & Yazliuk, A.V. (2013). *Efektivnist innovatsiinoho rozvytku ahropromysloвого vyrobnytstva: monohrafiia* [Efficiency of innovative development of agro-industrial production]. Ternopil: Aston [in Ukrainian].

8. Bilovodska, O.A. (2010) *Ekonomichne obhruntuvannya reinzhyrnyhu biznes-protsesiv vyrobnychkh pidpryemstv* [Economic substantiation of reengineering business processes of manufacturing enterprises]. L.M. Taraniuk (Ed.). Sumy: Mriia [in Ukrainian].

9. Lishuk, V.P., Lishchuk, V.P., Polinkevych, O.M., & Ishchuk, I.P. (2015). *Stratehiia upravlinnia biznes-protsesamy mashynobudivnykh pidpryemstv cherez reinzhyrnyh ta pereproektuvannya* [Strategy of management of business processes of machine-building enterprises through reengineering and re-designing]. *Ekonomichnyi chasopys – Economic Annals*, 1-2(160), 57-61 [in Ukrainian].

10. Bilovodska, O.A. (Eds). (2012). *Mekhanizm stratehichnogo upravlinnia innovatsiinym rozvytkom* [Mechanism of Strategic Management of Innovation Development]. Sumy: Universytetska knyha [in Ukrainian].

11. Fedonin, O.S., Shvydanenko, H.O., & Lavrenenko, V.V., (2011). *Novitni tendentsii rozvytku upravlinnia pidpryemstvamy* [Recent trends in enterprise management development]. Kyiv: KNEU [in Ukrainian].

12. Orlykovskiy, M.O., & Trokoz D.I. (2014). *Novitni kontseptsii upravlinnia efektyvnistiu diialnosti suchasnykh pidpryemstv*. [Newest Concepts of Management of the Modern Enterprises Activity Efficiency]. *Efektivna ekonomika – Effective economy*, 5 [in Ukrainian].

13. Polinkevych, O.M. (2015). *Upravlinnia biznes-protsesamy v systemi innovatsiinoho rozvytku pidpryemstv* [Management of business processes in the system of innovative development of enterprises]. *Extended abstract of Doctor's thesis*. Khmelnytsky.

[in Ukrainian].

14. Ponomarenko, V.S., Minukhin, S.V., & Znakhur, S.V. (2013). *Teoriia ta praktyka modeliuvannya biznes-protsesiv* [Theory and practice of business process modeling]. Kharkiv: KhNEU [in Ukrainian].

15. Porter, M.E. (2005). *Konkurentsia* [Competition]. Moscow: "Viliams" [in Russian].

16. Rohoza, M.Ye., & Verhal, K.Yu. (2011). *Stratehichnyi innovatsiinyy rozvytok pidpryemstv: modeli ta mekhanizmy*. [Strategic innovative development of enterprises: models and mechanisms]. Poltava: RVV PUET [in Ukrainian].

17. Todorova, O.V. (2015). *Innovatsii v komunikatsiakh*. Innovatsiinyi PR-instrumentarii v sotsialnykh komunikatsiakh suchasnoho biznesu [Innovation in communications. Innovative PR-toolkit in social communications of modern business]. Kyiv: Interkontynental [in Ukrainian].

18. Nazarova, H.V., Ivanisov, O.V., & Dorovskoi, O.F. (2010). *Upravlinnia rozvytkom diialnosti promyslovykh pidpryemstv*. [Management of the development of industrial enterprises]. Kharkiv: KhNEU [in Ukrainian].

19. Fatkhutdinov, R.A. (1997). *Sistema menezhmenta* [Management system]. Moscow: "ZAO "Biznes-shkola "Intel-Sintez" [in Russian].

20. Filippova, S.V., & Voronzhak, P.V. (2015) *Innovatsiinyi rozvytok vitchyznianykh promyslovykh pidpryemstv: osnovni problemy ta tendentsii* [Innovative development of domestic industrial enterprises: main problems and trends]. *Ekonomichni innovatsii – Economic innovations*. Odessa: IPREED NAN Ukrainy [in Ukrainian].

21. Khammer, M., & Dzheims Champy (2007). *Reinzhyrnyh korporatsii. Manifest revoliutsii v biznese* [Reengineering corporation. Manifesto of the Revolution in Business]. Moscow: Mann, Ivanov I Ferber [in Russian].

22. Shemaieva, L.H., & Bezhin, K.S. (2009). *Upravlinnia yakisti biznes-protsesiv na pidpryemstvi* [Quality management of business processes at the enterprise]. Kharkiv: KhNEU [in Ukrainian].

23. Shulhina, L.M., & Yuhymenko, V.V. (2015). *Innovatsiinyi rozvytok pidpryemstv: formuvannya stratehii* [Innovative development of enterprises: formation of strategies]. Kyiv: Univest PrePress [in Ukrainian].

24. Armstrong, M. (2006) *Strategic Human Resource Management*. London.

25. Gonchar, O.I. (2016) Management potential of the company with regard flock business life. *Naukovyi visnyk Polissia – Scientific Bulletin of Polissia*, 3 (7), 190-196.

26. Voynarenko, M.P., Dzhuliy, V.M., & Yemchuk, L.V. (2016). Development of information systems and modeling of their implementation in the business. *Problems and Perspectives in Management. International Research Journal*, 3(14), 102-107.

М.П. Войнаренко, д-р екон. наук, професор, Заслужений діяч науки і техніки України, член-кореспондент НАН України, проректор з науково-педагогічної та наукової роботи, Хмельницький національний університет (м. Хмельницький, Україна);

Л.В. Джулій, канд. екон. наук, доцент, доцент кафедри обліку і аудиту, Хмельницький національний університет (м. Хмельницький, Україна);

О.М. Кузьміна, канд. техн. наук, доцент, доцент кафедри економічної кібернетики та інформаційних систем, Вінницький торговельно-економічний інститут Київського торговельно-економічного університету (м. Вінниця, Україна);

Т.В. Янчук, канд. екон. наук, доцент, доцент кафедри маркетингу, Донецький національний університет імені Василя Стуса (м. Вінниця, Україна)

Управління розвитком інноваційних бізнес-процесів за умов використання автоматизованих інформаційних систем

М.П. Войнаренко, Л.В. Джулий, О.М. Кузьміна, Т.В. Янчук. Управление развитием инновационных бизнес-процесов за умов використання автоматизованих інформаційних систем

У статті проведено аналіз розвитку науки про управління. Систематизовано етапи формування наукових шкіл та інтегрованих методів у практиці управління. Доведено актуальність процесного підходу в управлінні підприємством, який в поєднанні з функціональним забезпечує оптимальний варіант функціонування системи управління із урахуванням ступеня складності виробничо-економічних об'єктів. Розглянуто сутність процесного управління через виділення бізнес-процесів як послідовності дій, що спрямовані на досягнення кінцевого, вимірюваного і конкретного результату. Авторами дана характеристика бізнес-процесів, та охарактеризована процесна модель підприємства як бізнес-системи, у якій усі процеси спрямовуються на реалізацію стратегії розвитку та впровадження інновацій. Установлено безпосередній взаємозв'язок бізнес-системи з відповідною інноваційною бізнес-моделлю, яку обиратиме підприємство до видів бізнес-діяльності для забезпечення їх конкурентоспроможності та прибутковості на основі інновацій. Дано визначення інноваційного бізнес-процесу та виділено основні види бізнес-процесів, інноваційних бізнес-процесів, їх цільове спрямування та інформаційний зв'язок. Запропоновано науково-методичний підхід до оцінювання ефективності впровадження інформаційних технологій в інноваційний бізнес-процес.

Ключові слова: інформаційні системи, автоматизація, управління підприємством, ефективність, бізнес-процеси, інновація.

М.П. Войнаренко, д-р экон. наук, профессор, Заслуженный деятель науки и техники Украины, член-корреспондент НАН Украины, проректор по научно-педагогической и научной деятельности, Хмельницкий национальный университет (г. Хмельницкий, Украина);

Л.В. Джулий, канд. экон. наук, доцент, доцент кафедры учета и аудита, Хмельницкий национальный университет (г. Хмельницкий, Украина);

А.Н. Кузьмина, канд. техн. наук, доцент, доцент кафедры экономической кибернетики и информационных систем, Винницкий торгово-экономический институт Киевского торгово-экономического университета (г. Винница, Украина);

Т.В. Янчук, канд. экон. наук, доцент, доцент кафедры маркетинга, Донецкий национальный университет имени Василия Стуса (г. Винница, Украина)

Управление развитием инновационных бизнес-процессов с использованием автоматизированных информационных систем

В статье проведен анализ развития науки об управлении. Систематизированы этапы формирования научных школ и интегрированных методов в практике управления. Доказана актуальность процессного подхода в управлении предприятием, который в сочетании с функциональным, обеспечивает оптимальный вариант функционирования системы управления с учетом степени сложности производственно-экономических объектов. Рассмотрена сущность процессного управления через выделение бизнес-процессов как последовательности действий, направленных на достижение конечного, измеряемого и конкретного результата. Авторами дана характеристика бизнес-процессов, и представлена процессная модель предприятия как бизнес-системы, в которой все бизнес-процессы направляются на реализацию стратегии развития и внедрения инноваций. Установлено непосредственную взаимосвязь бизнес-системы с соответствующей инновационной бизнес-моделью предприятия. Дано определение инновационного бизнес-процесса, выделены основные виды бизнес-процессов, инновационных бизнес-процессов, их целевое назначение и информационная связь. Предложен научно-методический подход оценки эффективности внедрения информационных технологий в инновационный бизнес-процесс, который предусматривает поэтапный учет всех расходов и рисков.

Ключевые слова: информационные системы, автоматизация, управление предприятием, эффективность, бизнес-процессы, инновация.

Отримано 14.03.2017 р.