



Matrix of Risks for Sustainable Development and the Universal Mechanisms of Risk Management of Implementing the SDGs

Ainura A. Adieva , Aleksandra V. Ryattel , Pavel A. Kalinin , and Olga A. Surkova

Abstract

Purpose: Development of a universal mechanism of risk management for achieving the Sustainable Development Goals according to the matrix of the criteria of risks in this sphere at the micro-level.

Design/methodology/approach: The complex method, content analysis, method of coefficients and forecasting method are used in this research.

Findings: The approaches to management and analysis of the indicators that identify the companies' Sustainable Development Goals are analysed and systematised. Based on the distinguished approaches, a universal approach in this sphere is developed, which takes into account the main positions of the authors and the concept of sustainable development. Also, the mechanisms of risk management are determined. The formulated approach ensures the integration of companies' achievements in the sphere of sustainable development in the general system at the level of a country and the global level.

Originality/value: The originality and value of this research are due to the development of the methodological framework in the sphere of management and assessment of the indicators of sustainable development components at the micro-level.

Keywords

Sustainable development · Risk management · Environment · Indicators of energy efficiency · Economic indicators · Social component

JEL Codes

I31 · M14 · M21 · O44 · P18 · Q53 · Q56 · Q57

1 Introduction

Under the conditions of internationalisation of economies, quick development of the globalisation processes and innovative development of all spheres of management, society faces new challenges, which could be formally classified into three groups, in particular the social, environmental and economic components. The top-priority challenges within these groups are unemployment, social inequality, pollution of the world ocean, growth of CO₂ emissions into the atmosphere, growth of national debt, inflation, etc. These groups of factors are interconnected. There might be observed the conditions of aggravation of the economic component, which led to the negative characteristics of the social component and improvement of the environment (growth of inflation, reduction of GDP per capita, reduction of consumption, reduction of the burden on ecology due to the decrease in the use of fuel, energy, products, etc.); conditions of the improvement of the economic component, with the corresponding optimisation of the social component and aggravation of the environmental component; conditions of improvement of all components, which are observed only in societies with a high level of responsibility for ecology and future of the world.

Traditionally, in less developed agrarian countries, there is a better level of the environmental component indicators, and in developed countries, high development is observed within the economic and social components. Achievement of balance at the level of the indicators of these elements is not easy. For this, the concept of sustainable development is used. The most popular modern definition of the concept was given by the UN World Commission on Environment and Development.

A. A. Adieva (✉)
International University of Kyrgyzstan, Bishkek, Kyrgyzstan

A. V. Ryattel · P. A. Kalinin
Vyatka State University, Kirov, Russia

O. A. Surkova
Sebryakovskiy Branch of Volgograd State Technical University,
Mikhailovka, Russia

The concept of macro-economic, but its methodology is translated to a lower level of economic systems. In particular, it is very important for ensuring the well-balanced development of industrial companies. Achievement of well-balanced indicators of the sustainable development components requires the use of a certain methodological framework, which is especially important under the conditions of risks that negatively influence its provision. It is necessary to create a matrix of criteria for such risks and to identify the universal mechanism of formation of risk management of implementing the SDGs in case of the emergence of threats to their achievement.

2 Materials and Methods

The assessment of risks to achieving the Sustainable Development Goals at the micro-level was performed at the theoretical, methodological and empirical levels in the works (Allen et al., 2019; DeSteur et al., 2019; Gorman & Dzombak, 2018; Janosova & Tokarčíková, 2021; Kolk et al., 2017; Lorincova et al., 2018; Lutje & Wohlgemuth, 2020; Piwowar-Sulej, 2021; Sarango-Lalangui et al., 2018; van Zanten & van Tulder, 2021).

Though at the modern state of development of scientific thought, there exists already a substantial contribution of scholars to the resolution of the issues of risk management in this direction, the need for the universalisation of the approach to the assessment and management of risks for achieving the Sustainable Development Goals is still urgent.

In this research, the complex approach is used to identify the universal methodological basis for the assessment and management of risks, oriented toward the implementation of the SDGs at the micro-level. This envisages the complex study of risks of all components and inclusion of the most relevant indicators that would allow evaluating them and for which clear criterial limits would be formulated. The choice of indicators was performed with the use of content analysis. The method of coefficients was utilised for determining the estimated indicators that characterise the level of implementation and management of the SDGs. The forecasting method was used for establishing the recommended directions for risk management at the universal level.

3 Results

The approaches to determining the indicators of components (goals) of sustainable development of companies, the management of which achievement is the basis for risk management at the micro-level are as follows.

First, one approach is based on the classification of the indicators of components (goals) of companies' sustainable

development in the context of the main spheres of the activities and the level of their implementation. Managerial parameters are systematised which are most peculiar for a specific sphere, region, country or type of companies (depending on the scale and level of integration). Within this approach, the indicators could be determined through qualitative and quantitative measuring.

Within this approach, it is possible to distinguish the provisions of Janosova and Tokarčíková (2021), which include a list of the top-priority indicators of the SDGs of companies that function in the sphere of agrarian production in Slovakia. According to the authors, this list includes the following:

1. Elements of the environmental component:
 - Indicators of the negative influence on the environment (air and water pollution, waste, level of noise from various production processes). The researchers note that this category of indicators is the most substantial within the environmental component; their provision should conform to the rules and norms of the UN programme AGENDA 2030;
 - Indicators of energy efficiency (indicators of renewable energy and the indicators of alternative energy) (Janosova & Tokarčíková, 2021) states that this category of indicators is ranked second and third by the importance of the goals of the environmental component. A high level of implementation of these indicators is very important for such energy-intensive companies as agrarian.
2. Elements of the social component: the indicators of development of personnel; indicators of protection of employees' health and provision of subsidies for personnel. According to the authors, these indicators are decisive in the context of a company's sustainable development;
3. Elements of the economic component. Their criteria should be determined based on the statistical data of the reporting. These could be indicators of profitability, liquidity, financial sustainability and growth of revenues in dynamics.

The above classification of indicators covers the range of development of the main components (goals) of sustainable development. The authors did not formulate the criteria of these indicators, but their work presents the main direction of the establishment of such criteria—they could be assessed through the lens of the UN's approach in the sphere of management and evaluation of sustainable development.

In the context of the orientation toward the first scientific approach, it is necessary to note the work (DeSteur et al., 2019), in which the authors, on the whole, designate a similar list of indicators of companies' SDGs. It is offered to introduce an additional parameter of production traditions (given

the consideration of the activities of Italian wine SMEs), which, according to the authors, will allow ensuring the uniqueness of products and value added. The study of the materials of correlation of the dependence between the component (goal) of the production traditions and other components showed a negative value. That is, retaining the production traditions does not ensure ecologisation, the indicators of the social sphere (decent wages, development of personnel) and the indicators of economic effectiveness. Due to the above and in view of the importance of preserving the production traditions, the authors support the necessity to search for a balance between these components. This task could be achieved in case of a complex reconsideration of the production indicators, which would not influence the change in traditions, but would improve the level of other components and ensure sustainable development.

In Lutje and Wohlgemuth (2020), the authors propose a list of indicators that characterise the management of the three components of sustainable development in the functioning of German industrial parks. An important feature of the authors' position is the orientation toward the necessity to build a model of risk management based on the quantitative indicators only (according to the authors, they are most precise for the purposes of forecasting and analysis of the achievement of goals).

Second, there is an approach that is based on determining the individualised indicators of one (two) components that affect the achievement of the attributes of the third indicator. This approach implies the formulation and provision of the chain reaction of the optimisation of sustainable development through the achievement of individualised goals, adopted within the general approach of the sustainable development concept in the context of the UN programmes.

In Lorincova et al. (2018), the scholars substantiate the need for the creation of individualised indicators of human development of companies (social component), which are connected with the motivation of individual employees (departments), on which work the results of production and sales depend. In the context of this research, there is no particular focus on the statement that an increase in motivation (social component) correlates with the improvement of the indicators of the environmental component. The list of the indicators of motivation has the indicator of facilitation for healthcare, which depends on the reduction in the company's negative influence on the environment. The authors' positions on the formation of a system of individualised indicators, which influence each other within the sustainable development components, are important in the context of this sphere's orientation at balance, which is achieved through the growth of positive dependence. Similar positions on the individualisation of the human development indicators, oriented toward the optimisation of the indicators of other components, are presented in Piwowar-Sulej (2021). Apart

from the emphasis on these directions, the author proves the necessity to take innovativeness into account. Though, we think that the level of this component management can be assessed within isolated indicators of the three studied components, which is shown within the UN's approach to managing and assessing sustainable development.

Third, there is an approach that implies the management and assessment of the indicators of main components of companies' sustainable development in the context of the programme strategy of sustainable development (integrated approach). The orientation toward the provisions of this approach is a sign of the responsible attitude of the subjects of the business community to the development of the national economy, social sphere and environment.

According to this approach Sarango-Lalangui et al. (2018), formulated the methodological framework and performed an analysis of the indicators of managing the sustainability of development by the main components, on the example of SMEs in Ecuador. These categories of companies account for 99% of all economic subjects in the country; due to this, the development and assessment of the level of these indicators are necessary for Ecuador and other countries which economies have similar structural characteristics. According to the authors, the largest influence on the sustainability of development, which in its turn, affects this parameter at the national level, is performed by the following:

- In the context of the economic component: compliance with laws in the sphere of taxation profit, which ensures revenues into the national budget; use of local labour and material resources, which influences the provision of national GDP from selling resources and the provision of population's employment; growth of the quality of products (services), which influences the sales volumes and growth of GDP; growth of revenues from sales, which influences national GDP and capitalisation;
- In the context of the social component: maximum implementation of employees' initiatives in the sphere of innovations, production and organisation of labour organisation, which is a motivation and stimulation for labour; use of the policy of non-interference with leisure and free time of personnel (stimulates family and personal life of personnel); providing the opportunities for personal and professional growth of personnel (payment for advanced training); constant involvement of personnel in the mastering of new knowledge and technologies for their preparation to new conditions of the economy; material motivation. High values of these indicators demonstrate a contribution to the social goals of the country's sustainable development;
- In the sphere of environmental component: indicators of protection and care for the environment; implementation

of specific initiatives in the sphere of reduction of material intensity and consumption of water and energy. Achievement of results within the management of these indicators influences the level of the environmental component of national sustainable development.

The authors of this methodology Sarango-Lalangui et al. (2018), suggest evaluating the formulated indicators using the qualitative and quantitative indicators. On the whole, despite the fact that many spheres of management are covered together with others, the orientation of this approach allows integrating sustainable development management into this sphere at the national level.

4 Discussion

Let us determine our approach to managing the universal mechanism of risk management of achieving the Sustainable Development Goals at the micro-level. Its formulation is based on the provisions of the studied scientific approaches and analysis of the materials of the UN programmes in the sphere of sustainable development, as well as companies' practice.

The main stage of this mechanism is forecasting the parameters of development of the given goals within the designated criteria. Accordingly, it is necessary to identify the approach to the forecast assessment of the values of the studied companies' indicators, which would demonstrate high results and be standards of risk management.

Since some studies refer to the UN approach to the policy of managing the influence on the environment as the basic one, we assume that it is possible to adapt it in the following form:

1. Indicators of achievement of the threshold norms of environment pollution, adopted within national and supranational legislation, can be evaluated according to the UN approach to the assessment of these parameters: 75–100 point—maximum level of the compliance with the requirement; 45–74 points—medium level; 30–44 points—low level; 0–32—very low level;
2. Indicators of energy efficiency (indicators of renewable energy and indicators of alternative energy) can be determined as calculation of the share of each type of energy in the total volume of consumer energy; evaluation of energy efficiency. Criteria of energy efficiency management are as follows: if the share of each type of energy in the total volume of consumed energy is within 75–100%, we note high effectiveness, 45–74% - medium, 30–44% - low, 0–32% - very low.
3. As for the indicators of the economic component, it is suggested to evaluate the following: growth of revenues

from sales; growth of profit; growth of companies' contribution to national GDP (share of sales revenues in GDP). Growth is treated as a positive tendency of development, absence of growth or reduction in the indicators—as aggravation of sustainable development.

4. Indicators of the social component can be assessed through the indicators of growth of personnel's purchasing power; growth and preservation of material and non-material motivation (support for self-improvement in the professional sphere, social benefits); support for personnel's initiatives in various spheres.

5 Conclusion

The modern theoretical and methodological approaches to risk management of companies' activities develop according to the changes in the concepts of society's development at the national and global levels. In the age of globalisation, the concept of sustainable development moved into the foreground; it includes the benchmarks of the three components: environmental, social and economic. Companies cannot move away from these benchmarks by simply relocating their business to other countries, because the implementation of the Sustainable Development Goals became of top priority for most countries of the world.

The inclusion of the system of risk management in the sphere of achieving the Sustainable Development Goals of companies in the system of this direction at the national level demonstrates the responsible attitude of these subjects toward the development of the country. The transformation of benchmarks of the country's sustainable development is the indicator of the change in the system of risk management in this direction. An example of this is China's development in the sphere of ecologisation, ensured due to the companies' adopting the government's course on the use of eco-friendly materials and energy efficiency.

References

- Allen, C., Metternicht, G., & Wiedmann, T. (2019). Prioritising SDG targets: Assessing baselines, gaps and interlinkages. *Sustainability Science*, 14(2), 421–438.
- DeSteur, H., Temmerman, H., Gellznch, X., & Canavari, M. (2019). Drivers, adoption, and evaluation of sustainability practice in Italian wine SMEs. *Business Strategy and Environment*, 29(2), 744–762.
- Gorman, M. R., & Dzombak, D. A. (2018). A review of sustainable mining and resource management: Transitioning from the life cycle of the mine to the life cycle of the mineral. *Resources, Conservation and Recycling*, 137, 281–291.
- Janosova, P., & Tokarčíková, E. (2021). *Management of sustainability, its measurement and relevance in the Enterprise*. Hradec Economic Days. Accessed June 09, 2022, from https://www.researchgate.net/publication/350932251_Management_of_Sustainability_its_Measurement_and_Relevance_in_the_Enterprise

- Kolk, A., Kourula, A., & Pisani, N. (2017). Multinational enterprises and the sustainable development goals: What do we know and how to proceed? *Transnational Corporations*, 24(3), 9–32.
- Lorincova, S., Hitka, M., Starchon, P., Stachova, K. (2018). Strategic instrument for sustainability of human resource management in small and medium-sized enterprises using management data. *Sustainability*, 10(10). Accessed June 09, 2022, from <https://www.mdpi.com/2071-1050/10/10/3687>
- Lutje, A., Wohlgemuth, V. (2020). Tracking sustainability targets with quantitative indicator Systems for Performance Measurement of industrial Symbiosis in industrial parks. *Administrative Science*, 10(1). Accessed June 09, 2022, from <https://www.mdpi.com/2076-3387/10/1/3>
- Piwońar-Sulej, K. (2021). Human resources development as an element of sustainable HRM – With the focus on production engineers. *Journal of Cleaner Production*, 278, 124008. Accessed June 09, 2022, from <https://www.sciencedirect.com/science/article/pii/S0959652620340531>
- Sarango-Lalangui, P., Álvarez-García, J., & de la Cruz del Río-Rama, M. (2018). Sustainable practices in small and medium-sized Enterprises in Ecuador. *Sustainability*, 10, 2105. Accessed June 09, 2022, from <https://www.mdpi.com/2071-1050/10/6/2105/pdf>
- van Zanten, J. A., & van Tulder, R. (2021). Analyzing companies' interactions with the sustainable development goals through network analysis: Four corporate sustainability imperatives. *Business Strategy and the Environment*, 30, 2396–2420.