

The object of this study is the assessment of the provision of innovative technologies for the growth of corporate social responsibility by types of economic activity in Lithuania.

In the course of the research, the problem of determining the level of provision of corporate social responsibility with innovative technologies as a factor of its growth was solved; establishing a benchmark for the regularity of the growth of corporate social responsibility by types of economic activity in Lithuania.

As a result of the study, an integral indicator of the provision of innovative technologies for the growth of corporate social responsibility by types of economic activity in Lithuania was obtained, which does not correspond to the reference model of the pattern of growth for each.

The peculiarity of this study is the comprehensive approach, which takes into account the multi-component content of corporate social responsibility, its relationship with internal and external elements of the socio-economic system, namely its growth, based on the use of innovative technologies.

A distinctive feature of the results, owing to which they made it possible to solve the set tasks, is multidimensionality, that is, the structure, dynamics, relationship of the research object were taken into account, quantitative and qualitative indicators were used, and a complex methodological toolkit of matrix business modeling.

The results of the study make it possible to determine in practice the level of assurance of the growth of corporate social responsibility by innovative technologies. Taking into account deviations from the reference model of growth patterns, make decisions about the introduction of certain types of innovative technologies in certain components of corporate social responsibility

Keywords: *matrix business model, provision assessment, innovative technologies, corporate social responsibility*

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ASSESSING THE PROVISION OF INNOVATIVE TECHNOLOGIES FOR THE GROWTH OF CORPORATE SOCIAL RESPONSIBILITY IN LITHUANIA

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1. Introduction

The international system for the achievement of the main goals by the participating countries, according to the Communication of the European Commission “Strategy for smart, sustainable, and inclusive growth”, provides a powerful basis for further management of their development, using a wide range of initiatives, topics, and indicators [1].

According to the Sustainable Development Report [2], for the period 2015–2021, the Sustainable Development Index in Lithuania grew by 0.77, which is 1 %. The decrease of this index is observed in 2016 and 2018 in the amount of 0.134 % and 0.903 %, respectively; growth – in other years of the considered period in the amount from 0.306 % to 0.783 % annually. In 2021, in the Sustainable Development Index rating of 163 countries, the Republic of Lithuania took 39th place, with a value of this index of 75.42 out of 100. These results are influenced by the corresponding values and dynamics of achieving the seventeen Sustainable Development Goals (Fig. 1), which, in turn, are formed based on the study of the appropriate set of indicators. The data shown in Fig. 1 indicate the need to assess the provision of innovative technologies of Corporate Social Responsibility in relevant segments of the national economy of Lithuania as a factor of its growth. Corporate social re-

sponsibility of business, in turn, serves as the basis for achieving the goals of sustainable development in society.

On track		6 16	8	15
Moderately Increasing	9	3 5	7 4 1	11
Stagnating	2 1 1	1 17		
Decreasing	1			
	Major challenges remain	Significant challenges remain	Challenges remain	SDG achievement

Fig. 1. The value and dynamics of achieving the Sustainable Development Goals in Lithuania for 2021 (compiled by authors based on [2]): ① – sustainable development goals, by numbers, according to [2]

Thus, the significance of the research confirms the necessity of choosing such a base as the types of economic activity

of the Republic of Lithuania. The choice of the research topic, its relevance is determined by the need to assess the provision of innovative technologies of corporate social responsibility as a factor in its growth and the achievement of sustainable development goals in Lithuania and society as a whole.

2. Literature review and problem statement

Achieving the goals of Sustainable Development [3], the fulfillment of tasks that are monitored with the help of an appropriate set of indicators, is determined by the need for responsible business conduct, ensuring the growth of corporate social responsibility and new business models of their management. An organization that takes action in accordance with the practical recommendations proposed in ISO 26000 will necessarily contribute to the achievement of the goals of sustainable development. According to [4]: “Businesses play a vital role in the transition to sustainable development.” The stated positions of the theory and practice of ensuring the sustainable development of society, which are relatively new, do not contradict the existing classical position of economic theory in work [5] the importance of productive forces in social development is confirmed. The growth of corporate social responsibility of business involves the continuous implementation of various innovative technologies, according to [6]. Continuous improvement of business processes is a means of necessary transformations and sustainable development of the socio-economic system. But the question remains insufficiently resolved: which innovative technologies, according to which direction of growth of corporate social responsibility, should be prioritized for implementation; which structure of innovation cost efficiency most ensures its growth.

Subjects at all levels of socio-economic functioning of society participate in the economic process, in particular, according to Section IV of the Constitution of the Republic of Lithuania [7], but economic activities are carried out directly by economic subjects, according to Article 2.4 of the Civil Code of Lithuania [8], which forms the exclusive role of microeconomic systems in achieving the goals of sustainable development of the state through their corporate social responsibility. The provision of the necessary innovative technologies for business entities, for various types of economic activity, is a source of growth in corporate social responsibility and, in turn, sustainable development of society.

All this allows us to assert the feasibility of conducting a study aimed at the improvement of appropriate scientific and methodological tools and procedure of assessing the provision of innovative technologies for the growth of corporate social responsibility.

The problems of managing corporate social responsibility, namely the question of its assessment as a complex system category, have been studied in many scientific works. However, without diminishing the significance of existing scientific heritage, there is a need to improve the methodological toolkit for managing the growth of corporate social responsibility by assessing its provision with innovative technologies that meet today's economic conditions.

The author of work [9] conducted a study in the field of social responsibility of small business, namely the development of tools for its support and efficiency growth. This work examines the need of small and medium-sized enterprises for tools to ensure their sustainable development, which is confirmed by the doctrine of social accounting. With the use of application software, self-assessment of indicators of their social development

is carried out, based on the analysis of the reporting standard. But the toolkit for providing innovative technologies is not taken into account.

At the same time, directions for the development of methodological tools for assessing corporate social responsibility are considered in work [10]: “Different philosophies, the history of business development, as well as questions of organizational culture give rise to heterogeneous models and, accordingly, different approaches and techniques for assessing corporate social responsibility.” In this study, the methods of assessing corporate social responsibility are divided into rating and self-assessment techniques. The possibility of applying the fuzzy theory to the formation of criteria for evaluating the company's reporting on corporate social responsibility activities is discussed. However, the fact that there is no general concept of assessing corporate social responsibility of companies with the simultaneous synchronization of the aspect of management, which is provided by innovative technologies, is established.

One of the areas of this research is solving the problem of increasing the competitiveness of microeconomic systems in the relevant market segment, in particular the national economy of the Republic of Lithuania. In work [11], the connection between the implementation of the practice of corporate social responsibility and aspects of customer behavior was investigated, which was considered by the authors in inextricable connection with the degree of economic development of the country in which the business entity operates. It is confirmed that corporate social responsibility is positively related to e-service quality, and e-service quality also directly affects customer and company identification. Therefore, increasing the provision of innovative technologies of corporate social responsibility, as a competitive advantage of the business entity, also depends on the economic and legal plane of the country's state regulation.

The development of public society and modernization in a sustainable environment was studied in work [12] from the point of view of a holistic approach and systematic assessment, an analysis of social, economic, and ecological aspects was carried out and the interaction between the expression of modernization changes and the formation of civil society was substantiated, distinguishing the contributing and limiting factors. The authors' conclusions describe the interrelationships “modernization changes and public citizenship contribute to the conceptual formation of the country's long-term development strategy”, which confirms the need to improve management tools at the microeconomic level in the operational perspective of providing innovative technologies.

For example, in [13] it is noted that in order to ensure sustainable business growth, it is necessary to quickly adapt to the external unstable environment with market competition, make appropriate decisions, and take into account the social component of business. It should be noted that making the necessary decisions requires the mandatory use of certain innovative technologies.

The current standard ISO 26000:2010 “Regulation on social responsibility” is the basis for the implementation of the concept of social responsibility, regulates its substantive parameters: recognition, interaction, involvement of interested parties, ways of integrating socially responsible behavior into others, which serves as the basis for evaluating its results and improving productivity. This standard formulates social responsibility as determining the organization's course: its policy, organizational culture, activity strategy, which has a recommendatory nature. With such a characteristic of corporate social responsibility, it is proposed to consider, specifically,

its provision of innovative technologies. Under such conditions, the implementation of economic activity is the system-forming basis of the vital activity of society and the achievement of the goals of sustainable development. Methods of monitoring results in the field of social responsibility are not limited by the standard. This allows the use of various (quantitative and qualitative) components of the methodological tools of management, in particular, assessment of corporate social responsibility, in the aspect of ensuring its growth with innovative technologies.

On the basis of the pyramidal structure of corporate social responsibility discussed in [14], the order, sequence, and interdependence of the initial and received data are proposed. Namely: the meaning and achievement of goals for each subsequent component is based on the state of the previous one, their decreasing interdependence takes place. Content and methodological characteristics inherent in this conceptual model are also taken into account.

The set of specified characteristic features of the concept of corporate social responsibility is the basis for assessing the provision of its growth with innovative technologies, which makes it possible to form and realize the innovative potential of the corresponding microeconomic system.

3. The aim and objectives of the study

The purpose of this study is to improve the methodology for assessing the provision of innovative technologies for the growth of corporate social responsibility based on matrix business modeling in Lithuania, by types of economic activity. This will make it possible to make managerial decisions regarding the types and volumes of innovative technologies that must be implemented to ensure the growth of corporate social responsibility of the respective business.

To achieve the goal, the following tasks are solved:

- to establish the relationship between the components of sustainable development and the main subjects and problems of social responsibility, to build a reference model of the regularity of its growth;
- to form a system of indicators for assessing the provision of innovative technologies for the growth of corporate social responsibility;
- to form a matrix business model for assessing the provision of innovative technologies for the growth of corporate social responsibility;
- to determine the integral indicator of the provision of innovative technologies for the growth of corporate social responsibility, on the basis of which to establish compliance with the reference model of the regularity of its growth.

4. The study materials and methods

The object of our study is a matrix business modeling of the corporate social responsibility of business, based on which an assessment of the provision of its growth by innovative technologies is formed.

The research hypothesis was as follows. Management of implementation of innovative technologies based on matrix business modeling of corporate social responsibility will lead to its growth and increase in the effectiveness of such implementations.

To achieve the goal, the following general scientific and special methods of scientific knowledge were used in the work:

for the purpose of studying existing methods of assessing corporate social responsibility – theoretical generalization and comparison (formulation of a comprehensive approach to assessing the provision of innovative technologies for the growth of corporate social responsibility); for the formation of a system of indicators for assessing the provision of innovative technologies for the growth of corporate social responsibility – analysis and synthesis (analysis of the plane of interconnection of the components of corporate social responsibility with the components of sustainable development, formation of local blocks of the matrix field); to characterize the proposed methodology – logical generalization (clarification of the content of successive stages of a comprehensive assessment of the provision of innovative technologies for the growth of corporate social responsibility); to describe the management model of providing innovative technologies for the growth of corporate social responsibility – methods of scientific observation (formulation of the regularity of the development of the components of sustainable development, their relationship with the components of corporate social responsibility); for the determination of integral indicators – methods of convolution of criteria (determination of integral indicators: the state of the structure and the state of the ratio, provision of innovative technologies for the growth of corporate social responsibility); for structuring and visualization of the obtained results – graphic (studying the level of provision of innovative technologies for the growth of corporate social responsibility); to formalize the construction of the matrix business model – economic and statistical (determination of the value of the initial indicators, elements of the ratio matrices, elements of the matrix business model, average values of local blocks).

5. Results of investigating the methodology for assessing the provision of innovative technologies for the growth of corporate social responsibility in Lithuania, by types of economic activity

5.1. Construction of a reference model of the regularity of the growth of corporate social responsibility

The European Commission in the document “Report for reflection on the way to a sustainable Europe 2030” [4] indicated that it is necessary to “promote the emergence of new business models”, thus the work proposes a methodology for building a matrix business model for assessing the provision of innovative technologies for the growth of corporate social responsibility. Chapter 3 of the document [4] “Moving towards a sustainable Europe 2030” formulates the priority of the components of sustainable development: “transition to a low-carbon, climate-neutral, resource-efficient and biodiverse economy... for the good of all, leaving no one behind, ensuring equality and inclusiveness”, namely: in the first place is the ecological component, on the basis of which the transformation of the economy is expected, which in turn provides the factors of the social component. In this regard, the authors have built a relationship between the components of Sustainable Development with the main subjects and problems of social responsibility in the following way (Fig. 2).

According to subsection 7.7.2 of the ISO 26000:2010 Standard, the organization makes decisions about monitoring objects, focusing on their significance, its results should be reliable, timely, easy to understand, relevant for interested parties. With this technique of assessing the provision of innovative technologies for the growth of corporate social respon-

sibility, the set of initial information includes indicators that correspond to the characteristics of the specified subsection and characterize the components of sustainable development in the following reference model of growth patterns:

$$Tek > Tec > Tso, \tag{1}$$

Tek, Tec, Tso – growth rates of ecological, economic, and social components of sustainable development, respectively.

The proposed reference model of the regularity of growth corresponds to and is the basis for achieving proportional provision of innovative technologies for the growth of corporate social responsibility, in particular, and sustainable development in general.

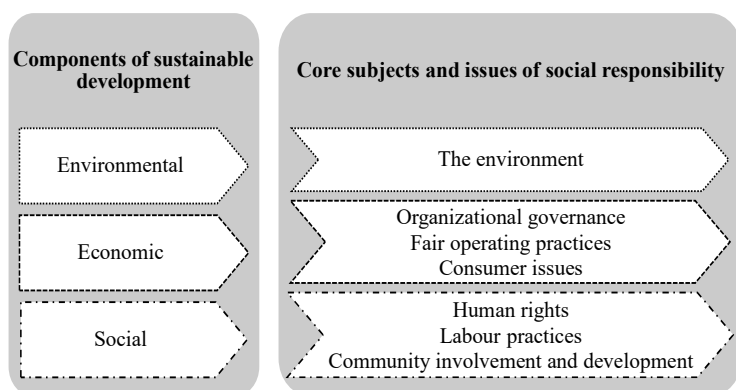


Fig. 2. Meaningful relationship between Sustainable Development and the Main Subjects and Problems of Social Responsibility, compiled by authors on the basis of their own research

5. 2. Formation of a system of indicators for assessing the provision of innovative technologies for the growth of corporate social responsibility

It is proposed to carry out a comprehensive assessment of the provision of innovative technologies for the growth of corporate social responsibility based on the following system of indicators (Table 1). A more complete discussion of the state of the structure and dynamics of doing business by type of economic activity will ensure the compatibility of the initial data used in relation to the total volume of the specific indicator in the Republic of Lithuania.

The increase in the growth rate of this set of indicators in the specified sequence characterizes the increase in provision of innovative technologies for the growth of corporate social responsibility, but it is important to take into account the existing cause-and-effect relationships between them, taking into account the attributes of sustainable development.

The values of indicators are given by the type of economic activity “Manufacturing” in Lithuania, compiled by authors on the basis of [15].

For the completeness of the assessment, in terms of the specificity of information regarding the type of economic activity – “Agriculture, forestry, and fishing”, the following replacement of the relevant indicators was carried out:

- * – the level of organic production in agriculture;
- ** – the level of farms that use equipment for the production of energy from renewable sources;
- *** – the level of farmers and family farms that sell more than 50 percent of their sales directly to consumers.

Table 1

The system of indicators for assessing the provision of innovative technologies for the growth of corporate social responsibility

No.	Indicator	Previous period before the reporting period	Reporting period	Absolute change, +	Change rate, %
Environmental					
1	Gross value added of the sector of environmentally friendly goods and services, the level of the industry in the total volume	0.200	0.189	0.0108	94.59
2	Companies’ revenue from by-products for environmental protection, industry level in total*	0.223	0.183	0.0406	81.82
3	The level of final energy consumption in the industry from renewable energy carriers, imports and transformation in the total volume	0.228	0.225	0.0022	99.03
4	Environmental taxes, the level of the industry in the total volume	0.100	0.171	0.0707	170.57
5	Emissions of pollutants into the atmosphere, the average level of the industry in the total volume	0.261	0.264	0.0035	101.35
Economic					
6	The level of net profit of companies from the industry in the total net profit	0.221	0.233	0.0121	105.47
7	The level of income from the sale of companies by industry in the total volume of sales revenue	0.223	0.238	0.015	106.82
8	Corporate investment in environmental protection, industry level**	0.044	0.257	0.2126	579.11
9	The level of domestic production of energy products by industry in total consumption	0.846	0.843	0.0023	99.73
10	The level of total costs of companies in the industry in the total volume of total costs	0.222	0.237	0.015	106.77
Social					
11	The ratio of the average monthly salary in the industry at the end of the year to the minimum monthly wage in the state	2.430	2.537	0.1069	104.40
12	Support received by charitable and supporting foundations from Lithuanian legal entities, industry level	0.090	0.083	0.00771	91.47
13	The level of e-commerce in the industry***	18.100	15.300	2.8000	84.53
14	Employment in the sector ecologist net goods, industry level	0.183	0.189	0.0064	103.49
15	Vacancy rate in the industry at the end of the reporting period	1.500	1.900	0.4000	126.67

5.3. Formation of a matrix business model for assessing the provision of innovative technologies for the growth of corporate social responsibility

Solving the problem of assessing the provision of innovative technologies for the growth of corporate social responsibility, by building an appropriate business model, is proposed based on the theory of the field of efficiency presented in [16], which was developed, including scientific works [17, 18].

The methodology for the formation of the specified business model involves the construction of a matrix as a method of logical ordering of the initial data, on the basis of which integral indicators are formed that characterize the provision of innovative technologies for the growth of corporate social responsibility.

Thus, it is proposed to include 15 indicators in the business model for assessing the provision of innovative technologies for the growth of corporate social responsibility, which allows building a 15*15 ratio matrix. The sequence of indicators within the group does not contradict law (1), that is, it is assumed that the rate of growth of the previous indicator should be greater than the next, which ensures a steady growth of corporate social responsibility. In this work, the dimensionality of the indicators is given in relative measurement, namely the share of each type of economic activity (industry) under study in the total volume of the national economy of the Republic of Lithuania. The following industries are included in the study:

- Agriculture, forestry, and fisheries (A);
- Industry (C);
- Supply of electricity, gas, steam and air conditioning and water supply; sewerage; waste management and recovery activities (DE);
- Construction (F);
- Transportation and storage (H), as they are the main processes of material production in the Republic of Lithuania.

The elements of the ratio matrix are the ratio of the indicators of each column to the indicators of each row. Ratio matrices are formed for the reporting period and for the previous period before the last reporting period. The elements of the matrix model for assessing the provision of innovative technologies for the growth of corporate social responsibility are the growth rates of the corresponding elements of the ratio matrices in the reporting period compared to the baseline (Table 2).

5.4. Determination of the results of the assessment of the provision of innovative technologies for the growth of corporate social responsibility

Using the elements of the obtained matrix business model, it is proposed to determine the integral indicator of the provision of innovative technologies for the growth of corporate social responsibility. For this, structure blocks and relationship blocks were formed based on the hierarchy of interconnected indicators.

The improvement (development) of this procedure of assessment of the provision of innovative technologies for the growth of corporate social responsibility is also proposed in the part of substantiating the methods of integrating the elements of the built matrix business model. The formation of local integral indicators, according to local blocks of the matrix business model (Table 2), is proposed to be performed by the geometric mean method with equal weighting of the elements – the typical value of the block of the matrix, which are standardized by the reference value. It is proposed to determine the intermediate integral indicators by the state blocks of the structure and ratio by the method of additive convolution. The general integral indicator of the assessment of provision of innovative technologies for the growth of corporate social responsibility – by the method of multiplicative convolution. The weights of the values of the local blocks of the constructed matrix business model do not contradict regularity (1). The weights of the structure blocks and ratios are proposed to be equal.

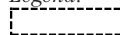





Table 2

Matrix business model for assessing the provision of innovative technologies for the growth of corporate social responsibility*

Indicator	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	0.865	1.047	1.803	1.072	1.115	1.129	6.122	1.054	1.129	1.104	0.967	0.894	1.094	1.339
2	1.156	1	1.210	2.085	1.239	1.289	1.306	7.078	1.219	1.305	1.276	1.118	1.033	1.265	1.548
3	0.955	0.826	1	1.722	1.023	1.065	1.079	5.848	1.007	1.078	1.054	0.924	0.854	1.045	1.279
4	0.555	0.480	0.581	1	0.594	0.618	0.626	3.395	0.585	0.626	0.612	0.536	0.496	0.607	0.743
5	0.933	0.807	0.977	1.683	1	1.041	1.054	5.714	0.984	1.053	1.030	0.902	0.834	1.021	1.250
6	0.897	0.776	0.939	1.617	0.961	1	1.013	5.491	0.946	1.012	0.990	0.867	0.801	0.981	1.201
7	0.885	0.766	0.927	1.597	0.949	0.987	1	5.421	0.934	1.000	0.977	0.856	0.791	0.969	1.186
8	0.163	0.141	0.171	0.295	0.175	0.182	0.184	1	0.172	0.184	0.180	0.158	0.146	0.179	0.219
9	0.948	0.820	0.993	1.710	1.016	1.058	1.071	5.807	1	1.071	1.047	0.917	0.848	1.038	1.270
10	0.886	0.766	0.928	1.598	0.949	0.988	1.000	5.424	0.934	1	0.978	0.857	0.792	0.969	1.186
11	0.906	0.784	0.949	1.634	0.971	1.010	1.023	5.547	0.955	1.023	1	0.876	0.810	0.991	1.213
12	1.034	0.894	1.083	1.865	1.108	1.153	1.168	6.331	1.090	1.167	1.141	1	0.924	1.131	1.385
13	1.119	0.968	1.172	2.018	1.199	1.248	1.264	6.851	1.180	1.263	1.235	1.082	1	1.224	1.498
14	0.914	0.791	0.957	1.648	0.979	1.019	1.032	5.596	0.964	1.032	1.009	0.884	0.817	1	1.224
15	0.747	0.646	0.782	1.347	0.800	0.833	0.843	4.572	0.787	0.843	0.824	0.722	0.667	0.817	1

Note: * – by type of economic activity “Industry” in Lithuania, compiled by authors on the basis of their own research.

Legend:

-  – block of the state of the structure of the ecological component;
-  – block of the state of the structure of the economic component;
-  – block of the state of the structure of the social component;
-  – block of ecological and economic correlation;
-  – block of ecological and social correlation;
-  – block of economic and social correlation.

The results of the assessment of the provision of innovative technologies for the growth of corporate social responsibility by types of economic activity in the Republic of Lithuania on the basis of matrix business modeling are shown in Fig. 3.

The value of the integral indicator of the provision of innovative technologies for the growth of corporate social responsibility allows us to determine the rating of the analyzed types of economic activity: the first place (the highest value of the indicator) is agriculture, forestry, and fishing; second place – construction; third place – supply of electricity, gas, steam, and air conditioning and water supply; sewerage; waste management and recovery activities; fourth place – industry; fifth place (the lowest value of the indicator among those analyzed) – transportation and storage. The formed rating demonstrates the level of provision of business entities of a certain industry with innovative technologies, which are a factor in the growth of their corporate social responsibility. It is also observed that, mostly, the value of the integral indicators of the state of the structure is higher than the state of the ratio, this demonstrates sufficient organization of the functioning of the components as a whole, and their volumes in comparison are insufficient, which necessitates the introduction of certain innovative technologies in certain components, for each type of economic activity.

The formulation of the final conclusions, as a result of the formed matrix business models for the types of economic ac-

tivity of Lithuania, is based on the proposed reference model of growth patterns (1) (Table 3).

Table 3

The results of compliance with the reference model of the regularity of growth of corporate social responsibility by types of economic activity in Lithuania, compiled by authors on the basis of their own research

Growth pattern reference model	Types of economic activity				
	A	C	DE	F	H
Block of the state of the structure of the ecological component	0.36	0.34	0.35	0.43	0.22
>	>	>	>	>	<
Block of the state of the structure of the economic component	0.34	0.18	0.17	0.17	0.24
>	>	<	<	<	>
Block of the state of the structure of the social component	0.22	0.22	0.21	0.24	0.23
Block of ecological and economic correlation	0.16	0.25	0.43	0.39	0.31
>	<	<	>	>	>
Block of ecological and social correlation	0.34	0.29	0.26	0.26	0.21
>	>	>	>	>	>
Block of economic and social correlation	0.24	0.13	0.07	0.08	0.08

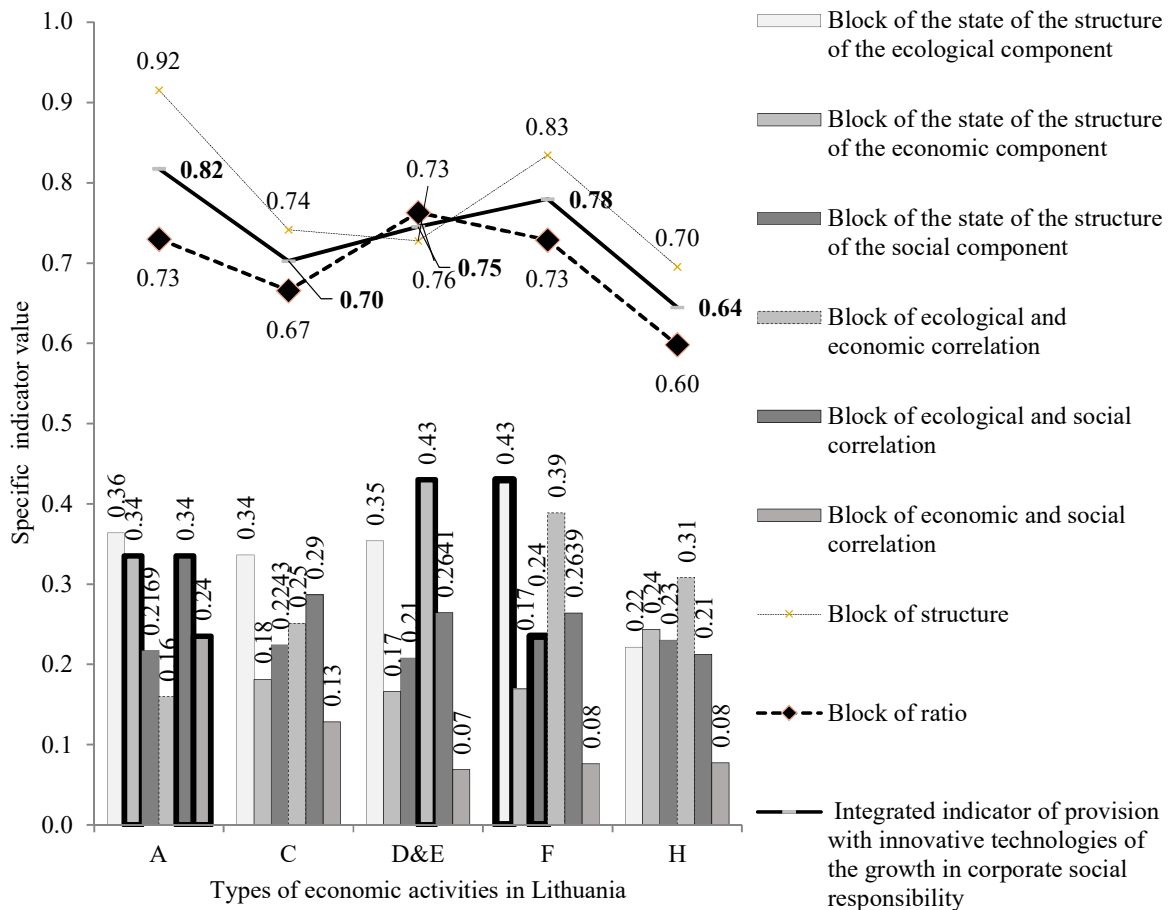


Fig. 3. Results of the assessment of the provision of innovative technologies for the growth of corporate social responsibility by types of economic activity in the Republic of Lithuania, on the basis of matrix business modeling, compiled by authors on the basis of their own research

Therefore, by the types of economic activity in Lithuania, as a result of the assessment of the provision of innovative technologies for the growth of corporate social responsibility based on matrix business modeling, disproportions were revealed. These results serve as the basis for making a management decision regarding the priority of implementing innovative technologies and provides characteristics of the state of the structure, the ratio of the necessary component, in the concept of achieving the goals of sustainable development of the economic system under study.

Namely: there is a deviation from the reference model between the ecological-economic and ecological-social relationship by types of economic activity – Agriculture, forestry, and fishing; Industry. That is, these types of economic activity in the tactical perspective require the introduction of innovative technologies to increase the volume of indicators of the ecological component, its structural construction in this sector of the Lithuanian economy corresponds to the reference model. Destructive shifts take place between the state of the structure of the economic and social components in Industry; Supply of electricity, gas, steam, and air conditioning and water supply; sewerage; waste management and recovery activities; Construction. That is, the structure of available economic results is not proportional to the structure of social ones, which can cause a significant shortage of resources in the industry and the inability to implement environmental and social measures. These results demonstrate the need to introduce innovative technologies to change the internal structure, organization and functioning of the relevant component. At “Transport and storage”, the destruction of corporate social responsibility was revealed between the state of the structure of the ecological and economic components. That is, it is necessary to transform the system of organizational management of the environmental component, namely, the introduction of innovative technologies, which are designed to change not the volume, but intra-industry business processes.

Thus, corporate social responsibility is a complex dynamic system of elements, in a certain way related to each other and the external environment, the generalization of the proposed comprehensive approach to the assessment of the provision of innovative technologies for its growth based on matrix business modeling is shown in Fig. 4.

In our study, a comprehensive approach to assessing the provision of innovative technologies for the growth of corporate social responsibility is proposed. The proposed methodology includes several stages. At the initial stages, a system of indicators for assessing the provision of innovative technologies for the growth of corporate social respon-

sibility is being formed, which reveals the content of this concept and the innovative aspect of the functioning of microeconomic systems, in order of decreasing importance, in a unified format. Based on this, ratio matrices for the reporting period and the previous period before the reporting period are calculated, the values of the elements of which are determined by the ratio of each indicator of the system to the next indicator. The values of the elements of the matrix business model are formed by relating the corresponding elements of the ratio matrices for the reporting period to the previous one. The matrix field of the business model has local blocks: the block of the state of the structure of the ecological component; the block of the state of the structure of the economic component; the block of the state of the structure of the social component; the block of the state of ecological and economic ratio; the block of ecological and social relationship; the block of economic and social relations. At the next stages, the methodology involves integrating the values of the elements of the matrix business model. Within local blocks, the typical value of the local block is defined. According to the blocks of the state of the structure and the blocks of the ratio – by the method of additive convolution, the dependence between the weights of each local block corresponds to inequality (1). The integral indicator of the provision of innovative technologies for the growth of corporate social responsibility is determined by the method of multiplicative convolution of indicators of the state of the structure and ratio, with equal significance. Also, an important part of the methodology for assessing the provision of innovative technologies for the growth of corporate social responsibility is the detection of destructive deviations between local blocks of the matrix business model in relation to the proposed reference model of growth patterns. The presence or absence of such deviations is the basis for the development and implementation of management decisions to ensure the growth of corporate social responsibility with innovative technologies.

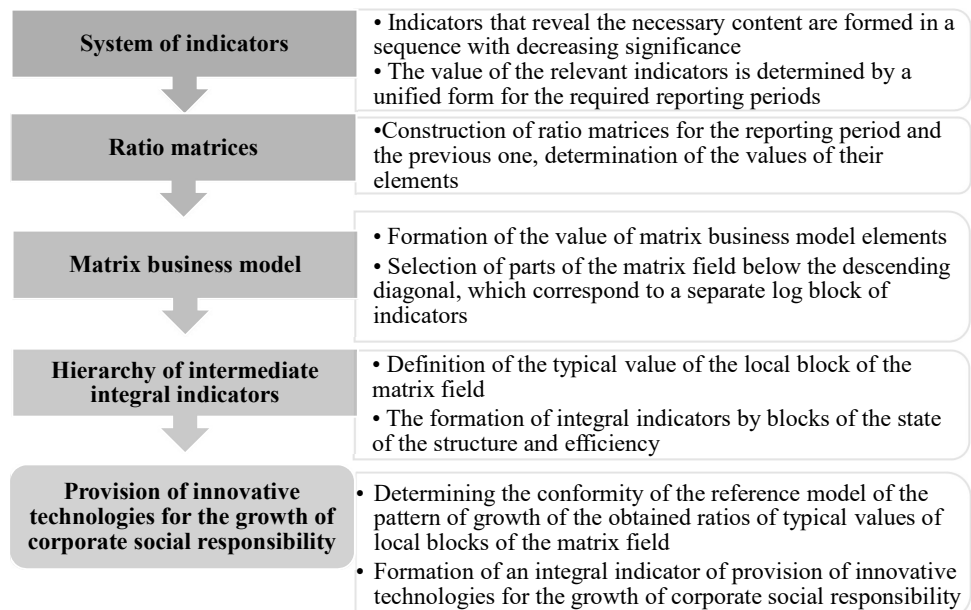


Fig. 4. An integrated approach to assessing the provision of innovative technologies for the growth of corporate social responsibility on the basis of matrix business modeling, compiled by authors on the basis of their own research

6. Discussion of results of the assessment of the provision of innovative technologies for the growth of corporate social responsibility

In our research, a methodology for assessing the provision of innovative technologies for the growth of social responsibility of business, based on matrix business modeling, is proposed. It makes it possible to determine the specific indicator, taking into account the content load of the concept of sustainable development and comprehensive parameters of corporate social responsibility of microeconomic systems (Fig. 2): structural, dynamic, relative, in the relationship of internal and external elements.

The methodology of this approach involves the combined use of indicators of analysis, structure, dynamics, and relationship of the object under study (Table 1). The peculiarity of this approach to assessing the provision of innovative technologies for the growth of corporate social responsibility is that static studies (structure indicators) are supplemented by dynamic (index indicators) and ratio (efficiency) indicators. Also, the assessment of the provision of innovative technologies for the growth of corporate social responsibility is carried out taking into account the internal and external connections of the system, in the conditions of interdependence and subordination of its elements (1).

Parameters with which corporate social responsibility is interconnected (reputation, competitiveness, public trust, customers, and others) are included in the assessment of its provision of innovative growth technologies and are measured through the dynamics of the proposed indicators. The negative dynamics of indicators included in the evaluation system demonstrate the presence of threats, conflicts of interest, "bottlenecks", positive dynamics – opportunities for growth. This procedure makes it possible to measure the achieved level of provision of innovative technologies for the growth of corporate social responsibility, its dynamics and structure, which makes it possible to manage changes in innovative activity, to develop and implement a strategy for managing the innovative potential of a business entity.

The assessment of the provision of innovative technologies for the growth of corporate social responsibility has been improved in that it was carried out on the basis of matrix business modeling (Table 2). Namely: in the part of forming a system of initial indicators, methods of determining intermediate and final integral indicators, a reference model of the regularity of the growth of corporate social responsibility. On the basis of the identified deviations from the reference model of the regularity of the growth of corporate social responsibility, conclusions can be formulated regarding the parametric characteristics of the need for the introduction of innovative technologies (Table 3), as a factor of its growth.

The proposed procedure makes it possible to detect destructive shifts in the management of the growth of corporate social responsibility, relying on the factor of provision of innovative management technologies (Fig. 3). Also, it makes it possible to determine the need for innovative technologies and the socio-economic characteristics of their implementation, to choose a vector for the further development of the innovative potential of the business entity to increase the efficiency of its management.

Thus, the proposed comprehensive approach (Fig. 4) makes it possible to evaluate the provision of innovative technologies for the growth of corporate social responsi-

bility and to identify its strengths and bottlenecks in its management. This procedure is universal, it can be applied to business subjects of different levels of socio-economic management, under the appropriate representative system of initial indicators, justified significance of calculated values.

The peculiarities of our results are also the fact that the system of indicators for assessing the provision of innovative technologies for the growth of corporate social responsibility was formed at the macro level. When applying the proposed methodology at the micro- and meso-levels of socio-economic development, the information field can be clarified and/or specified, while maintaining the given substantive principles and dimensions.

The prospect of future research is the improvement of the methodological toolkit of strategic and tactical management of the growth of corporate social responsibility and ensuring the achievement of the goals of sustainable development, including the use of mathematical methods.

7. Conclusions

1. The relationship between the components of sustainable development and the main subjects and problems of social responsibility has been established. The same problem of social responsibility corresponds to the ecological component of sustainable development. The following problems of social responsibility are tangential to the economic component of sustainable development: organizational management, honest work practices, consumer issues. The social component of sustainable development is reflected in social responsibility through human rights, labor practices, community involvement and development.

A reference model of the regularity of the growth of corporate social responsibility has been built. This model predicts the ratio of growth rates of ecological, economic, and social components in descending order. That is, the growth rate of the next component should be lower than the growth rate of the previous one.

The resulting meaningful relationship and reference model of the regularity of the growth of corporate social responsibility are the basis for revealing their essence in a set of certain indicators that are built in a certain interdependence. Innovative technologies are considered as a factor in the growth of corporate social responsibility; therefore, the indicated research results are elements of the system for assessing the provision of innovative technologies for the growth of corporate social responsibility.

2. A system of indicators for assessing the provision of innovative technologies for the growth of corporate social responsibility has been formed. This indicator system provides for 15 indicators (5 each for ecological, economic, and social components). Such a sequence of the proposed indicators is important because, in addition to revealing the aspect of the use of innovative technologies for each component, it corresponds to the proposed reference model of the regularity of the growth of corporate social responsibility. The indicators of the proposed system for assessing the provision of innovative technologies for the growth of corporate social responsibility have the measure of the specific weight of the corresponding type of economic activity in the total volume of this indicator in Lithuania.

3. A matrix business model for assessing the provision of innovative technologies for the growth of corporate social

responsibility for each type of economic activity in Lithuania has been formed. This matrix business model represents a certain system of calculated values by relating the corresponding elements of the ratio matrices for the base and previous before the base periods. The elements of ratio matrices are determined by the ratio of each indicator to all subsequent ones in one studied period. For further research, the elements of the business model under the descending diagonal of the matrix field are used, taking into account the content of the proposed reference model of the regularity of the growth of corporate social responsibility. The specified part of the matrix field is divided into local blocks, depending on the area of intersection of indicators by component: block of the state of the structure of the ecological component, block of the state of the structure of the economic component, block of the state of the structure of the social component, block of ecological-economic ratio, block of ecological-social ratio, block of economic-social relationship.

4. An integral indicator of the provision of innovative technologies for the growth of corporate social responsibility was determined, as a result of a series of phased calculations. For each of the formed local blocks, its typical value is determined. According to the type of economic activity in Lithuania "Industry", the following typical values of the local blocks of the matrix business model for assessing the provision of innovative technologies for the growth of corporate social responsibility, after their standardization, with the specified weighting, take place: block of the state of the structure of the ecological component (weighting 0.43) – 0.34, block of the state of the structure of the economic component (weight 0.335) – 0.18, block of the state of the structure of the social component (weight 0.235) – 0.22, block of the ecological-economic ratio (weight 0.43) – 0.25, block of ecological- social ratio (weight 0.335) – 0.29, block of economic and social ratio (weight 0.235) – 0.13. The typical values of the corresponding local blocks are integrated by the structure and relationship blocks. According to the type of economic activity in Lithuania "Industry", the following values of intermediate integral indicators are present: structure block – 0.74; block ratio – 0.67. The integral indicator

of the provision of innovative technologies for the growth of corporate social responsibility is determined through the integration of intermediate integral indicators, according to the type of economic activity in Lithuania "Industry" it takes a value of 0.70.

Correspondence of the relevant results of the integration of the elements of the matrix business model for assessing the provision of innovative technologies for the growth of corporate social responsibility to the reference model of the regularity of its growth has been established. In the process of determining the integral indicator of the provision of innovative technologies for the growth of corporate social responsibility, the actual ratio of typical values for local blocks was established and their inconsistencies with the reference model of the regularity of the growth of corporate social responsibility were revealed. The indicated inconsistencies take place: between the blocks of ecological-economic and ecological-social correlation by types of economic activity A and C; between state blocks of the structure of economic and social components by types of economic activity C, DE, F; between blocks of the state of the structure of ecological and economic components by type of economic activity N.

Conflict of interest

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results reported in this paper.

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Data availability

All data are available in the main text of the manuscript.

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