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ИЗВЕСТИЯ

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NAS RK is pleased to announce that News of NAS RK. Series physico-mathematical journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of News of NAS RK. Series of chemistry and technologies in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential content of chemical sciences to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы «ҚР ҰҒА Хабарлары. Физикалық-математикалық сериясы» ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Webof Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын усынады. ҚР ҰҒА Хабарлары. Химия және технология сериясы Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді химиялық ғылымдар бойынша контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Известия НАН РК. Серия физико-математическая» был принят для индексирования в Emerging Sources Citation Index, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Известия НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному контенту по химическим наукам для нашего сообщества.

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MODERN METHODS FOR EVALUATING BUSINESS PROCESSES OF AN ENTERPRISE USING A BALANCED SCORECARD

Abstract. The article presents methods and algorithms for analyzing and evaluating the effectiveness of business processes of enterprises using a system of balanced indicators. Due to the increased requirements for the efficiency of the functioning of organizations, the process approach based on the development of a process management system is becoming more popular. The activity of organizations is considered as a set of business processes with reference to structural divisions. The effectiveness of informatization and automation of algorithms for the work of enterprise entities primarily depends on the degree of formalization of business processes of organizations and readiness to implement management systems that meet the modern requirements of the digital economy.

A step-by-step algorithm for evaluating business processes with feedback elements is proposed for the transition of an organization to a process type of management by goals by introducing a technology for continuous improvement of business processes based on a system of balanced indicators. The difference between the proposed model and the existing ones is the use of formalized procedures to justify the method of implementation and the scale of changes in the business model of the organization.

A method of weighing and ranking performance indicators according to the Analytical hierarchy of Saati processes is proposed, which allows determining the feasibility of making changes to the business model of the organization. A distinctive feature of the method is the use of a system of paired comparison of criteria and occupies a special place due to the fact that it reduces the degree of subjectivity of expert assessments and serves to identify functional subsystems of the organization that require reform.

Key words: process approach, business processes, business process evaluation, optimization, reengineering, balanced scorecard, efficiency.

Introduction. The enterprise management system should be aimed at reducing the efficiency of formation, that is, at analyzing the effectiveness and adoption of resolutions in the company. This will help to identify and eliminate the causes of existing discrepancies, as well as determine their likely occurrence. The process method is an effective and topical means of achieving competitive advantages because it focuses the PR activity of the enterprise on the business processes, and orients the enterprise management system to conduct each business process individually and their interrelation at the enterprise as a whole in the framework of certain projects that are implemented at the state enterprise.

The problem of reforming business processes at enterprises is topical for countries with different levels of socio-economic development. In drtchk, Nam D., Lee J., Lee H. we developed a globalizing model for reforming business processes and conducted a survey with 170 Korean firms [1]. The analysis proved the expediency of reforming the business process at all stages of enterprise management.

Marrella A., Mecella M., Pernici B., Plebani P. in their researchproposed a modification of Case Management and Notation, where the premise is a cost estimate of the distance between the model of the decision-making process and the complete achievement of the stability level [2].

Antunes and Mourão have developed a sustainability framework based on two parameters: control, which can be mixed, or discretionary and responsive, with monitoring of planned and unplanned actions. The

reviewers have developed a set of services that combine stability support in business process management systems (BPM), including detection, psychodiagnostics, recovery and destabilization [3]. Marrella A., Mecella M., Sardina S. proposed SmartPM-a modification and prototype of a robotic enterprise management system that contains a set of ways to support the robotic adaptation of innovative processes during execution. Another confirmation that business processes are associated with a significant object of management [4].

Abdelkafi and Teusher proposed a business model of sustainable development aimed at creating value for various stakeholders and the natural environment [5]. This model is based on creating an extended feedback loop between the value for the consumer, the value of the company and the value for the environment. Chapman R. L., Soosay C., Kandampully, J. in their workargued that business processes play an important role in innovative service-based logistics services, transformed from a business concept of transportation into a service for all the logistics needs of customers [6]. In the work of Fomina I.G., Makolski M.S., innovative cooperation between universities and high-tech enterprises of Russia is analyzed [8]. It is established that the level of innovative development of Russia was one of the lowest in the world and the new model of business partnership between educational institutions and high-tech companies is based on the introduction of effective business process management.

Scientists from Estonia Bikse V., Lusena-Ezera I., Rivza B.conducted research on the creation of high-tech enterprises and the reform of business processes in their activities [7]. They reviewed the implementation of businesses and linked the startup doctrine with the business incubator, which shows the prospects for the formation of innovative communication in the country. Burukhina O.S., Serbin S.A., Vartanyan S.V., Maltceva I.N. have developed a modern doctrine of introducing business processes into the PR activities of several firms, in particular the Institute competition Multi Comfort House", conducted by Sen-Goben ISOVER [9]. Kinash I.P., Arkhypova L.M., Polyanska A.S., Dzoba O.G., Andrusiv U.Y., Iuras I.I. proposed a method of economic characteristics of the development of tourist enterprises, which confirms that business processes should be tested at all levels of management systems [10]. The researchers presented a methodology for assessing the profitability of the enterprise, there they proved the relevance of introducing the latest business processes into the marketing system.

Dovgal O.V., Kravchenko M.V., Demchuk N.I., Odnoshevnaya O.A., Novikov O.Y., Andrusiv U.Y., Popadynets I.R. argued that the process method requires the company's command not to take measures for socialization to changes and, as an inquiry, to improve the business processes [11].

In the study of Andrusiv U., Galtsova O., an educational and scientific approach to assessing the rank of high-tech initiative of agricultural enterprises was proposed, here the main focus was on the reflection of management processes at all ranks of the application of JSC [12]. Cherchata A. emphasized the division of socio-demographic typologies "Productivity" and "efficiency" in the mechanism of interpretation of dividend-metabolisms, because productivity and productivity characterize the most diverse components of their formation [13]. When re-equipping, he tells us to borrow the ideology of the balanced scorecard.

Materials and methods. The theoretical basis of the study included the works of foreign of innovative management approach - evaluating of business processes. The methodology of the study is based on a systematic approach. The application of methods developed by scientists Balashova E., Antipov D., Chuprov K., Kurenkov I., Luneva E. Sukhanova Y. and Tsapko S., Glukhov V. allowed to ensure the validity of the behavioral analysis, theoretical inputs and developed practical recommendations.

Process-oriented management depends as one of the most effective tools for conducting a state-owned enterprise in the works of great scientists, but video information and the sociological prerequisites for conducting business processes are sufficiently reformulated in them. The long-term modification of this work projects a set of information-analytical, theoretical and theoretical factors to refute the gradual method for self-identification and management of business-processes at a state-owned enterprise and to recreate the flywheel of the performance characteristics of the process, a method that assumes the formation of subjective coefficients of business-processes of a state-owned enterprise.

Results. For effective management, it is necessary to monitor and evaluate the state of business processes. Since any modifications of the requirements or the results of the business-processes can be calculated only if there are no corresponding parameters and methods of measuring them. At this moment, the seeker of weak places (narrow places) of business-processes with the help of certain coefficients does not have a huge value. As a result, the primary super-task in this factor is the reconstruction of the systems of the unit of the coefficients of effectiveness and efficiency of the business-process, which mark the peculiarity of the state-owned enterprise. On the premise of measuring and express analysis of the effectiveness and efficiency of existing business-processors, festivals are developed for their self-improvement using appropriate flywheels

and tools. The developed methodology for characterizing the state-owned enterprise's business-processors for detecting business-processors asking for modifications is presented below (Figure 1). It is based on the concept of the famous Harmonious Coefficient Unit System (BSP) by Sverdlov and Clark [14].The essence of the methodology is summarized in the following: the effectiveness and efficiency of the business-processes depends on the premise of the concepts of the coefficients found in the discourse of the parameters provided. At the moment, if the values of the productivity and effectiveness of the business-processes are lower than the unacceptable coefficient for the submitted gradation, it advises them to worsen them. The calculation for the characteristics of the state-owned enterprise's business-processes is advised to be carried out at the following points (figure 1).

First of all, we will reformulate the coefficients of efficiency and effectiveness of business processes on the premise of the BSP doctrine. The choice of performance and efficiency parameters has no significant significance when characterizing the effectiveness and efficiency of business processes. A parameter is a high-quality attribute, thanks to which the performance and/or efficiency characteristics, typology (object of research) and cost measurement are carried out.

Efficiency is the degree of completion of the task as such, and effectiveness is the degree of diversification of spending on its completion, which interprets the relationship of the assigned socio-economic result (total) to the expenditure of energy resources that guarantee the completion of this result.

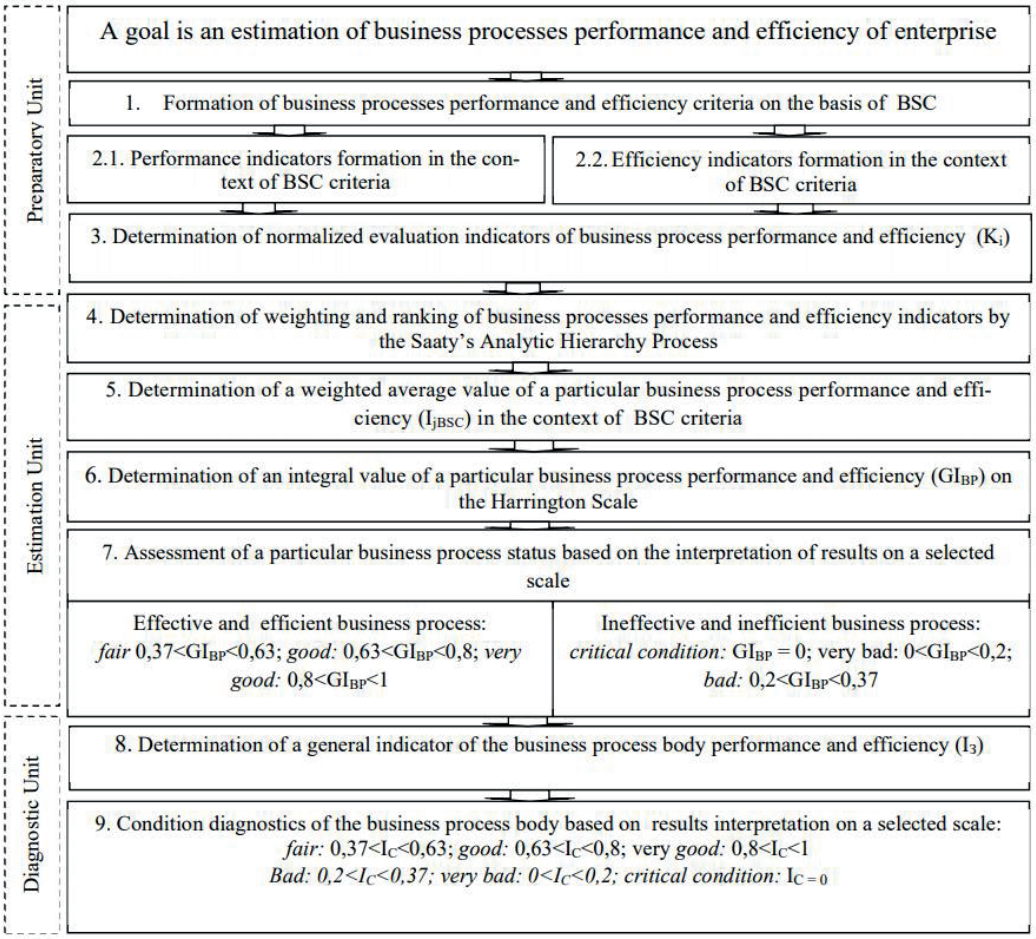

Figure 1. Step-by-step algorithm for analyzing and evaluating business processes of an enterprise using the BSP

In the following paragraph, we will reformulate the coefficients of effectiveness and efficiency in the discourse of the parameters of the joint venture. A parameter is an attribute of a phenomenon that allows you to classify its indicators. The coefficient is a quantitative statement of the phenomenon. The parameter dot displays the high-quality side of the page of the measured attribute, and the indicator shows its value value.

We need the concept of normalized performance characteristics of business-processes. The correlation between the formal and planned-preventive values for each coefficient is paid according to the calculation (1) by the subsequent archetype:

$$K_i = \frac{X_n}{Y_n} (1)$$

where K_i-the relative unit of the i-th indicator of the process; X_n-the actual value of the indicator, and Y_n -the planned value of the indicato.

At the same time, the planned warning values for each coefficient are set at the beginning of the reporting stage. The formal values depend on the results at the end of the stage. The stages of performance and efficiency characteristics depend on the specifics of the business process and can be quarterly, monthly, bi-weekly or annual. The incorrectly chosen stage of the characteristic (using the comparison of formal and planned-preventive values of coefficients) allows not only to identify discrepancies in the business process in time, but also to protect their origin.

The next step is to test and position the performance and efficiency coefficients of the business processes according to the Sociological Hierarchy of the Saatiprocesses. Since the corresponding coefficients, which are a reflection of the impact of the relevant aspects on the state of the state-owned enterprise's business-processes, have a different effect on the fulfillment of the state-owned enterprise's geopolitical tasks. Therefore, they should be classified according to the degree of significance. For this task, we apply the Sociological Hierarchy of the Saatiprocesses, which is based on a boiled comparison of coefficients that interpret the state of certain businessprocesses according to storm gradation. This method is related to the lyceum of parameters and will take a special place in the link with the fact that it will reduce the degree of reflection of interdepartmental characteristics.

After testing and positioning, it is necessary to calculate the weighted average coefficient of effectiveness and efficiency of a certain surgical business process (I_j) in the framework of the BSP parameters. After the concept of normalized coefficients of the state of the business process (according to the parameters of the first stage) and the identification of the heavyweight indicators of these coefficients, the weighted average coefficient of efficiency and efficiency of the business process with fixed values for each proposed parameter of the BSP depends on the method of a well-thought-out evaluation of the characteristics:

$$I_j = \sum_{i=1}^{n} K_i \times w_i (2)$$

where I_j- the weighted average coefficient of effectiveness and efficiency of a certain procedural business processing in the framework of the j-th parameterof BSP; K_i - normalized characteristic of the i-th business processing coefficient; W_{i_i} -the weighting coefficient of the indicator, n - is the number of indicators.

Now, in the code there is the concept of dynamic coefficients of effectiveness and efficiency of a certain surgical business process (GI_{BP}) according to the Harrington gradation. The dynamic coefficient of effectiveness and efficiency of the operational business process as a whole is a sum of weighted average coefficients of effectiveness and efficiency for all selected parameters of the BSP and, according to the indicator coefficient theorem, n is the number of indicators:

$$GI_{BP} = \sum_{j=1}^{n} I_{jBSC} (3)$$

where GI_{BP} - the dynamic coefficient of effectiveness and efficiency of the operational business process; the weighted average coefficient of effectiveness and efficiency of the examined procedural business process in the framework of the j-th parameter of the BSP, and m-the number of the evaluated parameters of the BSP.

Next, we need to analyze the state of the business process on the premise of interpreting the results according to the intended gradation. The dynamic coefficients of effectiveness and efficiency of the surveyed business processes GI_{BP} calculated by Theorem (3) do not have values varying from 0 to 1. Therefore, they need to be quantitatively interpreted for the concept of organizational actions for business processes. In connection with this, a multi-purpose gradation is needed in the property of the prerequisite for the interpretation of the coefficients. It should be shown in the form of a set of attributes, the relationship between which affects the relationship between the objects of the objective structure. The interpretation of the performance coefficients and the performance rank of the business process of a state-owned enterprise is advised to be carried out using the Harrington gradation: unfair 0, 37<I_C< 0, 63; bad: 0.63<I_C< 0.8; very bad: 0.8<I_C< 1; good: 0.2< I_C< 0.37; extremely good: 0<I_C< 0.2.

We determine the general coefficient of efficiency and effectiveness of the formation of the torso of business processors (I_C). After the concept of dynamic coefficients of efficiency and efficiency of the business processes of the enterprise, the general coefficient of the relationship of the business processes of the state enterprise is assumed according to the calculation (4) as follows:

$$I_C = \sum_{i=1}^{k} GI_{BP} / k (4)$$

Where I_C - the general coefficient of efficiency and efficiency of business processes; GI_{BP} - the dynamic coefficient of efficiency and efficiency of business processes; k-the number of surveyed business processes

Now we diagnose the conditions of the business process's body on the premise of interpreting the results in the selected scale:

After calculating the value of the universal coefficient of the overall effectiveness of the business processes and the effectiveness of the enterprise at the 7th stage of the Harrington gradation, the sublevel of the total procedural state of the business processes of the enterprise depends. Thus, after the performance and efficiency coefficients of the business processes are characterized, the sublevel of the effectiveness and efficiency of the business processes depends on the specified gradation. In addition, there are prepositional actions to the appropriate degree. the business process and the torso of the company's business processes depend on the degree of discrepancy between the assigned cost characteristics of the business process (processes) from the corresponding aisles according to the Harrington gradation. In addition, an express analysis of the modification of the dynamic coefficients of effectiveness and efficiency of the surveyed business processes in statics should be passed. This will allow us to reformulate the reasoned theses about the aspects and organizational actions that affect the activity of the company and the path of its improvement.

Characteristics of the effectiveness and efficiency of business processes of a state-owned enterprise regulate the identification of planning and preventive concepts, the concept of formal concepts and the importance of each coefficient in the framework of detecting business processes. In accordance with this methodology, a list of coefficients and parameters of the company's activity is formed. In addition, attention is paid to business processes related to the basic (procedural) vital activity of the company. The business process components of the criteria of applicants for public office, technological leadership of the information structure of organizational management are highlighted. The cost and effectiveness of business processes for each parameter of the BSP (I_{jBSC}) is calculated according to theorem (2). K_i - it is calculated according to theorem (1). It should be noted that the effective efficiency and efficiency coefficients are direct, that is, their value increases with the deterioration of the activity of the enterprise. And the opposite, the value of which increases with the decline in the deterioration of the activation of the state-owned enterprise. Therefore, he advises to apply the modernized theorem to calculate the normalized subjective coefficient for certain coefficients:K_i — for coefficients whose reduction will lead to worse results:

$$K_i = 1 - \frac{X_n}{Y_n}$$

where K_i - the normalized characteristic of the i-th coefficient of the process; X_n - the formal value of the coefficient; Y_n - the planned preventive value of the coefficient. For coefficients whose reduction will lead to the worst results:

$$K_i = \frac{X_n}{Y_n}$$

For coefficients whose increase will lead to first-class results:

$$K_i = 1 - \frac{Y_n}{X_n}$$

For coefficients whose increase will lead to bad results:

$$K_i = \frac{Y_n}{X_n}$$

According to the Kendall concordance indicator, he asserts the degree of plausibility of the passed examination for each factor of the structure of the BSP coefficients. After that, the dynamic coefficient of effectiveness and efficiency of the surgical business processes of the enterprise is calculated for each parameter of the BSP. Procedural and business process-guaranteeing tapes were used in the survey.

Discussion. The results of the evaluating business processes of organizations are usually:

- the number of company personnel is reduced with a stable level of production;
- the cost of finished goods (works, services)

The cost of finished goods (works, services) decreases, while maintaining the same volume and quality of finished products;

- the number of management levels decreases;
- the value of business reputation increases;
- the rating of the business in the industry increases;
- the profitability of a business entity grows.

It is proposed to evaluate the performance indicators in two areas: non-financial and financial indicators.

The non-financial indicators include: the degree of achievement of objectives, evaluation criteria related to of the enterprise management, expansion of the sales market, satisfaction with the work performed, term offormation of management reporting, etc.

Financial indicators include: headcount, wages, total costs, etc.

Thus, it is possible to draw conclusions about the efficiency of the use of resources, changes in qualitative assessments or satisfaction with the work performed under the influence of business processes.

Management technology based on business process improvement through evaluating, brings “noticeable” economic effect even in the practice of small organizations. Undoubtedly, the use of the evaluating business process improves both non-financial and financialindicators, but the disadvantage of evaluating is the high risks associated with the transformations.

Conclusion. Thus, the impact of specific subgroups of coefficients on each parameter of the BSP is evaluated and a dynamic characteristic of the effectiveness and efficiency of the surveyed business processes is carried out.

Process-oriented management by enterprises is based on business processes. The process method includes not only the presentation of the business as an interdependent network of business processes, but also the continuous analysis, management and self - improvement of business processes. In essence, the management of an enterprise is the detection of internal and external incidents affecting the indicators of business processes, as well as the systematic self-regulation of these indicators to achieve the rearranged tasks. Similarly, the company’s performance coefficients are subjective parameters of the impact of organizational influence on the business-processes. Incorrect self-identification and a rational corporation, timely study and characterization of business processes allow us to detect “problem” territories and adopt effective organizational solutions. In connection with this, a methodology is provided that allows comparing and evaluating the effectiveness of the company’s business processes. The calculation of the effectiveness and efficiency of personal business, the processes and its trunk allow us to obtain and aggregate data on the sublevel of the completion of tasks as practical business processes, as well as phenomenological tasks of the trunk of business processes. Video information about the efficiency and effectiveness of business processes is considered a prerequisite for the non-adoption of organizational decisions. In addition, it is used for agent management of business processes, express analysis and self-improvement of the life of the enterprise.

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ТЕҢГЕРІМДІ КӨРСЕТКІШТЕР ЖҮЙЕСІ БОЙЫНША КӘСІПОРЫННЫҢ БИЗНЕСПРОЦЕСТЕРІНІҢ ТИІМДІЛІГІН БАҒАЛАУ АЛГОРИТМІ

Аннотация. Мақалада теңдестірілген көрсеткіштер жүйесін қолдана отырып, кәсіпорындардың бизнес-процестерінің тиімділігін талдау және бағалау әдістерімен алгоритмдері келтірілген. Ұйымдардың жұмыс істеу тиімділігіне қойылатын талаптардың артуына байланысты процестерді басқару жүйесін әзірлеуге негізделген процестік тәсіл барған сайын танымал бола түсуде. Ұйымдардың қызметі құрылымдық бөлімшелерге қатысты бизнес процестердің жиынтығы ретінде қарастырылады. Кәсіпкерлік субъектілері жұмысының ақпараттандыру және алгоритмдерін автоматтандырудың тиімділігі бірінші кезекте ұйымдардың бизнес-процестерін ресмилендіру дәрежесіне және цифрлық экономиканың қазіргі заманғы талаптарына жауап беретін басқару жүйелерін енгізуге дайындығына байланысты.

Теңгерімді көрсеткіштер жүйесі негізінде бизнес-процестерді үздіксіз жетілдіру технологиясын енгізу арқылы ұйымды мақсаттар бойынша басқарудың технологиялық түріне көшіру үшін кері байланыс элементтері бар бизнес процестерді бағалаудың қадамдық алгоритмі ұсынылған. Ұсынылған модельмен қолданыстағы модельдің айырмашылығы – ұйымның бизнес-моделінің өзгеру әдісімен масштабын негіздеу үшін формальды процедураларды қолдану.

Saati процестерінің Аналитикалық иерархиясына сәйкес тиімділік көрсеткіштерін өлшеу және саралау әдісі ұсынылады, бұл ұйымның бизнес-моделіне өзгерістер енгізудің орындылығын

анықтауға мүмкіндік береді. Әдістің ерекшелігі критерийлерді жұптасып салыстыру жүйесін қолдану болып табылады және сараптамалық бағалаудың субъективтілік дәрежесін төмендететіндіктен және реформаны қажететететін ұйымның функционалды ішкі жүйелерін анықтауға қызмет ететіндіктен ерекше орын алады.

Түйінді сөздер: технологиялық тәсіл, бизнес-процестер, бизнес-процестерді бағалау, оңтайландыру, реинжиниринг, көрсеткіштердің теңдестірілген жүйесі, тиімділік.

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СОВРЕМЕННЫЕ МЕТОДЫ ОЦЕНКИ БИЗНЕС-ПРОЦЕССОВ ПРЕДПРИЯТИЯ С ИСПОЛЬЗОВАНИЕМ СБАЛАНСИРОВАННОЙ СИСТЕМЫ ПОКАЗАТЕЛЕЙ

Аннотация. В статье представлены методы и алгоритмы анализа и оценки эффективности бизнес-процессов предприятий с использованием системы сбалансированных показателей. В связи с повышением требований к эффективности функционирования организаций все более популярным становится процессный подход, основанный на разработке системы управления процессами. Деятельность организаций рассматривается как совокупность бизнес-процессов применительно к структурным подразделениям. Эффективность информатизации и автоматизации алгоритмов работы субъектов предпринимательства в первую очередь зависит от степени формализации бизнес-процессов организаций и готовности к внедрению систем управления, отвечающих современным требованиям цифровой экономики.

Предложен пошаговый алгоритм оценки бизнес-процессов с элементами обратной связи для перехода организации к процессному типу управления по целям путем внедрения технологии непрерывного совершенствования бизнес-процессов на основе системы сбалансированных показателей. Отличие предлагаемой модели от существующих заключается в использовании формализованных процедур для обоснования метода внедрения и масштаба изменений бизнес-модели организации.

Предложен метод взвешивания и ранжирования показателей эффективности в соответствии с аналитической иерархией процессов Saati, позволяющий определить целесообразность внесения изменений в бизнес-модель организации. Отличительной особенностью метода является использование системы парного сравнения критериев и занимает особое место в связи с тем, что он снижает степень субъективности экспертных оценок и служит для выявления функциональных подсистем организации, требующих реформирования.

Ключевые слова: процессный подход, бизнес-процессы, оценка бизнес-процессов, оптимизация, реинжиниринг, сбалансированная система показателей, эффективность.

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REFERENCES

[1] Nam D., Lee J., Lee H. (2019) Business analytics adoption process: An innovation diffusion perspective. International Journal of Information Management, 49:411-423. DOI: 10.1016/j.ijinfomgt.2019.07.017 (in Eng.).

[2] Marrella A., Mecella M., Pernici B., Plebani P. (2019). A design-time data-centric maturity model for assessing resilience in multi-party business processes. Information Systems, 86:62-78. DOI: 10.1016%2Fj.is.2018.11.002 (in Eng.).

[3] Antunes P., Mourão H. (2011). Resilient business process management: Framework and services. Expert Systems with Applications, 38(2):1241-1254.DOI: 10.1016/j.eswa.2010.05.017 (in Eng.).

[4] Marrella A., Mecella M., Sardina S. (2017). Intelligent process adaptation in the Smart PM system. ACM Transactions on Intelligent Systems and Technology, 8(2):25-32. DOI: 10.1145/2948071 (in Eng.).

[5] Abdelkafi N., Täuscher K. (2016). Business models for sustainability from a system dynamics perspective. Organization and Environment, 29(1):74-96. DOI: 10.1177/1086026615592930 (in Eng.).

[6] Chapman R.L., Soosay C., Kandampully J. (2003). Innovation in logistic services and the new business model: A conceptual framework. International Journal of Physical Distribution and Logistics Management, 33(7):630-650. DOI: 10.1108/09600030310499295 (in Eng.).

[7] Bikse V., Lusena - Ezera I., Rivza B. (2018). Innovative start-ups: Challenges and development opportunities in latvia. International Journal of Innovation Science, 10(2):261-273. DOI: 10.1108/IJIS-05-2017-0044 (in Eng.).

[8] Fomina I.G., Makolski M.S. (2017). Strategic partnership of universities and high-tech enterprises by the example of the innovative project “RFID systems (RFID) identification of vehicles”. Proceedings of the 2017 IEEE Russia Section Young Researchers in Electrical and Electronic Engineering Conference, St. Petersburg, Russian Federation. P. 1332.

[9] Burukhina O.S., Serbin S.A., Vartanyan S.V., Maltceva I.N. (2019). Modern tendencies in design of public spaces in term of sustainable development. IOP Conference Series: Materials Science and Engineering, Ekaterinburg, Russian Federation. N. 012040.

[10] Kinash I.P., Arkhypova L.M., Polyanska A.S., Dzoba O.G., Andrusiv U.Y., Iuras I.I. (2019). Economic evaluation of tourism infrastructure development in ukraine. Paper presented at the IOP Conference Series: Materials Science and Engineering,Banja Luke, Bosnia and Herzegovina. N. 012020.

[11] Dovgal O.V., Kravchenko M.V., Demchuk N.I., Odnoshevnaya O.A., Novikov O.Y., Andrusiv U.Y., Popadynets I.R. (2017). Methods of competitiveness assessment of agricultural enterprise in eastern europe. Regional Science Inquiry, 9(2):231-242 (in Eng.).

[12] Andrusiv U., Galtsova O. (2017). Evaluation of innovation activity of construction enterprises. Scientific bulletin of Polissia, 3(11):204- 215 (in Eng.).

[13] Cherchata A. (2016). Formation of Indicators of Resultativity and Effectiveness of Business Processes on the Basis of the Balanced Scorecard (BSC) Concept. Scientific Bulletin of Ivano-Frankivsk National Technical University of Oil and Gas (Series: Economics and Management in the Oil and Gas Industry), 2(14):37-143. DOI: 10.5267/j.msl.2019.9.016 (in Eng.).

[14] Kaplan R.S., Norton D.P. (1992). The Balanced Scorecard – Measures then drive Performance. Harvard Business Review, 70(1):71-79 (in Eng.).

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