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ВЕСТНИК

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NAS RK is pleased to announce that Bulletin of NAS RK scientific 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 Bulletin of NAS RK in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential multidiscipline content to our community.

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НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources CitationIndex, 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 Вестника НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному мультидисциплинарному контенту для нашего сообщества.

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EVALUATION OF INTEGRATED DEVELOPMENT OF THE ENTERPRISE

Abstract. The purpose of this article constitutes the formulation of a methodological approach to assessing and increasing the level of the integrated development effectiveness of Ukrainian light industry enterprises, taking into consideration the modularized diagnostics of their activity. **Methods.** The methodological toolkit for the effectiveness evaluation of integrated development of the enterprise is based on an integral indicator subject to the economic, organizational, informational and innovative integration modules. To undertake the study, 30 Ukrainian light industry enterprises were selected. The development diagnostics was carried out for each of them according to the key performance indicators and an integral indicator of the business development level was determined. **Results.** Seven groups of the enterprises were formed, and resulting from their integrated development, an increase in its level was received at all companies. The highest development growth was recorded at such companies as Orion, Kalyna, Lybid, Shovkova nytka and Lileya. These companies can significantly improve performance, through their development integration. A feature of the proposed orbital-based methodology is the stimulation of the development level increasing of both an individual enterprise and the industry as a whole, since less developed companies do not reduce the development level of others, but reach a higher level due to integration with the similar economic entities. **Conclusions.** The proposed orbital-based methodology implies the stimulation of the development level increasing of both an individual enterprise and the industry as a whole. It allows comprehensively to assess the enterprise`s performance by individual modules; to identify and compare the alternative development options; to determine deviations in the process of its functioning and to make adjustments to activities on time.

Key words: performance, integrated development, sustainable development, efficiency, business diagnostics.

Introduction. Modern dynamic economic conditions require the enhancement of approaches, methods, mechanisms, tools and development technologies for the domestic light industry companies with a view to increase their competitiveness. Features and advantages of the integrated development of the enterprise determine the complex and with a view to formulate a methodology appears, the practical implementation of which will provide an opportunity for quantitative evaluation of the efficiency level and allow to compare alternative options for the formation of an integrated development mechanism, specify deviations in such a process and adapt activities to changes in the environment of the enterprise`s operation. This study is intended to expand the methodological toolkit for assessing the development of the enterprise in the context of its integration in order to discover new opportunities and establish directions for the efficiency improving of the economy in modern economic conditions.

Nowadays, there are theoretical aspects and development of practical recommendations on the tools establishment for the analytical assessment of enterprise development, considering such essential structural elements as the enterprise development scale with the view to the level of educational and professional potential of the management system`s personnel and the level of enterprise development quality [1]. AP-processes for the formation of economic analysis in business activity do not provide an opportunity to assess the influence of menacing situations on the financial standing of enterprises to the full extend. Therefore, the taxonomic analysis techniques are applied, enabling introduction of the level of business development mathematically and identification of the most influential factors, including the consequences of negative events for the enterprise [2].

The traditional model of net present value has been replaced by a model for options evaluating using the global 100 index as a threshold value for the decision-making process evaluating in order to provide enterprises with a more complete assessment of the decision-making process [3]. Crowdfunding is considered in the capacity of an alternative financial source and an evaluation of the development of an enterprise [4]. The assessment of the relation between social entrepreneurship and sustainable business development is of significant importance [5]. This approach enables a high-quality evaluation of the development of the enterprise.

The chaos management model of the economic system has been developed in order to assess the effectiveness of the companies' development, allowing radically to change the status of the enterprise and the ability to influence supply and demand, and helps to strengthen the sustainability of the economic system [6].

An analysis of technological resources is used with a view to selecting the direction of micro-enterprise development in order to improve product quality [7]. Modern science contains studies of business development efficiency based on enterprise architecture (EA Architecture) and analysis of investments role, the main purpose of which is to provide the company with the opportunity to make decisions strategically about the future state of functioning and development on the whole [8,9]

The enterprise sustainable development model provides an assessment of the performance of convergence and/or synergy of numerous prospects for a purpose of development of a strategy for the integrated functioning of enterprises, rather than a narrow economic orientation of productivity [10]. Meanwhile, enterprises should pay significant attention to assessing and maintaining a sufficient level of competitiveness [11,12] and intellectual development [13].

The process of improving the enterprise's portfolio planning is assessed by means of comprehensive diagnostics of business development using the following five most important indicators: opportunities, accessibility, feasibility, adaptability and continuity [14]. Diagnostics of enterprise development focuses on the relative influence of two critical factors on assessing the quality of relationships in standard distribution channels, namely on the perceived quality of service of an integrator partner and the degree of affective and cognitive credibility given to this partner [15]. Integrated innovative management of enterprise development can significantly decrease the risk level in the process and promote the successful formation of an innovative business model [16].

The main disadvantage of models for assessing the business development level is their short-term features. Nowadays, a system for assessing financial condition has been formed based on a system of actual indicators. To that end, the "Octant sustainable enterprise development" tool for indicator forecasting was created in order to develop recommendations for management decision-making. The predicted algorithm for assessing the sustainability of the industrial enterprises development lies in its core [17].

An assessment of a company's development level can be based on a Product Sustainability Index (ProdSI) and a Process Sustainability Index (ProcSI), in order to form a platform for the integration evaluation of production at the system level [18].

The method of identifying the ideal point of an unclear group and combined weighting with an advanced method of the ratio of group order and entropy weight is also used in the assessing process of the sustainable development of enterprises [19].

Assessment of a company development is carried out for a purpose of improvement of four abilities in the following four aspects: the ability to comprehend the environment, the ability to estimate the situation, the ability to make strategic decisions and organizational adaptability [20].

In the process of evaluation of the enterprise development, the E-SET tool is implemented with a view to achievement of the sustainable business strategy, developed using indicators from six global sustainable development reporting structures and their implementation through programming [21].

Thus, the multidimensionality of methodological approaches to assessing the development of the enterprise enables distinguishing the following major areas:

first of all, the compulsory formation of an indicators system depending on the features of the business and the sectors of its functioning;

secondly, the use and implementation of information and telecommunication technologies in evaluating and presenting results;

thirdly, the implementation of different indicators in an integral indicator of the company's development effectiveness;

fourthly, focus on development diagnostics taking into consideration the interests of all business stakeholders;

fifthly, the establishment of methodological toolkit for forecasting the level of enterprise development.

Despite the significant scientific potential for business development evaluation, many aspects concerning this direction of research remain insufficiently covered. This concerns the issues of assessing the effectiveness of integrated enterprise development and making effective management decisions on its basis.The key motivation for the implementation of this study, in order to fill this science gap, is the need to develop a methodological approach to determine alternatives for company integration and assess enterprise development with a view to breakthrough increase of the level of performance and competitiveness.

All this contributed to the establishment of the targets of this article, which lies in the formation of a methodological approach to evaluating and increasing the level of effectiveness of the integrated development of the Ukrainian light industry enterprises, taking into consideration the modularized performance diagnostics.

Materials and methods of research. The procedure and methodological toolkit for assessing the effectiveness of integrated development of an enterprise are based on an integral indicator, considering the constituent integration modules according to the formula (1):

$$Ef_{id} = \alpha \cdot Ef_{eco} + \beta \cdot Ef_{org} + \gamma \cdot Ef_{inf} + \delta \cdot Ef_{inn} \quad (1)$$

where Ef_{id} is the effectiveness of the integrated development of the enterprise; Ef_{eco}, Ef_{org}, Ef_{inf}□, Ef_{inn} is the development efficiency in accordance with the economic, organizational, informational and innovative integrated module; α, β. γ, δ are the corresponding weighting coefficients of the relative indicators importance Ef_{eco}, Ef_{org}, Ef_{inf}□, Ef_{inn}.

The integrated development assessment is based on indicators of the functioning performance of organizational, economic, informational and innovative integrated modules, the influence of which is determined through weighting factors (α, β, γ, δ). Their relative value is determined through the hierarchy analysis method [22]. The essence of this method consists in the hierarchical decomposition of the problem and the current rating score with alternative solutions.

The formation of an array of indicators characterizing the development performance of the economic, organizational, informational and innovative integrated module is expressed with the help of an integrated assessment considering the total number of individual indicators, indicating the level of development effectiveness in individual directions.

For the research, 30 Ukrainian enterprises of light industry, which represent its various sub-sectors from different regions, were selected: “Gloria”, “Voronin”, “Rosa” (Kyiv), “Lesia”, “Arsaniya” (Zhytomyr Region), “Strichka”, “Ovetri” (Dnipropetrovsk region), “Lileya”, “Volodarka” (Vinnitsa Region), “Edelvika” (Volyn region), “Goryn” (Khmelnytsky Region), "Khutrofirma" Tysmenytsia "(Ivano- Frankivsk region), “Kalyna”, “Trottola” (Lviv region), “Rivne factory of nonwoven materials”, “Rivne-Styl” (Rivne region), “Modessa” (Odessa region), “Santa Ukraine” (Mykolaiv region) , "Ternopilske obiednannia" Teksterno "(Ternopil region)," Cherkasy silk mill ”(Cherkasy region)," Orion "," Fabryka Prut "(Chernivtsi region)," Bereginia ”," Desna "," Lybid "(Chernihiv region) , “Loteks”, “Svit” (Poltava region), “Zoryanka”, “Sabina“ (Kirovograd region), and “Shovkova nytka” (Zaporizhzhya region). Development diagnostics was carried out for each of them according to key performance indicators as of 2019 for the economic, organizational, innovative and information module.

Research results. The methodology for evaluating the effectiveness of the functioning of the integrated development mechanism of an enterprise should be implemented in stages. First of all, it is necessary to determine performance indicators, with the help of which it is possible to diagnose integrated development for each module, and then calculate the integral indicator. This approach to evaluation allows to highlight the impact of a particular module on the effectiveness of the company`s integrated development. Meanwhile, the effectiveness of the economic, organizational, innovative and information modules is determined bearing in mind the characteristics of individual indicators.

The principles and tools of internal and intercompany integration should be organically combined, when forming a system of indicators for an enterprise development. The activity of an integrated enterprise is ensured by the planning, organization, motivation and control mechanisms, therefore, the

proposed methodological approach is a set of interaction methods of internal elements and subsystems, ensuring optimal coordination of integration processes at different stages of company development by means of synchronizing internal business processes and their coherent behaviour, determining the optimal managerial impact according to the stage of life cycle of an enterprise, activation and implementation of integration processes.

Based on the diagnostics of the company's performance considering the economic, organizational, innovative and information modules, the integrated indicators of the enterprise development effectiveness are determined (table).

The results of business diagnostics of the development level of the Ukrainian light industry enterprises

№	The name of organisation	Economic module	Organizational module	Information module	Innovative module	Bf_{id}
1	Arsania	4,537	2,328	1,624	1,983	2,912
2	Bereginia	4,429	3,863	4,973	5,843	4,756
3	Cherkasy silk mill	1,962	1,375	2,285	3,533	2,301
4	Desna	7,658	9,982	4,722	6,732	7,605
5	Edelvika	9,874	8,792	7,638	6,721	8,441
6	Fabryka Prut	8,962	7,485	5,862	4,938	7,079
7	Gloria	9,554	8,995	8,638	6,995	8,581
8	Goryn	4,138	3,788	4,673	5,801	4,587
9	Kalyna	2,942	1,976	0,794	0,953	1,877
10	Lesia	2,564	1,962	3,175	1,452	2,178
11	Lileya	5,521	7,766	3,728	3,249	5,210
12	Loteks	5,164	8,562	3,843	3,345	5,323
13	Lybid	3,287	4,762	2,449	2,085	3,207
14	Modessa	6,822	4,895	7,852	2,891	5,367
15	Orion	1,485	2,123	1,328	1,432	1,608
16	Ovetri	9,201	9,548	7,942	5,454	8,074
17	Rivne FoNM	7,408	4,117	7,459	4,130	5,680
18	Rivne-Styl	8,847	7,192	5,938	5,745	7,204
19	Rosa	6,182	6,782	6,743	7,257	6,702
20	Sabina	4,456	2,977	0,826	1,174	2,717
21	Santa Ukraine	6,439	8,983	3,829	1,248	5,277
22	Shovkova nytka	5,881	3,162	0,982	0,607	3,117
23	Strichka	8,642	6,257	4,48	2,572	5,827
24	Svit	8,628	9,245	6,911	5,556	7,701
25	Teksterno	2,876	4,752	2,128	1,256	2,788
26	Trottola	6,984	7,391	6,612	3,646	6,097
27	Tysmenytsia	8,955	8,437	5,594	3,642	6,913
28	Volodarka	2,128	5,082	0,992	0,658	2,299
29	Voronin	8,429	7,435	8,864	6,828	7,787
30	Zoryanka	2,176	1,745	3,523	0,651	1,807

Source: formed by the authors

The orbital of integrated enterprise development is proposed to be form (figure 1). The orbital of the company is determined on the basis of the integral indicator value obtained on a scale from 0 to 10, and the segment of the enterprise's location is highlighted according to the most developed company`s module

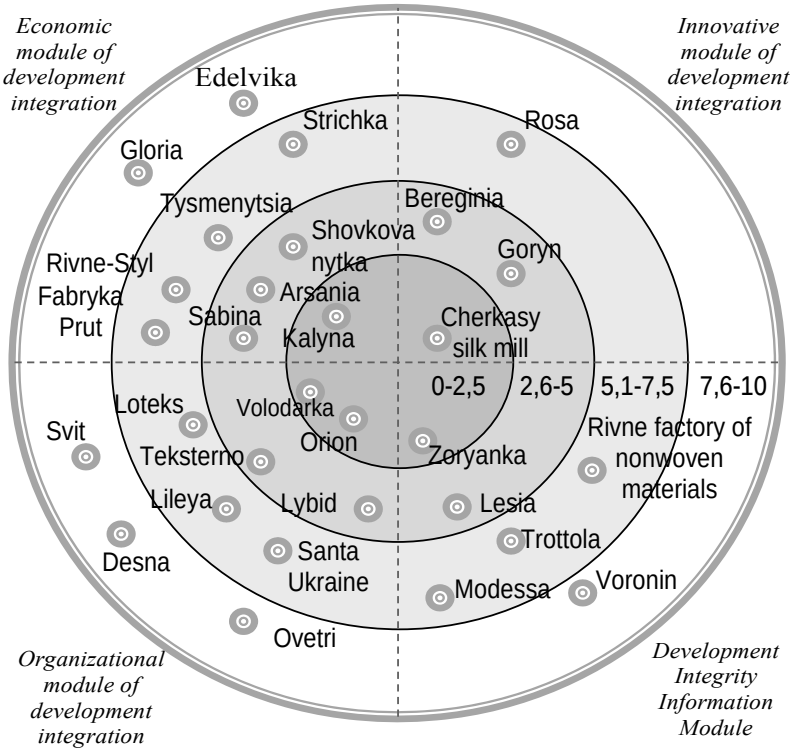

Figure 1 – Orbital of integrated development of the Ukrainian light industry enterprises.
Source: formed by the authors

according to the results of the diagnosis conducted. This enables the determination of the fact, which enterprises are the most developed and in which sphere they have an advantage.

Taking into account the strategic intentions of the business based on the proposed orbit, it is possible to determine the opportunities and directions of the companies' mutual integration. Enterprises with a single orbit can increase their development efficiency by means of mutual integration based on the most advanced modules and reach a higher orbit level, gaining business development growth.

Due account being taken of the current orbit of the development of light industry in Ukraine, it is proposed to create the following integrated groups of enterprises:

1) Kalyna, Volodarka, Orion, Zoryanka, Cherkasy silk mill;
2) Shovkova nytka, Goryn, Lybid, Sabina, Lesya;
3) Arsania, Tekstemo, Bereginia;
4) Tysmenytsia, Trotolla, Santa Ukraine, Loteks;
5) Rivne nonwoven materials factory, Rivne-Styl, Lileya;
6) Fabryka Prut, Strichka, Rosa, Modessa;
7) Gloria, Voronin, Right, Overty, Sweet, Edelvika.

These companies can significantly increase their operations performance by integrating between themselves. The feature of the proposed orbit is to stimulate the development growth of both the individual enterprise and the industry as a whole, since less developed companies in the process of integration do not decrease the level of development of others, but reach a higher level due to integration with the similar economic entities. If to integrate them with the proposed distribution by groups and determine the integral development index for each enterprise, taking into account the proposed modules, then eventually an increase in its level at all companies can be noted (figure 2).

At the same time, various combinations of integrated development between enterprises can be considered and the most effective option among alternative ones can be determined. The highest development growth can be traced in such enterprises as Orion (+3.1), Kalyna (+2.7), Lybid (+2.7), Shovkova nytka (+2.6) and Lileya (+2.6) In this case, a significant role has been played by economic and organizational development module, as well as the innovative and informational directions of companies, combined with the ability to be flexible and adaptive compared to large companies.

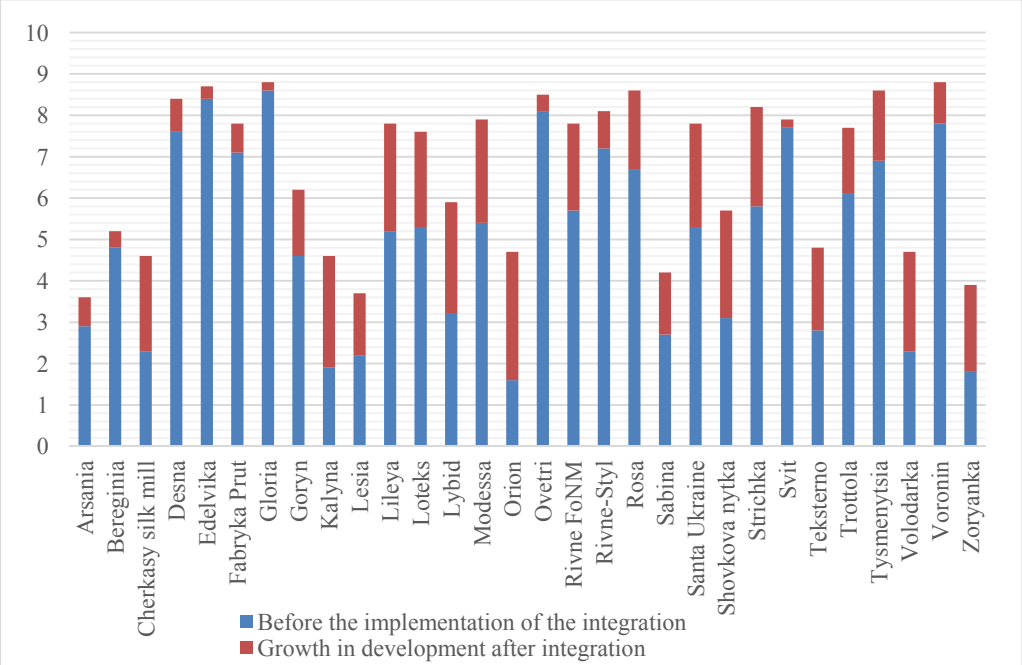

Figure 2 – The level of performance growth of light industry enterprises as a result of integrated development. Source: formed by the authors

The advantage of the proposed methodology is also the possibility to transform the system of indicators for diagnosing the development level of the enterprise using particular modules. This provides the possibility to use it not only in light industry companies, but also in other industries. Meanwhile, a unique set of key performance indicators can be formed taking into account the business goals of all stakeholders.

A promising direction for improving the proposed methodology is the practical opportunity to identify the most dangerous (in terms of influence on the level of development indicators) risks for the enterprise resulting from their integration. Bearing in mind the correction factors, formed due to the existing strengths and weaknesses of the enterprise, it enables determination of those internal factors of the enterprise, the development or elimination of which will minimize the existing risks.

The methodology for assessing integrated development on the basis of the orbital formation allows comprehensively to assess the performance of the enterprise using individual modules, compare alternative development options, identify deviations in the process of its functioning, make adjustments and modifications to activity on time.

Conclusion. Assessment of the integrated development of the enterprise provides for the formation of a performance indicators system with the help of which it is possible to conduct business diagnostics using the economic, organizational, innovative and information module, and then calculate the integral indicator. This approach to evaluation allows to highlight the impact of a particular module on the performance of the company`s integrated development.

The orbital of integrated development of enterprises is proposed to be formed on the basis of the obtained integral indicator for each enterprise. Meanwhile, the enterprise location segment is determined taking into consideration the most developed module. This enables the identification of the most developed companies and their predominant development direction.

Based on the developed orbital of development of the light industry enterprises in Ukraine, seven integrated groups of enterprises were formed. As a result of the integration of companies according to the proposed groups, an integrated development indicator was determined for each enterprise, taking into account the modules, and an increase in its level was obtained at all companies. The highest development growth was recorded at such enterprises as Orion (+3.1), Kalyna (+2.7), Lybid (+2.7), Shovkova nytka (+2.6) and Lileya (+2.6).

By integrating their development, these companies can significantly improve their performance. A feature of the proposed orbital-based methodology is the stimulation of the development level increasing of both an individual enterprise and the industry as a whole, since less developed companies do not reduce the development level of others, but reach a higher level due to integration with the similar economic entities.

The proposed methodological approach to assessment based on the formation of the integrated development orbital allows comprehensively to evaluate the performance of the enterprise's operation using separate modules, identify and compare alternative development options, identify deviations in the process of its functioning, and make adjustments and modifications to activity on time.

A promising direction for improving this methodology is the practical possibility of determining integration risks for the enterprise, developing software for diagnostics, and forming a mechanism for identifying the most optimal integration option for a group of companies.

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КӘСІПОРЫННЫҢ КЕШЕНДІ ДАМУЫН БАҒАЛАУ

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ОЦЕНИВАНИЕ ИНТЕГРИРОВАННОГО РАЗВИТИЯ ПРЕДПРИЯТИЯ

Аннотация. Целью данной статьи является формирование методического подхода к оценке и повышению уровня результативности интегрированного развития предприятий легкой промышленности Украины с учетом модулеризированной диагностики их деятельности.

Методы. Методический инструментарий оценки эффективности интегрированного развития предприятия основан на интегральном показателе с учетом экономического, организационного, информационного и инновационного модулей интегрированности. Для проведения исследования выбрано 30 предприятий легкой промышленности Украины. Для каждого из них проведена диагностика развития по ключевым индикаторам эффективности деятельности и определен интегральный показатель уровня развития бизнеса.

Результаты. Сформировано семь групп предприятий, в результате интегрированности развития которых получено повышение его уровня на всех компаниях. Интегрируясь между собой, данные компании могут существенно повысить эффективность деятельности. Особенностью предлагаемой орбитали является стимулирование повышения уровня развития как отдельного предприятия, так и отрасли в целом, так как менее развитые компании в процессе интегрированности не уменьшают уровень развития других, а выходят на более высокий уровень за счет интегрированности с подобными субъектами хозяйствования. Если интегрировать их с предложенным распределением по группам и определить интегральный показатель развития по каждому предприятию с учетом предложенных модулей, то в конечном результате можно отметить повышение его уровня на всех компаниях.

Самый высокий рост развития зафиксирован в таких компаниях, как Orion, Kalyna, Lybid, Shovkovanytka и Lileya.Интегрируя свое развитие, данные компании могут существенно повысить эффективность деятельности. Особенностью предлагаемой методики на основе орбитали является стимулирование повышения уровня развития как отдельного предприятия, так и отрасли в целом, поскольку менее развитые компании не уменьшают уровень развития других, а выходят на более высокий уровень за счет интегрированности с подобными субъектами хозяйствования.

Преимуществом предложенной методики является также возможность трансформации системы индикаторов для проведения диагностики уровня развития предприятия за определенными модулями. Это предоставляет возможность ее использования не только в компаниях легкой промышленности, но и в других

отраслях. При этом можно сформировать уникальный набор ключевых показателей эффективности деятельности с учетом целей бизнеса и всех заинтересованных сторон.

Выводы. Предлагаемая методика на основе формирования орбитали предполагает стимулирование повышения уровня развития как отдельного предприятия, так и отрасли в целом. Она позволяет комплексно оценить эффективность функционирования предприятия по отдельным модулям, идентифицировать и сравнить альтернативные варианты развития, выявить отклонения в процессе его функционирования и своевременно вносить изменения в деятельность.

Ключевые слова: результативность, интегрированное развитие, устойчивое развитие, эффективность, бизнес-диагностика.

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