

O. Mukan

PhD in Economics, Associate Professor

L. Hanas

PhD in Economics, Assistant Lecturer

Y. Tsyb

Bachelor Student

Lviv Polytechnic National University

FORMATION OF CORPORATE STRATEGY BY THE ENTERPRISE ENGAGED IN FOREIGN ECONOMIC ACTIVITY

Abstract. The article proves the importance of corporate strategy formation and the significance of considering the current state of the economy by the enterprise engaged in foreign economic activity. The nature of the corporate strategy, as well as stages and principles of its creation are analyzed. Based on the analysis of domestic and foreign scientific developments, the definition of the concept “corporate strategy” is provided. The process of the corporate strategy formation is also considered. The principles of the corporate strategy formation are systematized and their short description is presented. Requirements for the corporate strategy formation are developed.

Key words: corporate strategy, enterprise, strategic directions, principles, business unit, strategic planning.

Formulation of the problem

With the development of market relations in Ukraine, domestic enterprises are increasingly faced with the problem of surviving and ensuring sustainable economic growth in the long run in a challenging, dynamic environment. An effective solution to this problem is the creation and implementation of competitive advantages which can be gained due to a well-designed, effective strategy for the organization’s development.

It should be noted that at present there are no common approaches to working out the sequence of the enterprise corporate strategy development. The practical solutions to the problems associated with the need to ensure the functioning of the enterprise not only today but also in the future, depend on the enterprise management competence in the strategy formation methodology and methods. The strategy

enables the company to solve a complex of problems related to purposeful reorientation towards manufacturing new products; expansion or reduction of the nomenclature and range of commodity products; introduction and use of more effective technologies; formation of the strategic potential necessary for the achievement of strategic goals; transformation of production and organizational business structure; development of specialization and cooperation; diversification of activities; development of marketing; improvement of the management organizational structure etc. So taking into account the above said, it can be stated that the formation of the corporate strategy has an impact on the activity and development of the enterprise in the long term.

Relevance of the chosen topic

The corporate strategy is an objective basis for finding answers to such important questions facing the enterprise as in what sphere or on what markets should a firm operate; how to ensure the most efficient allocation of limited resources; how to compete effectively and so on.

The general significance of particular problems, their insufficient scientific development, misunderstanding and ignoring the role of the corporate strategy for the enterprise, the need to analyze the existing methods of its formation, underestimation of the role of choosing the right strategy and its impact on the further development of the company justify the necessity for a thorough study of these issues, they becoming extremely relevant in the current economic environment.

Analysis of recent research and publications

The nature of the corporate strategy is dealt with in the works of foreign and domestic scientists such as Thompson A., Strickland A. J., Ansoff I., Mintzberg H., Popov S.A., Markova V. D., Kuznetsova V. A., Vasylenko V. A., Tkachenko T. I., Oberemchuk V. F. and others. Their view of the corporate strategy is as of a comprehensive management plan for a diversified company (having a set of different types of business or strategic business areas). According to A. A. Thompson and A. J. Strickland, the "corporate strategy" is when a multi-industry company approves its principles in various fields, as well as in the activities and approaches aimed at improving the company's activities". R. Kokh uses the term "corporate strategy" in two approaches: as a direction for strengthening the competitive advantages of a company and increasing its value; as the concept to characterize the activities of top management. I. Ansoff, as an adherer of the theory of strategic planning considers the corporate strategy as a complex relationship between portfolio and competitive strategies and their components [1, 2].

It should be noted that today there exist no unified approaches either to the definition of the essence of the enterprise corporate strategy or to the development of the stages of its creation. The definition of the corporate, or general strategy provided by the Economic Encyclopedia, implies that this strategy determines the general direction of enterprise activities and is formed by the enterprise top management. It performs the following three main tasks:

- to choose the main direction of the enterprise activity and its strategic business units (CBU);
- to define the specific role of each CBU and each of its subdivisions in implementing the corporate strategy;
- to determine the amount of resources and the ways of their distribution between the CBUs and other units.

In multi-business enterprises, the corporate (general) strategy is also called the portfolio strategy. The corporate strategy is closely related to the competitive (or business) strategy, which it actually determines, and the latter ensures the implementation of the former.

In one-business enterprises, these two types of strategies are united – the corporate strategy is at

the same time the competitive strategy and vice versa.

W. King believes that the company's strategy has three stages: at the first stage, the company seeks to achieve its goal by using existing products and markets, trying to preserve its existing reputation. At the second stage, the enterprise pays more attention to new markets, trying to create a more advantageous image of itself. At the third stage, the company develops new products for existing markets, trying to significantly improve its reputation.

F. Kotler determines a sequence of the strategy development stages which consists of the company's program; company's goals and objectives; business portfolio development plans; company's growth strategies.

I. Ansoff distinguishes the following ways of developing a company strategy: analysis of the prospects of the enterprise; analysis of positions in competition; choice of strategy.

V. F. Oberemchuk criticizes by W. King, F. Kotler and I. Ansoff for their division of the process of strategy formation into stages because of its insufficiency for the current stage of the market relations development.

According to V.F. Oberemchuk, the above presented stages of the enterprise strategy formation can be applied only by non-diversified enterprises (enterprises with one type of business), where such a strategy will be simultaneously a general (corporate) strategy.

In a slightly different way, S.M. Gaydaeva presents the process of forming a competitive strategy, emphasizing that the process of strategic analysis is preceded by the process of establishing the course of enterprise development and the formation of its mission and goals.

V.A. Vasylenko and T. I. Tkachenko single out seven stages of the process of strategy development: statement of the mission, statement of the goal (goals), statement of values, analysis of the environment (includes collection and interpretation of information about the external environment, internal environment and expectations of interested groups), objectives, strategic choice: a) strategies, b) analysis of options, actions.

G.V.Osovska considers an algorithm for developing and implementing an enterprise strategy, outlining the main functions and key actions: definition of the mission; definition of

goals (transformation of the mission into a set of goals; construction of a “tree of goals”); analysis of internal capabilities (products, production potential, marketing, production cost; identification of strengths and weaknesses of the enterprise, formation of its competitive advantages); analysis of the external environment (market, consumers, competitors, analysis and evaluation of the macro environment, selection of the target market and the market segment); analysis of alternatives and strategy selection (strategic segmentation and strategy portfolio formation; choice of the basic development strategy); development (or optimization) of the organizational structure (development of principles and methods of motivation; making appropriate changes in the organizational structure); implementation of the strategy (selection of people for key positions, definition of strategically important advantages, motivation, creation of the organizational culture).

Given the above, it should be noted that there is no systematic and unified understanding of the concept of “corporate strategy”, there are hardly any clear principles for building a corporate strategy as a component of the enterprise management.

Goals and objectives

The goals and objectives of the research are: to specify the nature of the concept “corporate strategy”, to identify the principles of the enterprise corporate strategy formation and to provide a brief description of each of them, as well as to determine the role of corporate strategy in the development of the enterprise.

Main material and the research results

The corporate strategy is a program of actions, which determines the main directions of the company’s development and is worked out at the highest managerial (institutional) level. To meet the needs of the consumers, the company should follow a common corporate strategy, which is an important factor in achieving success. The developed corporate strategy helps large diversified enterprises to preserve and strengthen their positions on target markets for a long time, consistently meeting the needs of consumers better than their competitors.

When formulating a strategy, it is necessary to pay attention to the systematic approach to organizing changes in the enterprise, it being the

most justifiable methodological approach in this case. In the organization model, as a system, there are present interacting components: personnel, culture, tasks, technologies, structure and strategy. Changing one of them necessarily affects at least one of the rest. Therefore, changes must be introduced simultaneously both in the technical and in the social space of the organization in order to optimize their relationship and interaction.

Principles of forming a corporate strategy that define the requirements for it, the nature and the content of the the company’s business activity have a significant role and influence on the effectiveness of the process of development and implementation of corporate strategy of an enterprise involved in foreign economic activity. Compliance with these principles can guarantee the effective operation of the enterprise, avoiding negative results when implementing the chosen strategy (Table).

Characteristic for many enterprises is a hierarchical management system that has a number of disadvantages. Thus, for example, the internal interests of individual units may conflict with corporate interests. The development of predominantly vertical ties, being characteristic for a functional approach, brings up the necessity to solve problems arising at various levels of the organization by the head of the enterprise. Operational work, in turn, prevents top management from concentrating on solving strategic tasks. And this is not the fault of the top manager, but the drawback of the organizational system used.

To be competitive, businesses need flexibility, which they often lack. The progress of production technologies and the corresponding change in the requirements to product parameters are those factors that encourage modern firms to change their design and management practices. Organizations that today are still often characterized by rigid hierarchical management systems, a high degree of professional specialization, a limited range of tasks for each employee, inflexible rules and procedures, fail to respond adequately to changes. Therefore, programs of large-scale changes in the organization often involve introduction of changes in the organizational structure. The methods of introducing changes, in which the variable is an organization structure, relate to rethinking and reorganizing the interaction scheme and the tasks of the units and / or the structure of the entire enterprise.

Principles of corporate strategy formation and their key characteristics

Principles	Characteristics
Integrity	A corporate strategy should be formed as a system
Continuity	A corporate strategy should be used constantly, avoiding time differences
Flexibility	The ability of a corporate strategy to change its focus in response to unpredictable circumstances
Accuracy	A corporate strategy should be specified and detailed
Participation	The development of a corporate strategy should involve the largest possible number of employees at different levels of management
Compliance with the market requirements	It defines both the level and the possibility of rapid adaptation of the enterprise structure, goals, objectives and directions to changes in the market environment in order to ensure its effective functioning in the long run
Switching loads and resources	It implies an effective combination of resources in the process of their utilization aimed at ensuring their even consumption and distribution of the load during operation
Balance of goals and interests	It implies developing measures of anti-crisis nature aimed at preventing the crisis, overcoming the crisis and eliminating its negative consequences. This principle involves the need to consider the interests of every enterprise participant, who ensure the functional development of enterprise foreign economic activity, to prevent the deepening of the crisis situation

Note: Formed on the basis of the analysis of literary sources

Successful implementation of complex projects and solution of complex problems can be done due to formation of additional authorities – project teams. This new organizational structure is created for a certain time period to solve a specific problem. In this case, a temporary structure is being formed for the implementation of a separate, well-defined problem, which involves the representatives of various structural units.

A flexible organizational structure implies the coexistence of the project organization parallelly with the formal organization. The rules of the project organization related to cooperation of its members, the way of making decisions and solving problems differ from those of the main organization. But at the same time, a parallel organization does not require the recruitment of new people, it is closely connected with the main organization and coexists with it.

In large projects with a large number of participants, there operate several interconnected teams. There is the main team, whose members control the work of satellite teams, and are responsible for the free exchange of information between the main team and its satellites.

Project organizations are distinguished by the fact that all channels of interaction are open and engaged. Managers and employees communicate freely, without any restrictions, without looking at the formal communication channels specified by the hierarchy of the main organization. Unlike

traditional production teams, project teams are focused on achieving specific results. They are managed less formally, including the division of powers, with the role of the leader moving from one team member to another, depending on the stage of work or the availability of team members. Their meetings, as a rule, take place in the form of free discussions aimed at solving specific problems.

Personnel in such organizations are endowed with power, that is, decision-making is transferred to individuals and teams where competent decisions on specific situations can be made at a lower level. Management at all levels is aimed at ensuring positive leadership. The project team enables collaboration of specialists from different departments of the organization.

It is always difficult to change the structure of an organization. It often happens that managers have to change the attitude towards personnel in order to move forward. The system of organization should foresee, on the one hand, high responsibility of its employees, and on the other – the opportunity for the employees to show the initiative and for the organization to properly use employees’ potential.

The work of the project team requires activity from all its members. Instead of formalized rules and procedures, centralized decision-making, narrowly directed responsibility, official relationships characteristic for a formal organizational structure, the project team is able to accumulate a

potential that is several times greater than the sum of abilities and experience of any of its members due to participative methods of collective work. The team work allows using the efforts, skills, capabilities and creative abilities of all the project participants. The team is able to grow, change and adapt to new requirements, ensuring full and high-quality compliance and implementation of the strategy.

The top management is the “architect” of the process of forming a strategy, defining its main stages and consistency. Management determines the general goals of the enterprise development and the main ways to achieve them. Management of middle and lower levels, as well as departmental specialists, develop operational plans. The duties of specialists also include analysis of the internal and external environment of the enterprise, preparation of forecasts and scenarios for the development of events. Heads of divisions and staff members work together to evaluate the alternative strategies offered to the enterprise.

Business unit strategy should be developed by operational managers in each strategic business unit. The corporate center strategy should be developed by the chairman of the board of directors, the president or several close colleagues, but the best managers of business units should affect, check and approve it.

The development of market relations in Ukraine, in particular, in capital construction, requires the search for effective ways of economic management. Quality improvement is a prerequisite for improving competitiveness of the organization. The adoption of a long-term strategy for total quality management requires enterprises to develop a new organizational philosophy aimed at creating a balanced and integrated system that can meet the needs of both domestic and foreign customers. This, in turn, makes the enterprise management change the methods of designing and doing business.

The effectiveness of enterprise management now depends on how well managers are developing and implementing a strategy. Some managers develop strong strategies, but they can not turn them into practice while others create mediocre strategies though manage to brilliantly implement them. In order for the company to achieve maximum success, managers should combine a good strategy development with its successful implementation. If the strategy gives the company advantages over its competitors, it is better to keep it confidential.

All of the foregoing suggests that while building a scheme of the enterprise operation it is desirable to take into account the project approach, which requires rethinking of the place and the role of personnel in the process of implementing the corporate strategy of the enterprise.

In the Ukrainian market environment, unlike the foreign market, strategies are predominantly formed in the short run and the choice of a strategy for the enterprise depends fundamentally on a particular situation. In fact, we can say that there are as many specific strategies as there are enterprises.

When choosing their enterprise strategy many foreign companies use the development strategies choice offered by Thompson and Strekland. The scientists proposed a matrix for choosing a strategy, depending on the dynamics of the product market growth (equivalent to the growth of the industry) and the competitive position of the enterprise.

While overcoming the crisis the enterprises should use an integrated approach. The company’s leaders are supposed to solve a number of problems in each direction to achieve sustainability during the economic instability of the market. The listed changes are the most typical for overcoming the crisis situation by the company on the background of the problems that have arisen and management should take them into account. It is also worth taking into account the most important point in the times of crisis, namely, limited human, financial, and time resources. To be able to survive during the crisis the company should use the available resources very carefully.

The organizations that have developed a strategy are always able to behave consistently and systematically in their business, in particular, in a dynamic competitive market environment as a whole, which increases their ability to achieve their goals. Thus introduction of a strategic management system in Ukraine is an objectively necessary process in business management, which increases the ability of business organizations to adequately respond to unpredictable changes and contributes to a well-founded, coordinated solution of both current and strategic problems.

The process should be based on the available foreign experience in the field of strategic management and it is necessary to ensure that it is transferred creatively to the Ukrainian enterprises with the account of specific conditions of development of the Ukrainian economy. This will help domestic enterprises establish necessary

productions and increase their efficiency. Unfortunately, the following objective and subjective obstacles hinder this process:

- uncertainty of the market environment of the transition economy;
- high costs of organizing the planning and implementation of the strategy, in particular, for market research and the implementation of strategic changes;
- lack of qualified professionals of necessary specialties;
- the reluctance of the heads of enterprises to engage in strategic management.

Conclusions and prospects for further research

Defining the principles of corporate strategy formation allows outlining all the components and elements of the company's strategy. Further research may deal with determining the principles of corporate strategy formation based on the listed components and with the account of all its elements.

References

1. Saukh I. V. *Finansovyi potentsial pidpriemstva: pryntsyipy ta osoblyvosti yoho formuvannia* / I. V. Saukh // *Biznes Inform.* – 2015. – № 1. – P. 258–262.
2. Tompson A. A. *Stratehycheskyi menedzhment. Yskusstvo razrobotky y realizatsyy stratehyi: ucheb. dlia vuzov* / A. A. Tompson; per. s anhl.; Pod red. L. H. Zaitseva, M.Y. Sokolovoi. – M.: Banky y byrzhzy, YuNYTY, 1998. – 576 s
3. *Ekonomichna entsyklopediia: U 3-kh t. – T. 1 / [redkol.: S. V. Mochernyi (vidp. red.) ta in.] – K.: Vydavnychiy tsentr "Akademiia", 2000. – 864 s.*
4. Ansoff Y. *Stratehycheskoe upravlenye* / Ansoff Y. Sokr. per. s anhl.; Nauch. red. y avt. predysl. L. Y. Evenko. – M.: *Ekonomyka*, 1989. – 519 s.
5. Oberemchuk V. F. *Stratehiia pidpriemstva: korot. kurs lektsii* / V. F. Oberemchuk; mizhrehion. akad. upr. personalom. – K., 2000. – 127 c.
6. Myntsberh H. *Stratehycheskyi protsess* / Myntsberh H., Kuynn Dzh. B., Hoshal S. // *Per. s anhl. p od red. Yu.N. Kapturevskoho.* – SPb.: Pyter, 2014. – 688 p.
7. Vasylenko V. A. *Stratehichne upravlinnia. Navchalnyi posibnyk* / V. A. Vasylenko, T. I. Tkachenko. – Kyiv, 2003. – 150 p.
8. Oberemchuk V. F. *Stratehiia pidpriemstva: korotkyi kurs lektsii* / V. F. Oberemchuk – K.: MAUP, 2000. – P. 125–126.
9. Ovsiiuk M. O. *Udoskonalennia metodiv konkurentospromozhnosti pidpriemstva v umovakh kryzy* / M. O. Ovsiiuk // *Biznes Inform* – 2011. – №6. – P. 65–67.
10. Kovtun O. I. *Stratehiia pidpriemstva: pidruchnyk* / O. I. Kovtun. – Vyd. 2-he, onovl. i dopov. – Lviv // *Novyi Svit* – 2000, 2014. – 426 p.
11. Shershynova Z. Ye. *Stratehichne upravlinnia: pidruchnyk* / Z. Ye. Shershynova. – 2-he vyd., pererob. i dop. – K.: KNEU, 2004. – 699 p.
12. Helrihel D. *Orhanizatsiina povedinka* / D. Helrihel, Dzh. V. Slokum, R. V. Vudmen – K., 2014.
13. Uskova A. V. *Orhanizatsiia ta vdoskonalennia zbutovoi diialnosti budivelnykh pidpriemstv* / A. V. Uskova // *Biznes Inform* – 2011. – № 6. – P. 67–69.
14. Honcharova S. Yu. *Formuvannia modeli upravlinnia stalym rozvytkom pidpriemstva (orhanizatsii)* / A. B. Honcharov, N. V. Ahramakova // *Biznes Inform.* – 2015. – № 1. – P. 372–377.
15. Trenev V. N. *Upravlenye chelovecheskymy resursamy pry realizatsyy proektov. Metodyka y opyt* / V. N. Trenev, M. Y. Mahura, S. V. Leontev – M., 2004.
16. Hryshchenko I. M. *Aktualni problemy ekonomiky: ekonomika ta upravlinnia pidpriemstvamy* / I. M. Hryshchenko, D. A. Makatora – K., 2014.
17. Nykyforov A. Ye. *Klasyfikatsiia innovatsiino-investytsiinykh ryzykiv u systemi pryiniattia upravlinskykh rishen* / A. Ye. Nykyforov // *Biznes Inform* – 2015. – № 1. – P. 8–14.
18. Sotnikova Yu. V. *"Ekonomika rozvytku": efektyvni upravlinnia personalom na pidpriemstvi* / Yu. V. Sotnikova – KhNEU, 2015.
19. Pylypenko A. A. *"Investytsiinyi menedzhment ta finansovi innovatsii": zbalansovana systema pokaznykiv v systemi stratehichnoho upravlinnia rozvytkom intehrovanykh struktur biznesu* / A. A. Pylypenko – K. 2010. – P. 47–55.
20. Koiuda V. O. *Upravlinski rishennia v systemi antykryzovoho upravlinnia pidpriemstvom* / V. O. Koiuda // *"Economics & Sociology"* – 2011. – № 1. – P. 85–90.
21. Kovtun O. I. *Stratehiia pidpriemstva: navch. posibnyk.* – Lviv / O. I. Kovtun – Vyd-vo Lvivskoi komertsiinoi akademii, 2004. – 336p.
22. Ivanova T. B. *Korporatyvnaia kultura i efektyvnost predpriatiya: monohrafiia* / T. B. Ivanova, E. A. Zhuravliova – M.: RUDN, 2015. – 152 s.
23. Kuzmin O. Ye. *Korporatyvne upravlinnia: posibnyk dlia studentiv* / O. Ye. Kuzmin, L. I. Chernobai, A. O. Bosak ta in. ; za red. O. Ye. Kuzmina – Nats. unt "Lvivska politekhnikha". – L. : 2004.
24. Topii I. I. *Otsiniuvannia rivnia uspishnosti realizovanykh antykryzovykh zakhodiv* / I. I. Topii // *Biznes Inform* – 2011. – № 8. – P. 160–163.
25. Khan D. *Planyrovanye y kontrol: kontseptsiia kontrolynya* / Khan D.; pod. red. y s pred. A. A. Turchaka, L. H. Holovacha, M. L. Lukashevycha. – M.: *Finansy i statystyka*, 1997. – 800 p.
26. Ryzhakova H. M. *Ekonomika maloho pidpriemnytstva: suchasna metodolohiia ta praktyka: monohrafiia* / H. M. Ryzhakova. – K. : KNEU, 2015.
27. Bondar O. A. *Metody upravlinnia pidpriemstvom v umovakh rynku (za pryntsyipom potokorozpodilu). Monohrafiia* / O. A. Bondar, V. I. Anin. – K.: *Naukovyi svit*, 2015.

PUBLIC PRIVATE PARTNERSHIP IN EXTERNAL ECONOMIC ACTIVITY: THEORETICAL ASPECTS

Abstract. The article analyzes the concept and the meaning of public private partnership. After the definitions of public private partnership were systematized, its essential characteristics were specified and its meanings in external economic activity were outlined. It made possible to improve the definition of public private partnership in external economic activity as the interaction between the state and business structures, namely Ukrainian economic entities and foreign economic entities (as well as the interaction between Ukrainian economic entities and other states), that is one of the conditions for attracting the necessary investments, increasing innovative activity of economy, developing economic and social infrastructure and solving economic and social issues, etc.

Keywords: public private partnership, external economic activity, theoretical aspects, economic development, interaction.

Formulation of the problem

The modern economy of Ukraine is under transformation and requires significant innovations in many fields, as well as in the types of economic activities. This particularly relates to the interaction between the state and business, that is the so-called public private partnership (PPP). Its essence can be considered as individual projects, which are implemented jointly by public bodies and private companies. Together they develop the system of relations between the state and business, which is widely used as a tool of economic and social development at the regional, national and international levels [7].

The PPP platform, already existing in many countries, has proven to be rather effective. Since this type of interaction between the state and economic entities has more of the character of a cooperation system, which depends on both the state and private entities, the conditions of a mixed economy involve the private sector in all the stages of economic projects implementation. Conse-

quently, PPPs effectively address topical issues related to the development of economic systems and solve major economic and social issues. It should be noted that this type of partnership can also be the basis for solving those significant problems that have now affected many countries, including Ukraine. This is a matter of reconstructing the areas affected by armed conflict.

Regarding the state's participation in the development of the PPP system, it is worth noting that there are legal conditions and acts for implementing joint projects of the state and the private sector (The Concept of PPP Development in Ukraine for 2013-2018; the Law of Ukraine "Public Private Partnership" [5]; the draft Law "Strategy for PPP Development in Ukraine", etc.). Based on them, Ukraine implements the PPP projects in the following areas: sports, heat supply, health care, transport infrastructure, housing and communal services, etc.

The PPP projects were being largely developed in 2013, when the Department of Investment and Innovation Policy and PPP Development of the Ministry of Economic Development in Ukraine was implementing 160 projects within the PPP framework. The Ministry of Economic Development constantly monitored the effectiveness of the projects implementation based on PPP terms and analyzed the legislation in this area with the purpose of their further development.

These projects provided for the cooperation between the public and private sectors under the terms of a concession (a mutually beneficial agreement, under which the state grants business with the right to use certain entity or property), lease agreements and share participations. In addition, they were implemented in the fields of production, transportation, heat and water supply,

health care and power supply, tourism, leisure, recreation, culture and sports, geological exploration and mineral production, etc.

Their distinctive feature is that the proposals for partnership come mainly from public bodies to private sector representatives. This fact is associated with the establishment and development of the institutes for civil society in Ukraine and the power of public bodies allowing private sector representatives to conduct certain types of activities within their own competence [4].

It is important to identify and take into account all the factors for PPP and either create or borrow the existing models and methods of rational and efficient implementation of the PPP projects to further develop them and promote in the context of all the types of economic activities.

Despite the interest of the state and the private sector in Ukraine in such an interaction, its existing advantages and potential are not fully realized within the national economy, especially within external economic activity. This requires that both theoretical aspects and features of PPP in external economic activity should be studied. The foregoing makes it possible to justify the relevance of the chosen subject, its theoretical and practical value both for the Ukrainian economy and the world economy.

The recent investigations and publications

During the last years, the Ukrainian and foreign researches have been considerably focused on the study of the relations between the state and the private sector and PPP. The problem of the relations between the state and business and their interaction was described and analyzed in different contexts by such scholars as A. Klymenko, V. Korolev, M. Pasichnyk, K. Pavliuk, S. Pavliuk, O. Poliakova, V. Puchkov, O. Pyroh, V. Varnavskyi et al. [1-13]. The scholars defined the concept of PPP, its features, forms and characteristics of implementation and outlined its role in the development of the national economy, social sphere, etc. The generalized definitions of the PPP concept are presented in table.

Purpose and objectives

The purpose of the article is to determine the essential features and characteristics of PPP, its peculiarities and theoretical aspects in external economic activity, to outline its direct connection with external economic activity of economic entities, which will suggest the actual definition of

PPP in external economic activity.

Main material and results of the research

The modern economic processes and transformations in Ukraine are very important, on the one hand, for Ukrainian enterprises, namely for their integration into the international system of economic relations, and, on the other hand, are required to involve foreign businessmen in cooperation within and beyond Ukraine. The importance and significance of such relations is constantly increasing for the development of certain countries and especially for Ukraine. It is equally important and positive that countries participate in various forms and types of the international cooperation, the international division of labour and PPPs. Since this type of a systemic interaction is developing and can occur not only within the borders of one country, PPPs in external economic activity should be considered.

Based on the generalization of literary sources on the problem of determining the essence of the concept under study, the following features of PPP have been outlined:

- a systemic interaction;
- a strategic importance: a strategic orientation of the PPP projects towards solving topical social problems;
- innovativity: having considered the already implemented PPP projects, it should be noted that they provided for introducing the innovative methods of activity, technologies, etc.; therefore, PPP itself can be considered as an innovative method of interaction between private structures and public bodies;
- resource constraints: at the micro level, PPPs are individual projects that require a certain level of resources for their implementation, normally on an investment basis.

In accordance with the Law of Ukraine “External Economic Activity”, external economic activity is an activity of Ukrainian and foreign economic entities built on the relations between them, which occurs both on the territory of Ukraine and abroad; one of the important conditions for economic growth and development of any country [6]. It makes it possible to develop and discover novel promising directions for the export of goods and services. Due to this activity, Ukraine can solve the shortage of energy sources, the latest technologies, equipment and machinery, certain consumer goods, etc. Under the conditions of the

Defining the concept of public private partnership

Author/Sources	Definition
The Law of Ukraine "Public Private Partnership" as of July 1, 2010 [5]	Public private partnership is a cooperation between the state of Ukraine, the Autonomous Republic of Crimea, territorial communities in the person of the relevant public bodies and local self-government bodies (state partners) and legal entities, except public and municipal enterprises, or individuals – entrepreneurs (private partners), which is carried out based on the contract in accordance with the procedure established by the Law and other legal acts and corresponds to the features of PPP.
M. Pasichnyk [8]	Public private partnership is one of the principles of the New Public Management model. This is a model of public administration, which is based on the borrowing of corporate administration methods that are applied in business and non-profit organizations. It focuses on increasing the flexibility of decision-making in the state apparatus, reducing its hierarchy, delegating the powers to a lower level of decision-making and strengthening the mechanisms for feedback between the state and citizens.
A. Klymenko, V. Korolev, V. Varnavskiy [1]	Public private partnership is a legally established form of interaction between the state and the private sector in relation to economic entities and municipal ownership, as well as the services performed and provided by public and municipal bodies, institutions and enterprises with the aim to realize socially significant projects in a wide range of economic activities.
O. Pyroh [9]	Public private partnership is an interaction between the state and business, which is one of the most important conditions for shaping an effective investment policy, enhancing innovation activity in the economy, developing economic and social infrastructure.
K. Pavliuk, S. Pavliuk [7, p. 11]	Public private partnership is a constructive cooperation between the state, private entities and civil institutions in the economic, political, social, humanitarian and other spheres of social activity with the aim to implement socially significant projects based on the priority of the interests of the state, its political support, consolidation of resources of the stakeholders, the effective distribution of the risks between them, the equality and transparency of the relations in order to ensure the progressive development of society.
O. Poliakova [10, p. 318]	Public private partnership is a social institution, which includes a set of formal and informal rules, within which the joint activities of public authorities and the private sector are implemented based on a set of alternatives of conduct in order to meet the needs of society.
V. Puchkov [11, p. 289]	Public private partnership is an institutional and organizational alliance between the state and business with the aim to implement socially significant projects in a wide range of fields of activity: from the development of strategically important industrial sectors and research activities to the provision of public services. As a rule, every such alliance is temporary since it is established for a certain period of time in order to implement a specific project and ceases to exist after its implementation.
European Commission [13]	Public private partnership is reduced to the transfer of some powers, responsibilities and risks to the private sector to implement investment projects financed by the public sector.
O. Didchenko, S. Moskalenko [3]	Public private partnership is a cooperation between public bodies and the private sector in socially important sectors. However, the leading role is played by the private sector, which not only seeks to generate profits, but also recognizes social responsibility to society.

intensified transnationalization, international integration and globalization of the world economy and the international division of labour, the importance of external economic activity is increasing annually.

External economic activity is characterized by the following features:

a) it is, by its very nature, economic activity, that is "the activity of economic entities in the field of social production aimed at producing and selling products, performing relevant actions or providing value-added services that have accurate prices" [2];

b) this activity is based on the relations between economic entities that are under the jurisdiction of different states;

c) it can be conducted within or beyond Ukraine, with or without crossing its customs border [12].

Based on the determined essence and characteristics of PPP, the analyzed definition of

external economic activity and its characterized features, it can be concluded that PPP and external economic activity are directly related. The functioning of public property can be enhanced provided that partnership relations between the state and business are developed, since this will make it possible to attract additional resources in the public sector, in particular investments. With regard to the private sector, PPP increases the level of business social responsibility and consumer loyalty and reduces the risks of entrepreneurial activities. In addition, PPP enhances the efficiency of using available investment resources. Due to PPP, entrepreneurial structures in external economic activity gain access to additional investment resources if there are no such resources within the country. Also, it increases the level of projects' innovativity, etc.

According to the obtained results, the concept of PPP in external economic activity can be defined as the interaction between the state and business structures, namely Ukrainian economic entities and foreign economic entities (as well as the interaction between Ukrainian economic entities and other states), that is one of the conditions for attracting the necessary investments, increasing innovative activity of economy, developing economic and social infrastructure and solving economic and social issues, etc.

Conclusions and prospects for further research

PPP is aimed at solving economic and social problems, transforming the Ukrainian economy and involving it in the international integration processes, etc. Despite a range of positive legislative and proactive processes, PPP is still under development. In the field of international economic relations, it provides access to additional investment resources, distributes business risks, increases the level of innovative interaction, etc.

Therefore, the current research defines PPP in external economic activity as follows: the interaction between the state and business structures, namely Ukrainian economic entities and foreign economic entities (as well as the interaction between Ukrainian economic entities and other states), that is one of the conditions for attracting the necessary investments, increasing innovative activity of economy, developing economic and social infrastructure and solving economic and social issues, etc.

References

1. Varnavskyy, V. G., Klymenko, A. V. & Korolev, V. A. (2010). *Gosudarstvenno-chastnoe partnerstvo: teoriya i praktyka* [Public-Private Partnership: Theory and Practice]. Moscow: HSE. [in Russian].
2. *Gospodarskyj kodeks Ukrainy* [Commercial Code of Ukraine]. (2003). Retrieves from: zakon2.rada.gov.ua/laws/show/436-15 [in Ukrainian].
3. Didchenko, O. I. & Moskalenko, S. A. (2012). *Derzhavno-pryvatne partnerstvo: sutnist, zakonodavstvo, zakordonnyj dosvid* [Public-Private Partnership: Essence, Legislation, Foreign Experience]. *Ekonomichnyj visnyk Zaporizkoyi derzhanoyi inzhenernoyi akademiyi* [Economic Bulletin of Zaporizhzhya State Engineering Academy]. Retrieves from: www.zgia.zp.ua/gazeta/evzdia_2_048.pdf. [in Ukrainian].
4. Dubok, I. P. (2014) *Sutnist ta osoblyvosti derzhavno-pryvatnogo partnerstva* [The essence and peculiarities of public-private partnership]. *Zbirnyk naukovykh pracz Nacionalnoyi akademiyi derzhavnogo upravlinnya pry Prezydentovi Ukrainy* [Collection of scientific works of the National Academy of Public Administration under the President of Ukraine]. Retrieves from: nbuv.gov.ua/UJRN/znpnadu_2014_2_14 [in Ukrainian].
5. *Pro derzhavno-pryvatne partnerstvo: Zakon Ukrainy* [Public-Private Partnership: Law of Ukraine]. (2010). Retrieves from: zakon0.rada.gov.ua/laws/show/2404-17. [in Ukrainian].
6. *Pro zovnishnjoekonomichnu diyalnist: Zakon Ukrainy* [External Economic Activity: Law of Ukraine]. (1991). Retrieves from: zakon3.rada.gov.ua/laws/show/959-12/. [in Ukrainian].
7. Pavlyuk, K. V. & Pavlyuk, S. M. (2010). *Sutnist i rol derzhavno-pryvatnogo partnerstva v socialno-ekonomichnomu rozvytku derzhavy* [The essence and role of public-private partnership in the socio-economic development of the state]. *Naukovi praci KNTU. Ekonomichni nauky* [Scientific works of KNTU. Economic sciences]. Retrieves from: www.nbuv.gov.ua [in Ukrainian].
8. Pasichnyk, M. V. (2009). *Mexanizmy vprovadzhennya novogo publichnogo menedzhmentu: dosvid SSHA* [Mechanisms for introducing new public management: USA experience]. *Derzhavne upravlinnya: teoriya ta praktyka* [State Administration: Theory and Practice]. Retrieves from: www.academy.gov.ua/ej/ej9/doc_pdf/Pasichnyk_MV.pdf [in Ukrainian].
9. Pyrog, O. V. (2013). *Nacionalni proekty yak instrument zaluchennya pryamykh inozemnykh investytsij* [National projects as an instrument for attracting foreign direct investment]. *Visnyk Dnipropetrovskogo universytetu. Seriya: Svitove gospodarstvo i mizhnarodni ekonomichni vidnosyny* [Bulletin of the University of Dnipropetrovsk. Series: World Economy and International Economic Relations], Vol. 5, 10 / 2 (21), p. 95-105. [in Ukrainian].
10. Polyakova, O. M. (2009). *Derzhavno-pryvatne partnerstvo v Ukraini: problemy stanovlennya* [Public-Private Partnership in Ukraine: Problems of Formation]. *Kommunalnoe khozaystvo gorodov* [Public Utilities of the Cities], 87, p. 317-322. [in Ukrainian].
11. Puchkov, V. V. (2009). *Gosudarstvenno-chastnoe partnerstvo kak forma vzaimodejstviya vlasti i byznesa* [State-private partnership as a form of interaction between government and business]. *Polzunov almanach* [Polzunov almanac], 1, p. 289-293. [in Russian].
12. Shkurupij, O. V., Goncharenko, V. V. & Artemenko, I. A. (2012). *Zovnishnjoekonomichna diyalnist pidpryjemstv* [Foreign economic activity of enterprises]. Kyiv: CUL. [in Ukrainian].
13. *Guidelines for successful public-private partnerships. European Commission Directorate General regional Policy* (2018). Retrieves from: ec.europa.eu/regional_policy/sources/docgener/guides/ppp_en.pdf [in English].

M. Bublyk

Doctor of Economic Sciences, Professor
Lviv Polytechnic National University

A. Didyk

Doctor of Economic Sciences
Member of the Accounting Chamber

MODELING OF INNOVATIVE DEVELOPMENT OF ADMINISTRATION OF OUTSOURCING ACTIVITIES OF IT-MARKET ENTERPRISES

Abstract. Outsourcing provides IT companies with a number of benefits and improves the financial and economic performance of their operations. The outsourcing market in Ukraine is developing fast, many types of outsourcing are used in various types of economic activity. Implementation of outsourcing as one of the most popular business models necessitates constant and well-coordinated cooperation with other business entities. The need for outsourcing research and modeling of its administration methods today is acute and corresponds to the directions of the latest scientific research and practical applications, which substantiates the relevance and practical feasibility of this study.

In this work scientific-methodical, normative-legal sources concerning administration of outsourcing activity are investigated, the state of administration of outsourcing activity of IT enterprises is studied and problems, which arise in the administration of outsourcing activity, are analyzed. The ways of their elimination in order to improve the economic indicators of economic activity of IT enterprises and ways of modeling of their innovation development are proposed.

Taking into account the results obtained in the work, we note the rapid innovation development of the global outsourcing market over the last decades. We consider it is expedient to model the outsourcing market in Ukraine, which develops rapidly. Since outsourcing provides numerous benefits to the company and positively affects the economic performance of its activities, this proves the feasibility of its introduction into the business activities of enterprises. Having numerous varieties, now outsourcing has been distributed in virtually all types of economic activity of enterprises.

Key words: modeling, innovation development, outsourcing, administration, IT entrepreneurship, IT-market.

The problem statement

Outsourcing provides IT companies with a number of benefits and improves the financial and economic performance of their operations. Over the past decades, the concept of an outsourcing market has emerged within the national economies of the states, which are responsible for the modern globalization processes of the development of national economies, where the international division of labor is intensified every year, and the specialization of countries or individual regions and companies is formed in individual business processes. The outsourcing market in Ukraine is developing fast, many types of outsourcing are used in various types of economic activity. In order to ensure their viability companies try to optimize their activities by reducing the functions performed. Implementation of outsourcing as one of the most popular business models necessitates constant and well-coordinated cooperation with other business entities. The need for outsourcing research and modeling of its administration methods today is acute and corresponds to the directions of the latest scientific research and practical applications, which substantiates the relevance and practical feasibility of this study.

An analysis of recent research and publications

The following domestic and foreign scholars worked on the study of outsourcing activities in terms of its implementation, preferences and evaluation: Abolhasan F. [1], Bublyk M. I.[2], Grebeshkova O. M. [3], Heywood J. B. [4], Ilien-

ko O. V., [5], Matviy I. E. [6], Moroz N. K. [5], Prokopenko A.C. [7], Stelmakh O. Yu. [3], Tsarenko O.V. [7], Zavodovska I. I. [8], Zorii O.M. [9] and others. However, the issue of modeling the innovative development of outsourcing in Ukraine and the problems of its practical application at enterprises need further research.

Previously unsettled problem constituent

At the same time, today the implementation of outsourcing operations modeling is still an unresolved issue, their mechanism involves interaction with the external environment and aimed at the effective functioning and development of both enterprises and the entire national (even global) economy.

Purpose and objectives

In order to find ways of modeling the innovative development of the administration processes of outsourcing activity of IT enterprises, various outsourcing problems and ways of improving its administration by IT enterprises were investigated. The tasks in achieving this goal were as follows: 1) to analyze scientific and methodical sources on the issues of administration of outsourcing activities; 2) study existing Ukrainian and international legislative and regulatory frameworks regarding the features of outsourcing activities; 3) analyze possible alternatives to improve the administration of outsourcing activities of IT enterprises; 4) to propose ways of modeling the innovative development of administration of outsourcing activity to substantiate expediency of implementation of the developed measures in the practice of IT enterprises.

The main material of the research and the results obtained

The decision on the necessity of introducing outsourcing processes into the economic activity of the enterprise is accompanied by the choice of the type of cooperation and the model of its implementation. Usually, enterprises develop their own forms and models of implementation of outsourcing. Tsarenko O.V. and Prokopenko A.C. [7] investigated the problems of outsourcing development at Ukrainian enterprises, substantiated approaches to outsourcing efficiency that take into account the risk reduction method and the creation of recovery processes by modeling the optimal structure of business construction. Zorie O.M. con-

siders in [9] approaches to the definition of the concept of "outsourcing", the main of which are: functional-oriented, cooperative, managerial and instrumental. Among the types of outsourcing the main are IT outsourcing, business projects outsourcing, manufacturing outsourcing and outsourcing in the service sector.

In work [6] Matviy I. Ye. considers ways of developing IT outsourcing (outsourcing of information technologies) in Ukraine, where a company that is a specialist in a certain type of business gets full or partial functions related to the processing of information, application of information technologies, among which: 1) service (maintenance of network infrastructure, support and maintenance of open web servers, servicing of automated business systems with the subsequent constant development and support, etc.); 2) design and planning of corporate database placement on the servers of specialized companies; 3) general management of information systems; 4) offshore programming, etc.

The prerequisites and prospects for the development of modern business on the basis of outsourcing, according to Zavodovska I. I. in [8], are: 1) the dynamism of business conduct in circumstances where it is necessary to respond quickly to changes in business (increase of market share, acquisition of a certain share of business participation or, conversely, stock sale, etc.); 2) operational attraction of additional resources (material, labor, financial, etc.) for the implementation and development of IT projects; 3) the need to improve the quality of providing universal services and standardize them by creating a single technical support service for all departments of the company; 4) the dismissal of highly skilled senior management personnel to perform complex tasks in strategic planning, corporate governance by engaging external outsourcing companies in the operational tasks; 5) lack of appropriate qualification level for own employees to perform special technical knowledge by hiring employees from a company specializing in the relevant services; 6) inappropriate involvement of a specialist on a full-time basis to perform certain non-key functions; 7) the need for improvement and standardization of work in the management of large processes; 8) the need to make an optimal managerial decision to achieve objectivity by engaging an impartial consultant.

However, there are problems of outsourcing development at enterprises, which, according to the authors of works [1-9], are as follows: 1) loss of control over own resources and a certain part of production; 2) decrease of productivity of own workers; 3) increase of expenses in the transfer of secondary functions; 4) decrease in the quality of goods and services; 5) the risk of leakage of commercial information of the enterprise; 6) an undeveloped culture of interaction between the enterprise and the outsourcer; 7) training other people's specialists instead of their; 8) lack of experience of communication with outsourcing companies; 9) a small number of outsourcing companies.

The evaluation of regulatory legal framework [10, 11] of outsourcing activities in Ukraine and in the world indicates that Ukraine has no relevant legislative and regulatory document regulating such activities. The world legal framework is more developed, where among the legal documents of the leading world organizations for 2016 [12-14] the Directive EU was adopted, which legislatively defined the concept of international outsourcing as a model for business, according to which the company transfers its separate functions or business processes to a foreign organization under a long-term contract. The specificity of international industrial outsourcing (which is predominantly based on long-term cooperation agreements) points to the boundary between international outsourcing and international supply of goods under subcontracting. In case of outsourcing, all risks associated with the project are borne by the seller, and subcontract risks are shared between the outsourcer and the buyer.

In regulatory documents adopted in Ukraine in 2017, it was determined that the entity of outsourcing activity is an agent (intermediary) [10], and outsourcing should be considered "transfer of functions of inspections the availability and condition of property on a contractual basis to another organization of any form of ownership"[11]. The main laws affecting the activities of all types of enterprises in Ukraine, regardless of ownership, are the Economic Code of Ukraine, where the legal, economic and social provisions of their activities are formed, and the Tax Code in which the principles of taxation of economic entities activities in Ukraine are determined.

A characteristic feature of the global economy is the rapid growth of competition, where the winners in this struggle are only those companies with the implementation of the most effective models of business organization. In an increasingly open national economy, one of the most modern and successful business models is outsourcing. Outsourcing business model involves certain functions of the internal divisions of the company (accounting, legal services, marketing research, maintenance of the internal information network, processing of incoming information, public relations, etc.) to transfer to other service organizations that are highly specialized in these services.

Based on the specifics of IT business, IT enterprises have many years of outsourcing experience. On the IT market, companies with decades of experience in the development and maintenance of business information systems, and about 500 successful projects in 18 countries of the world, act as an IT outsourcer, that is, a specialized company that meets the needs of outsourcing other IT services. IT outsourcing in IT enterprises includes: 1) the deployment of corporate databases on their own servers and servers of specialized companies; 2) services for servicing the network infrastructure of enterprises and organizations; 3) services for full or partial servicing of web servers; 4) design and planning of automated business systems with the further constant development and support; 5) services in full or partial management of information systems of enterprises; 6) services on creation and maintenance of open web servers; 7) offshore programming; 8) IT consulting and so on.

The results of the analysis of outsourcing activities of IT enterprises [14] in the first half of 2017-2018 are presented in Table. 1, with the largest share of offshore programming services (1st half of 2017 – 31,50 %; I half-year 2018 – 34,50 % of the total amount of outsourced services provided) and IT consulting (1st half of 2017 – 28,10 %; and the first half of 2018 – 31,20 %). The latter allows you to get the most out of the information system (increase its manageability, transparency and profitability) for each customer-enterprise outsourcing services by reducing the cost of its maintenance.

Table 1

Analysis of outsourcing activities of IT enterprises in the first half of 2017-2018.

№	Indicators	Years		Deviation	
		the I half-year of 2017	the I half-year of 2018	absolute	%
1.	Total amount of outsourced services provided, ths. UAH	14 824,20	16 696,87	1 872,67	113 %
2.	Share of services for placing corporate databases on external servers, %	5,64 %	3,20 %	-2,4 %	57 %
3.	Share of network infrastructure services, %	21,70 %	15,80 %	-5,9 %	73 %
4.	Share of IT consulting, %	28,10 %	31,20 %	3,1 %	111 %
5.	Share of offshore programming, %	31,50 %	34,50 %	3,0 %	110 %
6.	Share of services for maintenance of open web servers, %	7,72 %	8,70 %	1,0 %	113 %
7.	Share of IP management services, %	4,10 %	3,80 %	-0,3 %	93 %
8.	The share of outsourcing personnel (outstaffing), %	1,20 %	2,80 %	1,6 %	233 %

Note: compiled by authors

Table 2

List of documents required for placing an agreement with the organization-customer of IT outsourcing services

№	Title of the document	Resident	Non-resident
1.	Constituent documents (charter of the enterprise)	+	+
2.	Certificate of state registration of a legal entity	+	+
3.	Excerpt from the Unified State Register	+	-
4.	Exit from a commercial, bank or court registry	-	+
5.	Order (protocol) on the election of the head of a legal entity	+	+
6.	Power of Attorney issued to a legal entity representative	+	+
7.	Documents certifying the position of a person	+	+
8.	Presence of a seal of a legal entity	+	+
9.	Certificate of translation of documents into Ukrainian language	-	+
10.	Legalization of documents by the authorities of the Ministry of Foreign Affairs of Ukraine	-	+

Note: compiled by authors

Table 3

Analysis of indicators of outsourcing activity administration of IT-enterprises for the first half of 2017-2018 years

№	Administrative Indicators	The I half-year	
		2017	2018
1.	Total amount of outsourced services provided, ths. UAH	14 824,20	16 696,87
2.	Share of outsourcing services, %	77,50 %	79,90 %
3.	Average annual number of employees, os.	129	143
4.	Outstaffing share, %	1,20 %	2,80 %
5.	Share of employees employed in outsourcing, %	27,50 %	1326,65
6.	Total number of valid outsourcing deals, units.	72	81
7.	Total NDA transactions, units	37	46

Note: compiled by authors

Indicators of administration of outsourcing activity of IT enterprises are presented in the table. 3.

Preferably, IT companies provide a range of consulting services in the field of information technology (IT consulting), which include audit, analysis and optimization of business processes; selection, implementation and service support of software solutions; training of the personnel of enterprises-customers of outsourcing services by creating a unified, well-built IT infrastructure at the customer.

The total amount of IT consulting services provided in the first six months of 2017 amounted to 4 165.6 thousand UAH, and in the first half of 2018 – 5 209.4 thousand UAH.

In tabl. 2 it is shown the list of documents necessary for the conclusion of an agreement with the organization-customer of outsourcing services.

An additional service when concluding an agreement on outsourcing services is the conclusion of the NDA-agreement (confidentiality agreement). Such confidentiality agreements are designed to protect participants in outsourcing agreements from disclosure of information important to each party, so the term NDA agreements is defined in the main agreement or continues to be in force in the new framework agreement on outsourcing cooperation. An NDA-one-way agreement is concluded when the transfer of information goes one-way, it is mostly taken by the outstaffing of employees. A two-way NDA agreement is accepted when there is a risk to lose confidential information for both parties. The main purpose of the NDA-agreement is to blame the offender for the violation of confidentiality and oblige it to compensate the injured party for damage.

In the case of publicity, the contract serves as a legal basis for a claim to the court for the recovery of damages. Another important feature of the NDA is that the parties undertake not to disclose the confidential information they received in the context of business relations. This does not in any way relate to information available from publicly available sources.

Consequently, the administration system and the overall document flow of IT outsourcing processes are at an appropriate level, with most employees having entered into an NDA. In the first half of 2018, the share of outstaffing (2.8 %) is growing more than twice, and the number of NDA agreements, compared to the corresponding period in 2017, has not increased significantly, which causes the risks of disclosure of confidential information and claims to the court for damages compensations.

During the economic activities of IT-enterprises the rate awareness of management personnel plays an important role, meaning provision formalized relevant information required in certain time. Systems used in IT companies are aimed at solving the basic problem of quality awareness, which is to meet the information needs of each user, regardless of a rate or a management level.

The effective formalization of useful information in IT companies based on the order workflow, built on the principles of efficient workflow organization and routes of the documents flow taking into account the industry specific features of IT companies.

Depending on the size of the organization, its industry features, the list and structure of the relevant services are formed. Management of IT enterprises is characterized by a multi-level state of administration of major business processes. In the state of IT enterprises there are separate administrative positions available: secretary-referent of the director, IT projects office manager, business assistant in the sale department, staff manager, clerk, technical operator of the technology department, personal assistant to the chief designer, head of the secretariat, etc. However, there are no separate services for IT enterprises.

The service is a separate independent structural unit, which is directly subordinate to the head of the enterprise. Under the condition of a small volume of document flow, the performance of service functions of a particular direction is (on the basis of a regulatory document) on one of the employees of the enterprise. The need for the development of regulations on structural units is provided by part two of Article 64 of the Commercial Code of Ukraine, according to which the functions, rights and responsibilities of structural units are determined by the provisions on them, which are approved in accordance with the procedure established by the statute or other constituent documents of the economic entity activities. The system of administrative management of IT enterprises is aimed at solving management problems and staff motivating, the two main of which are: organization of the workplace and the formation of an effective system of personnel motivation.

Let's investigate the trends of administration development in IT enterprises during 2014–2017 (table 4).

Simulation of the development of the administrative management system of IT enterprises allows to obtain concrete economic results: increase of labor productivity, decrease of time losses during implementation of projects, which will have a positive effect on reduction of full cost of services.

Investigation of trends of administration development in IT enterprises during 2014-2017

Indicators of development of administration	Value by years			
	2014	2015	2016	2017
Type of structure of the administrative management system	+	+	+	+
Type of planning and budgeting system	+	+	+	+
Number of structural divisions	12	12	13	13
Number of provisions for divisions	6	8	12	13
Number of job descriptions	27	32	36	48
Presence of staffing schedule	-	+	+	+
Route maps of workflow	-	-	+	+
The number of sample documents from each document flow procedure	2	5	7	19
Availability of unified tariff system	-	+	+	+
Availability of a unified result system	-	+	+	+
Availability of a unified system of employee participation in profits	-	+	+	+
Availability of a system of economical production	-	-	+	+
Availability of resource administration system	-	-	-	+
Number of quality management system certificates (ISO 9000)	1	1	2	5
Availability of electronic document circulation	-	-	+	+

Note: compiled by authors

Since the main tasks of IT business documents are: efficiency of document circulation; one-time residence of documents in the divisions of the enterprise; direction of communication of documents to employees for whom information is most relevant and useful; exact correspondence to the IT business operation scheme..

The modeling of a rational system of outsourcing management that could take into account the specificity and dynamics of the control object, the interconnection of elements within the system, determines the influence of the external environment on the functioning of the IT enterprise system [15-16].

Consequently, the system of document management of IT enterprises should be organized so that the benefits of information support received from managerial decisions exceed the costs of formalizing information. Efficiency, economy and reliability of the operation of the IT document management system are provided by the following elements of the mechanism of administrative activity.

1. Direct and operational flow of documents, where the route of the document is selected on the principle of one-time stay of the document in one structural unit, and various documents processing operations are executed in parallel or from one executor.

2. The presence of a document in an instance is conditioned by the necessity of its processing and corresponds to the organization and labor technology of the worker.

3. The movement of documents is justified and excludes feedback.

4. Processes of processing and order of passing are the same.

Since IT companies are mostly outsourced and work in the field of high intellectual class software development by providing IT consulting and offshore programming, in the process of innovative development of outsourcing administration, the following problems can occur:

1. Growth of volumes of outsourcing activity.

The growth of outsourcing IT projects and their number results in an increase in administrative work on agreements about outsourcing both external and internal, an increase in document flow through the regular collection of project performance reports to monitor this process, the growth in the number of concluded NDA agreements both with hired workers, and with customers of outsourcing services. This necessitates the organization of a separate structural unit – outsourcing services, where employees will be responsible for the implementation of internal and external outsourcing processes, administering document flows due to outsourcing activities.

Therefore, among the recommended measures to solve this problem, it may be the creation of an outsourcing service or sharing responsibility for the outsourcing administration process between the IT project managers and the HR department manager.

2. The next issue is the lack of a provision on the departmental unit and job descriptions of the outsourcing service inspectors, the route chart of the document flow, document samples in the document flow system from each outsourcing administration procedure, a unified system of employee participation in revenues (profits) from outsourcing activities at IT enterprises, etc.

The recommended measures to address this problem include the formation of the regulations on the structural unit and the approval of the job descriptions of the outsourcing inspectors, the development of a route map of the flow of documents, the approval of document samples in the document flow system for each outsourcing administration procedure that can be relied on the commercial director, Chief of the Legal Department and Chief of the HR Department, developing a provision on a unified system of employee participation in revenues (profits) from outsourcing of activities can be relied on the chief accountant and others.

3. Significant material losses in recovering damages caused by the consequences of failure to comply with the NDA.

Among the consequences of the breach of NDA-agreements can be: the harm from disclosure of confidential information (for example, an employee simply forgot to delete the file and he got someone that information surfaced and there are damages, direct or indirect damages inflicted by the publication of confidential information and damage to the goodwill, which is considered as indirect damage. The severity of the consequences is determined by the court, and the fact of non-fulfillment of the clause of the contract is established only by a court decision, which may oblige IT companies to reimburse the losses incurred. An alternative to a court may be a voluntary agreement with the owner of information, which rarely ends without material damage for the offender.

Consequently, there are alternatives for improving outsourcing administration of IT-companies: a separate service outsourcing creation, and concentration of all document flow on employees of the service or the distribution of powers and responsibilities between the heads of IT projects,

commercial director, heads of HR-department, legal department and chief accountant.

Conclusions, which sum up the work and prospects for further research in this direction

Taking into account the results obtained in the work, we note the rapid innovation development of the global outsourcing market over the last decades. We consider it is expedient to model the outsourcing market in Ukraine, which develops rapidly. Since outsourcing provides numerous benefits to the company and positively affects the economic performance of its activities, this proves the feasibility of its introduction into the business activities of enterprises. Having numerous varieties, now outsourcing has been distributed in virtually all types of economic activity of enterprises.

In the work, a detailed review of scientific and methodological literature and regulatory support for the administration of outsourcing activities in the last 2018 was made. Having analyzed the information received about the state and trends of changes in the indicators of economic activity, it was found that one of the main tasks of any society is to master the most up-to-date scientific and technological achievements, widespread use of universal intellectual property through the creation and development of information networks, provision on this new social progress in establishing moral constraints on the dangerous consequences of scientific and technological progress. The paper analyzes the main factors influencing the development of the processes of administration of the outsourcing activity of the enterprise, including the administration system and the overall document flow for outsourcing processes, with the majority of employees concluded NDA agreements. The system of document management of IT enterprises is organized in such a way that the benefits of the received information support of managerial decisions exceed the costs of formalizing information. Efficiency, economy and reliability of operation of the IT management system for document management ensure solutions to these problems.

The modeling of a rational system of outsourcing management that could take into account the specificity and dynamics of the control object, the interconnection of elements within the system, determines the influence of the external environment on the functioning of the IT enterprise system.

There are alternatives to improving the management of IT outsourcing activities: creating a separate outsourcing service and concentrating the

entire document flow on the employees of this service, or sharing powers and responsibilities between IT project managers, commercial director, heads of HR department, legal department and chief accountant. At the current stage of development of the Ukrainian economy, ensuring the effective functioning of IT enterprises requires continuous improvement of the administering processes of its activities and processes of optimal use of production potential, processes for responding to changes in the external environment.

References

1. Abolhasan, F. (2017) *Kundenzufriedenheit im IT-Outsourcing – Das Optimum realisieren*. Retrieved from <http://www.funkschau.de/telekommunikation/artikel/110293>.
2. Bublyk, M. I., Khimiyak, M. M., & Liber, M. V. (2009) *Benchmarking yak sposib oderzhannia konkurentnykh perevah [Benchmarking as a way of obtaining competitive advantages]* *Naukovyi visnyk Natsionalnoho lisotekhnichnoho universytetu Ukrainy [Scientific Bulletin of the National Forestry University of Ukraine]*, 19.5, 136 – 139. [in Ukrainian].
3. Grebeshkova, O. M., & Stelmakh O. Yu. (2011). *The formation of IT outsourcing in Ukraine: review through the prism of world practice. Formuvannja rynkovoji ekonomiky [Formation of a market economy]*, 25, 305–313. [in Ukrainian].
4. Heywood, J. B. (2002). *Autsorsynh: v poyskakh konkurentnykh preymushchestv [Outsourcing: in search of competitive advantages]*. (Trans.). M.: Izd. William House [in Russian].
5. Iliencko O. V., & Moroz N. K. (2014). *Market analysis IT-outsorsinga in Ukraine (on the example of cloud technology)*. Retrieved from: http://www.ej.kherson.ua/journal/economic_09/159.pdf. [in Ukrainian].
6. Matviy I. Ye. (2013). *Features of development of IT-outsourcing in Ukraine*. Retrieved from: http://irbis-nbuv.gov.ua/cgi-bin/irbis_nbuv/cgiirbis_64.exe/VNULPP_2013_754_28.pdf. [in Ukrainian].
7. Tsarenko O. V., & Prokopenko A. S. (2016) *Outsourcing as a tool for optimizing business processes of the enterprise* *Naukovi visti Dalivskoho universytetu [Scientific News of the University of Dahlia]*, 4, 152 – 157. [in Ukrainian]
8. Zavodska, I. I. (2016) *Prerequisites and prospects of the modern business development on outsourcing basis [Peredumovy ta perspektyvy rozvytku suchasnogo biznesu na osnovi outsorsingu]*. *Kultura narodov Prichernomoria [Culture of the peoples of the Black Sea]*, 80, 43-45. [in Ukrainian]
9. Zorii, O. M., & Kovalenko, T. V. (2016). *Features of outsourcing using*. *Ekonomichnyy analiz [Economic analysis]*, 14, 3, 18-28 [in Ukrainian].
10. *On information №2938-VI, code of the act 82725/2016* (2016).
11. *On Approval of the Regulations on the Management of the Risks Related to the Provision of State Guarantees and the Distribution of Such Risks between the State, Creditors and Borrowers, №663-2016-p* (2016).
12. *Directive (EU) 2016/48 of the European Parliament and of the Council on the launching and implementation of outsourcing activities* (2016)
13. *World Trade Report* (2016) Retrieved from <http://www.unctad.org>
14. *Outsourcing Institute Publications* (2016) Retrieved from <http://www.outsourcing.com>
15. Bublyk, M., Koval, V., & Redkva, O. (2017) *Analysis impact of the structural competition preconditions for ensuring economic security of the machine building complex. Marketynh i menedzhment innovatsii [Marketing and Management of Innovations]*, 4, 229–240.
16. Bublyk, M. I., Duliaba, N. I., Petryshyn, N. Ya., & Drymalovska K. V. (2018) *Analizuvannia rozvytku navchalno-naukovoji diialnosti zakladiv vyshchoi osvity [Analysis of development of educational and scientific activity of higher education establishments]*. *Ekonomichnyy analiz [Economic Analysis]*, 28, 1, 30-39. – ISSN 1993-0259.

UDC 657.42

T. Shepel

PhD in Economics, Associate Professor
Lviv Polytechnic National University

J. Narkiewicz

PhD, Associate Professor
Maria Curie-Skłodowska University (Poland)

ECONOMIC AND METHODOLOGICAL BASIS OF BIOLOGICAL ASSETS MEASUREMENT UNDER CONDITIONS OF ACCOUNTING TRANSFORMATION TOWARDS IFRS

Abstract. Under current conditions of economic management, application of IFRS, especially IFRS 41 “Agricultural sector”, is one of primary elements of ensuring successful and long-term performance for domestic agricultural enterprises as well as their mutual understanding with foreign contracting parties. Current methods of assessing biological assets and agricultural goods based on fair value of biological assets require follow-up revision, making certain adjustments to the measurement model that, in turn, will guarantee exchange equivalence between independent parties on active market.

Fundamental changes being introduced into current practice of agricultural activity accounting by Accounting Statement (Standard) 30 include allocation of plants and animals that belong to agricultural activity objects into a separate accounting category (“biological assets”), measurement of biological assets and agricultural goods based on fair value, special procedure of determining financial results.

Most often fair value of agricultural goods cannot be determined with sufficient degree of confidence. The studies have found that on account of biotransformation, measurement of biological assets based on fair value will be much different from measurement based on historic prime cost. Theoretic and methodological approaches as well as practical guidelines for biological assets and agricultural goods measurement based on fair value have been suggested, which makes it possible to measure the outcomes of agricultural activity of economic entities more objectively, extends their opportunities in terms of attracting investments and improving competitiveness on agrarian markets.

Key words: agricultural activity, IAS 41 “Agriculture”, Accounting Statement (Standard) 30 “Biological assets”, biotransformation, agricultural goods.

Topicality of the selected subject

In 2014 our country signed association agreement with the European Union, according to which we should implement into our legislation a range of demands aimed to improve investment climate and cooperation conditions with European partners. Among them there is increase in transparency of agricultural enterprises activity by means of legislative improvements regarding accounting, financial reporting and auditing. Introduction of amendments to the Law of Ukraine “On accounting and financial reporting” is just the first step on the way to harmonization with corresponding EU Directives and Regulations. In order to achieve the goal in view it is necessary to take more active steps in the field of accounting modernization in line with generally accepted principles and IFRS procedures. Accounting is the main informational background for management, and it should provide interested parties with true and complete information on enterprise activity. Accounting may be improved by means of adjusting it to international requirements defined within international financial reporting standards. Agriculture is considered to be one of the main investment-attractive industries in Ukraine. IFRS (IAS) 41 “Agriculture” ensures regulation of accounting process of transactions involving agricultural activity and biological assets of the institution. In this regard, practical application of regulations of IFRS 41 “Agriculture” is gaining particular significance for agricultural enterprises. It is necessary to highlight the importance of measurement principle of biological assets based on fair value, which was introduced by IFRS 41.

Recent research and publications analysis

Issues of research and development of measures for introducing IFRS into accounting practices are being studied by the following scholars: V. M. Zhuk, L. M. Kindratska, H. H. Kireitsev, O. O. Konturov, V. Y. Lisinf, L. I. Maksymov, V. B. Mossakovskiy and other.

Scholars choose different ways to reveal conceptual foundations and requirements concerning accounting records maintenance and preparation of financial reporting, systematizing ideas of western and domestic researchers, making references to legislative acts.

Purpose and objectives of research

The purpose of the article is to develop theoretic and methodological approaches and practical guidelines for biological assets measurement.

Presentation of basic material of the research and obtained results

IFRS (IAS) 41 establishes accounting procedure, financial reporting and disclosure of information on agricultural activity [1]. According to this standard, agricultural activity is management of biotransformation of plants and animals for the purpose of selling, receiving agricultural goods or producing additional biological assets.

Consequently, there is a need to clarify the term “biotransformation”. In our opinion, these are processes of growth, degeneration, production and reproduction that cause qualitative or quantitative changes of biological asset. Biotransformation leads to changes of asset in form of its amount or quality increase or decrease. Additional assets, such as leguminous crops in plant growing and milk in

animal breeding, may appear as a result of reproduction (Fig. 1).

On the basis of general conceptual framework, each agricultural enterprise may determine, within its accounting policy, clearly defined procedure of accounting management, measurement of biological assets and outcomes of their biotransformation, in accordance with the following underlying principles:

- principle of identification, which means that plants (agricultural crops) and animals used in agricultural activity are defined as biological assets in accounting system of economic entities;
- controllability concept, which means that the enterprise controls biological assets and outcomes of their biotransformation in the course of production and commercial activities;
- principle of initial and subsequent recognition – the point of initial and subsequent recognition of biological assets at fair value with the deduction of anticipated selling expenses;
- principle of value (money) measurement, which means that biological assets and agricultural goods in accounting are estimated at fair value with the deduction of anticipated selling expenses;
- principle of multiple information use, which means that accounting information on biological assets and outcomes of their biotransformation is used by the economic entity within the system of biological resources management (to prepare a special form of reporting (statement) on potential profit, expenses and financial results of agricultural activity) and in the analysis of property and financial conditions, credit worthiness etc.;

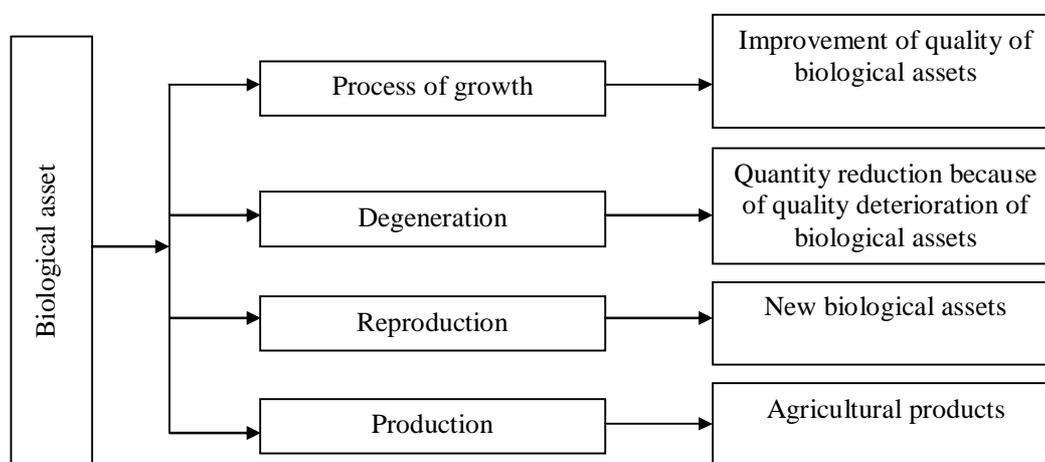


Fig. 1. Subject matter and outcome of biotransformation

– registration principle – all transactions connected with recognition, measurement of biological assets and presentation of their biotransformation outcomes should be recorded by means of preparing relevant basic documents and registers of analytical and synthetic accounting;

– principle of tracking, measuring and presenting results of biotransformation of biological assets, which means that economic entity should periodically control and measure qualitative and quantitative changes of biological assets and outcomes of their biotransformation (profit, expenditures, financial results) and at the same time disclose them in accounting registers;

– periodicity principle, which means that fair value measurement of biological assets for the purpose of their disclosure in accounting should be carried out for every accounting date.

Measurement of changes of biological assets is the key element of biological transformation. It comprises measurement and control over the changes of quality (fat or proteins content, fiber durability, etc.) and quantity (animal yield, weight, length, etc.).

According to current IFRS (IAS) 41 requirements, all biological assets should be recognized at fair value with the deduction of selling expenses (p. 12 of IFRS (IAS) 41). This requirement is based on the fact that the best value estimation of biological assets in the course of biotransformation is their fair value. It should be noted that the standard defines the above mentioned process as the total of processes of growth, degeneration, production and procreation that lead to qualitative and quantitative changes in biological asset (p. 5 IFRS (IAS) 41).

With the introduction of Accounting Statement (Standard) 30 “Biological assets” biological assets in crop production and animal production form a component of resource potential of agricultural enterprises. Biological assets that provide economic benefit for more than 12 months are classified as long-term assets [2]. Assets that provide economic benefit during operating cycle are classified as current assets. According to p. 52-53 of IFRS 41 “Agriculture”, biological assets can be divided into consumable and yielding, and according to p. 54 they can be divided into mature and immature. Consumable assets are those that after achieving certain parameters can be used for their intended purpose (meat breed livestock; meat

on hoof; market bird; fish in artificial lakes; forest cultivated for logging; autumn sown cereals from ripening till harvesting). Yielding assets are those that ensure production on a regular basis (dairy breeding – small and large cattle, egg laying stock, fruit trees and bushes, vineyards).

In our opinion, there is also a category of agricultural assets – derivative of biological ones. According to IFRS 41, they are classified as agricultural goods as of the time of their gathering (carcass meat, raw milk, grain, eggs, wool and other products of plant or animal origin that can not be industrially processed) [3].

It should be pointed out that material supplies of agricultural designation (account 208) are not mentioned in the international standard probably because such material supplies are also agricultural products. If they are not obtained within own household and are purchased from third parties, then IFRS 41 is not applicable to them. In such cases, IFRS 2 “Share-based payment” [4] should be followed.

The notion of biological assets and their derivatives according to Accounting Statement (Standard) 30 and Instructions № 291 [5] fully conforms the notions set out in IFRS 41, though here they are classified not so clearly as in the National Chart of Accounts.

According to information on initial recognition and measurement of biological assets, it should be noted that while Accounting Statement (Standard) 30 specifies that measurement of assets purchased from third parties should be carried out in accordance with Accounting Statement (Standard) 7 “Fixed assets”, IFRS 41 does not contain explicit references that assets in such occasions should be assessed in accordance with IFRS 16 “Fixed assets”.

It is necessary to note that the point of initial recognition of biological assets at fair value in accounting is the following: the date when the economic entity started measuring current biological assets at fair value; date of receipt (acquisition) of assets from third parties; date of receipt (reproduction) and start of raising/cultivating additional biological assets directly within agricultural enterprise.

The point of further recognition of biological assets at fair value within accounting system of economic entity is the date of their revaluation as a result of biotransformation (increase, degeneration) at the beginning of every accounting period.

Biological assets in plant growing should be recognized apart from agricultural land.

Besides, it is necessary to point out the valuation problem of non-market agricultural products that are used in production process as production stock.

We are of the opinion that their fair value (for which the market is neglected), especially as far as feeding stuff (hay, straw, herbage, etc.) of own production and by-products are concerned, should be determined on the basis of their business and economic utility. Animals are assessed at fair value with the deduction of anticipated selling expenses. Fair value of livestock is established based upon market value of animals of the same age, breed and genetic makeup.

The international financial reporting standard 41 (IAS) "Agriculture" foresees the impossibility to carry out reliable estimation of fair value: in the time of initial recognition of biological asset has no information (and can not receive it) on relevant market prices and rates, and alternative fair value measurements are not reliable. If that is the case, biological asset is measured at cost with the deduction of accumulated amortization and asset impairment loss. This regulation refers only to initial recognition of biological asset. With the advent of possibility to measure biological asset fair value with sufficient degree of reliability, the company should switch over towards measurement according to fair value with the deduction of anticipated selling expenses [6-8].

In case of acquisition of biological assets from third parties and at the moment of such acquisition their initial valuation should be carried out in accordance with IAS 16 on the ground of the fact that IAS 41 does not mention operations of biological assets acquisition from third parties. However, it is not like that.

It is clearly stated in IAS 16 that this standard is not applicable to biological assets so their initial valuation should not be carried out according to IAS 16 [9]. Consequently, this means that biological assets from the very moment of their emergence, whether it is animal yield or acquisition from third parties, should always be measured at fair value with the deduction of anticipated expenses at the place of potential sales. And only with the exception (p. 30 IAS 41) – at historical cost (id est in accordance with IAS 16) provided that this asset will be measured at fair value.

As the analysis of international financial reporting standards shows, issues of accounting items valuation are also regulated by IFRS 13 "Fair value measurement". Let us examine fundamental regulations of this standard concerning measurement of biological assets at fair value. Fair value is a price that would be received to sell an asset at measurement date in an orderly transaction between market participants, what is called the exit price [10].

The following factors should be taken into consideration in the course of fair value measurement:

1) principal market – measurement is carried out with hypothetical transaction handled on the principal market. Principal market is the market with the greatest volume of transactions for biological asset measurement. Besides, the standard specifies that principal market is the market on which the entity usually makes selling transactions of certain type of assets. In the absence of a principal market, the most advantageous market for the asset is used. In other words, this is a market that maximizes the amount that would be received to sell the asset. As of the measurement date the entity should have access to the principal or the most advantageous market;

2) asset characteristic – measurement is carried out with due account for qualitative properties and location of accounting item. This factor directly refers to biological assets since the price directly depends on physical properties. Similarly, such characteristic as location of biological asset or agricultural products has an influence on measurement. Despite the fact that within the frame of IFRS 13 costs of transactions are not included into fair value measurement, shipping costs are not classified as costs of transactions. As a consequence, fair value is corrected as expense amount incurred during asset transportation to the principal market;

3) fair value, even if the economic entity intends to use the asset in a different way;

4) measurement techniques – it is necessary to apply procedures that are viable and relevant under existing conditions and for which there is enough output information. In the course of fair value measurement it is recommended to use market-based approach. In addition to it, the standard foresees application of cost and income approaches.

Thus, measurement of biological assets should be realized from the standpoint of all market

participants, and market environment determination should be entrusted to economic entities. This will allow taking into account differences between them since they differ in kinds of production and commercial activities.

In accordance with IFRS 13 inputs used for measurement are divided into three levels: 1) quoted prices (not adjusted) in active markets for identical assets that the entity can access at the measurement date. Active markets exist with regard to such agricultural products as grain, oil seeds, etc; 2) inputs other than quoted market prices included within Level 1 that are observable for the asset either directly or indirectly. For instance, prices disclosed in marketing researches of information agencies, State Statistics Service of Ukraine, Ministry of Agrarian Policy and Food of Ukraine; 3) relative indices of assets under review. They include rates developed by the entity itself. Thus, the cost of cattle herd bred for consumption is determined on the ground of beef price taking into account quality and finish of animals. For more efficient measurement of meat price it is meaningful to apply rates calculated on the basis of herd classification according to qualitative characteristics (for example, finish). For farm animals that will be used for further breeding, other design ratios are applied (on the basis of their external characteristic features).

Biological assets at the moment of their initial recognition and as of each accounting date should be valued at fair value less anticipated selling costs except where fair value can not be determined with a sufficient degree of reliability (Fig. 2).

According to IFRS 41, fair value is defined as current market price less anticipated expenses at

the point of future sale, except when fair value of the asset can not be measured reliably (p. 21 of IFRS 41). Expenses, anticipated at the point of sale include: commission fees for brokers and dealers; trading exchange fees; taxes and duties on sales transactions. Transportation expenses and other types of expenses associated with delivery of assets to the point of sale do not belong to such expenses (p. 23 of IFRS 41) (Fig. 2).

As shown in the research results, in the absence of active market for fair value measurement, information from other accessible sources is used: last selling transaction price of similar products; market prices of similar assets; basic branch prices for other products which can be calculation basis for fair value measurement of the given asset [11].

Scholars believe that in the absence of market prices and other cost indicators of biological asset that is in a particular state at the moment, current value of net cash flow that the asset is expected to generate is employed [12]. In certain cases it can not be determined, particularly: at the point of initial costing characterizing the process of unfinished production (sowing and maintenance of autumn sown cereal in autumn period), etc. Fair value of gathered agricultural products is reported in the course of income and financial results determination over a period when such products were obtained. This procedure fully conforms to product recovery by means of its separation from biological asset or while producing grain or oil bearing crops with a short biotransformation cycle (within several months of a calendar year).

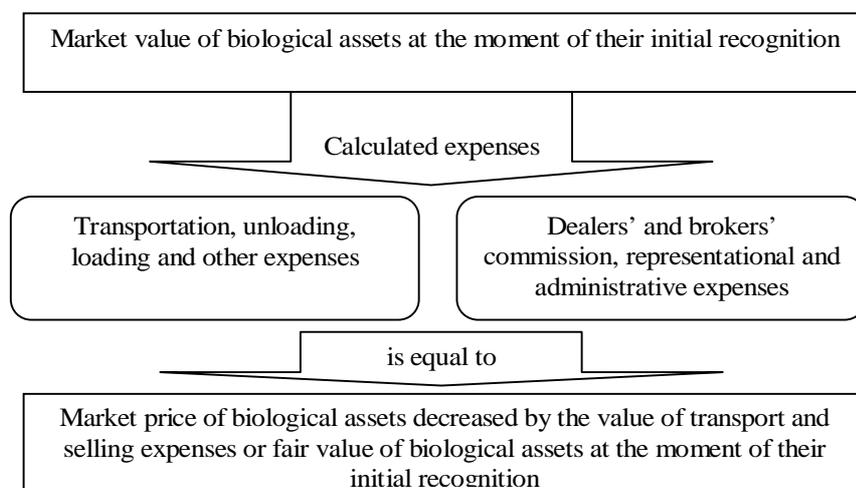


Fig. 2. Formation of fair value of biological assets at the moment of their initial recognition

We consider that if fair value can not be determined with a sufficient degree of reliability, biological assets are measured at net cost exclusive of depreciation and impairment loss. As soon as biological assets are measured at their fair value, accrual of depreciation ceases.

However, in practical terms, there is no market for certain types of biological assets, and the nature of possible consumption and usage of such assets differs. As a result, certain difficulties emerged in the course of recognition of such biological assets at fair value.

Besides, such biological assets as fruit bearing perennial plants after achieving their fruiting stage no longer perform notable biological transformation.

Scholars claim that in relation to such biological assets valuation according to fair value is not completely correct because the nature of their usage in production process is similar to production equipment [13].

In all cases, according to IFRS 41, a change in fair value of biological asset should be considered while determining the financial results over a period when this change takes place, less the expected selling expenses. Thus, an economic entity should follow the specified procedure till the moment of its disposal.

It is necessary to point out that increase or decrease in their measurement value is recorded only if there is a change in fair value of biological assets.

The research has shown the lack of unified principles and rules for accounting of biological assets at fair value. Basically, researchers refer to the regulations of IFRS 41 "Agriculture" [13]. Particular nature of accounting system legacy and management system restrains transition to international financial reporting standards. Hence, there is a need to formulate adaptation measures for the requirements of IFRS 41 "Agriculture" ultimately on the principles of fair value measurement of biological assets [14].

In the course of investigation the following principles have been specified: 1) availability of active market in compliance with the following demands: homogeneity of transaction objects on the market, accessibility of information on prices ensuring formation of market model of perfectly competitive agricultural products; 2) objectivity and reliability of prices stipulating absence of

monopolistic market segments and elimination of a large amount of intermediaries on the way from producer to the market; 3) accessibility of information on prices, which calls for the creation of data system in Ukraine that will provide authentic and available information on prices from a perspective of geographically restricted areas of active market; 4) availability of reliable reference information and economic planning information that takes into account peculiarities and techniques of farm production giving the opportunity for comparison of biological assets and outcomes of their biotransformation; 5) simplicity of algorithm and procedures of fair value measurement that supplies practical work of accountants with the simplest algorithms and methodological approaches using reliable and available information; 6) high professional level of agricultural enterprise accountants related to the introduction of new category of biological assets presupposes relevant organization of their synthetical and analytical accounting on separate inventory records that disclose relevant information on existence, flow and biotransformation of biological assets according to certain types; 7) selecting accounting policy for accounting of biological assets and outcomes of their biotransformation at fair value depending on current tasks of economic entity regarding one of three variants of information use: a) to prepare only profit and loss statement; b) to prepare accounting balance sheet as well as profit and loss statement; c) to manage enterprise biological resources. In accordance with the selected variant of accounting policy, enterprise should form relevant composition of annual, interim, and current accounting information. 8) securing unbiased measurement of economic performance of agrarian business parties that requires relevant organization of synthetical and analytical cost accounting as well as yielding capacity accounting, formation of financial results of agricultural activities.

In the course of investigation it has been established that the process of accounting and valuation of biological assets at fair price involves the following stages:

1. Determination of biological assets as an object of accounting according to their classification. The aim of this stage is to single out biological assets and business transactions that have organizational and economic independence

and are subject to money valuation at certain points of their life cycle: formation, usage, sale and liquidation that facilitates determination of real money equivalent of fair value of biological assets results over a definite period and till certain accounting date.

2. Specification of biological assets according to culture, breed and other distinguishing features. Diversity of conditions and output of agricultural products associated with peculiarities and specific issues of the sector require separating biological assets and outcomes of their biotransformation into separate groups of biological assets and results of their biotransformation taking into consideration both natural and biological peculiarities and economic utility.

3. Investigation of active market; collection of information about prices as well as technical and economic information. It may be conceived that active market for marketable agricultural products has been formed. Several market outlets should be examined here, and a focus on existing sales markets should be made because prices vary widely depending on the country, sales region, processors, etc. For non-market types of production we should use technical and economic features that influence production quality or the content of separate elements with price/money value on the market.

4. Selection of valuation technique for biological assets. This stage is the most important. Prices and financial results of economic activity of the agrarian market entity will basically depend on valuation technique.

5. Fair value measurement. In accordance with IFRS 41 "Agriculture", costs associated with transportation, storage and other selling procedures should be taken into account in the course of fair value measurement.

6. Fair value measurement of biological assets in accordance with the approved procedure. At this stage fair value of biological assets is determined for accounting reporting purposes with a view to make managerial decisions regarding enhancement of agricultural production efficiency.

7. Disclosure of biological assets in the bookkeeping records at fair value makes it possible to obtain the most reliable and exhaustive information on activity of agricultural organizations. We believe that application of suggested methodological approaches will ensure determination of real measurement of biological assets, especially in plant growing industry.

Conclusion

Thus, under current conditions, application of IFRS, especially IFRS 41 "Agriculture", is one of key elements providing opportunities for successful and long-term performance of national agricultural enterprises with foreign contracting parties

IFRS makes a synthesis of agriculture peculiarities in the unique characteristics of agricultural activity as management of biotransformation of biological assets.

The best conditions for fair value measurement are created by the existence of active market where: regular transactions with homogeneous biological assets are carried out; seller and buyer ready to make a transaction can be found at any time; all interested parties have access to pricing information. Lack of active market complicates fair value measurement, and this is the reason why certain alternative procedures for fair value measurement may be applied (in particular, the following value alternatives may be used alongside with market value as fair value: intracompany inflation-adjusted transfer price; entity profitability; replacement cost; equilibrium price; cost of acquisition; selling cost; actual or standard cost taking into account inflation rate; discounted value, and other).

Application of fair value necessitates relevant transformations of such notions as "incomings", "expenses" and "financial results" within which it is necessary to single out earning capacity, expenses, profit and loss updated by means of using the specified valuation.

We are of the opinion that in the course of biological assets measurement it is always assumed that fair value of biological asset can be reliably measured. In order to simplify the process of fair value measurement of biological assets and agricultural products, it is worth grouping them according to age, quality and other key features.

We consider that simultaneous application of several indicators for fair value measurement may be a cause of different values of biological asset or agricultural production fair value. Agrarian business entity is obliged to examine reasons for inconsistent calculations and choose the most reliable fair value measurement.

Fair value should reflect changeability of money flows that are taken into account during price negotiation by independent, aware and interested in such transaction buyers and sellers.

Lack of unified approach is caused by the fact that the majority of assets have no market value and their fair value, calculated by experts, is relative and valid only as of the measurement date. But, nevertheless, fair value is necessary for prospective investors and irreplaceable for financial assets.

Therefore, methods of measuring biological assets and agricultural products at fair value of biological assets need to be improved, and adjustments should be introduced into measurement models, ensuring equivalence of exchange between independent parties on active market.

Measurement of biological assets and agricultural production at fair value makes it possible to measure outcomes of agricultural activity of economic entities in an unbiased manner. This increases their opportunities concerning investment generation and competitive growth on agrarian markets.

References

1. MSFO (IAS) 41 "Selskoe khoziaistvo" [Elektronnyi resurs] // Elektronnye dannye. – URL: <http://base.garant.ru/70108111/> [IAS 41 "Agriculture"] [Electronic resource] // Electronic data. – URL: <http://base.garant.ru/70108111/> (reference date 15.03.2017).
2. Mizhnarodnyi standart bukhhalterskoho obliku 41 "Biologichni aktyvy" [Elektronnyi resurs]. – Rezhym dostupu: <http://www.minfin.gov.ua/file/link/320311/file/IAS%2041.pdf> International [Accounting Standard 41 "Biological Assets"] [Electronic Resource]. – Mode of access: <http://www.minfin.gov.ua/file/link/320311/file/IAS%2041.pdf>
3. Kokorev N. Otsenka byolohicheskikh aktyvov [Evaluation of biological assets / NA Kokorev // Accounting in agriculture. – 2008. – No. 8. – P. 71.
4. International Financial Reporting Standard 2 "Sharebased Payment" [Electronic resource]. – Mode of access to the resource: <http://eifrs.ifrs.org/eifrs/bnstandards/en/2015/ifrs02.pdf>.
5. Metodychni rekomendatsii z bukhhalterskoho obliku biologichnykh aktyviv i silskohospodarskoi produktsii za rynkovoii (spravedlyvoii) vartistii // Oblik i audyt. – № 1. – 2008. – S. 5–22. [Methodological recommendations for the accounting of biological assets and agricultural products at market (fair) value // Accounting and audit. – No. 1. – 2008. – P. 5–22.
6. Mossakovskiy V. B. Stan ta perspektyvy rozvytku bukhhalterskoho obliku v Ukraini: [monografiia] / V. B. Mossakovskiy. – K. : Interpres LTD, 2009. – 326 s. [Mossakovskiy V. B. Status and prospects of accounting development in Ukraine: [monograph] / VB Mossakovskiy – K.: Interpress LTD, 2009. – 326 p.
7. Diakiv V. V. Upravlinskyi oblik v Ukraini – realii sohodennia / V. V. Diakiv // Ekonomika APK. – 2010. – №8. – S. 76–80. Dyakov V. V. Management Accounting in Ukraine – Realities of Today / V. V. Diakov // Economy of agroindustrial complex. – 2010. – No. 8. – P. 76–80.
8. Brazilii N. M. Kontseptualni pidkhody do vartisnoho vymyruvannia v systemi bukhhalterskoho obliku / N. M. Brazilii // Visnyk universytetu bankivskoi spravy Natsionalnoho banku Ukrainy. – 2013. – № 3 (18). – S. 235–238. [Brazilii N. M. Conceptual approaches to cost measurement in the accounting system / N.M. Brasil // Bulletin of the University of Banking of the National Bank of Ukraine. – 2013. – No. 3 (18). – P. 235-238.
9. MSFO (IAS) 16 "Osnovnye sredstva" [Elektronnyi resurs] – Rezhym dostupa: <http://www.ippnou.ru/article.php?idarticle=002712>. – Data dostupa: 29.04.2015. [IAS 16 "Fixed Assets" [Electronic Resource] – Access Mode: <http://www.ippnou.ru/article.php?idarticle=002712>. – Date of Access: Apr 29, 2014
10. MSFZ (IFRS) 13 "Otsinka spravedlyvoi vartosti" [Elektronnyi resurs]. – Rezhym dostupu: http://www.minfin.gov.ua/control/publish/article/main?art_id=92410&cat_id=92408. [IFRS 13 "Fair Valuation" [Electronic Resource]. – Access mode: http://www.minfin.gov.ua/control/publish/article/main?art_id=92410&cat_id=92408.
11. Hrynychshyn Ya. Perevahy i problemy zastosuvannia spravedlyvoi vartosti dlia otsinky biologichnykh aktyviv // Visnyk Lvivskoho NAU: ekonomika APK.- №19 (1).-2012.-S.381-385 [Grinchyshyn Ya. Benefits and problems of applying fair value for the estimation of biological assets // Visnyk of Lvivskii NAU: Economy of agroindustrial complex. – № 19 (1). – 2012. – S. 381–385
12. Koriahin M. V. Otsiniuvannia vartosti pidpriemstva v systemi bukhhalterskoho obliku : monografiia / M. V. Koriahin. – Lviv : TOV "NVP "Interservis". – 2012. – 262 s. [Koryagin MV Estimation of the value of the enterprise in the accounting system: monograph / M. V. Korjagin – Lviv: LLC "NVP" Interservice ". – 2012. – 262 p.
13. Piatov M. L. Pryznanye byoaktyvov v otchetnosti selskokhoziaistvennykh orhanyzatsyi / M. L. Piatov // Bukhchet v selskom khoziaistve. – 2009. – № 9. – S. 10. [Pyatov ML Recognition of bioactive substances in the reporting of agricultural organizations / M. L. Pyatov // Accounting in agriculture. – 2009. – No. 9. – P. 10.
14. Kuzmowych P. Poniattia biologichnykh aktyviv ta yikh klasyfikatsiia: oblik i finansy APK // P. M. Kuzmowych. – 2010. – № 4. – S. 32–37. [Kuzmowych P.M. The notion of biological assets and their classification: Accounting and Finance APK // P. M. Kuzmovich – 2010. – No. 4. – P. 32-37.

EVALUATION OF ECONOMIC EFFICIENCY AND DIRECTIONS OF IMPROVEMENT OF INFORMATION PROVISION OF INNOVATIVE PROJECTS

Abstract. The process of information provision of innovative projects is complex, since it requires the application of certain skills of a methodological and technical nature. The design and implementation of innovative projects begins with the collection and processing of information about the external environment and internal processes. Using at this information systems raises the effectiveness of their implementation. However, permanent improvements will result in the successful implementation of innovative projects.

Key words: information, information provision, innovative projects.

Problem statement

Efficiently constructed information provision of innovative projects increases the success of managerial decisions, contributes to achieving the goals and objectives of innovative projects, reducing routine work etc. Formation and use of information provision of innovative projects is a complex process, however, it needs to be continuously improved. This will lead to the successful implementation of innovation projects and innovation activity in general.

The essence of improving of information provision of innovative projects can be the creation of new or modernization of existing systems of information provision of innovative projects. It needs to be done systematically in order to ensure the proper level of information quality.

Analysis of recent research and publications

Research questions of the formation and use of information provision was provided by such scholars as: J. Akerlof, R. Barkley, I. Bosak, L. Walras, N. Georgiadi, C. J. Arrow, V. Evdokimov, M. Yermoshenko, I. Korneev, R. Neumann,

V. Ogienko, E. Paliga, M. Spence, J. Stiglitz, J. Tyrol, F. Hayek, S. Chistyakov, M. Chumachenko, N. Shpak, A. Shanthret and others. Despite the considerable attention of scientists to the study of innovation projects and the necessary information with this, the question of evaluation economic efficiency and possible directions of improvement of informational provision of innovative projects remain insufficiently studied and need further research.

The aim of this research

Improve the approach to evaluating efficiency and identify possible ways to improve information provision in the process of design and implementation of innovative projects.

Material presentation

For effective functioning system of information provision must be integral, with the automation of the processes of collecting, processing, storing and transmitting information. However, for today exist low disadvantages in the process of informational provision of innovative projects:

– absence the only information space where was in all information on innovation activity and which would provide access to national information resources and exchange of information with the world;

– unsatisfactory material and technical and software (lack of software development, insufficient use of modern computer equipment, funds protection, technical capabilities, channels of information transmission, computer technology, insufficient attention to organizational and methodological support). The databases used do not

meet the needs of users and do not take into account the specifics of the process of design and implementation of innovative projects. This indicates that it does not take into account such a factor as the possibility of adapting the information provision;

- insufficient personnel support. The low level of computer education in the staff leads to a shortage of skilled staff, which slows down the process of informatization;

- duplication and multiple processing of the same information at different managerial levels;

- lack of real and proper information interaction between stakeholders (significant costs time to receive an answer to a request, resulting in a reduction in the speed of action in extreme situations).

In the process of introducing and using information provision for design and implementation of innovative projects, there may be difficulties. In tabl. 1 discusses the main ones and provides directions for overcoming them.

Existing problems of information provision have a negative impact on the process of design and implementation innovative projects. After all on this process can affect both the surplus and the lack of information that is needed for the effective implementation of innovative projects.

At the initial stage of the implementation of the information provision, it is necessary to develop a system of indicators that would provide an immediate response to the deviations or

violations that arise in the process of informational provision for design and implementation of innovation project and would enable the adjustment of certain indicators in accordance with the objective of the project.

As a result of the analysis of literary sources as well as the practice of machine building enterprises, in order to assess the level of information provision of innovative projects, it is recommended to use an integrated indicator of information provision for innovative projects that comprehensively characterizes the availability of necessary information at each stage of the life cycle of an innovation project and is determined as a result of the evaluation of level of information provision stage of design, implementation and completion of innovation projects with regard to their validity and criterion time.

To enter the time criterion it is advisable to differentiate the stage of design, implementation and completion. For a clear separation it is advisable to take into account the tasks of each stage of the life cycle. The design phase begins with the development of the strategy of the new product and lasts until the moment of business analysis, the implementation phase – from the formation of the brand product to commercialization, at the end of the serial production of the product begins the phase of completion of the main task is to complete the production of the product and the closure of contracts.

Table 1

Basic difficulties in implementation systems information provision in the process of design and implementation of innovative projects and directions for overcoming them

Difficulties in introducing information provision	Directions of overcoming difficulties when implementing information provision.
Level of training for the implementer	It is necessary to involve qualified specialists who are interested in implementation of information provision.
Insufficient funding	Increase the budget for financing information provision, holding a tender for it's implementation or having a financial strategy.
Low skilled personnel	Teaching the staff for advanced training, as employees are not used to using new computer technologies.
Lack of well-articulated tasks	Availability in the participants clear objectives and requirements for information provision.
Informality business processes	Carrying out reengineering business processes prior to implementation.

Note: systematized by the author on the basis of analysis [2]

Integral indicator the level of information provision of innovation projects we suggest to determine by the formula:

$$I_{ZIP}(t) = \sqrt[3]{P1(\Delta t)^1 \times P2(\Delta t)^2 \times P3(\Delta t)^3} \quad (1)$$

where, P1 – indicator of the level of information provision of the stage of development of innovation project, points; Δt_1 – duration of the development stage, days; P2 – indicator of the level of information provision of the stage of implementation of innovation project, points; Δt_2 – duration of the implementation stage, days; P3 – indicator of the level of information provision of the stage of completion of innovation project, points; Δt_3 – duration of the completion stage, days.

In turn, the level of information provision of the corresponding stage (P_n) is calculated by the formula:

$$\Pi_n = \sum ZO_n = \sum (V_{kp.} \times O), \quad (2)$$

where, ZO_n – weight criterion use of a particular type of information at each stage of the life cycle of an innovation project; O – assessment of the use of a particular type of information at each stage of the life cycle of the innovation project, points.

Indicator the level of information provision for each stage of the life cycle of the innovation project (stage of design, stage of implementation and stage of completion) is defined as the sum of the weighted estimation of the use of each type of information at a particular stage, in turn, the weighted estimate is calculated as product weight of the criterion and assessments use of information.

The calculation of the integral indicator of the level of information provision of innovation projects was carried out at the following machine-building enterprises, such as: SP LLC “Sferos-Electron”; PJSC “Lviv Electrolumines Factory “Iskra”, OJSC “Pasautoprom”.

To determine the weight of each criterion was used method of expert assessments. Experts acted managers of all levels involved in the process of implementing an innovation project of investigated enterprises.

Total in the study took part 80 people. Poll was conducted to determine the weight of the criterion for each stage of the life cycle of the innovation project. Before of respondents were asked to determine the importance of using a specific type of information at the stage of design, implementation and completion of innovation project.

Rating was exhibited in points: 0 points – information is not used; 0,5 points – information is partially used; 1 point – information is used in full.

Scale evaluation integral indicator of the level of information provision of innovation project:

– 0 – 0,25 – low level of information provision of innovation project, points;

– 0,26 – 0,5 – average level of information provision of the innovation project, points;

– 0,51 – 0,75 – high level of information provision of innovation project, points;

– 0,76 – 1 – very high level of informational provision of innovation project, points.

Definition of numerical gradation values of the scale done by assigning valid numbers with the preservation of the given relation.

Evaluation the level of information provision of innovation project at SP LLC “Sferos-Electron”, PJSC “Lviv Electrolumines Factory “Iskra”, OJSC “Pasautoprom” are shown in the table 2.

According to received results, the high level of information provision of innovation project is observed at SP LLC “Sferos-Electron” (0,55 points) because of the average level of information provision of the stage of design of innovation project (0,45 points) and high levels of implementation phase and completion of the innovation project, 0,55 points and 0,7 points, respectively. On PJSC “Lviv Electrolumines Factory “Iskra” – the average level of information provision of innovation project (0,41 points) due to the low level of information provision at the stage of design of innovation project (0,25 points). At OJSC “Pasautoprom”, the average level of information provision of innovation project (0,27 points) is also observed due to the average level of information provision for the stages of design and implementation of the innovation project and the low level of completion.

Using such a system of evaluation allows you to identify “problem areas” and take the necessary measures to improve the information provision of innovation project. The essence of improving the information provision of innovative projects can be to create new or upgrade existing systems. Him must be carried out systematically in order to ensure an adequate level of quality. The improvement of information provision system should be based on new information technologies, means of computer and communication technology, which in turn will allow to increase the productivity of the participants of the implementation of the innovation project, optimize the use of resources and costs, accelerate workflow, accelerate problem solving, etc. After all a prerequisite for the effective implementation of innovative

projects are: implementation a set of activities for the creation systems information provision, access to it for interested persons, monitoring of the quality of information provided to users;

implementation necessary measures of information security;

increase qualification and retraining of the participants of implementation of innovation project;

increasing the level of information provision of each participant in the implementation of innovation project;

development of general information infrastructure.

Therefore, focusing on improving the effectiveness of information provision, it is necessary:

create an information base which will contain legislative and regulatory acts on innovation activity, specialized periodicals and other informational materials;

use this system where it is automated functions search, collection, processing, storage of information with using computer hardware and special software;

form the system of informational provision of innovative projects taking into account interna-

tional experience to solve problems that arise in the process of project implementation with the use of modern information technologies;

create information and communication technologies and networks for access to information resources for participants of innovative projects.

Experts acted the manager of all levels of such machine-building enterprises: SP LLC "Sferos-Electron", PJSC "Lviv Electrolumines Factory "Iskra", OJSC "Pasautoprom". Total in the study took part 50 experts. Before respondents was put the task of choice the west improvement that they think is most effective. The results of the survey are summarized in table 3.

The largest share among respondents (48 %) believe that the most effective measure for improving information provision of innovative projects is the creation of a single information space. The only information space is to create a set of databases, information and communication systems and networks that operate in accordance with the general rules and principles, ensuring the exchange of information between citizens, organizations, while meeting the information needs of users.

Table 2

Results of calculation of integral index of level of information provision of innovative projects at machine-building enterprises

Enterprises	Value indicators			
	P1	P2	P3	I _{ZIP}
SP LLC "Sferos-Electron"	0,45	0,55	0,7	0,55
PJSC "Lviv Electrolumines Factory "Iskra"	0,25	0,5	0,59	0,41
OJSC "Pasautoprom"	0,29	0,43	0,15	0,27

Note: calculated by the author on the basis of data enterprises

Table 3

Possible measures to improve the information provision of innovative projects at machine-building enterprises

Measures to improve the information provision of innovative projects	Recognized the event as expedient (%)
Creation of a single information space	48
Setting up of information communications in the process of implementation of innovative projects	29
Increase the level of software	10
Implementation of document management system	6
Implementation of an automated internal reporting system	5
Introduction systems of balanced indicators	2

Note: compiled by the authors

For debugging information communications in the process of implementing innovative projects gave their voice 29 % of experts. In this case, the communication system is a direct (from the implementer of the innovation project to participants) and feedback (from the participants to implementer of innovation project). One of the possible options for improving the information provision of innovative projects at the enterprises of the machine-building industry is set-up such connections, which will improve information communications and ensure compliance basic requirements both for information and for information provision.

The smallest share of the proposed measures were:

increase equal software (10 %);

implementation of document management system (6 %);

introduction of automated systems compilation of internal reporting (5 %);

the introduction of a balanced indicator system (2 %).

Under the software understand a set of programs for the processing of information and software documents that are required for the operation of these programs. Implementation of such a system will allow to reduce the lack of necessary skills and knowledge of personnel in working with documents, ensure comparability of indicators of the reporting period with the past and the adequacy of information provision, etc. With the help of an automated financial reporting system, the implementer and the participants of the innovation project can obtain the necessary information on the economic activity of the company, which will be organized and received at the right time. Such a system will increase the level of awareness of participants at any given time. The system of balanced indicators is based on the indicators of financial and non-financial nature, their calculation and analysis, and the provision of practical recommendations for improving the results of a particular indicator taking into account the sectoral peculiarities of the machine-building industry.

Taking into account the views of the authors [1; 3; 4; 5; 6; 7; 8; 9] and on the basis of the survey conducted it can be argued that the main ways of improving information provision of innovative projects for machine-building enterprises are:

establishment of an effective exchange of innovative information at the interstate level;

creation of mechanisms for realization of the right of access to interested persons to the necessary information;

adaptability and the possibility of development system of information provision of innovative projects;

automation of information provision of innovative projects should cover all stages of it's life cycle;

only rules in the information base for the collection, processing, storage, use and transfer of information;

introduction of the latest computer information technologies;

use of powerful and efficient computer networks;

application of the system of electronic document management (automation of the document circulation process), which will ensure the automated movement of documents and constant control over the passage of documents, has a significant impact on reducing the timing of preparation and decision-making;

combination of different forms presentation of information what provide users with up-to-date and complete information and provide them with the opportunity to view, copy, or print the necessary information sources;

increasing the manageability of the information provision of innovative projects at the expense of speed information flows, reduction of mistakes when making managerial decisions at the expense of use actual and timely information;

the use of special means of protection and information security.

It is important to note that one of the ways to improve information provision both in innovation activities in general and in innovation projects in particular is creation of a single information space, which will enable to significantly increase the degree of interaction of remote offices, affiliates, representative offices. Integrated and stored corporate information is in the system, not in the head of employees. When a worker is released or transferred to another unit, his knowledge related to the processing of information is stored in the database and can be used by other employees who came to their place. Combining knowledge of employees in such a corporate system gives a synergistic effect, which can lead to high results. Information entered at any level should be accessible to all users of the information system, should to be executed the principle one-time introduction. When creating a national information space important is his interaction with the world.

The effectiveness of the formation and use of information provision for innovation projects

depends on its interaction with the information provision system in the information market, existing and potential information resources, state information provision and information space. Therefore, the important point is the formation of an adequate information infrastructure of machine-building enterprises and interaction with the market players. Under the informational space should be understood the information base necessary for making managerial decisions, analysis, control and regulation of financial and economic activity of an industrial enterprise [4]. Such a system should provide for the exchange of information at all levels of government. Example, in our country there is no single center that collects and analyzes information from enterprises that carry out innovative activities. No less an important point is the interaction of the information provision system with the Internet, support for the Web-interface, integration with other external systems, such as: "Client-Bank", electronic document flow, automated design, management of technological processes, etc. Such interaction will reduce the time spent on implementation user queries. For this purpose the formation and use of information provision system should be based on the use of software tools, information and communication technologies, network infrastructure, etc.

Effective formation and use of information provision for design and implementation of innovative projects can lead to a shorter time for office workers working with documents (contracts, accounts, overhead, letters, etc.) due to reduced time on routine processing of documents. By conducted by estimated the total average time spent by office workers on unproductive processing of documents is more than 60 %. At the same time, some of the workers spend almost all their working time on these operations [3, p.45].

Conclusions

For evaluation the level of information provision of innovation project it is proposed to carry out the calculation of the integral indicator of the level of information provision of innovative projects, which enables to formulate a clear conclusion for the adoption of objective managerial decisions, to take into account the interests of all stakeholders, identify "problem areas" and the risks inherent in the stages of the life cycle of innovation project and participants in the implementation of the innovation project. Improving the information provision of innovative projects will not only save time for participants, but also increase the efficiency of their work and

accuracy of information, reduce risk and reduce uncertainty. As a result of the research carried out at the machine-building enterprises (SP LLC "Sferos-Electron", PJSC "Lviv Electrolumines Factory "Iskra", OJSC "Pasautoprom") with identification of possible measures to improve the information provision of innovative projects established the most effective ones are: the creation of a single information space (48 %) and the establishment of information communications (29 %), less effective: increasing the level of software (10 %); implementation of document management system (6 %); implementation of the automated internal reporting system (5 %); introduction of a balanced indicator system (2 %). Conduct improvement of information provision can be achieved either through the creation of new or modernization of existing systems. It must be carried out systematically in order to ensure the proper level of information quality.

References

1. Yeltsov V. O. (2010) *Of improvement of information provision of judicial activity.* – *Law and Safety № 5*, p. 99-103, [Electronic resource] – Access mode: http://nbuv.gov.ua/UJRN/Pib_2010_5_24
2. Zhilinska L. O. (2014) *Improvement of subsystem of information provision at the industrial enterprise.* – *State and regions. Series: Economics and Business*, [Electronic resource] – Access mode: http://nbuv.gov.ua/UJRN/drep_2014_5_15
3. Batyuk A. E., Dvulit Z. P., Obel'ovskaya K. M. and other (2009) *Information systems in management.* Lviv: National University "Lviv Polytechnic", "Intellect-West".
4. Ptitsina L. A. (2010) *Optimizing the workflow of the enterprise to make managerial decisions.* *Economic space: Collection of scientific works №37*, pp. 241–247.
5. Rotanov G. (2013) *Improving the information provision of an industrial enterprise.* – *Collection of scientific works of Cherkasy State Technological University. Series: Economic Sciences.* – 2013. Issue 34 (1), p. 61–64, [Electronic resource] – Access mode: [http://nbuv.gov.ua/UJRN/Znpchdtu_2013_34\(1\)](http://nbuv.gov.ua/UJRN/Znpchdtu_2013_34(1))
6. Svetunkova S. G. *Information management of competitiveness management.* – *Internet project "Encyclopedia of Marketing"*, [Electronic resource] – Access mode: <http://www.marketing.spb.ru/read/m19/>
7. Ptitsina L. A. (2011) *Improving the formation of information provision for management system of enterprises of the baking industry of Ukraine*, [Electronic resource] – Access mode: <http://nbuv.gov.ua/UJRN/econupr>
8. Yakovlev A. I. (2016) *Means determination of efficiency from the creation and implementation of science-intensive products.* – *Economist № 3*, [Electronic resource] – Access mode: http://nbuv.gov.ua/UJRN/econ_2016_3_6/

O. Vysochan

Doctor of Economic Sciences, Professor

O. Vysochan

PhD in Economics, Associate professor
Lviv Polytechnic National University

APPERCEPTIVE DEFECTS IN ACCOUNTING INFORMATION SYSTEM

Abstract. The article is concerned with a relevant issue of origin and adverse effects caused by defects of accounting and information system. The aim is the research and categorization of defects related to the perception of accounting information by recipients and the influence of such defects on efficiency of decision-making. Interdependence between the part of information unperceived by the consumer because of defects and coefficient of accounting information perception has been determined in this work. The work is also concerned with the classification of defects that may arise in accounting and information system of economic entities and stem from one of the reasons caused by other information system constituents or their combination: peculiarities (including psychological, medical and biological ones) of the recipient; characteristics of accounting information source; transit properties of transmitting medium; qualitative, quantitative, value and formal properties of accounting information. Factors affecting apperception of accounting information by the consumer have been characterized. Three types of complex apperceptive defects arising as a result of various impact factors combination have been pointed out and specified: type I – due solely to internal factors; transmitting medium, accounting information and its source are not involved in their generation; type II – arise in the course of processing information by the person concerned though their reasons are external; type III – combine characteristics of the first type (source of origin, accounting information, its generator and/or transmitting medium) and the second type (primary cause: internal characteristics of the recipient). It has been concluded that apperceptive defects influence accounting system of economic entity, and they are one of the reasons leading to aberration of accounting and information flows.

Key words: accounting information, recipient, information source, transmitting medium, accounting system, apperception of information.

Problem statement

Accounting information system (that is the total of accounting information, sources of its formation, recipients or users, transmitting medium, links between them, as well as means, methods and procedures used in order to store, redistribute and convert information into resources suitable for the solution of certain problems set by ultimate customers) forms the basis of modern accounting paradigm, and its theoretical and empirical perception remains the subject matter of academic interest of several generations of native scholars and scholars abroad. The chief problem of such research is that accounting information system combines technological and mechanical elements like accounting information with living creatures such as human individuals that take on a role of source and recipient of that information and with their inherent complex “lacework” of psycho-physiological, social and cultural, professional and qualifying individual traits and interpersonal relations. In this case, investigation of certain complex psycho-cognitive constructs, such as perception and processing of information by the ultimate consumer (recipient, addressee), comes to the foreground.

All in all, agreeing with M. Kharlamov that “psychological foundation of successful information processing consists of motivation, information search, understanding of information, memorizing, applying information and its subject matter” [1, p.115], it still should be noted that one of the key elements of information processing is its perception (comprehension) acting as a kind of connecting link between thorough understanding of information and its application.

Perception is a process of reflection of phenomena and things including their properties,

states and components in the consciousness of an individual. The process of information perception is a complex internal work involving all mental processes – attention, imagination, memory, brainwork [2, p. 108]. It is the combination of the last-named ones with the channels of acquisition forms specific chain of accounting information circulation, where the appearance of defects may cause the loss of implicitly the most valuable data for the user.

Topicality of the selected subject is defined by the fact that perception or apperception of accounting information is a basic mental process stability of which directly influences the success of decision making by a recipient.

A person takes the world with the help of certain sensor systems that are modalities (for instance, visual, auditory, kinesthetic, logical) while submodalities are considered to be qualities of perception: they define person's attitude towards the world, so they are sense qualities expressed in small distinctions of sensor systems, characteristics of inner representations composing perceptual experience of a person [3, p. 203]. Absolutely essential though insufficient condition for information perception is that sensory organs receive enough intense, clear, undistorted signals relevant to characteristics of sensory organs and peculiarities of human perception [4, p. 106].

Any surrounding information is perceived by the recipient through sensory organs. Main channels of accounting information perception are visual and auditory with certain priority of the first one because considerable amount of information appears in textual and graphical format. Besides, researchers point out digital channel of perception associated with the ability of a person to abstract and logical thinking. In-depth analysis, inherent to the usage of this channel, is also very useful in the course of processing information data on accounting phenomena and processes. Particular attention should be given to the research into the issues of intuitive channel applicability for accounting information perception, which is known as the one that should be characterized by such qualitative properties as accuracy and unambiguity of interpretation.

Recent research and publications analysis

The following scholars have made a major contribution to dealing with issues associated with information circulation within the system of

accounting: K. V. Bezverkhyi, T. V. Bochulia, R. F. Brukhanskyi, N. V. Holiachuk, L. V. Hutsalenko, M. V. Dubinina, V. V. Yevdokymov, S. A. Kuznietsova, N. B. Melnyk, I. Y. Plikus, N. L. Pravdiuk, M. S. Pushkar, M. V. Resler, L. V. Rudenko-Sudarieva, Y. S. Tsal-Tsalko, A.Y. Shchyrskya and others. At the same time, interdisciplinarity and complex character of issues associated with theoretical comprehension and practical implementation of this process call for further development of their research.

Purpose and objectives

The purpose of the article is investigation and categorization of defects associated with perception of accounting information by the recipient (called apperceptive defects) and their influence of efficiency of decision making. The objectives based on the purpose are the following:

- 1) establishing interdependence between the part of information unperceived by the consumer because of defects and coefficient of accounting information perception;
- 2) classification of defects that may arise in accounting and information system of economic entities;
- 3) characteristics of factors affecting apperception of accounting information by consumers;
- 4) pointing out and specification of three types of complex apperceptive defects arising as a result of various impact factors combination.

Presentation of basic material of the research and obtained results

Individual peculiarities of world perception and thinking lead to ambiguity of interpretation of certain accounting phenomena and events by various interested parties. It should seem that regulation of the majority of accounting issues in terms of inner state legislation and within international recommendations concerning accounting practice solves the problem. However, its complexity lies in multifaceted plane of human behaviour, sociology and personality psychology. Out of the box thinking, creativity and lateral thinking are among the qualities that nowadays are so valued by highly professional managers, issuing new challenges for accounting system. Form and content of presenting accounting information, in compliance with certain regularities, anyway acquire special features in each specific case.

Individual peculiarities of perception are the following: accuracy, emotionality, quantitative ratio of analysis and synthesis, image and word. Different perception of one and the same objects by different people is due to peculiarities of their previous experience, knowledge, skills, and characteristics of their nervous system type. Some people perceive objects accurately and do not add anything on a personal note in the course of information transmission while others inform on their own attitude towards the perceived information. Integral, synthetic object perception is predominant for some people. Such people reflect the phenomenon in whole, without going into details. Analysis in the process of object perception is predominant for other people. They perceive each phenomenon getting into details [5].

B.R. Mandel [2, p. 110-111] outlines five characteristic features of perception:

- 1) thingness – commitment to the outer world;
- 2) integrity – formation of generalized image of the world around;
- 3) structuredness – capability of arranging material in a certain order;
- 4) constancy – relative stability of the information being perceived, under different conditions;
- 5) sense of purpose – focus on information perception with predictability of definite result and pursuance of it.

According to V.R. Vesnin [6, p. 84-86], the following circumstances define specific features of perception:

- situation in which a person is getting to know certain information and degree of its understanding by the person;
- personal (for a person) and physical (for a person, an object or a process) characteristics of object of which or from which the information is received;
- stereotypes, psychological effects, prejudices.

Here is the graphical model of interdependence between the part of information unperceived because of defects and perception of accounting information by the recipient (Fig 1) with three zones: active imperception (information is not useful); critical reevaluation (information is useful for solving certain problems); trust (information is useful in all circumstances).

An index of accounting information perception is used for technical assessment of the volume of accounting information perceived by the recipient. The index of perception shows the correlation between perceived accounting-informational flow and generated one [7, p. 119].

If there are no apperceptive defects, the value of such index may come close to 1.

Intersection of curves in the graph (Picture 1) indicates an average relationship between the part of information, unperceived because of defects, and the index of information perception ($\approx 0,5$). However, location and value of critical reevaluation zone is much more important for further analysis. Location of critical thinking zone in the graph (left-directed or right-directed shift from the intersection of curves along horizontal axis) depends on accuracy (genuineness) of indices of accounting information quality and its relevance for effective decision-making. If there are a lot of defects, the index of information perception is objectively low. If there is enough evidence for their small amount, the situation is reverse. Confirmation of accuracy or falseness of evidence concerning accounting information defects is a factor that influences the dimensions of critical reevaluation zone. The larger it is, the more doubtful is the accuracy of conclusions concerning accounting information quality. Reduction of its dimensions is possible if there are reasonable grounds to prove of accounting and information flow quality. The situation is particularly critical if the reduction of critical reevaluation zone is accompanied by its left-directed shift along horizontal axis (there is sufficient evidence for a considerable amount of major defects) because it may lead to the complete destruction of communication between producer of accounting information and its consumer as well as reduction of coefficient of such information perception to zero.

Imperception of accounting information by the recipient may be ascribed to the presence of certain defects in accounting system (Fig. 2).

Given the fact that any information system presents a set of interrelated elements that form it, defects in accounting information system usually do not exist autonomously and are characterized by interdependence, integration, dependency, and may be caused by external and internal factors.

In particular, although apperceptive defects arise at the level of recipient, they may be the result of one of the reasons provoked by other elements of information system or their combination:

- 1) peculiarities (including psychological, medical and biological) of the recipient;
- 2) characteristics of accounting information source;
- 3) transit properties of transmitting medium;
- 4) quantitative and qualitative properties of accounting information. The first group of factors is

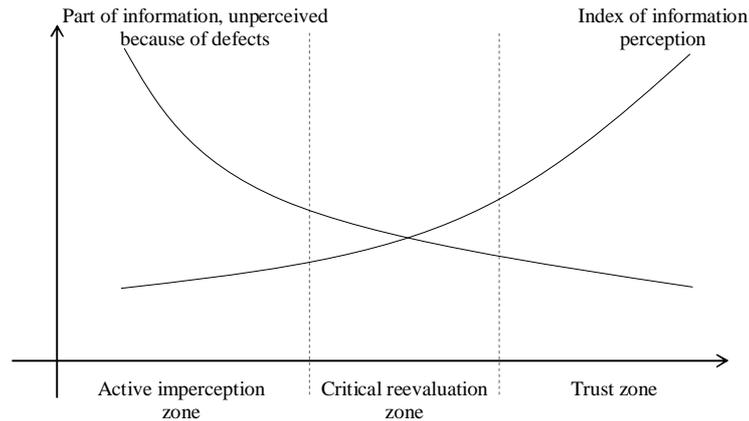


Fig. 1. Theoretical model of dynamic dependence of the index of accounting information perception on the level of apperceptive defectiveness*
* Note: developed by the authors

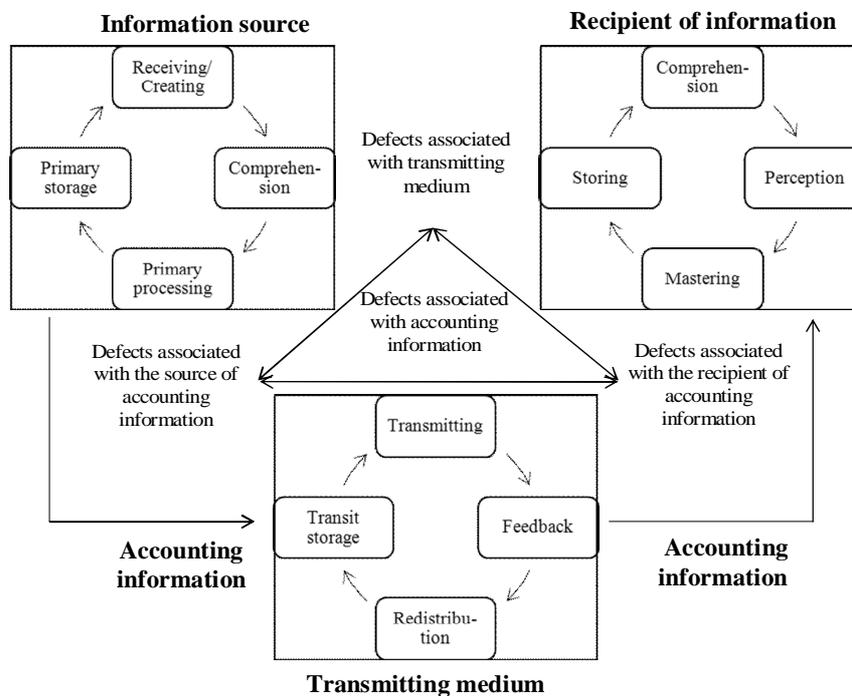


Fig. 2. Defects of accounting information system*
Note: developed by the authors

associated with personal characteristics of accounting information recipient and concerns the processes of its comprehension, perception, mastering and storing; ability to think critically and analytically; Gnostic (cognitive) characteristics; operative memory; professional background, knowledge, skills, qualifications and more. Besides, the point to note is the importance of investigating psychological (personality traits, temperament) as well as medical and biological (poor health, over-fatigue, no contentment with job performance, lack of positive emotions, etc) traits of individuals. Negative effect of the latter raises

barriers of temporary nature on the way towards objective perception of accounting information and its beneficial application. Their elimination is closely related to the creation of maximally comfortable working conditions and promoting proper rest of decision-makers. At the same time, psychological factors are difficult to adjust; they should be taken into consideration when the worker is being employed, functional responsibilities are being distributed, in the process of motivating, appraisal of results of his or her performance, formation of corporate and organizational culture at the enterprise, etc.

The second group of factors is associated with accounting information source. Given the fact that a person is usually the source of information (even when automatic accounting information systems and communication channels are used, people usually have the primary role in the course of comprehension, evaluation, adjustment and taking final decision regarding further transmission of bulk data), a range of its characteristics coincides with recipient's qualities. At the same time, while the ability to produce accounting information according to given quality parameters is important for the first, the ability to perceive and use it in order to make efficient decision is important for the latter. It should be remembered that accountants form structured data files that are maximally applicable for decision makers, with predetermined aim. This means that positive result may be achieved only if there is close cooperation and continuous communication between accounting department employees and end consumers of accounting information.

Causes of defects associated with transmitting medium are mainly in two planes: technical (glitches in channels of communication and information transmission) and social-psychological (conflict situations, problems within socio-professional groups, the phenomenon of collective stereotypy, etc.). Factors of this group may have internal (endogenous) and external (exogenous) nature. Internal factors are the subject of optimization with the aim to prevent or minimize negative effect (shortcomings of paperwork approved at the enterprise may be relatively easily detected and eliminated) while external factors generally may be only detected and taken into consideration (recipients and accounting information generators have limited influence on improving legislative and regulatory background governing a wide range of accounting issues or their specific aspects). Speed increase (reduction of time) of accounting information transmission from the source to the receiver is a prerequisite for reduction of negative effect of transmitting medium defects on accounting information apperception. The longer the process of accounting information flow is, the higher the risks of loss of data topicality and data distortion are.

Separate group of factors is associated with characteristic features of accounting information regarded as report on certain accounting facts or events that may be confined to the following: relevance, accuracy, completeness, faithfulness, topicality, representativity, etc. (qualitative

criteria); volume, transmission speed, noise loss, etc. (quantitative criteria); expenditures for its receiving, processing, traffic and storage (cost criteria); compliance with regulatory, ergonomic and aesthetic requirements (formal criteria). Combination of positive values of these criteria makes it possible to talk about the availability of maximally valuable accounting information resource suitable for solving topical issues in a particular domain of application. However, only their correlation with characteristics of information source, its recipient and transmitting medium lays the foundation for objective conclusions concerning the efficiency of accounting system of economic entity. High quality accounting information flow itself does not guarantee its fullest perception by the recipient.

Therefore, apperceptive defect is a shortage of accounting information perception by the recipient, but it can not be considered in an embodied way, without reference to other elements of information system, such as source, transmitting medium and accounting information itself. In relation to the subject (recipient), defect may be caused merely by internal (inward) factors or may be instigated from outside. Several factors are often combined, creating a complex multifactor that is difficult to determine and in the end has an impact on the efficiency of decision made by the interested party.

We have seen similar dependence while investigating the influence of stereotypy on information perception by the recipient. However, it is important to emphasize that interdependence between the part of information, unperceived owing to defects, and coefficient of perception is not absolutely inversely proportional because accounting information may be ignored by the recipient due to other external factors, which are, for example, connected with the phenomenon of accounting and information flows coherency (for more details, see publication [8, p. 199-200]).

From our point of view, it makes sense to refer to three kinds of apperceptive defects (type I, type II, and type III). Their disposition can be carried out after careful analysis of consequences of accounting information comprehension stage. Comprehension, as a mental process, serves as a peculiar filter with the help of which recipient identifies information suitable for the solution of specific problem out of the data file.

Therefore, apperceptive defects of type I are caused solely by internal factors; transmitting medium, accounting information and its source are not involved in their formation. For example,

accounting information, which is potentially useful to solve the problem, is not used by the recipient due to individual recipient's stereotype towards it (like "accounting information is used mainly for tax accounts"). Apperceptive defects of type II also arise when the information is being mastered by the interested party, though their causes are external. For example, low expertise of accountant causes mistrust of recipient to the information produced by him because of its low quality. Apperceptive defects of type III combine characteristic features of the first ones (source of origin: accounting information, its generator and/or transmitting medium) and the second ones (primary cause: internal characteristics of recipient). For example, excess accounting information leads to over-fatigue of consumer, and, as a result, useful information is lost. Any of three above-mentioned types of defects may do considerable damage. However, defects of type III are the most complicated to cope with due to their complex and integrated nature.

Conclusion and directions for future research

The existence of apperceptive defects is only one of the reasons resulting in aberration of accounting and information flows within accounting system of economic entity (another significant cause is accounting distortion, the origin of which was considered in publication [9]). However, investigation of prerequisites of their origin and elimination methods is integral to improvement of functional efficiency of such system for dealing with management issues.

Major methods of struggling against negative influence of apperceptive defects are the following: development of recipient's own critical thinking; self analysis (including metacognition as a system of person's knowledge about peculiarities of personal cognitive sphere (for example, refer to L. M. Naidonova [10, p.273]); increase in the level of awareness regarding the area of concern, particularly by means of improving the efficiency of communicative relation with accounting department.

Active involvement of accounting information recipient in communication process turns him or her into communicative personality that, according to V. B. Kashkin, possesses "the total of individual strategies and tactics, cognitive, semiotic and motivational preferences, which have been formed in the process of communication as individual communicative competence" [11, p. 46].

Directions for future research concerning the referred issues lie in empiric evidence of theoretical

models presented in the article, regarding the influence of recipient's apperceptive defects on his or her decisions based on accounting information.

References

1. Kharlamov, M. (2014). *Psychological mechanisms for the learning of information by students* Retrieved from <http://repositsc.nuczu.edu.ua/handle/123456789/727> [in Ukrainian]
2. Mandel, B.R. (2016) *Sovremennaiia psikhologiiia massovykh kommunikatsii: istoriia, teoriia, problematika* [Modern psychology of mass communications: history, theory, problems]. Moskow-Berlin: DirectMEDIA. [in Russian]
3. Paliienko, A. (2014). *Specific features of media perception. Vytoky pedahohichnoi maisternosti* [The sources of pedagogical skills], 14, 202–208. [in Ukrainian]
4. Gariaev, A. V. & Gariaeva, T. P. (2008). *Psychological and physiological features of visual perception of information and their accounting when creating educational presentations. Informatcionnye kompiuternye tekhnologii v obrazovanii* [Information Computer Technologies in Education], 4, 106–113. [in Russian]
5. Tretiak, T. M. (2013). *Psychological prerequisites of students' readiness for creative perception of information. Aktualni problemy psikhologii* [Actual problems of psychology], 6 (9), 445–453. [in Ukrainian]
6. Vesnin, V. R. (2006) *Menedzhment* [Management]. Moskow: Izdatelstvo Prospekt. [in Russian]
7. Vysochan, O. S. (2015). *Kontseptualizatsiia rozvytku bukhhalterskoho obliku u sub'iektiv, shcho zdiisniuiut turystychnu dialnist* [Conceptualization of the development of accounting in subjects engaged in tourism activities]. Lviv: Vydavnytstvo Tarasa Soroky. [in Ukrainian]
8. Vysochan, O. S. & Vysochan, O. O. (2016). *Coherence of information as a reason for the breach of the reliability of accounting systems. Yevropeyskyi vybir ekonomichnoho postupu rehionu : materialy Mizhnar. nauk.-prakt. konf. [European choice of economic progress of the region: Proceedings of the International Conference]. (pp. 199–200). May 26–27. Chernivtsi, Ukraine: ChTEI KNTEU. [in Ukrainian]*
9. Vysochan, O. S. (2017). *Accounting distortion: concept, classification, causes and negative effects minimization. Naukovi zapysky Natsionalnoho universytetu "Ostrozka akademiia". Seriia "Ekonomika" [Scientific Notes of Ostroh Academy National University, Series "Economics"], 5 (33), 127–132. [in Ukrainian]*
10. Naidonova, L. M. (2015). *Psychological features of perception of screen information in adolescence. Aktualni problemy psikhologii* [Actual problems of psychology], 12 (21), 267–275. [in Ukrainian]
11. Kashkin, V. B. (2001). *Universal grammatical concepts. Metodologicheskie problemy kognitivnoi lingvistiki* [Methodological problems of cognitive linguistics], 45–52. [in Russian]

TYPES OF ECONOMIC ANALYSIS AND ITS INFORMATION MAINTENANCE

Abstract. Investigated the types of economic analysis. Described the major tasks internal and external economic analysis. Carried out comparative characteristic of types of economic analysis by the time of making managerial decisions. Investigated specifics into branch and among branch economic analysis. Particular attention is paid to factor analysis.

Key words: economic analysis, types of economic analysis, factor analysis.

Introduction

Type of economic analysis – is an ordered set of elements, concepts, teaching methods and approaches to the study of economic phenomena and processes that are typical for economic analysis as a science, as well as specific properties that are inherent only to this totality. With the formation of the modern classification of economic analysis take into account the requirements of a functional approach (the assessment of customer needs in analysis' results and obtained opportunities from conducting the relevant type of analysis); the need to unify information support of analysis; experience of other countries and so on. In practice, the types of economic analysis are used simultaneously. At each level of management daily take various decisions, to substantiate them use appropriate types of economic analysis. Classification of household analysis has an important value for the correct understanding of its essence and tasks, for development of method of its conducting and for organization of analytical process.

Internal and external economic analysis

Analysis distribution into internal (managerial) and external is caused by character of

information sources, executors and objectives, which seek to achieve during the research. In practice, these types of analytical work often overlap.

The internal analysis is performed directly at the company for the purpose of rapid, short-term and long-term management of industrial, commercial and financial activities. Its results are a strictly commercial.

Purpose of the internal analysis is to promote the supply of internal users by information which is necessary for making grounded management decisions. And the internal users of different levels of management are enterprise's administration, workers of functional divisions and subdivisions and others.

The subjects of internal analysis are workers of functional divisions and subdivisions, special analytical services of the company, accounting firms, consultants and objects are the company and its structural divisions.

As information base of analysis use the full range of economic information including unregulated information. Its content is caused by the organization of accounting process at the enterprise, its technical supply, analyticity, operative credentials. Information should be detailed and confidential.

The main tasks of internal analysis are represented on Fig. 1.

Internal analysis includes retrospective, operational and perspective analysis. In the result of operational and prospective analysis there is a probability of obtaining insufficient reliable output analytical information. Frequency of providing

analytical information conditioned to the interests of information users (daily, weekly, each decade, etc.). The company can develop methods of analysis by themselves.

So, features of internal analysis are:

- focus on the company’s management;
- use of all information sources;
- absence of external regulation of methods of analysis;
- the complexity of analysis, the study of all aspects of the enterprise activity;
- maximum secrecy of analysis’ results to preserve commercial secret.

Internal analysis is divided into managerial and financial (Fig. 2).

External analysis is carried out on the basis of financial and statistical reporting by economic bodies, banks and financial authorities,

shareholders, investors. It promotes the supply of external users of information with necessary one for selecting the most appropriate line of conduct. External users are real and potential creditors, owners, suppliers, customers, owners of assets of the company, investors, statistics, government agencies, research institutions, regulatory authorities, financial and credit institutions.

The subjects of analysis are external users of analytical information (accounting firms, consultants) and the objects of analysis – the enterprise as a whole. Information base of analysis – financial statements (balance sheet, income statement, cash flow statement, statement of shareholders’ equity, notes to the financial statements – regulated information).

The main tasks of external analysis are represented on Fig. 3.

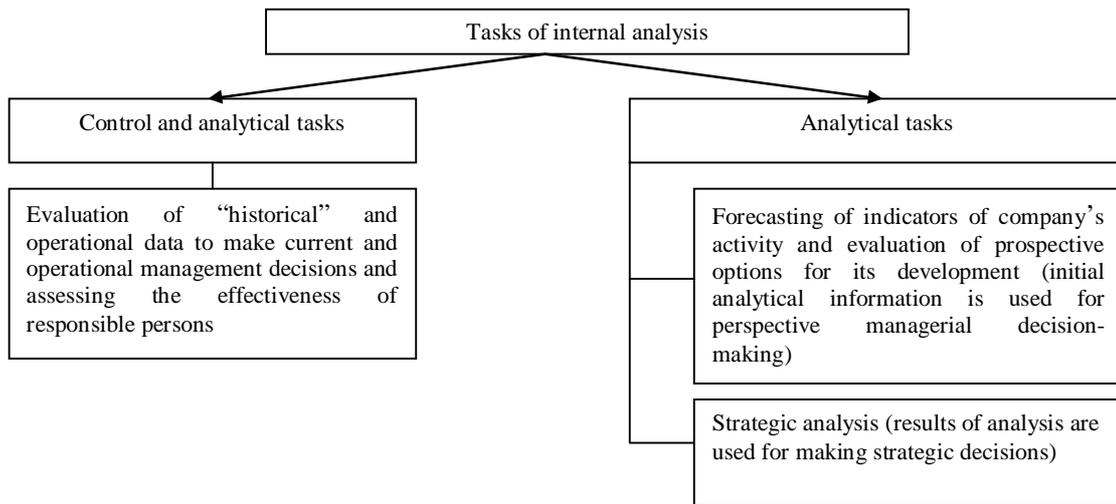


Fig. 1. Tasks of internal analysis

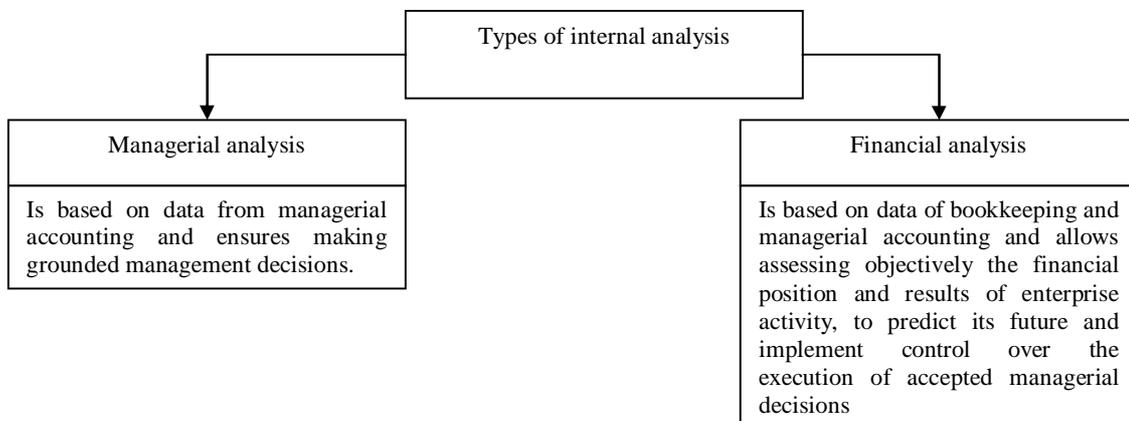


Fig. 2. Types of internal analysis

Types of economic analysis and its information maintenance

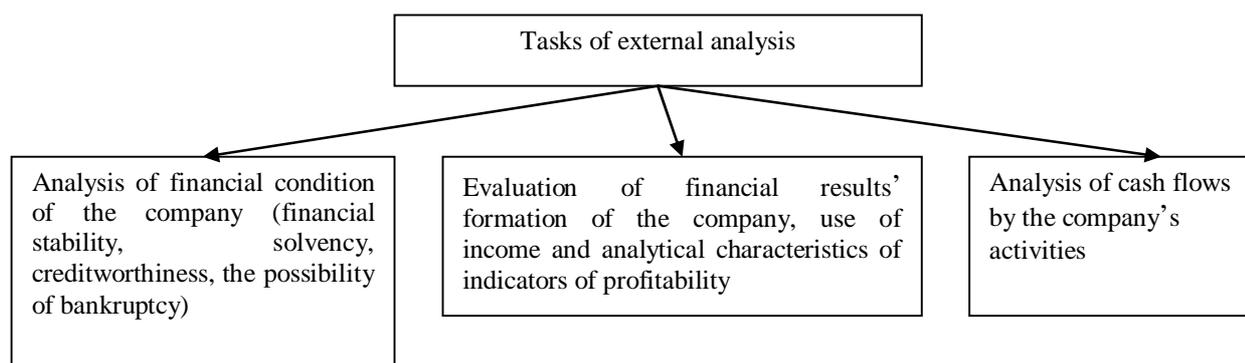


Fig. 3. The tasks of external analysis

Table 1

Comparative characteristics of internal and external economic analysis

Comparative features	Internal economic analysis	External economic analysis
Objects of research	Structural subdivisions, economic phenomena and processes, elements of economic relations	Enterprises in general, inter object comparison
Subjects of research	Managers and specialists of all structural levels	National, sectoral and territorial economic institutions, partners and customers
Time forms	Strategic, operational, retrospective	Strategic, retrospective
Frequency of analysis	Permanent	By the standards of analytical process and at the request of users
Privacy Policy	Confidential	Public
The degree of analytical indicators' integration	The totality of general and partial indicators	General indicators

The external analysis is retrospective, characterized by a high degree of reliability and probability of the original analytical information. This information is provided to users on a regular basis, in accordance with the terms of preparation of financial statements (quarterly, annually).

External analysis is only financial.

So, the external analysis features are:

- multiplicity of subjects of analysis – users of information about the company;
- a variety of purposes and interests of subjects of analysis;
- availability of typical methods of analysis to all industries;
- focus only on external financial statements;
- limited tasks of analysis as a result of previous factor;
- maximum openness of analysis results to information users about the company.

The comparative characteristics of internal and external economic analysis are presented in Table 1.

Perspective and retrospective economic analysis

On the feature of time an economic analysis is divided into perspective (previous) and retrospective (following, historical).

The perspective analysis is conducted before household operations take place. It's needed for household decisions and plans-prognoses substantiation, undesirable results prevention. The perspective analysis depending on time duration is divided into short-term and long-term (strategic). The short-term analysis engulfs a period to one year, and long-term — more a year. A short-term prognosis analysis is applied for making of tactical, and long-term — strategic business policy. The long-term analysis is less detailed, than short-term;

however its role is more significant. If correct strategy of enterprise development is selected, it is easier to make tactical decisions. In the conditions of market competition a long-term (strategic) analysis becomes an integral part of managerial activity.

Perspective analysis – an analysis of business results to determine their potential value in the future. The results of this analysis are used to develop strategic plans and preliminary evaluation of the results of their implementation. The peculiarity of this analysis is explore the possibilities of achieving the desired results.

Perspective analysis aims finding in each process or phenomenon of economic activity the most stable perspective elements which can play a crucial role in the future.

Tasks of perspective analysis are determined by its essence and place in planning and management (Fig. 4).

During plans' compiling forecast analysis serves as the main form of preplanned researches of business economics, during the execution of busi-

ness plans – it is a tool for prediction and evaluation of the expected results.

Sequence of carrying of perspective analysis is shown on Fig. 5.

Perspective analysis is conducted in such main directions:

1) Technical equipment, material, labor and financial resources of the company, production and sales;

2) The degree of product quality and customer satisfaction;

3) Perspective evaluation of costs and expected profit, profitability, solvency and financial condition.

The retrospective analysis is carried out after completion of household acts on the basis official of financial and statistical reporting. It is needed for the study of development tendencies, control after operative plans fulfillment, objective evaluation and diagnostics of enterprise's activity results and of the level of enterprises risks.

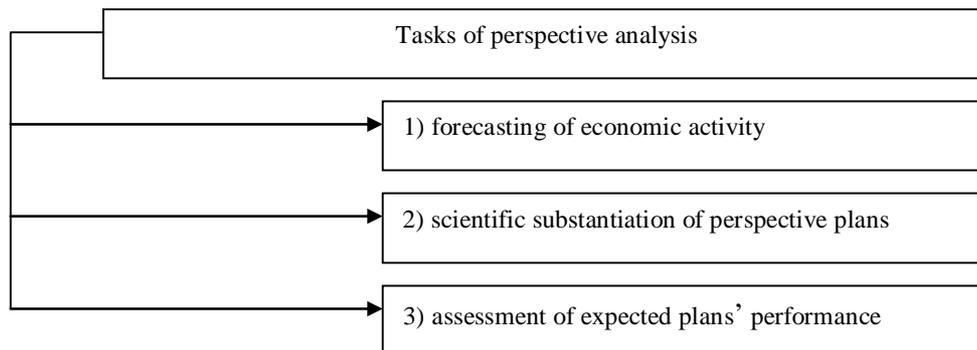


Fig. 4. The tasks of perspective analysis

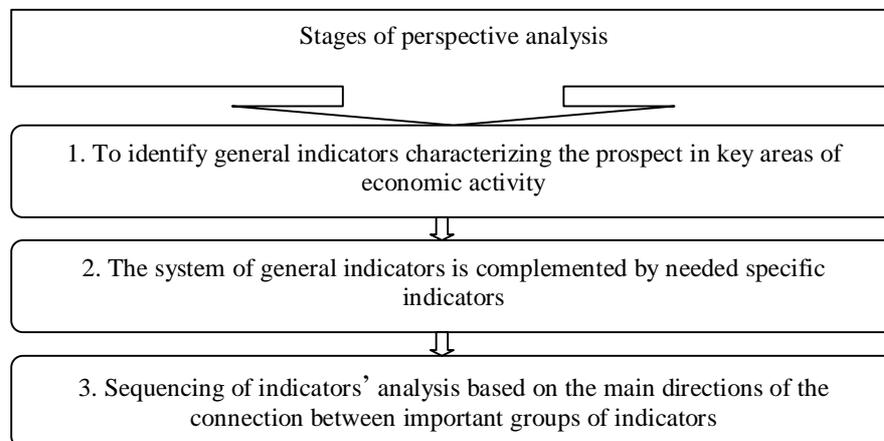


Fig. 5. Sequence of perspective analysis implementation

Types of economic analysis and its information maintenance

The main task of the retrospective analysis – an objective assessment of activity results, comprehensive identification of unused reserves and detected drawbacks in the work and responsible executors. The results of retrospective analysis are used to solve problems of strategic management. But this analysis has a significant drawback – identified deficiencies belong to the past periods and mean forever lost opportunities.

Peculiarities of retrospective analysis technique consist in that the actual results of the work are evaluated in comparison with plan and analytical data of the previous periods. Identified in the analysis of deviations from the base of comparison deciphered by technical and economic factors that determine these deviations, shall be established not only the causes of deviations, but the responsible persons, services, are developed measures to eliminate shortcomings in the work.

The retrospective analysis is divided into operative and summary. An operative analysis is conducted right after realization of household operations or change of situation for the short periods of time (shift, day, decade period and so on). Its purpose — operatively estimate changes in relation to the preset parameters, to find out fai-

lings and reasons of their appearance, in good time to take correcting measures for their elimination. In respond to the rapid change of all types of enterprise’s activity and its environment operative analysis takes on special significance.

Conducting a summary analysis it’s necessary to study activity results for the period under review (month, quarter, and year). Its value lays in enterprise activity study in complex and comprehensive way from current data of the proper period. Thus, more complete and more objective estimation of enterprise activity is reached from the use of present possibilities.

Operative and summary analyses are interrelated and complement each other. They enable guidance of enterprise not only operatively liquidate failings in the production process, but also summarize achievements, results of activity for proper periods, to develop measures, directed on growth of business efficiency.

Some scientists by the time of management decision making distinguish analysis perspective, operative and retrospective. If guided by this classification, it is appropriate to compare these types of analysis (Table 2).

Table 2

Comparative characteristics of the types of analysis by the time of management decision making

Comparative characteristics	Type of economic analysis by the time of management decision making		
	perspective	operative	retrospective
According to the purpose of analysis	Determination of the prospects of the company	Evaluation of indicators deviations of the actual situation of the company from their regulations and appropriate maneuvering of resources and capital	Comprehensive diagnostics and evaluation of the results of enterprise functioning
By the scale of objects’ research	Parametric general indicators of the company	Local and general indicators of operating enterprise activity	The entire set of indicators of forecasted operating and summary enterprise activity
According to sources of information	Legal and regulatory information, dynamic series of indicators of enterprise activity by generalizing parameters, target programs and forecasts	Operative plans, schedules of operative accounting and marketing	Current plans and regulations, accounting and reporting statistical information, special surveys data
According to the terms of carrying out	Annually, by periods of planning and forecasting	Daily, by operative periods (5, 10 days, month)	Quarterly, annually

On the basis of this comparative table and understanding of the classification criteria “time (content of management process)” consider it appropriate to adhere the attribution of operative analysis into the retrospective, since it is being conducted after the business operations took place along with the final one.

Retrospective analysis – the most comprehensive view of economic analysis that incorporates the results operative analysis and is the basis for perspective analysis.

Into branch and among branch economic analysis

According to the feature of the place of research (particular branch) which is based on the public labor division, an analysis is divided into branch and among branch.

Peculiarities of branch analysis lie in its detailing by separate departments. Branch analysis covers all steps of management hierarchy of basic link of national economy – from the units of the first order to the workplace.

Branch economic analysis consists in objective and comprehensive assessment of reaching target plans by units; identifying and measurement of factors and reasons that have caused production results, revealing branch reserves, development of measures of their use, research of peculiarities of economic functioning and development of one or another unit.

By content branch economic analysis differs significantly from the analysis of the enterprise as a whole. These features are determined by the specific content of economic indicators established by branch division unlike the indicators of enterprise activity as a whole. Often each of the main production departments does not produce fully finished production. Therefore, the main indicators of production efficiency in this case are not profit and profitability but costs of production. In branch analysis use more natural parameters for assessing output, productivity, quality of produced products.

Branch economic analysis has its specific subjects of analysis. If the activities of the company mainly examine the economic life of the enterprise, the higher organization, the economy of branch production units study mainly specialists of the enterprise and the related service divisions.

Significantly different is the InfoBase of branch economic analysis from the information support of analysis of the enterprise as a whole. Branch economic analysis has a wider information base.

For its performance use not only the reporting data, but also consolidated data and even primary documents, because in terms of production units usually group and summarize various primary records about availability and movement of fixed assets; material, labor, production and so on. Consolidated data sources of branch economic analysis include various kinds of workshops' reports on the costs of raw materials and fuel.

An important role in the economic analysis also occupies among branch analysis of enterprises. Its purpose is comparison of results achieved in economic activity with results of other companies or organizations, study the causes of differences in the use of production resources, identifying reserves of further improvement of production efficiency.

Objects of among branch are results of industrial corporations, businesses, industries, workshops, work places. At the same time compared phenomena, processes, objects of the same level (businesses, workshops, products), of one content (labor, equipment, technology, organization), of one dimension (large, medium, small enterprises), of the same parameters and indicators (labor productivity, production capacity, production costs).

Among branch comparisons can be general (full) and partial (local) (Fig. 6).

In general (full) study all the work of enterprises and their units under the general scheme of complex economic analysis. Is implemented by enterprises that produce similar products, ie the enterprises of the same industry or sub-industry.

At the local – study a separate unit or individual single issues (eg., use of power equipment, working time of employees, etc.).

Conducting among branch comparative analysis includes the following stages:

- the choice of enterprises and objects of comparison;
- determination of the degree of comparability and range of comparable indicators;
- gathering and processing of economic information about objects, bringing indicators to comparable type;
- comparison and analysis of indicators, evaluation of achieved results, identification of the causes of differences and the factors that determined the value of the indicator;

Types of economic analysis and its information maintenance

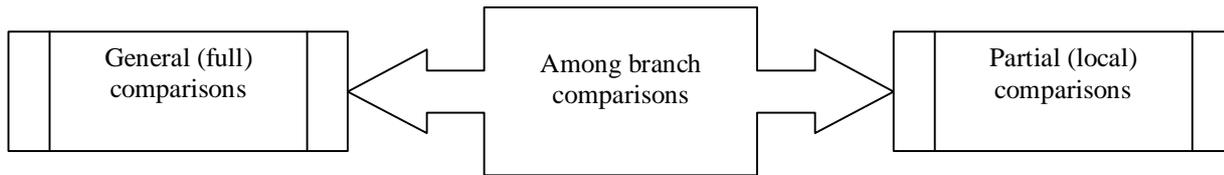


Fig. 6. Types of among branch comparisons

– summarizing the results of the analysis, conclusions and suggestions to improve the efficiency of the comparable objects, the calculation of economic benefits from the implementation of the proposals and the degree of their impact on the general indicators.

At enterprises among branch comparative analysis is performed by chief economist or planning and economic department with the assistance of economic and technical services. Among method of among branch comparative analysis is grouping of enterprises by size, producing similar products. Size of enterprises more fully appear in indicators of volume of production.

Depending on the purpose of analysis is selected base of comparison. In particular, to identify the best enterprise base – a set of indicators, the analysis which will allow comprehensively examine the results of comparable companies, compare them with the results of the leading companies with prior periods.

When choosing of base of comparison to provide comparative indicators (production capacity, energy supply, technical equipment, etc.) and to define indicators which need to be brought to comparative form (productivity, production costs, payroll fund, etc.).

During this analysis appear reasons for the difference of the same indicators, factors which depend and do not depend on the companies in order to increase the objectivity of the terms of comparison.

Most modern achievement in the field of among branch analysis – benchmarking. This early warning system of problems brewing. Benchmarking is used as a tool to obtain the information necessary to achieve and maintain competitive advantages.

The nature of objects' research as a feature of economic analysis classification

Classification of analysis of business enterprise by dependence on the method of objects

research is essential for the developing methods for their implementation. By this feature analysis is divided into:

- 1) comparative (qualitative);
- 2) factor (quantitative);
- 3) diagnostic (express analysis);
- 4) marginal;
- 5) economic-mathematical;
- 6) function-value;
- 7) fundamental analysis;
- 8) situation analysis

1) Comparative (qualitative) analysis – a method of research based on qualitative comparative characteristics and expert opinions of phenomena and processes which they study. This analysis is largely limited to a comparison of reporting indicators of business enterprises with planned indicators, reporting data of prior periods, indicators of competitors and more. Application of comparison to economic phenomena gives an opportunity to make a horizontal, vertical, trending, as well as one-dimensional and multidimensional analysis.

2) Factor (quantitative) analysis is based on quantitative comparisons and study of the degree of sensitivity of economic phenomena before changes in various factors. This analysis intended to identify the causes of changes in effective indicators. Types of factor analysis are represented on Fig. 7.

Single-level factor analysis is used to study factors of only one level of subordination without detailing on the components. In the multi-factor analysis factors of the first level are decomposed into components.

Retrospective factor analysis studies the causes of what happened, for instance, why such financial results were achieved; and perspective – factors that are considered to be most significant for achievement of the desired results in the future. In practice, these two types are often intertwined, so it is important to organize analysis for making reasonable managerial decisions on certain issues.

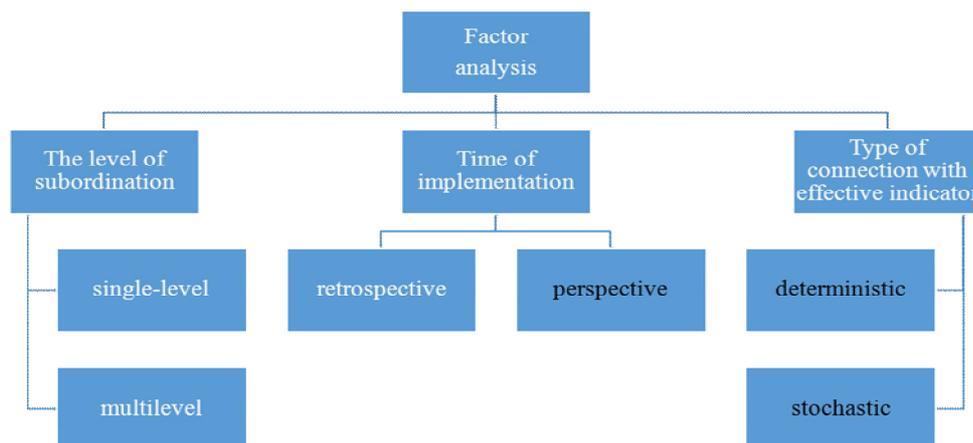


Fig 7. Types of factor analysis

Deterministic factor analysis is used to study the influence of factors which relationship with effective indicator has a functional character. Typical tasks of deterministic analysis include: assessment of the impact of relative changes in factors on relative change of the effective indicator; assessment of the impact of absolute change in certain factors on the absolute change in the effective indicator; determining the ratio of the of changes in the effective indicator caused by the change of certain factor to the base value of the effective indicator; determining the share of absolute change of the effective indicator when changing certain factor. Stochastic analysis explores factors' influence in the connection of which effective indicator is probabilistic (correlation). Such analysis to some extent is a supplement and deepening of deterministic factor analysis. This analysis is used in the following conditions:

- the research of factors' impact for which it is impossible to build a deterministic factor model;
- determination of factors' influence which are not exposed to combining in a single strictly determined model;
- studying of the impact of complex factors which can not be given by one quantitative indicator.

Application of a stochastic approach is possible only with a compulsory precondition that complicates its implementation.

3) Diagnostic analysis – express analysis, a method of enterprise economy state diagnostics on the basis of typical features for the certain economic phenomena, that is the formation of

enterprise diagnosis by typical signs. For example, if the rate of gross output growth passes ahead the rate of commodity output growth, it certifies growth of uncompleted production remains. If the rate of commodity output growth is higher than the rate of production sale it is a sign of overstocking. Presence of overdue obligations, deceleration of capital circulating, losses is indicators of probable enterprise bankruptcy. Identification of proper feature enables quickly and accurately determine the nature of violations without taking additional action. For example, express analysis of enterprise covers the following stages: “statements reading”; review the report by their formal attributes; review of accounting policy; identification of “sick” articles in the reporting and evaluation of their dynamics; acquaintance with basic indicators; reading the explanatory notes (analytical sections of the report); overall assessment of financial and property state according to the balance sheet; drawing conclusions from the analysis. Such analysis does not require much time and its implementation – complex calculations and a significant amount of information.

4) Marginal analysis is a method of evaluation and substantiation of managerial decisions efficiency in business on the basis of reason-result interrelation study of sales scope, prime price and profit, as well as division of expenses on fixed and variable. With its help they determine brake-even points of sales, price, fixed and variable expenses, in this case financial result will be equal zero. Optimum production level is in an intersection of total expenses and total revenues. This type of analysis makes it possible to manage a

profit in business, optimize its parameters depending on deviations in production volume, the share of variable costs, unit prices and more.

5) By economic-mathematical analysis it's possible to choose the most optimum variant of economic task decision, find out backlogs of production efficiency increase due to more complete use of enterprise production potential using complex mathematical tools.

6) Function-value analysis (FVA) is a research of functions which are executed by an object, as well as methods of their realization. Its basic target is to find out the unnecessary functions of object and avoid unnecessary expenses due to liquidation of unnecessary details, simplification of good construction, replacement of materials and so on.

Function-value analysis (FVA) appeared in 40s of the last century as a result and almost simultaneously in different countries (conducted research of Russian constructor Y. M. Sobolev from Perm telephone factory and American engineer L. D. Miles of the company General Electric). The first development of Y. M. Sobolev constructed using the results of FVA – node for strengthening mikrotelephone allowed to reduce the number of parts by 70 %, the cost of materials by 42 %, the labor capacity of production by 69 %, and the total cost in 1,7 times.

L. D. Miles in 1946 first formulated the concept of function-value analysis, defining it as “applied philosophy of economic activity, as a system of ways of cost savings before, during and

after their implementation”. Since then the FVA is considered to be one of the most important innovations in governance over the past hundred years.

The purpose of implementing FVA is to prevent unnecessary production costs by improving production technology and product design, the use of cheaper raw materials.

The essence of the FVA can be briefly described as follows – each type of product produced in the company in order to satisfy the needs of customers, to perform certain functions. Each function has its own feature, since for its creation required materialized labor costs. These functions can be major, minor and generally unnecessary.

Therefore, at the stage of manufacturing products, using FVA, thoroughly study products, detect unnecessary costs, eliminate unnecessary functions of goods and thus decreasing is reached of expenses for production. The basic requirement is that the product in a result of FVA did not lose its commodity form.

The main purpose of FVA is to identify and prevent unnecessary costs due to elimination of unnecessary components, parts; simplification of product designs, materials substitution and more.

Principles of FVA – creative innovative thinking, consistency, complexity, functionality of objects’ analysis and cost on their implementation, experience and knowledge of workers.

The main tasks of FVA are presented on Fig. 8.

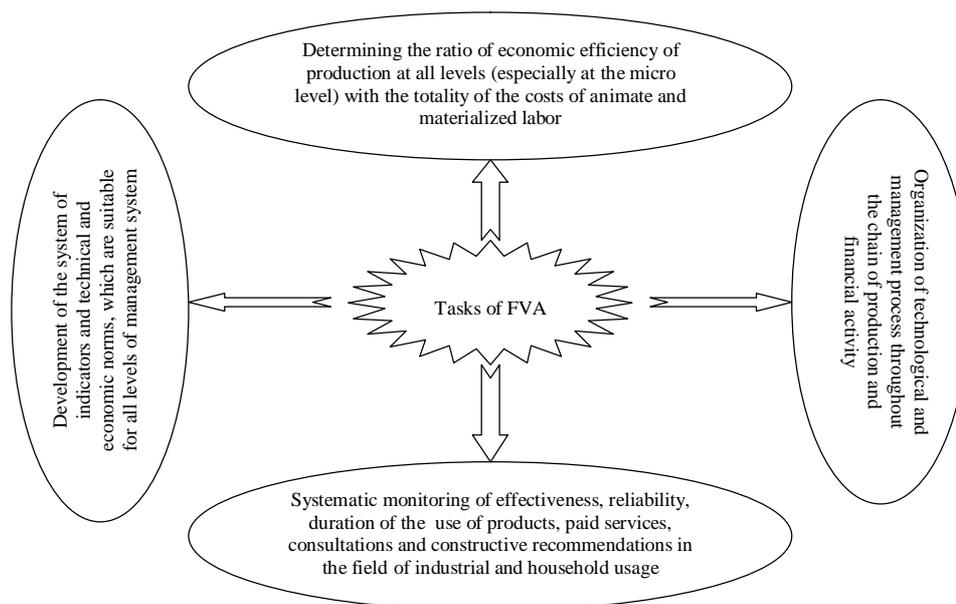


Fig. 8. The main tasks of FVA

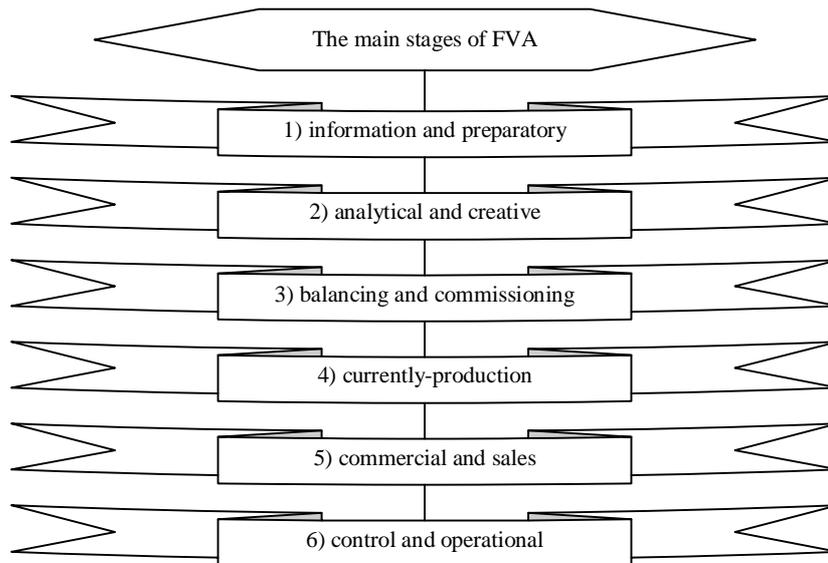


Fig. 9. The main stages of FVA

To select the correct version of the solution use methods: “Delphi”, PATTERN and their modifications (expert survey). Essence of a method “Delphi” is that expert assessments foresee mutual analysis of the views of various experts in the absence of direct contact between them and anonymity. Method Pattern is that researched problem is divided into a number of sub problems, specific tasks and items subject to expert evaluation, then they are arranged in a “decision tree”, determine coefficients of importance of each task, each element; estimates were put forward by experts are subject an open discussion. The disadvantage is the lack of clarity in building a “decision tree”, lack of clarity in the selection of experts.

The main stages of FVA are shown on Fig. 9.

The first stage (information and preparatory) begins with the selection of the object. This could be the creation of fundamentally new product of industrial or a household purpose or radical reconstruction of pre-existing one. Labor capacity in this case is the scientific research work. New object must meet certain criteria that make it ideal not only for now but for the future. An important criterion is a reduction of material capacity. Required also a choice of biologically clean technology. The quality of the new product needs to be protected by patents, licenses and so on. The group of developers includes economists, analysts, financiers and accountants.

The second stage (analytical and creative) provides a comprehensive constructive weighing of

the idea, puts forward a large number of alternative ideas, conducts their thorough theoretical consideration – assessing all the “pros” and “cons”. Condition of this stage implementation is multiversion of ideas.

A list of works carried out at this stage:

- formation of all possible functions of the object of analysis and its components;
- classification and grouping of functions, identifying major, main, supporting, unnecessary functions of researched system and its components;
- construction of a functional model of the object;
- analysis and evaluation of the significance of functions;
- the construction of functional and structural model of the object;
- analysis and evaluation of costs associated with the implementation of the identified functions;
- comparative analysis of features’ significance and costs of their implementation to identify areas with unreasonably high costs;
- carrying out a differentiated analysis for each of the functional area of reserves’ concentration of economy labor and material costs;
- search for new ideas and alternatives of more cost effective solutions;
- creative discussion of recommendations, proposals, opinions of independent experts selected for the method of “Delphi”, Pattern, etc .;
- preliminary elaboration of proposals formed by the creative team, their general systematization and by functions;

– analysis and formation of variants of practical object's implementation (product design, technology, etc.);

– registration of materials related to the realization of creative and analytical stage.

The third stage (balancing and commissioning) is associated with experimentation, bench verification of fundamentally new product. After identifying deficiencies including essential is possible to complete or partially repeat the 2nd stage.

At the fourth stage (currently-production) carry out an economic analysis of output, gross output, product and sales, analysis of products by the assortment (with the release of new models), product cost analysis, profitability in general and by type of products. At this stage, the analyst should clearly follow the identification of deficiencies and deviations from the standards set by the technological requirements and standards and must fix them strictly. Sometimes deficiencies are so essential that the new design is back for revision.

Fifth stage is commercial and sales. If all the products are manufactured by the enterprise, all the commissioning and balancing as well as currently-production processes are under the direct control. If all the products are released by the union, concern, corporation, etc., production control is necessary and more difficult. A large number of people involved in the discussion of "behavior" of new products and further analysis, at the results of which are formed the appropriate conclusions and recommendations about the revision.

Sixth stage (operational and control). Required reverse contact with the consumer, because the consumer of industrial products is the true connoisseur of reliability, durability, quality of products produced, so collection of necessary information, summarizing mass consumer opinions become sometimes more important than the conclusion of the most qualified expert.

Thus, the FVA is an effective tool of search reserves to reduce costs, based on cheaper ways of implementation of core functions while eliminating unnecessary.

7) Fundamental analysis – a comprehensive study of thorough nature of phenomena under study using mathematical tools and other complex tools.

8) Situation analysis is intended to solve specific management problems in terms of the

changed situation (economic, legal, political, etc.). It requires the implementation of systematic analytical study that would allow a comprehensive assessment of the situation and the consequences of decisions which was accepted, the ability to generate and analyze alternatives under uncertainty.

Conclusion

Consequently, there are many types of economic analysis, but in practice individual species in pure form are rare. At each level of management, a host of decisions are taken daily, which are supported by various types of economic analysis. The basis for making decisions on the regulation of production is operational analysis, which is characterized by the use of standard solutions. Operational analysis is used at all levels of management, but its share in the total volume of managerial decisions increases as we approach it directly to production.

For higher levels of managerial hierarchy characterized by strategic management, associated with planning and forecasting. As a rule, a comprehensive integrated economic analysis of individual associations and enterprises, a comprehensive analysis of the economic outlook for their development is used to solve strategic management tasks.

None of the specific types of economic analysis can exist without the other. Internal analysis is closely interwoven with the external, because the company can not exist within itself without maintaining the connection with the external environment: consumers, suppliers, financial institutions, insurance companies, etc. Perspective analysis can not be conducted without a retrospective analysis. Since the projected values of the activities of enterprises are always based on the analysis of indicators of past years.

The into branch analysis is closely linked to among branch, since the activities of the enterprise largely depends on the influence of external factors. But common in all types of economic analysis is that they all need timely, sufficient, complete, truthful and reliable information support.

References

1. *Vashchenko L. O. Information and methodological support for analysis of the financial condition of enterprises: the dissertation author's abstract of the candidate of economic sciences: 08.06.04 / L. O. Vashchenko; State Academy of Statistics,*

- Accounting and Auditing of the State Statistics Committee of Ukraine.* – K., 2005. – 20 p.
2. Golovko T. V. *Strategic analysis: Educational and methodical manual for independent study of discipline* / By edition M. V. Kuzhelnogo / T. V. Golovko, S. V. Sagova. – K.: KNEU, 2002. – 198 p.
 3. Zholonskyj E. *Financial and economic analysis of business of industrial companies* / E. Zholonskyj – H.: Faktor, 2007. – 320 p.
 4. Kindratska G.I. *Economic analysis: Textbook* / By edition prof. A. G. Zagorodnij / G. I. Kindratska, M. S. Bilyk, A. G. Zagorodnij. – 3-th edition, processed and supplemented – K.: Znannya, 2008. – 487 p.
 5. Kindratska G. I. *Structuring the economic analysis of the enterprise: management approach* / G. I. Kindratska, A. G. Zagorodni, M. S. Bilyk // *Bulletin of National University "Lviv Polytechnic". – Series: Management and Entrepreneurship in Ukraine: Stages of Development and Development Issues.* – 2007. – № 606. – P. 466–472.
 6. *Complex economic analysis of the enterprise* / By edition N. V. Vojtolovskyj, A. P. Kalinina, I. I. Mazurova. – SPb.: Piter, 2010. – 576 p.
 7. Korinko M. D. *Control and analysis of business entities in the conditions of its differentiation: theory, methodology, organization: monograph* / M. D. Korinko. – K.: IVC State Committee of Statistics of Ukraine, 2007. – 429 p.
 8. Kupalova G. I. *Theory of economic analysis: Tutorial* / Kupalova G. I. – K.: Znannya, 2008. – 639 p.
 9. Popovych P. Y. *Economic analysis of business entities* / P. Y. Popovych – K.: Znannya, 2008. – 630 p.
 10. *Problems and Prospects for the Development of Statistics, Audit and Economic Analysis: Collective Monograph* / By edition V. A. Derij. – Ternopil: Krok, 2016. – 362 p.
 11. Suharev P. M. *System approach to the definition of the essence of the financial potential of the enterprise* / P. M. Suharev, O. O. Batlukova // *Trade and Market of Ukraine: Thematic collection of scientific works.* – Donetsk: DonDUET, 2005. – Publication 19, Part 2. – P. 110–115.
 12. Sheremet A. D. *Complex analysis of economic activity* / A. D. Sheremet. – M.: INFRA-M, 2006. – 415 p.

UDC 657.631

V. Shkvir

PhD in Economics, Associate Professor

I. Borshchuk

PhD in Economics, Associate Professor
Lviv Polytechnic National University

METHODOLOGY OF CONSTRUCTION ACCOUNTING NOMENCLATURE CODES OF NON-AUTOMATIC INFORMATIONAL BASE OF COMPUTER ACCOUNTING SYSTEM

Abstract. The basic approaches for creation a computer accounting informational system (KIS-BO) have been determined and the theoretical aspects of designing non-automatic information base (IB) have been found out. The main emphasis is on such a component of ectopic IB, as the codes of accounting nomenclature, because the further effective exploitation of KIS-BO depends on their rational construction. It is shown that classification and encoding is an undivided creation and operation element of the computer informational base. The aim of classification and encoding is to order and coordinate various objects, concepts, properties or other elements of information. The employment of codes can significantly reduce the amount of information and the complexity of its processing at all stages of the technological process of automated data processing.

The method of designing codes of accounting nomenclature is proposed and an example of this implementation is given.

Key words: computer information accounting system, information support, non-automated information base, machine information base, classification and encoding of information.

The formulation of the problem

Nowadays, there are a lot of options for creating computer accounting information systems that can be purchased as a product in the form of a set of software, a so-called “by pattern” solution (including foreign programs). Another approach is to buy and integrate components. It is also possible that the development of the system is transferred to a third side in order to reduce costs. Although the options are considered especially for sufficiently financially strong enterprises, on which it is possible to build an information system on its own.

Regardless of the variants of creation of KIS-BO, for which specialists develop a machine-based information base in a qualified manner, the issue of designing a machine-based information base of such a system remains incomplete. Mostly, KIS-BO does not count the specifics of the company’s operating, which will exploit this system. The most important part of the machine tool IB are codes of the accounting nomenclature, because the encoding allows to establish the uniformity of the representation of all the signs, bring the information into a convenient for computer input and processing form, etc.

Based on their own practical experience in developing KIS-BO for budget organizations, machine-building enterprises, exploration expeditions, and others, we are deeply convinced that accountants are the best-qualified subject area and only they understand which codes are most convenient for accounting and with which codes can clearly trace the essence of accounting processes. Therefore, the codes of accounting nomenclature for the machine tool IB KIS-BO should be developed primarily by the accountants who will operate this system, and accordingly, the theoretical and practical aspects of building the codes of accounting nomenclature should be reflected in specific methodological recommendations for employees of the accounting services of enterprises and organizations.

Analysis of the latest researches and publications

It is observed a rapid implementation of information technology in all areas of

the socio-economic environment. The information accounting technology is developing specially quickly. Nowadays, none of the accounting workers can imagine professional activity without a computer. A question of using informational systems and technologies in accounting is the subject of researches for many scholars. Firstly, among the monographs we should highlight the work of Zavgorodniy VP [1], which describes in detail the methodology of designing automated accounting, control, analysis and audit systems. The work of Benko M.M. [2]. Ivakhnenko is very interesting in the application of information systems and technologies in accounting. He made a number of monographs in terms of computer auditing and internal control [3, 4]. Many scholars cover similar issues in articles, investigating trends in the development of information technologies used in accounting [5], peculiarities of the application of computer technologies for automation of accounting in enterprises [6], and others. Special attention is paid to such issues in a number of textbooks and tutorials [7-10], which is explained to a certain extent by the fact that the normative discipline "Information Systems and Technologies in Accounting and Auditing" is being studied by prospective accountants at the Bachelor level of higher educational institutions of Ukraine. However, a number of aspects of building a computer accounting system are generally not disclosed, or are mentioned too superficially in scientific works. Firstly this question is related to the questions of construction of the machine-tool information base KIS-BO and, in particular, the design of the codes of accounting nomenclatures. That is why there is a need of better researches in these questions.

The purpose of the article is to develop a methodology of accounting nomenclature codes of non-automatic informational base KIS-BO by the accounting workers and to show its practical application.

The presentation of the main material

First of all, we find out the concept of computer accounting system. Some authors [9] interpret it as an automated information system of accounting (AIS-BO). One of the important places in the information systems of enterprises takes up the function of accounting. We note that the study of this function is given sufficient attention in

scientific works, for example, in [11]. For full realization of the functions of accounting in enterprise management and reporting, which is provided to external users, it is necessary to collect, register, transmit, accumulate, store and process credentials. For the implementation of this information process, appropriate forms of organization of work, technical means, methods and ways of data conversion, as well as personnel of a certain qualification are required. All of this is an automated information system of accounting, which is an integral part of the enterprise's CIS (AIS).

A computerized or automated information system of accounting is a system in which the information process of accounting is automated through the use of special methods of data processing in which a set of computing, communication and other technical means for the purpose of obtaining and delivering the information required by specialist accountants for the functions of management and financial accounting are used.

KIS-BO implements certain information technologies. For their implementation, KIS-BO has a set of security components, in particular: informational, technical, mathematical, software, linguistic, organizational, technological, legal, methodological and ergonomic support.

Analyzing the purpose of the research, primarily we are interested in the information support KIS-BO, so we emphasize on this concept. The organization of solving any economic task is based on information provision (IZ), which means a set of decisions on the volume, location and forms of organization of information. The decision relates to classification and coding systems, unified documentation systems and data files. The listed components are organized in the form of information base – a set of ordered information used in the operation of IP. The structure of the IZ is shown in Fig. 1.

Information support includes methodical and guidance documents, classification and coding systems and information base.

IB is subdivided into automatic and non-automatic. IB which includes organizational and information documents is non-automatic. A person can easily understand this kind of IB without computers. Automatic IB it is a set of data recorded on carriers (information arrays).

The non-automatic IB combines all the documents used in the management system, which can be divided into two groups: organizational and informational.

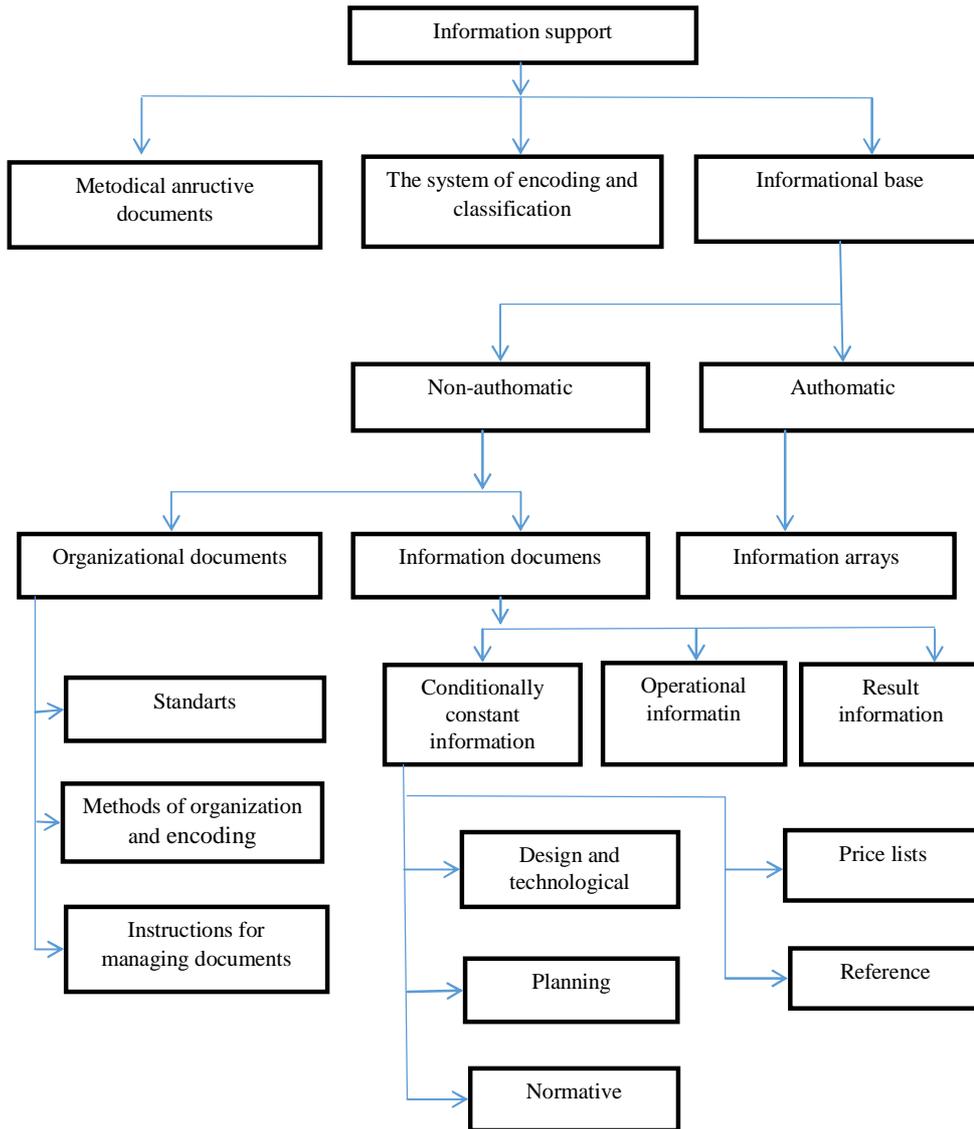


Fig. 1. Structure of information support

The first group includes standards, methods and instructions for the classification and coding of economic information, instructions for filling and adjusting documents. The second group contains documentation with conditional-constant, operational (it records all operations of production and economic activity) and the resulting information.

Conditional information is contained in the design and technological, planning and normative documentation, as well as in price lists.

The rest of the documents circulating in the enterprise management system are operational information (invoices, outfits, acts, accounts, etc.). The rest of the documents circulating in the enterprise management system are operational

information (invoices, outfits, acts, accounts, etc.). The results include information, tables, graphs and charts that are obtained after solving the problem.

The machine information base KIS-BU is designed only by specialists in the field of computer systems. Now there are many options for the creation of the CIS. Generalizing approaches to the construction of the computer information systems, which are given in [7, p. 254, 10, p. 237] we have the following bases: 1) acquisition the of SIS-BO in the form of a set of software called a turnkey solution” (including foreign programs); 2) acquisition of software components and their integration; 3) the development of a system, which is given to a third party in order to reduce costs; 4) construction of the information system by own forces.

CIDs that implement accounting functions and which are represented in the market of software products in Ukraine, what means, that they can be purchased “turnkey”, are widely considered in [7,9]. CID accounting is represented by hundreds of PPPs of different companies producing software products and implement the main tasks of the classical sections of accounting – accounting for fixed assets, accounting for labor and wages, etc.

But along with the development of a machine information base, it is equally important for the successful operation of the CIS and, in particular, the KIS-BO, the development of an off-machine IB, in particular its component, as the codes of accounting nomenclature.

Note that classification and encoding are an integral part of the creation and operation of computer ICs. The purpose of classification and encoding is to streamline and reconcile various objects, concepts, properties or other elements of information.

The use of codes can significantly reduce the amount of information and the complexity of its processing at all stages of the technological process of automated data processing.

Based on their own practical experience in developing KIS-BO for budget organizations, machine-building enterprises, and others. we are deeply convinced that the best specialists at the subject area are accountants and only they understand which codes are most convenient for accounting and by which one it is possible to see clearly the essence of accounting processes. On our opinion, the codes of accounting nomenclature for the machine tool IB KIS-BO should be developed by the accountants who will operate this system. To do this, they need to have a deeper theoretical knowledge and practical aspects of performing such a work.

To construct a methodology for carrying out work on the coding of accounting nomenclatures, consider the basic concepts of classification and coding information.

Classification and encoding are two inseparable parts of one process – the translation of various economic information from the natural

language into the formalized language of the computer. The basic terms and concepts of this industry are : classification; classification system; classification group; coding; code; code alphabet; digit code; code length; code structure; classifier. The content of these terms and concepts are discussed in detail in [10, p. 63-64].

It should be noted that distinguish two basic methods of classification – hierarchical and facet.

The choice of a particular method of classification depends on the researching purpose of the economic data and should be performed taking into account the satisfaction of the requirements of the entire complex of management tasks.

Why do we encrypt credentials? The purpose of encoding the economic data nomenclature is to provide information in a compact and convenient form. Encoding allows you to set the monotony of the representation of all the signs, bring the information to a form that is convenient for input and processing using computers. The need for coding is due to the peculiarities of economic information: its large volumes, high specific weight of alphabetical information, the predominance of logical operations in the processing, and the growth of volumes of information transmitted through communication channels.

Codes facilitate the recognition of object features and enable their control, simplify and speed up the recording of information on any medium and the provision of various references. The use of codes greatly facilitates the grouping of information, the share of which during data processing is significant. Without the use of the codes for this operation, it would be significantly hampered by the large number of objects taken into account and by their complex, ramified classification.

The use of codes greatly facilitates the grouping of information, the share of which during data processing is significant. Without the use of the codes for this operation, it would be significantly hampered by the large number of objects taken into account and by their complex, ramified classification.

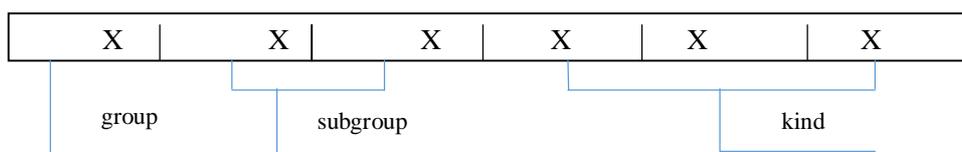


Fig. 2. The example of imagine of the code structure

Recall that the process of encoding is the assignment of symbols to various objects of a defined nomenclature according to the rules on the basis of the alphabet adopted for this, and the set of rules that assign codes to individual items of the nomenclature, is a method or system of coding.

Numbers, letters, symbols which are used in code marking are called code alphabets. Codes have a certain length (L) – the number of characters in the code and the structure-order of the placement of characters in it. For example, if a set of elements of A is systematized in 8 groups, within groups of 30 subgroups and in each subgroup of more than 100 species, then the structure of the code can be presented as shown in Fig. 2. The length of the code mark for this set-6 (L = 6).

Codes can be categorized according to the number of characters, in form, depending on the alphabet used for coding, but the most accepted classification is based on the construction principle. On the principle of construction distinguish serial, serial coding systems, the system of repetition, bit (positional) and combined coding system. Let's consider more detailed the essence of the ordinal, serial, bit (positional), combined coding systems and the system of repetition.

The order system is used to encode single-valued, stable, and simple nomenclatures. It involves assigning objects to digital numbers in the sequence of their placement in the range from a natural number of numbers without spaces. New items of the nomenclature receive the next code mark at the end of the systematic list, and violates the established classification and internal order of coded items. In addition, the classifier, built on the order system, does not distinguish groups of homogeneous features. So: the benefits of the system-the ease of constructing codes, small value, the density of records; disadvantages – it is not expected to group objects by feature; with the advent of new objects in this nomenclature violated accepted classification.

The serial system is intended for the coding of similar simple nomenclatures, having incomplete classification, for example, on two grounds. Encoding an older character, a series of numbers is assigned, in which all elements of the younger sign are encoded in sequence. The size of the series is determined taking into account the number of elements of the younger sign and the necessary to reserve free numbers in the event of

expansion of the nomenclature. For new items, the code numbers from the reserve of free numbers of the corresponding series are assigned. Advantages – the most economical of the number of discharges, contains the necessary reserve of free rooms for new objects. Disadvantages – it's difficult to set the optimal number of free numbers and remember, the appearance of a large number of new positions can change the structure of the code.

The repetition system uses the letters or numerals that directly describe the encoded object (e.g., weight, object size, etc.) or data associated with it, such as location, address, etc. Advantages – easy to remember, because they express signs, naturally and logically predetermined. Disadvantages-limited use.

Discharge (position) system is used for the coding of complex multi-valued nomenclatures: each classification feature allocates a certain number of digits (positions), which depends on the number of objects in a particular classification group. The discharging system ensures the clarity and logic of the codes, the clear allocation of each classification mark, the convenience for the machine obsolete information, but, at the same time, needs to increase the bit number of the code. In addition, position codes are often characterized by complexity of construction, large length and insufficient flexibility in the case of their structural formation. By the bit coding system, the reserve of free numbers is determined by the very structure of the code. The advantage of bit-code is the clear allocation of each classification mark.

For the coding of large, multi-valued nomenclatures, which are characterized by the subordination and independence of individual classification features, use a combined system based on various combinations of coding principles for all systems under consideration. Combined codes, clear and logical in design, have the most rigorous structure, sufficient flexibility, they can be used for both hierarchical and multi-dimensional nomenclature.

Acquainted with the basic terms and concepts of classification and coding and based on the practical experience of conducting similar works, we will offer a method for constructing codes of accounting nomenclature. To design the codes an accountant is advisable to perform certain work in the following sequence:

- 1) determine the nomenclature of coded features;

2) make lists (filing cards) of the names of objects of each classification group;

3) systematize each nomenclature taking into account the accepted classification system;

4) choose the most rigorous coding system, that is, determine the rules for writing the code;

5) assign to each element of the nomenclature a code mark (code);

6) finalize the encoded nomenclature in the form of special code books (coders).

First of all, it is necessary to study the features, determine the nomenclature of coded objects, its dynamism, depth of classification.

The coding system is chosen on the basis of constructing various possible options and evaluating their effectiveness. After choosing a coding system, there is a need to collect and prepare the input data necessary for the direct compilation of a systematic summary of the names of classification groups and individual elements of the nomenclature, as well as their code markings.

Simultaneously with the direct compilation, coders develop their management system, intended to update codifiers, their centralized adjustment with the accumulation of information about changes, as well as for the prompt notification of users about the additions and changes made.

The compiled classifiers are experimentally tested, determining their correctness, adaptability to the solution of specific control problems in the conditions of machine data processing; At the same time it is possible to identify certain disadvantages, which are eliminated, making the appropriate adjustments. After approbation and adjustment, the classifiers are approved and put into action.

Apply the proposed coding technique for a specific example. Perhaps there was a need to encode units of measurement of material values. Accountant, based on primary documents to individual, writes a card (preferably heavy paper) the names of all available units of property (full title units, abbreviated, etc.). Let it be the following units of measurement: hryvnia, pennies; kilometer; ton; thing; shares of cents; centimeter; square kilometer; hundredweight; bottle; cubic kilometer; square meter; kilogram; decimetre; square decimeter; cubic meter; gram; roll; square centimeter; milligram; bundle; cubic decimeter; box; cubic centimeter.

In the future it is necessary to systematize units of measurement. After expanding the cards

with the written names of units of measurement of material values in groups (by type of units of measurement), we get the following result:

cost – hryvnia, penny, shares of cents;

length – kilometer, centimeter, decimeter;

Square – square kilometer, meter, decimeter, centimeter;

volume – liter, cubic kilometer, meter, decimeter, centimeter;

mass – ton, centner, kilogram, gram, milligram;

natural – a piece, a bottle, a roll, a pack, a box.

It raises the question of choosing the most rigorous coding system for units of measurement, that is, determining the rules for writing their code, so that by applying the coding method to each element of the nomenclature (units of measurement in this case) eventually assign a code mark (code) and finally issue coded nomenclature in the form of special code books (codifiers).

Knowing the advantages and disadvantages of different coding systems, given above, we encode units of measurement for order, serial and bit systems. The results will be presented in tabular form.

In order to select the final version of the coding, we analyze the results obtained according to different criteria of the effectiveness of constructing the code of units of measurement of material values, in particular: the small length of the code (the probability of occurrence of errors decreases when the code is entered into the computer); record density; possibility of grouping on a certain sign; the possibility of assigning codes to new nomenclatures without breaking the code structure, etc.

By the ordinal coding system, we assigned the ordinal numbers of each unit of measurement (see Table 1), based on the rules for constructing such codes. The last ordinal code of the unit of measurement is 25. The length of the code in this case is two digits. The advantages of this encoding system are the ease of constructing codes, the small size, the density of records. Disadvantages – the grouping of objects is not foreseen; with the appearance of new objects of this nomenclature breaks the accepted classification, that is, if a new unit of measurement, for example a mile, appears, then it assigns the next free serial number – 26. Since the mile will no longer be in the group of units of length, it is difficult to group by, for example the type of unit of measurement “length”, etc.

Codes of measurement units for different coding systems

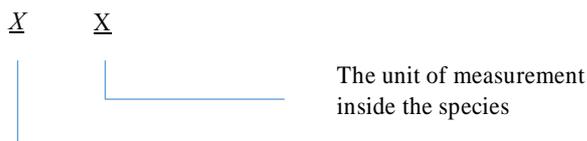
Name of the type and unit of measurement of material value	Unit of measurement code		
	ordinal	serial	bit
<i>Quantitative</i>		01-06	10
Ghruvnia	01	01	11
kopeck	02	02	12
shares of kopeck	03	03 reserve 04-06	13
<i>Lenght</i>		07-12	20
kilometr	04	07	21
centimetr	05	08	22
decimetr	06	09 reserve 10-12	23
<i>Square</i>		13-20	30
square kilometr	07	13	31
square meter	08	14	32
square decimetr	09	15	33
square centimetr	10	16 17 reserve-20	34
<i>Volume</i>		21-29	40
liter	11	21	41
cubic kilometr	12	22	42
cubic meter	13	23	43
cubic decimetr	14	24	44
cubic centimetr	15	25 reserve 26-29	45
<i>Weight</i>		30-39	50
ton	16	30	51
centner	17	31	52
kilograms	18	32	53
grams	19	33	54
milligram	20	34 reserve 35-39	55
<i>Natural</i>		40-49	60
piece	21	40	61
bottle	22	41	62
roll	23	42	63
packet	24	43	64
box	25	44 reserve 45-49	65

Let's code units of measurement by serial coding system. For our example, for each type of measurement unit, let's take a series of numbers, taking into account the existing number of units of measurement within each species, and we will necessarily leave the reserve of free numbers for new units of measurement of this type (in case of such appearance). The reserve is difficult to determine, it is established, based on practical experience, real economic and trade relations of the enterprise, etc. The advantage: it is the most economical system by the number of discharges, contains the necessary reserve of free numbers for new objects.

Disadvantages – it is difficult to establish and remember the optimal amount of free numbers. The appearance of a large amount of new positions can change the structure of the code. So, we do not know how many new units of measurement may appear. Units, which are left for this kind of unit of measurement of free numbers, are sometimes not

enough. For example, among the cost units of measurement will appear such cost units of measurement, as the euro, the dollar, yuan, yen. The unit value, the yen, will no longer have the free reserved code in the “cost” group, since the remaining codes are assigned to the euro, the dollar and the yuan. It will break the classification. If you leave a large reserve of free numbers for each type of measurement unit (for example, 10000), then the value of the code will increase (the code length for our example will be 5 symbols), which will increase the likelihood of an error occurring during the set of information.

By the bit coding system, the reserve of free numbers is determined by the structure of the code. Since we have six types of measurement units, and within each of the types there are no more than five actual units of measurement, so for our example, the structure of the code of the units of measurement will be as follows:



For types of measurement units, one digit is assigned and one digit for the actual measurement units. Therefore, we can encode nine types of measurement units (volume, weight, natural, etc.) and nine other actual units of measurement inside each species. You can leave two digits for the units of measurement (99 positions), and the code will be three-digit. If necessary (there are more than ten types of measurement units) the length of the code will have four digits. It all depends on a deep and comprehensive analysis of the work of a particular company, analysis of partner relationships, etc. For our example, the construction of the code of measurement units by the bit coding system is optimal from the positions of machine processing information (grouping information, sampling, etc.).

The advantage of bit-code is the clear allocation of each classification feature. After making a final decision regarding the encoding of units of measurement of material values, the cards display the designed code symbols (codes) and ultimately, based on such cards, codebooks (coders) are compiled mostly in electronic form. Again, we note that accountants who will use KIS-BO will build such codes the best, since they only have deep knowledge of accounting nomenclature. Of course, they may need help from specialists of KIS-BO developers or firms that bind existing market-based accounting software products to specific terms of use. But such assistance will only concern information about length, type, format, etc. characteristics of the requisites programmed in the system in the structure of the array records of the machine information base. This will allow the accountant to determine the maximum possible length of the relevant codes of accounting nomenclature, which he will develop for the on-machine information center KIS-BO acquired by the enterprise in the market of software products for further exploitation.

Conclusions and perspectives of further research

Consequently, the codes of accounting nomenclature, as one of the components of the machine-tool information base KIS-BO, should primarily develop accountants who will operate this system. Using the coding method proposed in the article and having a thorough knowledge of the

accounting processes of an enterprise, only the accountant can design effective codes of accounting nomenclatures. That will allow to establish the uniformity of representation of all signs, to bring information into a form convenient for input and processing by means of computers, will be the most rational the point of view of their construction, etc.

The subject of further research is the creation of a methodology for designing primary accounting documents that would correspond to the form of construction of the requirements for automated processing of information as an important component of the off-vehicle information base KIS-BO.

References

1. Zavgorodniy, V. P. (1998). *Avtomatyzatsiia bukhhalterskoho obliku, kontroliu, analizu ta audytu. [Automation of accounting, control, analysis and audit]*. Kyiv: ASK (Economics, Finance, Law).
2. Benko, M. M. (2010). *Informatsiini systemy i tekhnolohii v bukhhalterskomu obliku [Information systems and technologies in accounting]*. Kyiv: Kyiv. nats. auction. – econ. Unt.
3. Ivakhnenkov, S. V. (2010). *Informatsiini tekhnolohii audytu ta vnutrishnohospodarskoho kontroliu v konteksti svitovoi informatsii [Information technology of audit and internal control in the context of world information. Zhytonyr: PE "Ruta"]*
4. Ivakhnenkov, S. V. (2005). *Kompiuternyi audyt: kontrolni metodyky i tekhnolohii [Computer audit: control techniques and technologies]*. K : Knowledge
5. Pikulina, N. Yu. & Shilo, L. A. (2013). *Trends in the development of information technologies used in accounting, auditing and internal control. Problemy ekonomiky transport. [Problems of Transport Economics]*,6, 68-75. [in Ukrainian].
6. Polishchuk, O. M. (2014). *Peculiarities of application of computer technologies for automation of accounting on enterprises. Ekonomichni nauky. Seriya "Oblik i finansy". [Economic sciences. The series "Accounting and Finance"]*, 11 (41), part 2, 287–292. [in Ukrainian].
7. Ivakhnenkov, S. V. (2013). *Informatsiini tekhnolohii v orhanizatsii bukhhalterskoho obliku ta audytu [Information technology in the organization of accounting and auditin]*. Kyiv: Znannia-Pres [in Ukrainian].
8. Susidenko, V. T. (2016). *Informatsiini systemy i tekhnolohii [Information systems and technologies]*. Kyiv: Tsent uchbovoi literatury. [in Ukrainian].
9. Shuremov, E. L., Ummov, E. A., & Voropaev, T. V. (2001). *Avtomatizirovannye informacionnye systemy buhgalterskogo ucheta, analiza, audita. [Automated informational accounting systems, analysis, audit]*. SPb: Perspektiva. [in Russian].
10. Shkvir, V. D., Zagorodniy, A. G. & Vysochan, O. S. (2017). *Informatsiini systemy i tekhnolohii v obliku ta audyti [Information systems and technologies in accounting and auditing: textbook]*. (4thed., rev). Lviv: Lviv Polytechnic Publishing House. [in Ukrainian].
11. Lemishovska, O. (2015). *Metodical bases of fundamental works on accounting by comparative aspect. Economics, Entrepreneurship, Management*, 2 (2), 27–32. <https://doi.org/10.23939/eem2015.02.02>.

UDC 336.747.5

A. Zahorodniy

PhD in Economics, Professor

H. Partyn

PhD in Economics, Professor

Lviv Polytechnic National University

CRYPTO CURRENCY – A VIRTUAL PHENOMENON WHICH CAN DESTABILIZE FINANCIAL MARKETS

Abstract. The article considers the essence of a new financial instrument – the crypto currency, which is a kind of electronic money, its essence, specific features, the classification of types, advantages and disadvantages of traditional currencies, as well as prospects for further development of crypto currencies from the point of view of their impact on financial markets.

Key words: financial markets, financial instruments, electronic money, Bitcoin, crypto currency, advantages and disadvantages of the crypto currency, impact of crypto currencies on the stability of financial markets.

Formulation of the problem

The crypto currency, in comparison with other monetary instruments of the financial market, has certain advantages and disadvantages, which are caused by its virtuality, methods of emission, circulation and accounting. The problematic issues today include the question of assessing the potential of the positive and negative impact of crypto currencies and their technologies on financial markets.

Analysis of recent research and publications

Since the emergence of the first crypto currency in the financial market, this phenomenon has attracted the attention of many scholars and institutional establishments, in particular banking ones. The analytical research on the crypto currency essence conducted by the European Banking Authority [1] and the European Central Bank [2] is worth noting. In the latest research, this virtual currency is defined as a digital representation of value, not issued by a central bank, credit institution or e-money institution, which in some circumstances can be used as an

alternative to money. [2, p. 4]. A lot of scientific works of Ukrainian and foreign scientists, in particular of T. Kovalchuk and K. Polyvoda are devoted to the urgent problems of the creation and use of crypto currencies, in particular their impact on financial markets, who, based on the analysis of the formation and strengthening of the crypto currency, argue that the digital currency is a virtual source of fictitious capital [3]; V. Dostov, V. Kuznietsov, P. Shust, who regard the electronic money primarily as an instrument for optimizing payment transactions [4]; O. Lobachova and V. Rodionova, who carried out the analysis of innovations, including virtual currencies, and their influence on the development of payment systems [5]; V. Lukianov, who maintains that crypto currencies are infographic-monetary symbols, quasi-substitutes of paper money [6]; H. Kartcheva, V. Kavetskyi, R. Lernasovych and S. Nikitchuk, who carried out the research on the peculiarities of the development of virtual currencies and underlying blockchain-technologies, their disadvantages, prospects and influence on the financial system [7; 8]; S. Volosovych, whose research subject was the substantiation of development prospects of the crypto currency sphere [9] and other scholars.

The purpose of the research

The purpose of the article is to analyze the influence of the crypto currency on financial markets, in particular, to identify the factors that may have a destabilizing effect on these markets. The purpose is to implement the following main tasks: to detect the main differences between the crypto currency and fiat and electronic money; to carry out the classification of the crypto currency

on the grounds inherent in traditional money; to analyze the main advantages and disadvantages of the crypto currency; to predict the impact of crypto currency threats (destabilizing factors) on financial markets.

Material and results

The financial market is a system of economic and legal relations connected with the issue (emission), purchase and sale and circulation of financial instruments, the essence of which is legal requirements of their owners for the future receipt of certain monetary income. The combination of financial instruments (various types of a market financial product – monetary obligations, a currency, securities, options, futures, loan agreements, insurance policies, precious metals, etc.) owned by a legal or physical entity

ensures the formation and use of their assets. Because of this, the terms “financial instruments” and “financial assets” are often identified, although the first concept in terms of its economic content is somewhat broader, since assets are only those means that bring their owners real income. There are a lot of classification features of financial instruments, in particular: the nature of financial obligations; priority significance; the term of financial instrument circulation in the market; the guarantee of a profitability level; the level of regulation; the level of risks; market globality and other features. According to the types of financial markets, financial instruments are divided into instruments of the currency, credit, stock, insurance markets and precious metals market (see Table 1) [10, p. 296–297, 649–650].

Table 1

Types of financial markets and financial instruments inherent in them

Types of financial markets	Types of financial instruments
Currency market	Foreign currency, account documents in the foreign currency, certain types of securities servicing this market
Monetary market	Money and account documents of the monetary market
Stock market	Securities and derivatives
Insurance market	Insurance and reinsurance services
Precious metals market	Precious metals (gold, silver and individual metals of iridio-platinum group-payer, palladium, iridium, osmium and others), which form part of state’s currency reserves

It can be concluded from the information given in Table 1 that each of the financial markets and each of the financial instruments (types of a market financial product) has a common feature – monetary measurement or monetary value. Therefore, the financial market is directly related to money circulation and money (currency) has a significant impact on its functioning.

In the process of evolutionary development, money has passed three most important stages:

commodity money that was related to barter exchange;

full value money when mostly gold or silver ingots or coins played the role of money;

fiat (fiduciary, loan or fiat) money, the nominal value of which is determined, established and guaranteed by the state, and this value does not depend on the cost of the metal from which it is made. Today, most paper money is fiat, which is not secured money (has nothing but trust to the state).

The kind of fiat money is electronic money – a conventional name of the money used in electronic banking services. Electronic money circulates without using paper (banknotes) or metal (coins) bearers, but through the introduction of computer technology and modern information systems into the payment sphere. The main advantages of electronic money for remote payments are: convenience for online stores and providers, since payments are made practically instantly; competitiveness over banking, and, moreover, a postal transfer; a low risk of settlement transactions; adaptability to the remote nature of payments. Due to this, electronic money is characterized as a framework technology, which “provides necessary flexibility in the process of meeting the needs of customers and gives additional competitive advantages in comparison with cash” [4, p. 11]. Electronic money is an economical, convenient and progressive bearer of monetary functions, which significantly accelerates

cashless payments and is an instrument for optimizing payment transactions. The main feature of electronic money is that it is used, as regulated by the normative documents of the international financial institutions (the World Bank, the European Central Bank, the Bank for International Settlements, etc.), not by central banks, but by special lending institutions (banks or authorized financial institutions) within the limits of a certain amount of traditional (fiat) money previously received from the owner, which serves as a guarantee of the issued estimated amount [10, p. 153].

At the beginning of the third millennium, a new financial phenomenon, called Bitcoin (from English Bitcoin, combining two terms: bit – a minimum unit of the computer memory and coin – a coin), emerged unexpectedly on the financial market for its stakeholders. Bitcoin is:

firstly, a decentralized payment system, for the protection and operation of which cryptographic algorithms are used. In this system, transaction accounting is carried out with the help of the same name the crypto currency “Bitcoin” and the same protocol of data transfer. The system allows making payments without intermediaries – banks and other payment systems. The concept of this system, in the form of a file describing the protocol and principles of work, was promulgated in 2008 by the so-called Satoshi Nakamoto, whose personality is still not established (perhaps a group of people under the pseudonym). The main feature of the Bitcoin payment system is its complete decentralization, that is, the absence of a central administrator or any of its counterparts. An electronic payment in this system is irreversible, as there is no mechanism for cancelling a confirmed transaction or forcing a currency withdrawal. No one can block (arrest) money even temporarily, except for the owner himself;

secondly, a monetary unit of the virtual (digital) currency used in the Bitcoin payment system. The code of this currency is generated by the corresponding formula as a result of complex mathematical calculations using computers. The number of possible Bitcoins is registered in the program code, and is limited (21 million coins). The additional issue of the currency is impossible. This is an advantage of Bitcoin over official world currencies, whose new emissions can be caused by their depreciation and inflation. The Bitcoin rate is determined by the ratio of demand and supply. For the abbreviated symbol of Bitcoin, the Latin letters

BTC are used. The Bitcoin graphic symbol “₿” is included in the Unicode version 10.0. The American company “Casascius Bitcoin Mint” in 2011 began the issue of metal Bitcoin coins of various denominations. Such coins are in fact “autonomous wallets”, which indicate the Bitcoin address, and their secret key is hidden under a one-time hologram.

Later on, this financial phenomenon was called the crypto currency. The emergence of this term is associated with the publication of the article about the Bitcoin payment system “Cripto currency” (“Cryptographic currency”) in the Forbes journal in 2011. The anonymous developer himself (or developers themselves) of the Bitcoin payment system and the same crypto-currency, like many other authors, used the term “electronic cash” (BrE. Electronic cash). Currently, today’s crypto-currency is a virtual (digital) currency, the issue and accounting of which are based on asymmetric encryption and application of various cryptographic (i.e., secret, hidden) methods of protection. A cryptographic unit (coin) is a code generated as a result of complex mathematical calculations. The coin is protected against counterfeiting because it contains encrypted information that cannot be copied. The crypto currency is different from traditional (fiat) money in that in order for the latter to appear in an electronic account, it must first be deposited to this account in real implementation, for example, through a bank or a payment terminal. The crypto currency is emitted directly in the network, and it is not related to any traditional currency or the national currency system. The main crypto currencies have a limited total emission. The key feature of the crypto currency is the absence of any internal or external administrator. Therefore, banks, tax, judicial and other public or private bodies cannot influence the transactions of stakeholders of the payment system of such a currency. The crypto currency transfer is irreversible – nobody can cancel, block, appeal or forcedly (without a private key) make a transaction. However, the parties of agreements may voluntarily temporarily and mutually block their crypto currencies as a pledge or decide that the completion or cancellation of the transaction requires the consent of all the parties. Anyone can receive the crypto currency from the network (this procedure is called mining). This needs only computer equipment of the required power and special software. The basis of all crypto

currencies is complex calculation of certain functions that can be easily verified by reverse mathematical actions, for example, the calculation of large prime numbers. In the process of mining, the computing device solves algorithms whose complexity is constantly increasing, and having solved, extracts a coin – a set of encrypted information. The proof of coin availability on the network is a blockchain – a kind of account (profile). The extraction of each new crypto currency unit is more difficult than the previous one, as the calculation process becomes more complicated. In addition, such a calculation involves the cost of a certain amount of electricity and computer time. The crypto currency is kept decentralized, i.e. it is distributed by electronic crypto wallets of the users [11; 12; 13; 14; 15].

The classic characteristics that distinguish the crypto currency from fiat and electronic money are as follows: the use of a pseudonym (Bitcoin-address); their extraction (mining) with the help of a computer; issue independent of the central bank; the democratic nature of a cryptosystem; displaying each transaction in an open database, which cannot be changed; minimum payment for a transaction; a high transaction speed; data retrieval, that is, the direction of computer capabilities to search for one of the millions of possible combinations of the only correct code, after which the owner obtains a crypto currency [8, p. 112].

Two centuries after the start of North American golden fevers (the end of the 18th century – the beginning of the 19th century), characterized by unorganized gold mining mainly in the artisanal way in newly discovered deposits, the world was gripped by the crypto currency fever, with its massive unorganized extraction (mining) of coins. The number of crypto currencies is constantly increasing. As of the beginning of 2018 (that is, 10 years after the emergence of the first virtual currency – Bitcoin), the number of crypto currencies was about 2,500 kinds. The total volume of the crypto currency market as of 01.01.2018 amounted to 612.9 billion dollars. In 2017, the market capitalization of the crypto currency grew by 34.6 (!) times. The share of each individual crypto currency in the total volume varies significantly. The first place in this list is occupied by Bitcoin – 236.7 billion (38.6 %). The volume of the next five crypto currencies amounts totally to 236.0 billion (38.5 %) in the volume of their market, namely: Ripple – 88.9 billion (14.5 %);

Ethereum – 73.1 billion (11.9 %); Bitcoin cash – 42.8 billion (7.0 %); Cardano – 18.6 billion (3.0 %); Litecoin – 12.6 billion (2.1 %). All the rest of the crypto currencies own only 22.9 % of the market [16].

The classification of the crypto currency is given in Table. 2.

Concerning convertibility, it is accepted to distinguish two main types of the crypto currency – a convertible (open) and inconvertible (closed) virtual currency. The essence of this classification feature is a chance to convert the crypto currency into fiat money and vice versa. This convertibility is not guaranteed by any legislation, therefore, does not mean its official convertibility. By the exchange rate, crypto currencies are divided into currencies with a floating rate determined by the market currency demand and supply, and with a fixed rate set by the administrator in terms of a fiat currency or other valuables (precious metals). By centralization, crypto currencies are distinguished as centralized and decentralized. Centralized ones are emitted by the central administrator who simultaneously controls the system, establishes rules for the use of currencies, maintains a centralized payment register and can remove the currency from circulation. All inconvertible crypto currencies are centralized, while convertible ones are divided into centralized and decentralized [7, p. 25-26]. Another feature of the classification is emission limit level – the emission of a certain crypto currency is limited to a certain amount of coins, whereas others do not have such restrictions [3, p. 5].

The features of the crypto currency cause its advantages and disadvantages in comparison with traditional currencies. These aspects of the functioning of the crypto currency are considered in the works of [5; 7; 8] and others. S. Volosovych in [9] carried out a SWOT analysis of virtual currency schemes, on the basis of which he concludes that this currency has its advantages, disadvantages, opportunities and threats of functioning. However, in the authors' opinion, to assess the role and prospects for the further development of such a virtual phenomenon as the crypto currency can be only through the prism of its impact on financial markets.

The potential of the positive impact of crypto currencies, their technologies and instruments on financial markets is due to the following:

Classification of crypto currencies

Classification feature	Types of crypto currencies
Convertibility	<ul style="list-style-type: none"> • convertible (open); • inconvertible (closed)
Exchange rate	<ul style="list-style-type: none"> • with a floating exchange rate; • with a fixed exchange rate
Centralization	<ul style="list-style-type: none"> • centralized; • decentralized
Emission limit level	<ul style="list-style-type: none"> • limited; • unlimited

Developed by the authors due to the information provided in [7, p. 25-26] and [3, p. 5].

a cheap, easy and fast way to make payments around the world is inherent in crypto currencies, which with some adaptation can be used in existing money transfer systems. Not without reason, the central banks of individual states (in particular, the Bank of England and the People’s Bank of China) are investigating, analyzing and beginning to introduce new financial technologies, first of all, the “blockchain” technology – the main platform for crypto currency circulation, as well as non-standard tools used in these technologies [17, p. 14] Since the need to improve the innovative tools of the national payment system is obvious, the chance of introducing the electronic hryvnia based on the “blockchain” technology, which allows creating a fundamentally new infrastructure of financial services, is also considered by the National Bank of Ukraine;

in connection with the fact that the emission limit level of many popular crypto currencies is restricted by the cryptographic method (for example, Bitcoin and Namecoin – 21 million coins, Litecoin – 84 million, Feathercoin – 336 million, Freicoin – 100 million coins, etc. [3, p. 6–7], their money supply is protected from unwarranted growth, therefore such crypto currencies are not characterized by the risk of inflation;

the exchange rate of crypto currencies, in connection with the decentralization of their functioning (independence of banking regulators), is formed solely on the basis of demand for them and their supply;

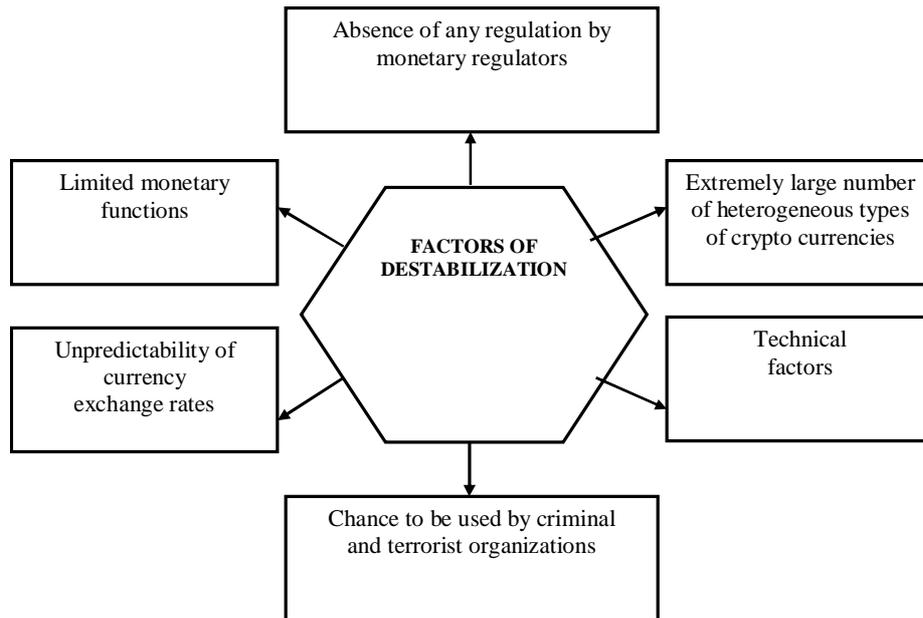
the stakeholders of the crypto currency market are rapidly forming its infrastructure – organize crypto exchanges that allow exchanging in real-time one crypto currency for another or for fiat money, install cryptomats (analogs of banking terminals in which one can buy a crypto currency for

cash) and other elements of infrastructure that allow buying and selling goods, buying a crypto currency, paying taxes and dividends, etc. For example, in autumn 2017 in Ukraine, where the legal status of the crypto currency is not defined, the first Bitcoin cryptomats were installed (6 in Kyiv and 2 in Kharkiv). It is expected that after testing these machines, their number will increase to 150.

Other benefits of the crypto currency include high adaptability to the financial environment, a free access to virtual currency schemes and anonymity of transactions. All these advantages provide potential opportunities for crypto currencies, namely: high innovation potential, financial inclusiveness (i.e. an access to financial services) and competition to traditional banking business [3, p. 26].

At the same time, crypto currencies are also characterized by significant drawbacks that are considered to be threats (destabilizing factors) to financial markets. There are at least six such basic threats (see Figure).

The main threat of crypto currencies to financial markets is that they, as a product of computer programming, are not subject to legislative regulation both in individual states and in the global electronic payment system. Monetary regulators today lack real opportunities to effectively influence virtual sources of the crypto currency formation. As V. Lukianov notes: “If intergovernmental associations and state central banks (in Ukraine, the National Bank of Ukraine) have a prudential influence on the development of the electronic money, the processes of creation and issue of crypto currencies are still completely spontaneous and decentralized” [6, p. 439]. A virtual and uncontrolled crypto currency can become a major destabilizing factor in financial markets.



Main factors of the crypto currency – destabilizers of financial markets

The crypto-currency is characterized by the limitation of monetary functions, that is, the main features of the concrete manifestation of the essence of money. Money, in accordance with the classical theory, serves as a measure of value, a means of circulation, a means of treasure formation, a means of payment and world money. In the modern neoclassical theory, there are three functions of money – a measure of accounting, a means of accounting, a means of preserving value (accumulation) [17, p. 49]. Scientists, in particular the authors of the article [5], believe that the crypto currency is not money in the usual sense of its functions, it only “performs the functions of servicing the processes of moving funds” as an instrument of “tracking transactions, settlement and payment transactions and exchange transactions in the channels of national money and world currencies” [5, p. 7]. In the joint statement of the financial regulators of Ukraine (the National Bank of Ukraine, the National Commission on Securities and Financial Market, the National Commission for Regulation in the field of financial services) of 30.11.2017, it is argued that “the complex nature of crypto currencies does not allow them to be recognized as either money funds, or currencies, or means of payment of another state, or currency value, or electronic money, or securities, or money surrogate” [19].

The number of different crypto currencies, as already mentioned above, is extremely large.

Proceeding from the dynamics of their number in recent years, it can be predicted that by the end of 2018 or at the very beginning of next year the number of crypto currencies will exceed the figure of 3,000. If to compare the number of crypto currencies (national and regional), as of the beginning of 2018 the number of the latter was slightly lower than 160, and crypto currencies – about 2,500, that is almost 16 times more. In addition, it is necessary to take into account the fact that crypto currencies differ a lot from each other, in particular: their issuers and emission process; methods of protection; software products that enable working with them, first of all – mining; convertibility; an exchange rate; emission limit level or its absence; other characteristics.

Practically unpredictable, and therefore very unexpected, very dynamic and powerful fluctuations in the rates of many crypto currencies (especially those in high demand) make them an unreliable and extremely risky financial instrument both for investing and speculative financial transactions. The authors absolutely agree with the scientists [3, p. 7], who argue that “the definition of the rate of crypto currencies is not subject to any logic and mathematical calculations”. As an example, the authors suggest considering the dynamics (relative to the US dollar) of the first most popular and most capitalized crypto currency, also called digital gold, – Bitcoin. The history of Bitcoin since its emergence in 2008 has undergone a huge number of ups and downs.

During the first three years of its existence in the crypto currency market the Bitcoin rate against the US dollar did not exceed one dollar. 2011 was the first year of the instability of the Bitcoin exchange rate. During this year, its value increased from 1 to 91 US dollars, and then began its rapid fall. However, in February 2013, there was a tendency to increase, and in a few weeks the Bitcoin rate rose to \$ 266, and after November 23, its value rose to an unprecedented mark – \$ 1,242. Between the beginning of 2014 and the end of 2015 there was a tendency to decrease the Bitcoin rate (average balancing at the mark of \$ 370 per Bitcoin), after which in the early 2016 a steep drop of up to \$ 50 per Bitcoin was recorded. During the May of that year, the cost of this crypto currency grew rapidly, reaching the mark of \$ 600 at the end of the month. In the December of that year, another record of the Bitcoin rate was broken – \$ 1,000. 2017 became the year of record growth of the Bitcoin rate, which in July of that year was already \$ 2,900, at the beginning of November, \$ 7,450, and in the middle of December approached \$ 19,000. Thus, in 2016 and 2017, the growth the Bitcoin rate approached 2,000 per cent per year. Anyone who understands even a bit in economic processes should come to the conclusion that such incomes are not gained without reason. Therefore, one should not reject the thoughts of those scholars and businessmen who argue that the crypto currency is a financial pyramid, because of its high volatility, a soap bubble that is going to burst sooner or later. Carefully analyzing the Bitcoin dynamics schedule in the second half of 2017 and the early 2018, one can observe the following regularity: the growth of the rate to a certain level, consolidation at this level, and in the future – a sharp fall in the exchange rate. It seems that this is done in order for the most experienced market stakeholders to be able to buy a certain number of Bitcoins at a low price, and after the Bitcoin rate is in the high, it is profitable to sell [20; 21; 22]. Price stability is not inherent in other crypto currencies, especially those that are in demand in the market. The rate of crypto currencies may be influenced by those crypto market stakeholders who own a large share of one or more such currencies, artificially manipulating the demand for them or their offer. This causes their unreliability as an investment tool.

Another destabilizing factor of crypto currencies for financial markets is a technical factor, which is caused by:

firstly, the need for technical preconditions for the organization of crypto currency circulation, namely: computer equipment of appropriate capacity, highly skilled computer experts, an access to the Internet network and the availability of necessary computer software;

and, secondly, technical risks that may be related to a computer malfunction, in particular its hard disk, a hacker attack, a theft or hacking of a personal computer, which may result in loss of real money.

And, in the end, crypto currencies can be used by criminal and terrorist organizations to implement various types of fraudulent financial schemes and money laundering, that is, the legalization of funds received by illegal (criminal) ways – income from the shadow business, from the manufacture and sale of weapons, drugs and money counterfeit, as well as for the financing of terrorist groups and the committing terrorist acts.

Each of these factors is a definite threat to financial markets. Despite a large number of crypto currencies and their high level of capitalization, the impact of the crypto currency market on financial markets today is insignificant, since their share in monetary circulation does not exceed several percent. However, this share is gradually going up, which may increase the destabilizing effect of the crypto currency on financial markets. Therefore, every stakeholder of financial markets should take into account the possible negative impact of the crypto currency market on economic processes, and every country, in the person of its financial regulator, must determine its policy on crypto currencies and a model for regulating their market. There may be several such models: repressive – involves the prohibition of crypto currencies; expected – the prohibition on crypto currency operations is absent, but there are limitations on their implementation; conservative – based on the licensing and application of instruments for regulating crypto currency transactions; liberal – official recognition of crypto currencies and transactions with them [9].

Conclusions

The crypto currency, as an electronic-digital product of computer origin, which is actively winning the global financial market, is a virtual financial phenomenon, a source of fictitious capital. The growth speed of the number of crypto

currencies, the number of their types and the rates of their capitalization is rapid, and market rates – unpredictable. Crypto currencies, in view of their technologies and instruments, can have a positive effect on financial markets. At the same time, excessive negative risks can significantly exceed the potential of the positive impact. These risks are global, since the circulation of crypto currencies has no borders, and will increase with the growth of the share of the crypto currency circulation. Ukraine, in which the crypto currency market with its positive and negative factors of influence increases from year to year, should determine the model of this market regulation, legislatively approve of the official institute of such regulation, in particular, the processes of emission, mining and circulation of the crypto currency, and its functions, and also predict and develop the mechanisms of influence (state regulation) in the market of virtual currencies.

References

1. EBA Opinion on "virtual currencies" (2014). European Banking Authority.
2. Virtual currency schemes – a further analysis (2015). European Central Bank.
3. Kovalchuk, T. & Palyvoda, K. (2014). Digital currency as a virtual source of fictitious capital. *Bankivska sprava*. [Banking], 1–2, 3–11. [in Ukrainian]
4. Dostov, V. L., Kuznetsov, V. A., & Shust, P. M. (2013). Electronic money as a tool for optimizing payment transactions. *Dengi i kredit* [Money and credit], 12, 7–13. [in Russian]
5. Lobacheva, E. N. & Rodionova, V. G. (2014). Innovations in the system of electronic payments. *Gumanitarnyi vesnik* [Humanitarian Newsletter], 1. Retrieved from <http://hmbul.bmstu.ru/catalog/econom/hidden/160.html>. [in Russian]
6. Lukyanov, V. S (2014). The emergence of cryptocurrency market in the information networking paradigm. *Aktualni problemy ekonomiky* [Actual problems of economics], 8 (158), 436–441. [in Ukrainian]
7. Karcheva, G. T. & Nikitchuk, S. M. (2015). Virtual innovative currencies as futures currencies. *Finansovyi prostir* [Financial space] ,2, 24–30. [in Ukrainian]
8. Karcheva, G., Leratovich, R., & Kavetsky, V. (2017). Using the "blockchain" technology as a factor in improving the efficiency of the financial sector. *Bankivska sprava*. [Banking], 2, 110–119. [in Ukrainian]
9. Volosovich, S. V. (2016). Virtual currency: globalization challenges and development prospects. *Ekonomika Ukrainy* [Ukraine economy], 4 (653), 68–78. [in Ukrainian]
10. Zagorodniy, A. H. & Voznyuk, G. L. (2011). *Finansovo-ekonomichnyi slovnyk* [Financial and Economic Dictionary]. Lviv: Publishing House of Lviv Polytechnic National University [in Ukrainian]
11. Popov, V. (2017). Shcho take kryptovaliuta? [What is crypto currency?]. Retrieved from <https://www.radiosvoboda.org/a/details/28742278.html> [in Ukrainian]
12. Kryptovaliuta: Zibraty po kryptakh [Cryptocurrency: Collect crypts]. (2017). Retrieved from <http://www.ukrjurist.com/?article/1402> [in Ukrainian]
13. Bitkoin, blokchein i maininh. Komu potribna kryptovaliuta i yak derzhavy yii kontroliuiut [Bitcoin, blockchain and mining. Who needs cryptocurrency and how states control it]. (2017). Retrieved from <https://tsn.ua/groshi/bitkoyin-blokcheyu-i-mayning-komu-potribna-kriptovalyuta-i-yak-derzhavi-yiyi-kontrolyuyut-1016475.html>. [in Ukrainian]
14. Chto takoe kryptovaliuta [What is crypto currency?] (2017). Retrieved from <http://onecoins.info/chtotakoe-kriptovalyuta.html>. [in Russian]
15. Kryptovaliuta [Cryptocurrency?] (2017). Retrieved from <https://uk.wikipedia.org/wiki/>. [in Ukrainian]
16. Kornilov D., Zaitsev, D., Evdokimov, N., Rayzin, M., Babaev, A., & Generalova, D. *Obzor rynka kryptovaliut i ISO za 2017 god* [Cryptocurrency market review and ISO for 2017] (2018). Retrieved from <https://anycoin.news/2018/01/05/obzor-rynka-ico-2017/>. [in Russian]
17. Nikolaichuk, S. & Pidvysotsky, R. (2016). International Research Conference "Transformation of central banks' activities". *Essential. Visnyk Natsionalnoho banku Ukrainy* [Visnyk of the National Bank], 6, 6–19. [in Ukrainian]
18. Bazylevych, V. D. & Bazylevych, K. S. (2006). *Rynkova ekonomika: osnovni poniattia i katehorii* [Market Economy: Key Concepts and Categories]. Kiev: Znannia [in Ukrainian]
19. Spilna zaiava finansovykh rehuliatoriv shchodo statusu kryptovaliut v Ukraini [Joint statement of financial regulators on the status of cryptocurrency in Ukraine] (2017). Retrieved from https://bank.gov.ua/control/uk/publish/printable_article?art_id=59735329&showTitle=true. [in Ukrainian]
20. Grafik izmeneniia kursa bitkoina za vse vremia [The schedule for changing bitcoin rate for all time] (2017). Retrieved from <https://coinnet.ru/obzory/grafik-kursa-bitcoina.html>. [in Russian]
21. Istoriia bitkoina – grafik kursa stoimosti bitkoina za vse vremia [Bitcoin's history – the schedule of the rate of bitcoin cost for all time] (2017). Retrieved from <http://great-word.ru/istoriya-bitkoina-grafik-kursa/>. [in Russian]
22. Dinamika kursa dollara SShA k bitkoin (USD/BTC). [Dynamics of the US dollar to bitcoin rate (USD/BTC)] (2018). Retrieved from <https://fjinstat.info/dinamika-kursa-dollar-ssha-k-bitkoin-usd-btc>. [in Russian]

UDC 330.016

A. Chushak-Holoborodko

PhD in Economics, Associate professor

O. Didukh

PhD in Economics, Senior lecturer

R. Zaderetska

PhD in Economics, Assistant professor

Lviv Polytechnic National University

DETERMINING THE EFFICIENCY OF THE FINANCIAL OUTSOURCING USE BY AN ENTERPRISE-CUSTOMER

Abstract. The article disclosed the essence of the financial outsourcing and its place in the outsourcing activity system of an enterprise-customer. It is determined that financial outsourcing can be considered as one of the subspecies of management processes outsourcing. The delegation of financial functions to the third-party organization has a number of advantages, but this is also rather risky considering the importance of such a function qualitative performing. That is why the determination of financial outsourcing efficiency is an important task. So it is proposed to use a complex of indicators, as it would enable consideration of all peculiarities of this activity. To determine the result of delegating the financial functions to outsourcer, one should first of all estimate the cost efficiency of such an activity. It is also important to compare rate of growth in profits and income before and after outsourcing implementation. We should mention that different functions, which are being delegated to the third-party, influence on different sides of enterprise-customer activity, so the system of indicators is being determined and the main of them have been calculated by the example of domestic enterprises.

Key words: outsourcing, financial outsourcing, outsourcing activity, outsourcing cost efficiency, indicators of outsourcing efficiency.

Problem statement

Outsourcing use at the Ukrainian enterprises became a prerequisite for their activities optimization. Modern economic conditions stipulate for the necessity of cost reduction and the certain functions duration shortening with the preservation of the required quality level of products and

services that are provided to the consumer. One of the outsourcing types, which is being actively implemented by the domestic and foreign enterprises today is the financial outsourcing. So the evaluation of this type of outsourcing use efficiency by the enterprise-customer is an important task in order to avoid unpredictable financial consequences, in particular, the situation, when delegation of some functions to outsourcer is ineffective.

Relevance of the selected topic

In the domestic economy conditions, the financial outsourcing use sometimes is riskier comparing with another types of outsourcing, since in this case the information about financial and accounting calculations is being transmitted. So the formation of mechanism for determining the efficiency of some financial functions delegation to the third-party organization is urgent.

Analysis of the recent researches and publications

The investigation of the essence and evaluation features of the financial outsourcing use have been realized by many scientists, such as O. Lohvinova, A. Isavnin, V. Kosmina, O. Kalendzhian, L. Omelchenko, O. Laktyonova, N. Mandra and others. However, in the studies of both native and foreign scientists only the certain aspect of outsourcing efficiency determination is very often considered, and consequently the comprehensive

approach, which would reckon all the peculiarities of this activity, is absent.

Purpose and tasks

The aim of the article is to develop a comprehensive approach for determining the efficiency of financial outsourcing use by the domestic enterprises-customers.

Exposition of the main research material and the results obtained

Generally outsourcing is an instrument of the enterprise production and economic activities management, which provides for the delegation to the third-party organization of a part of both secondary and main functions on the basis of the established contract and for a certain fee; it stipulates for the entrepreneurial activities optimization and in some cases, for the additional involvement of employees, and is directed on the activities competitiveness increasing. So we may conclude that the financial outsourcing is one of the outsourcing types, which provides for the realization of financial functions by the third-party organization or the involved external employee in accordance with the established contract and for a certain fee. Interconnection and a place of the financial outsourcing in the enterprise outsourcing activities in general is shown in Fig. 1.

Sufficiently exhaustive and complete definition of financial outsourcing types was presented by O. Bilotserkivkii and Yu. Chudnovets. In parti-

cular, they singled out: outsourcing in accounting; outsourcing in taxation; outsourcing in the sphere of banking services; outsourcing in the field of financial-investment and financial-economic analysis; outsourcing in management (accounting, control, incomes and costs planning, analysis of financial indicators etc.). This classification of financial outsourcing types should be supplemented with the outsourcing in business planning and in the sphere of internal audit (before the revision audit of the financial statements) [7]. We should note that outsourcing in the business planning is not very developed on the domestic enterprises, because this type of activity is of a strategic character and is one of the most important for the business entity activities.

The financial outsourcing use stipulate for the range of advantages appearance, namely:

- costs reduction (the cost of outsourcing company services is usually lower than out-of-pocket expenses on the financial department maintenance);
- quality improvement of the performance of financial functions delegated (outsourcer's employees better understand changes in legislation and innovative projects as they specialize in the realization of certain functions);
- an increase of financial information objectivity (reducing the shenanigans risk) [1, p. 272];
- a possibility to concentrate on the execution of one's main duties.

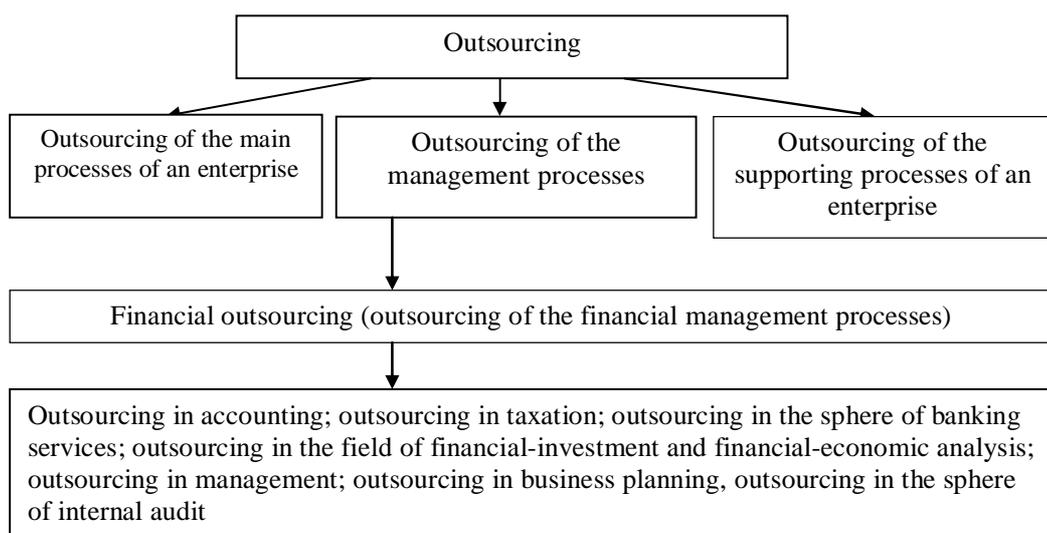


Fig. 1. Interconnection and a place of the financial outsourcing in the enterprise outsourcing activities

But along with the advantages, delegation of financial functions to outsourcer may also lead to the appearance of a range of risks, among which: the risk of outsourcer's untimeliness in his functions realization; the risk of getting low-quality services from outsourcer; the risk of confidential information disclosure by outsourcer.

Therefore, we may conclude that the financial outsourcing is an important instrument of an enterprise-customer activities optimization. The decision to delegate financial functions implementation to the third-party organization is primarily related to the priorities of the enterprise activities, as well as with the ability to get a positive economic effect from the outsourcing.

Since the outsourcing activities of an enterprise-customer may provide for the delegation of several functions to outsourcer at once, it is necessary to determine separately the efficiency of each function delegated on outsourcing with the aim of further evaluation of final results of enterprise-customer cooperation with one or several outsourcing companies. That is why, it is appropriate to calculate indicators both by the separate types of outsourcing and in general while evaluating the efficiency of outsourcing activities. During the comprehensive analysis of an outsourcing activities effectiveness, one should estimate not only the quantitative change of production parameters, but qualitative changes in the enterprise functioning and the resulting increase in income and profit. It is also important that while analyzing the substantiation of the certain functions delegation on outsourcing, one should consider both changes in the financial and economic condition of an enterprise-customer and the changes in influence of factors that determine it. Therefore, during the analysis process one should possess not only the financial, but also non-financial information concerning the enterprise outsourcing activities effectiveness [3, p. 173].

The formation of the indicators system for determining the economic efficiency of enterprises outsourcing requires a comprehensive analysis of its usage purpose and aims, as well as the evaluation of possibility and validity of internal organizational changes after the functions delegation to outsourcer.

The analysis of practical experience in determining the economic efficiency of outsourcing activities shows that enterprises-customers, as a rule, compare only the labour costs of employees, whose functions they plan to delegate to outsourcer, with general costs of outsourcing. However, this approach does not consider all the expenses, related to the function performance by the own forces, which, in addition to labour costs, include expanses for employees' vacations and sick leaves payments, the costs of production process organizing, the corresponding taxations, etc. So the evaluation of the outsourcing activities economic efficiency should be realized holistically, considering all the incomes and expenses of an enterprise, which arise in the process of certain functions delegation to outsourcing company. While measuring the enterprise costs related to outsourcing activities realization, one should take into the account not only the market price of outsourcer's services, but also the transactional costs that arise in the process of delegating a function, in our case – the financial one. Therefore, in fact, the cost of the outsourcing service for an enterprise consists of two main parts: the cost of service declared by outsourcer, and the sum of accompanying transactional costs that arise in the process of outsourcing introduction into the enterprise activities.

Out of this, it can be said that outsourcing may be considered as effective, if the difference between the own costs of machine-building enterprise for the function implementation and the cost of outsourcer's services exceeds the sum of transactional costs related to the outsourcing agreement implementation. To analyze carefully the enterprise costs when using the outsourcing and to outline the special features of determining its economic efficiency, one should, first of all, characterize the enterprise costs on the main stages of outsourcing agreement preparation and implementation (see Tab. 1).

While analyzing the financial outsourcing economic efficiency, one should, first of all, compare the customer's relevant costs for the certain function implementation with the related costs of an outsourcing company. Relevant costs are the costs, the amount of which may change due to the decision-making [7]. If the certain function is

being delegated for an outsourcing, these costs should include all the variable costs of enterprise-customer related to this function realization. Most of fixed costs are usually not relevant, because their amount during establishing the cooperation

with outsourcer is often static. If the outsourcing costs are below the relevant costs for the certain function or business process realization through one's own efforts, then the outsourcing usage may be considered as profitable.

Table 1

Expenses of an enterprise-customer, which arise at every stage of financial functions outsourcing planning and implementation*

Stages of outsourcing planning and implementation		Types of expenses
Planning of outsourcing	Expediency evaluation of functions delegation on outsourcing	Costs to assess the risks related to an outsourcing implementation; costs associated with identifying the opportunities of outsourcing use; costs for outsourcing mechanism development, etc.
	Selecting an outsourcer for the separate function delegating	Costs of outsourcing services market monitoring, costs of a tender organizing, costs of preparing the negotiations, etc.
Implementation of outsourcing	Establishing the individual contract	Costs of information transfer and accessing, consultations and negotiations costs, costs for transactions documentation.
	Delegation of the separate function to outsourcer	The costs of activities transformation, the costs of changes in operating conditions and in labour collective's composition at an enterprise.
	Monitoring of outsourcer's performing of its tasks, deviations correcting	The costs for monitoring and control of the outsourcing operations implementation process, the costs for economic analysis of contract terms fulfilment, the costs of correcting measures implementation.
	The summary analysis of economic efficiency of the separate function delegation on outsourcing	Costs for the summary analysis implementation; losses caused by the outsourcer in the event of failure to comply with the terms of the contract; the costs related to termination of the relationship with an outsourcer; the costs for business reorganization, etc.

* Note: developed by authors on the basis of [2, p.45]

We should mention that this approach can be implemented only in the short-term period, as the fixed costs may also undergo the certain changes after the function delegation to outsourcer. That is why, if the costs of the function implementation by outsourcer exceeds the customer's variable costs, this still does not completely indicate that the use of outsourcing is inexpedient. During the general analysis implementation one should also consider the opportunities for the fixed costs reduction in future, qualitative changes at the enterprise, as well as the ability to get the additional profit in case of outsourcing implementation.

Therefore, in the process of outsourcing activities economic efficiency analysis, one should calculate the expenditure efficiency indicator, which characterizes the sum of costs saving in case of outsourcing implementation at the machine-

building enterprise. The amount of such saving can be calculated by the following formula:

$$Ve = \sum_{i=1}^n Vb_i - \sum_{i=1}^n Vf_i - Vvz - R, \quad (1)$$

where Ve – the expenditure efficiency of the outsourcing activity, UAH., Vb_i – the cost of the i -th function implementation before the outsourcing use, UAH., Vf_i – the cost of the i -th function implementation by the outsourcer, UAH, Vvz – costs of the measures concerning the outsourcing activities implementation, UAH, R – the expected volume of losses (at the realization of risks, depends on the probability of risk realization and the amount of costs), UAH.

In the event the $Ve > 0$, the implementation of outsourcing activities is justified from a cost point of view. But if $Ve < 0$, the implementation of outsourcing activities is unjustified from a cost

point of view. Provided that $V_e = 0$, there will not be any cost savings from the outsourcing activities implementation.

While analyzing the economic efficiency of outsourcing activities, it is important to evaluate the influence of outsourcing implementation risks on the results of cooperation between the enterprise-customer and the outsourcer, as the calculated economic benefit from the outsourcing use may decrease after the risk situation onset.

At the same time, the improvement of financial results is not always the purpose of outsourcing implementation. In some cases, the use of this management instrument is directed at the improvement of enterprise functioning qualitative characteristics, and consequently, at its competitive abilities increase in future. In this case, during the process of the outsourcing economic efficiency analysis one should evaluate the qualitative parameters of the cooperation and the outsourcer's capabilities to provide the relevant services [6].

Outsourcing activities of the enterprise-customer may influence not only at its quantitative results, but also at changes in the labour and material resources use environment, as well as the operation process organizing in general. So while determining the economic efficiency of outsourcing activities, it is important to assess the qualitative changes resulting from:

- quality enhancement of functions implementation;
- the outsourcer's experience use;
- optimizing the management system;
- optimizing the organizational structure and so on.

Qualitative effect of the outsourcing activities implementation can be measured using the expert evaluation methods or taking to consideration changes of machine-building enterprise financial results in future. Therefore, the improvement of the production quality will in time result in the profits increase, and the organizational structure optimizing – in the enhancing of information flows state.

When analyzing the economic efficiency of outsourcing activities, it is expedient to compare the enterprise financial result before and after the outsourcing implementation. In this case, the main

and rather contradictory task for the enterprise is to choose the system of evaluation indicators [4].

To measure the quantitative result of the outsourcing activities implementation, they use the quantitative indicators that reflect the cost side of the enterprise activities. In the economic literature they are being divided into absolute indicators, using which the one can analyze the deviations of actual volume of expenses, incomes and profit from the base values, and then conclude about the outsourcing implementation effectiveness, and the relative ones' that enable to find the ratio between the enterprise economic activities and evaluate its economic potential at all.

The selection of quantitative indicators system of outsourcing economic efficiency depends on the aim of the outsourcing use, as well as on setting the quantitative requirements to its expected results. Therefore, the determination of the outsourcing activities implementation quantitative effect, as with the qualitative one, depends on the form and types of outsourcing, which is being realized on a case-by-case basis. Different types of outsourcing are characterized by their organizational features and the implementation process, ultimately influencing the selection of parameters for determining the impact of outsourcing on the enterprise-customer activities. The evaluation of economic efficiency of enterprise-customer outsourcing activities using the indicators by the separate types of outsourcing enable determining how these outsourcing types influence on its performance. We should note that while calculating the mentioned indicators, the one must consider only those changes that arise on an enterprise as a result of the delegating to the third-party executor the certain function or a group of functions within the individual outsourcing type.

Given that the financial functions relate to the outsourcing of management processes, we have identified the list of key indicators that are appropriate to use while determining the efficiency of partial or absolute delegation of the financial functions to outsourcer (Tab. 2).

Since the efficiency of the enterprise outsourcing activities is determined by the sum of effects from the separate functions delegation on outsourcing, as well as by means of calculation and comparison of the enterprise management

effectiveness generalized indicators, the process of this activity economic efficiency evaluation should end with the identifying the general indicators of enterprise functioning economic efficiency. The main among them are the indicators of business activity, profitability, EVA and so on.

Evaluation of economic efficiency of financial functions outsourcing has been implemented by the example of the following enterprises: “Skiper” Ltd., “Optima Trading” Ltd. and “Kaleidoskop” Ltd. The investigation results are represented in the Table 3.

Table 2

Key indicators of evaluating the economic efficiency of enterprise-customer’s delegating the financial management functions to outsourcing*

Indicators	Calculation formulas	Best value	Notation conventions
Financial sustainability indicators			
Change in the enterprise financial sustainability	$\Delta I_{fs.f} = \frac{I_{fs.f}}{I_{fs.b}}$	> 1	$I_{fs.f}$, $I_{fs.b}$ – corresponding values of financial sustainability indicators after and before the financial management functions delegation on outsourcing
Change in the enterprise autonomy ratio	$\Delta I_{ar.f} = \frac{I_{ar.f}}{I_{ar.b}}$	> 1	$I_{ar.f}$, $I_{ar.b}$ – corresponding values of autonomy ratios after and before the financial management functions delegation on outsourcing
Liquidity and solvency indicators			
Change in the enterprise general liquidity	$\Delta I_{gl.f} = \frac{I_{gl.f}}{I_{gl.b}}$	> 1	$I_{gl.f}$, $I_{gl.b}$ – corresponding values of general liquidity indicators after and before the financial management functions delegation on outsourcing
Change in the enterprise fast liquidity	$\Delta I_{fl.f} = \frac{I_{fl.f}}{I_{fl.b}}$	> 1	$I_{fl.f}$, $I_{fl.b}$ – corresponding values of fast liquidity indicators after and before the financial management functions delegation on outsourcing
Change in the enterprise absolute liquidity	$\Delta I_{al.f} = \frac{I_{al.f}}{I_{al.b}}$	> 1	$I_{al.f}$, $I_{al.b}$ – corresponding values of absolute liquidity indicators after and before the financial management functions delegation on outsourcing
Profitability indicators			
Change in the return on equity	$\Delta ROE_f = \frac{ROE_f}{ROE_b}$	> 1	ROE_f , ROE_b – corresponding values of return on equity indicators after and before the financial management functions delegation on outsourcing
Change in profitability of the enterprise activities	$\Delta Pea_f = \frac{Pea_f}{Pea_b}$	> 1	Pea_f , Pea_b – corresponding values of net margin indicators after and before the financial management functions delegation on outsourcing
Change in the enterprise return on assets	$\Delta ROA_f = \frac{ROA_f}{ROA_b}$	> 1	ROA_f , ROA_b – corresponding values of return on assets indicators after and before the financial management functions delegation on outsourcing.

Note: developed by authors on the basis of [5, p.230].

The results of outsourcing activities economic efficiency evaluation at machine-building enterprises*

Enterprise name (types of functions that are being delegated on outsourcing)	Indicators of outsourcing activities economic efficiency evaluation
“Skiper” Ltd. (outsourcing in accounting and financial-economic analysis)	Change in the enterprise financial sustainability $\Delta I_{ff} = 1.02$ Change in the enterprise general liquidity $\Delta I_{gif} = 1.05$ Change in the return on equity $\Delta ROE_f = 1.05$ Change in the profitability of enterprise activities $Re a_f = 1.03$ Change in the return on assets $\Delta ROA_f = 1.04$ The values of the indicators signal the positive use of outsourcing
“Optima Trading” Ltd (outsourcing in accounting)	Change in the profitability of enterprise activities $Re a_f = 1.01$ Change in the return on equity $\Delta ROE_f = 1.02$ The values of the indicators signal the positive use of outsourcing
“Kaleidoskop” Ltd. (outsourcing in accounting)	Change in the profitability of enterprise activities $Re a_f = 1.02$ Change in the return on equity $\Delta ROE_f = 1.0$ The values of the indicators signal the positive use of outsourcing

*Note: authors' calculation.

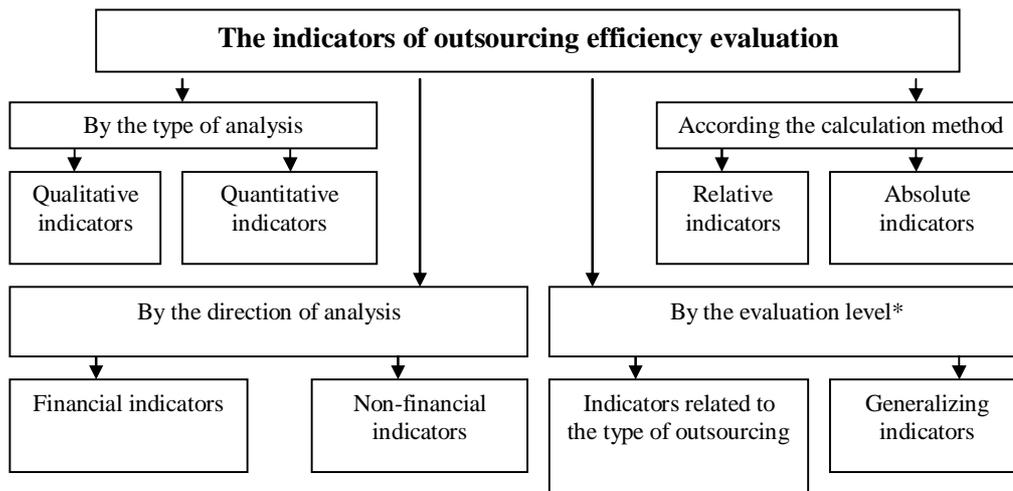


Fig. 2. Indicators for evaluating the economic efficiency of outsourcing activities implementing at a machine-building enterprise

Note: supplemented by authors

So, the evaluation of outsourcing activities economic efficiency at machine-building enterprises can be realized both on the basis of specific indicators within the separate types of outsourcing and with the help of generalizing ones. In Fig. 2 the list of indicators groups of economic efficiency evaluation of outsourcing activities realization at the machine-building enterprise is presented.

Considering what has been said above, three conceptual approaches to determining the economic efficiency of financial outsourcing by an enterprise-customer can be singled out: on the basis of calculating the outsourcing cost effectiveness. This indicator is reasonable to use when the purpose of outsourcing is to reduce costs, provided that the income of the enterprise will be unchanged; by comparing the growth rates of the

income, profit and costs of the enterprise- customer before and after implementing the outsourcing activities; with the use of estimates for both individual types of outsourcing, and generalizing.

As a **conclusion**, it should be noted that the formation of an indicators system for assessing the economic efficiency of outsourcing activities implementing by the enterprise-customer requires managers to develop and implement a number of managerial decisions, depending on the type and form of outsourcing. Evaluation of the outsourcing implementation results should be comprehensive and consider all aspects of cooperation between the customer and the outsourcer both during the establishing and within the period of fulfillment of the outsourcing agreement conditions. It is important to develop a risk assessment system for a financial outsourcer in the future, which will allow us to calculate more accurately the cost savings after delegating the functions to the outsourcer.

References

1. Kosmina V. (2014). *Offshore outsourcing and export of transnational companies from newly industrialised countries of Asia. Austrian Journal of Humanities and Social Sciences*, 271-275
2. Logvinova O. (2013). *Financial outsourcing: the essence, trends and prospects of development in Ukraine. Ekonomichna stratehiya I perspektyvy rozvytku sfery torhivli ta posluh [Economic strategy and prospects for the development of trade and services]*, 1(2), 40-48. [in Ukrainian]
3. Omel'chenko L., Laktyonova O., Mandra N. (2017) *SME development in Ukraine: outsourcing aspect. Skhidna Yevropa: ekonomika, biznes ta upravlinnya [Eastern Europe: Economics, Business and Management]*, 3, 170-177 [in Ukrainian]
4. Omel'chenko L., Laktyonova O., Kalendzhyan, O. (2016) *Fynansovyy autsorsynh [Financial outsourcing]. Maryupol': PHTU [in Russian]*
5. Partyn H. & Didukh O. (2013) *Metrics formation of effectiveness evaluation of outsourcing application in enterprise business activity [Accounting and analytical support of the management system of an enterprise: collective monograph / Edited by: prof. A. Zahorodny and prof. H. Ronnek.] (pp.218-235). Lviv: Publishing House of Lviv Politechnic.*
6. Ysavnyn, A. H. (2013) *Osobennosty prymyneniya proyzvodstvennoho autsorsynha: monohrafiya [Features of application outsourcing production: monograph], LAP LAMBERT Academic Publishing. [in Russian]*
7. 8cent-emails (2014) *Prepiatstviya dlja povysheniya efektyvnosti vneshneekonomicheskoy deiatel'nosti kompanyy [Obstacles to improve the efficiency of foreign economic activity of the company], <http://8cent-emails.com/prepiatstvija-dlja-povysheniya-jeffektivnosti-vneshnejekonomicheskoy-dejatelnosti-kompanii> [in Russian].*