

Original article

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**NEW FRAMEWORK OF ASSESSING THE IMPACTS OF COMPANIES
ON REGIONAL SUSTAINABLE DEVELOPMENT: THE SAKHA CASE****Svetlana S. Gutman¹, Elena V. Rytova², Cristina Sousa³, Viktoria V. Kadzaeva⁴**^{1, 2, 4}Institute of Industrial Management, Economics and Trade, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russia³Iscte — Instituto Universitário de Lisboa, DINAMIA'CET, Lisbon, Portugal¹Svetlana@fem.spbstu.ru, ORCID 0000-0002-1098-3915²rytova_ev@spbstu.ru, ORCID 0000-0002-6774-7577³Cristina.Sousa@iscte-iul.pt, ORCID 0000-0002-8051-3943⁴vika_vika333@mail.ru

Abstract. This paper is based on the proposed hypothesis: the activities of a company (especially a large, backbone company) in the social, environmental and economic spheres have a corresponding impact on certain aspects of the sustainable development of the region. The goal of the study is to prove this relationship at a conceptual level using indicators of sustainable development applied at different levels of socio-economic systems. The paper addresses a relevant gap in the literature: the absence of frameworks allowing the assessment of the interactions and interdependencies between levels. To do this, the literature on this issue was studied and it was proved that there were no studies with a similar framework. The study draws on the systems of sustainable development indicators, suggested in literature and used for the assessment of sustainable development at the regional and company's level and proposes a framework to integrate them. For that it uses the classical balance scorecard (BSC) tools — the strategic maps both for a region and a company. The Republic of Sakha (Yakutia) in Russian Federation and public joint stock company "ALROSA" were chosen as the basic object of research at the regional and corporate level, respectively. The built strategic maps reflect the decomposition of the main strategic goal and contain an interdependent set of sustainable development indicators for each level, which can be used to assess and monitor the results of the relevant strategies. Then, a new conceptual framework reflecting the impact of the company's activities on the sustainable development of the region is proposed. The framework includes the performance indicators of the company and the region by three dimensions of sustainable development — environmental, social, and economic. On the basis of the conceptual scheme of the relationship, it is possible in the future to build econometric models based on the proposed indicators. The identified quantitative assessments in this case will make it possible to make strategic management decisions that will maximize the positive effect of the implementation of the sustainable development strategy in the region using the potential of companies.

Keywords: sustainable development, BSC, Republic of Sakha (Yakutia), "ALROSA", strategic map

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Научная статья

**НОВЫЙ ПОДХОД К ИССЛЕДОВАНИЮ ВЛИЯНИЯ КОМПАНИЙ
НА РЕГИОНАЛЬНОЕ УСТОЙЧИВОЕ РАЗВИТИЕ: КЕЙС ЯКУТИИ****Светлана Семеновна Гутман¹, Елена Владимировна Рытова², Кристина Соуза³, Виктория Владимировна Кадзаева⁴**^{1, 2, 4}Санкт-Петербургский политехнический университет Петра Великого, Институт промышленного менеджмента, экономики и торговли, Санкт-Петербург, Россия³Iscte — Университетский институт Лиссабона, ДИНАМИКА, Лиссабон, Португалия¹Svetlana@fem.spbstu.ru, ORCID 0000-0002-1098-3915²rytova_ev@spbstu.ru, ORCID 0000-0002-6774-7577³Cristina.Sousa@iscte-iul.pt, ORCID 0000-0002-8051-3943⁴vika_vika333@mail.ru

Аннотация. Данное исследование строится вокруг предлагаемой гипотезы, что деятельность компании (особенно крупной, системообразующей) в социальной, экологической и экономической сферах оказывает соответствующее влияние на отдельные аспекты устойчивого развития региона Российской Федерации. Цель исследования — доказать эту взаимосвязь на концептуальном уровне с использованием индикаторов устойчивого развития, применяемых на разных уровнях социально-экономических систем. В статье отмечается наличие пробела в литературе: отсутствие подхода, позволяющего оценивать стратегии с учетом социально-экономических систем разного уровня. Для этого была изучена литература по данному вопросу и было доказано, что исследований с аналогичным подходом не проводилось. Подход основан на системах показателей устойчивого развития, предложенных в литературе и используемых для его оценки на уровнях региона и компании,

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и предлагает основу для их интеграции с помощью классических инструментов Системы сбалансированных показателей (BSC) — стратегических карт как для региона, так и для компании. В качестве базового объекта исследования на региональном и корпоративном уровнях соответственно были выбраны Республика Саха (Якутия) и открытое акционерное общество «АЛРОСА». Построенные стратегические карты отражают декомпозицию основной стратегической цели и содержат взаимозависимый набор показателей устойчивого развития для каждого уровня, которые могут быть использованы для оценки и мониторинга результатов соответствующих стратегий. Затем предлагается новая концептуальная структура, отражающая влияние деятельности компании на устойчивое развитие региона, которая включает в себя показатели деятельности компании и региона по трем измерениям устойчивого развития — экологическому, социальному и экономическому. Были выявлены концептуальные взаимосвязи и взаимозависимости между уровнями по индикаторам. На основе концептуальной схемы взаимосвязи в дальнейшем возможно построить эконометрические модели на основе предложенных индикаторов. Выявленные количественные оценки связей в таком случае позволят принимать стратегические управленческие решения, позволяющие максимизировать позитивный эффект реализации стратегии устойчивого развития в регионе с использованием потенциала компаний.

Ключевые слова: устойчивое развитие, система сбалансированных показателей, Республика Саха (Якутия), «АЛРОСА», стратегические карты

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Introduction

Sustainable development (SD) is currently a priority in the agendas of policymakers and researchers. The idea of SD is consistent with the global nature of society's environmental problems, namely the global warming and the loss of biodiversity, and many countries and international organizations use it to foster effective green strategies and policies for managing socioeconomic systems. However, the concept of SD goes beyond the environmental sphere and also incorporates social and economic factors, forming a multidimensional concept often named as 'three-pillar' or 'triple bottom line' [1].

Nowadays, over a hundred countries take decisions consistent with the concept of SD¹ [2]. Most countries have established national programs and formed authorized agencies in charge of achieving SD goals (SDGs). In order to map out an effective strategy, countries should also think over a comprehensive approach towards ensuring and maintaining SD at all levels of the economy, including regions and cities [2, 3]. In addition, it is necessary to accommodate the interests of all stakeholders (population, companies, local governments, etc.). In turn, if enterprises are not taking part or are not interested in implementing this concept, SD cannot be achieved in the region and in the country as a whole² [3, 4].

The assessment of the results of the strategies and policies already adopted requires measurement frameworks and indicators. Due to its multidimensional character, the assessment of SD raises several methodological challenges, namely related to the choice of indicators to capture the interrelated three-pillars [5]. In this context, composite indicators, which have pros and cons, are gaining increased attention from policymakers and scholars, since they provide a unique

number to describe complex phenomena and enable longitudinal analysis [5, 6]. Moreover, most of the indicators are computed at a global or national level and their translation to sub-national (territorial) levels and to micro (e. g., companies) levels is also subject to difficulties, which is reflected in a smaller number of indexes that cover these levels of analysis [7]. Furthermore, extant research tends to consider the several levels of analysis macro (global, national), meso (regional / local) and micro (company) as silos, giving little attention to their complex relationships and interdependencies [8].

This study is based on the proposed hypothesis: the activities of a company (especially a large company) have a corresponding impact on certain aspect (social, environmental and economic) of the sustainable development of the region. The main goal of the study is to prove this relationship between companies and regions using set of indicators of SD applied at different levels of socio-economic systems at a conceptual level. To do this, the literature on this issue have to be studied. We need to identify the most common SD indicators in the strategic documents of regions and companies. Conceptual relationships and interdependencies between socio-economic levels have to be identified. On the basis of the conceptual scheme of the relationship, it is possible in the future to build econometric models based on the proposed indicators. The identified quantitative assessments of the links in this case will make it possible to make strategic management decisions that will maximize the positive effect of the implementation of the SD strategy in the region using the potential of companies.

The paper tackles this gap by proposing a framework to assess the SD at the crossroad of two levels of analysis — a meso level (the region) and the micro level

¹ United Nations, "The sustainable development goals report 2019," 2019. Available at: <https://unstats.un.org/sdgs/report/2019/The-Sustainable-Development-Goals-Report-2019.pdf>.

² The Secretary-General of the OECD, "Good practices in the National Sustainable Development Strategies of OECD Countries good practices in the National Sustainable Development Strategies of OECD Countries," 2006.

(the company), allowing the understanding of the impacts of the company's strategies and activities on the SD of the region where it is located. This framework is particularly useful for territories where a large company dominates the socio-economic system of the region. In these regions it is possible to argue that the activities of the company in the social, environmental and economic dimensions have a certain impact on individual aspects of SD in the region. The framework was developed using the Balanced Score Card methodology and a real case — the Russian region Sakha (Yakutia), on whose territory the public joint stock company "ALROSA" has a considerable impact.

Literature Review

Sustainability development indicators in companies

In order to achieve SD, it is mandatory that companies make a commitment to ensure that their businesses are environmentally sustainable and socially fair [9]. In order to warrant the sustainability of its business, a company needs to ensure both financial success, respect for its workers, the environment and society. This is often named as Corporate Social Responsibility (CSR), which is often considered as a tool to achieve SDGs on a company's level [10].

The incorporation of policies and objectives that reduce the environmental impact and increase social fairness of companies is a process that is still recent and often a result of the pressure they are exposed to through top-down policies emanating from international organizations and national governments and to through its stakeholder's interests [11, 12]. At the same time, the development of new business models and strategies that take into account the risks to which society is subject (climate change, water and resource scarcity, unemployment, hunger, among others) is a great opportunity for the construction of new markets that develop more efficient and sustainable solutions and allow accessibility of products and services even to the poorest³.

Although companies, especially large ones in developed countries, have been integrating sustainability into their strategic planning and management actions [13], a recent study on the challenge of incorporating the SDGs into businesses [14] has concluded that only ¼ of the companies included the SDGs in their published business strategy, and those that do it pay varying degrees of attention to and place different priority on different goals. This is exacerbated in small and medium-sized enterprises that face higher barriers, namely those linked to the lack of resources and leadership [13, 15].

Sustainability Reports are one of the tools available to companies for their sustainability self-assessment. They enable to integrate sustainability information into the reporting (non-financial reporting), providing information on the impacts of their business that can be used to improve their environmental and social performance and balance them with financial performance⁴ and to convey a good image to consumers and other stakeholders [13]. In this respect, the Global Reporting Initiative (GRI), launched in 1997 by the United Nations Environment Programme and by the Coalition for Environmentally Responsible Economics, is a milestone in establishing standards that enhance the quality, rigor and utility of sustainability reporting, in the three dimensions of SD.

Currently, alongside the sustainability reporting there are other tools that allow companies to stand out in an increasingly competitive market focused on the environmental sustainability, of which two can be highlighted: the BCorp certification and the Life Cycle Assessment. The BCorp certification determines, through a thorough assessment, the impact of the business on workers, community, environment and consumers and highlights companies that have excellent environmental and social performance [16]. The Life Cycle Assessment evaluates and quantifies the impacts associated with a product, from the extraction of natural resources necessary for its production to its consumption, thus avoiding a superficial analysis and allowing to compare identical situations or products and decide which is the most sustainable⁵. Moreover, certifications and audit schemes are available (e. g., the environmental management standard ISO 14000 and the Eco-Management and Audit Scheme).

Thus, companies have, nowadays, a diverse set of tools that allow them to make their business model more sustainable. However, in order to assess the progress of each company in terms of SD, it is necessary to use indicators. Choosing which indicators are most appropriate and relevant to include in is a complex process for companies, given their variety and their different real meanings [17]. In this context, sustainability indexes at corporate level have become extremely useful tools in the assessment because they allow simultaneously to monitor the company's performance and create a global sustainability reference for benchmarking. It is now possible to find several proposals of indexes, developed both by international organizations, namely the Dow Jones Global Index and the FTSE4GOOD.

It is also possible to find several academic proposals of sustainability measurement frameworks for companies

³ "Guide to Corporate Sustainability | UN Global Compact," 2015. <https://www.unglobalcompact.org/library/1151> (accessed Jun. 24, 2022).

⁴ "How to use the GRI Standards". <https://www.globalreporting.org/how-to-use-the-gri-standards/> (accessed Aug. 10, 2021).

⁵ International Organization for Standardization, "ISO 14040-Environmental management — Life cycle assessment — Principles and framework," 2006. Available at: <https://www.iso.org/standard/37456.html>.

that consider the three dimension of SD, namely the following: Azapagic [18] developed a framework compatible to the Global Reporting Initiative; Krajnc and Glavic [19] proposed set of sustainability indicators covering the three dimensions of SD and a composite sustainable development index; Pohl [20] suggested the ITT Flygt Sustainability Index to measure the significant sustainability aspects of the company; Singh et al. [7] offer a composite sustainability performance index, based on the aggregation of key corporate sustainability performance indicators. Pusnik et al. [21] developed an online software tool sustainability assessment, focused on Eco-Energy-Efficiency management, of small and medium-sized enterprises; Harik et al. [22] propose a holistic index for manufacturing companies that adds a fourth dimension to sustainability assessment — the manufacturing dimension. Beiragh et al. [23] provide a tool for the assessment of Corporate Sustainability where the sustainability criteria are developed from the SDGs.

Recognizing the interaction between the company and the region

The previous sections have shown the existence of a variety of frameworks and indicators to perform sustainability assessment both at several territorial scales and at the level of companies. However, the frameworks tend to treat the assessment levels as silos, i. e., they tend to neglect the potential interactions and interdependencies between the micro, meso and macro levels. According to Kuosmanen et al. [8] there is a lack of research of the interactions between the company level and the aggregate regional level. This paper was presented in 2013. In the future, studies of the interaction between companies and regions appeared. But they are more often limited only to an assessment of economic interaction and the impact of large companies on regional economic indicators, or an assessment of the impact of environmental indicators on regional ones. The papers lack a systematic approach based on the three components of SD.

In the context of regional development, some authors raised the question of the interrelationship between regional and corporate development, usually relating it to the promotion of regional competitiveness [24–30] and provide some insights on the indicators that can be used to capture the connection between the SD of the region and the sustainability of the companies operating on its territory. Table 1 systemizes the indicators suggested in the extant studies, organizing them according to the three SD dimensions: economic, social and environmental. It can be concluded that the three bottom line perspective is not present in all of the identified

studies and that the number of indicators they suggest is quite low.

In the context of SD, to the best of our knowledge, only two studies provide insights on the interaction between companies and regions. Andreev [26] suggests that the impact produced by a company on the development of the region should be assessed via calculating the integral coefficient of the impact of the company's socially responsible activities on the SD of the region. This integral coefficient, drawing on the triple bottom line perspective, would be composed of the following elements: index assessing the corporate influence on the economic growth of the region; the index assessing the corporate influence on the standard and quality of life of the region's population; the index assessing the corporate influence on the environmental situation in the region.

Additionally, Sinitskaya and Yakusheva [27] substantiate the influence of raw materials companies on the SD of the Arctic Zone regions. They suggest that the contribution made by socially responsible companies operating on the region's territory to the region's SD should be assessed according to the following methodology:

- determining the main line of business in the region;
- determining the goals of SD in the region broken down into stakeholders;
- determining the socially responsible companies which obtained a license to operate in the region;
- determining the ratio of the SDGs of the region to the areas of CSR of the companies;
- developing the indicators of the influence made by the companies on the SD of the region;
- acquiring information and assessing the influence of the companies on the SD of the region.

Therefore, the extant literature can only provide some generic indication on the indicators that can reflect the influence of companies on regional development and some possible approaches to assess the impact of the company's socially responsible activities on the SD of the region. This issue has to be studied further and additional indicators have to be looked for, since the assessment of SD demands a multidimensional approach.

Drawing on the literature review on the SD assessment on the regional and corporate level presented in the previous sections and the insights from the studies presented above, we propose that to assess the influence of corporate activities on the key processes of SD in the region, considering the UNSDGs, the indicators presented in Table 2 should be considered.

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Table 1

Indicators showing how companies influence regional development as defined in scientific literature

Indicator	Authors				
	Bryleva [31]	Razgulina [25]	Berkovich & Antipina [24]	Capannelli et al. [30]	Martin [32]
<i>Economic</i>					
Contributing to the creation of the region's infrastructure, including innovative infrastructure			+		+
The share of the company among large companies of the region	+				
Tax deductions in the regional budget	+	+	+		
The share of company's revenues in GRP	+	+		+	
The ratio of the average salary paid in the enterprise to the average salary paid in the region	+	+			+
<i>Social</i>					
Amount of investment in the social development of the region			+	+	
Offering jobs to the population	+	+	+		+
<i>Environmental</i>					
Amount of investment in the environmental development of the region			+	+	

Note. Compiled by the authors, based on [24, 25, 30, 31, 32].

Table 2

Indicators to assess the influence of corporate activities on the SD of the region

Indicator	Result of the company	Influence of corporate policy on the region	Relevant SDG of UNO
<i>Economic development</i>			
Specific weight of tax payments in the budget of the region	+		SDG 8
Share of company's revenues in GRP	+		SDG 8
Average salary grade	+		SDG 8
Investments into the development of new technologies and innovations	+		SDG 9
Share in the sector	+		SDG 8
<i>Environmental development</i>			
Environmental costs	+		SDG 13
Investments into the ecological development of the region		+	SDG 12 SDG 13
Innovations in the field of ecological development	+		SDG 9 SDG 13
Emission levels	+		SDG 6, 13, 14, 15
Level of energy saving	+		SDG 7
<i>Social development</i>			
Company's contribution into the infrastructure created in the region		+	SDG 9 SDG 11
Number of jobs given to the population of the region	+		SDG 8 SDG 10
Investments in the development of the social sphere in the region		+	SDG 3 SDG 4 SDG 5
Partnership contracts with stakeholders	+	+	SDG 17
Share of personnel with tertiary education	+		SDG 4
Providing perks and social guarantees to the employees		+	SDG 3, SDG 8, SDG 16

Note. Compiled by the authors.

Methodology and empirical setting

The balanced scorecard as the methodological base of the assessment framework

The methodological basis of this research is the balanced scorecard (BSC) suggested by Kaplan and Norton [33, 34]. The BSC is based on the stakeholder theory, which considers that companies have responsibilities to a wide set of stakeholders, including customers, suppliers, employees, governments and local communities [35]. Therefore, this approach is suitable to address sustainability performance [36].

This BSC methodology is used, in this paper, to develop a framework to assess SD that combines the regional and the company level. BSC is a performance measurement tool that enables to assess if operational activities are aligned with broader strategic objectives. It represents a comprehensive approach which can be used, if properly adapted, to study the development and implementation of a strategy at different levels of analysis, namely the regional and the company level [37]. It is, then, considered that the BSC methodology enables to select both the regional and the company SD indicators that reflect the interaction between the levels and that will integrate the proposed framework.

The main advantage of the suggested approach is that it can be used to align the SD strategies of individual companies (or other socioeconomic subsystems of the region) with the general SD strategy of the entire region and then each strategy can be transformed into a specific sequence of actions on the principle “from the bottom to the top”, aimed at achieving the goals at all the levels of management. At the same time the BSC can be used to form a coherent set of SD indicators for every level, in this case the company and the region. The indicators chosen in the process of forming a BSC allow us to move to the assessment of the results of the strategy. In addition, they can be used to further model different interrelations in the region.

The empirical setting used for the development of the assessment framework

The BSC approach will be applied to a real case, where the region is the Republic of Sakha, Yakutia (Russian Federation) and the company is ALROSA. ALROSA is the largest company in the Republic of Sakha (Yakutia) and is a substantial element in the development of the region.

Before presenting the region and the company is necessary to briefly characterize the legal framework of the Russian Federation in the field of SD, its framing in the global institutional framework and its translation in the regional level (Figure 1). The country still lacks consistent legislation in this sphere, even though many general principles are included in the existing documents.

Results and discussion

The framework to assess the impact of the company on the region's sustainable development

Developing a system of indicators to implement sustainable development regional strategy on the example of the Republic of Sakha (Yakutia). As mentioned in the previous section, this research draws on the scoreboard (BSC) methodology that has been adapted to develop a system of indicators to assess the SD at the regional level. This implies working out a general scheme for the development of the region, creating a strategic map, and determining the key indicators for the constituent entity.

According to the 2032 Development Strategy of the Region of the Republic of Sakha (Yakutia), the following growth scheme has been defined (Figure 2).

In order to develop an intelligent system of indicators, it is necessary to consider the strategic goals, priority areas of development and the objectives in different spheres that will contribute to the execution of the region's strategic development plan by the three SD dimensions: environmental, economic, and social. The next stage of the research was, then, to create a strategic map. The following elements of the set of indicators were defined according to the classical BSC theory: financial and client components, business processes, training and development. However, when we deal with the region, these elements have to be adapted, as suggested in Figure 3 [38].

In this modification, the financial component reflects the tools that can be used to achieve the socio-economic effect in the region's SD. It is worth considering that maximizing profits plays a secondary role for the region, differently from the goals of any company.

The client component was modified in the economic entities of the region, which are understood as the regional governmental authorities, the external organizations and companies operating on the territory, and the civil population. These stakeholders can influence the course of the SD strategy pursued in the region and are also affected by the strategy.

The category “internal business processes” is presented as the manufacturing industry and entrepreneurship, since companies and organizations operating on the territory help the region to maintain ecological and socioeconomic development.

The category “training and development” was extended for the region by including the element “innovation”. In today's realities of the world community, new technologies and innovations play an important role in achieving the competitiveness of the region and its SD.

These transformations helped to form a strategic map for the implementation of the SD strategy in the Republic of Sakha (Yakutia), which is presented in Figure 4.

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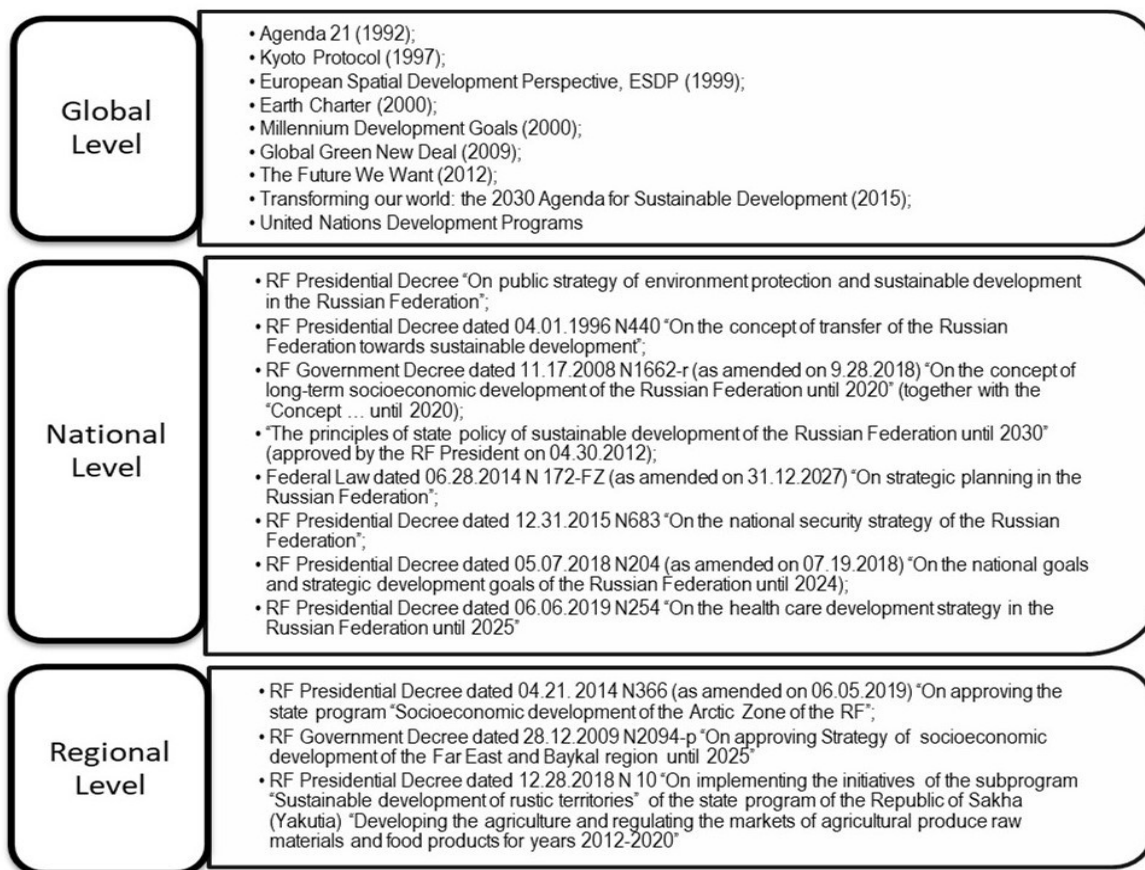


Fig. 1. Legal framework in the field of SD of socioeconomic systems (compiled by the authors)

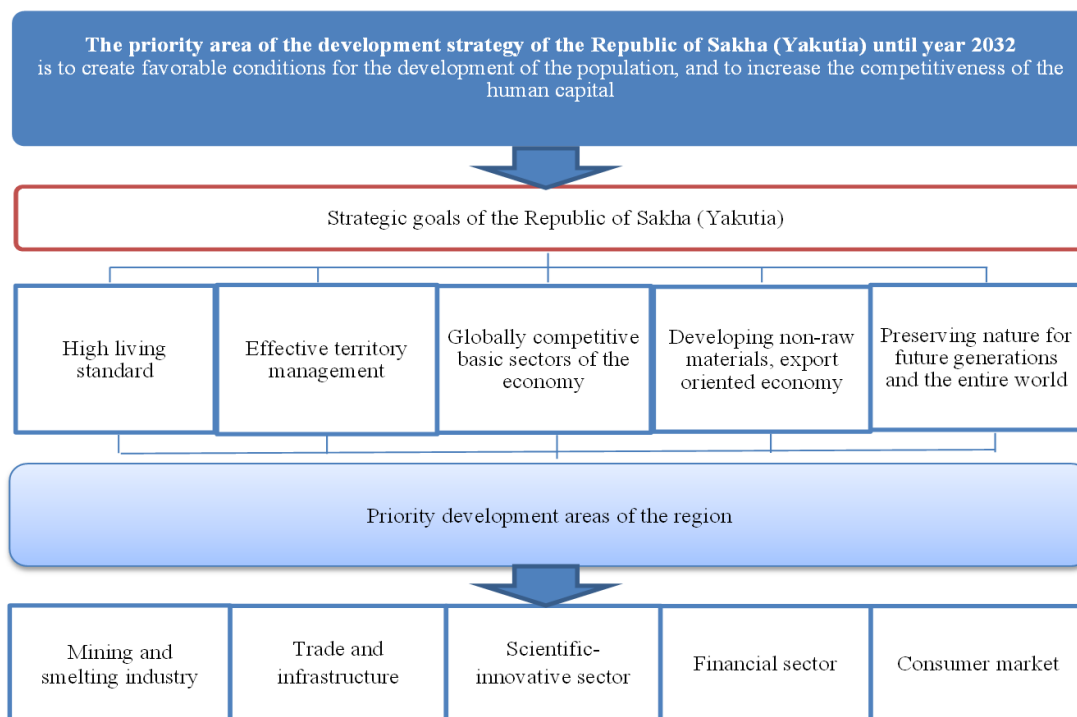


Fig. 2. The development scheme of the Republic of Sakha (Yakutia) (compiled by the authors)

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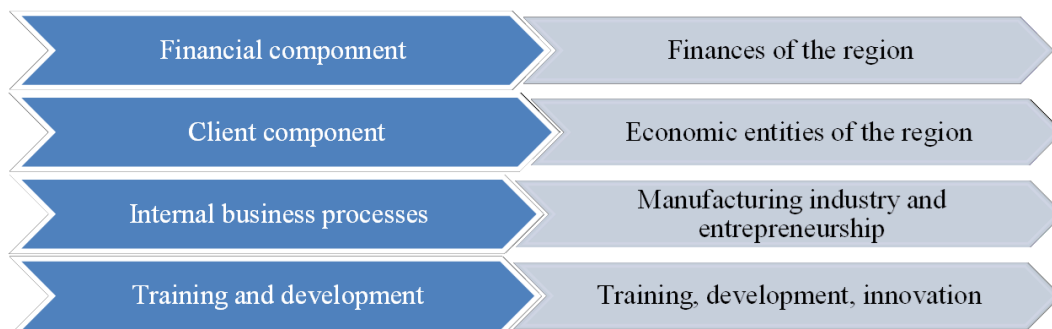


Fig. 3. Transforming the classical BSC for the region (compiled by the authors)

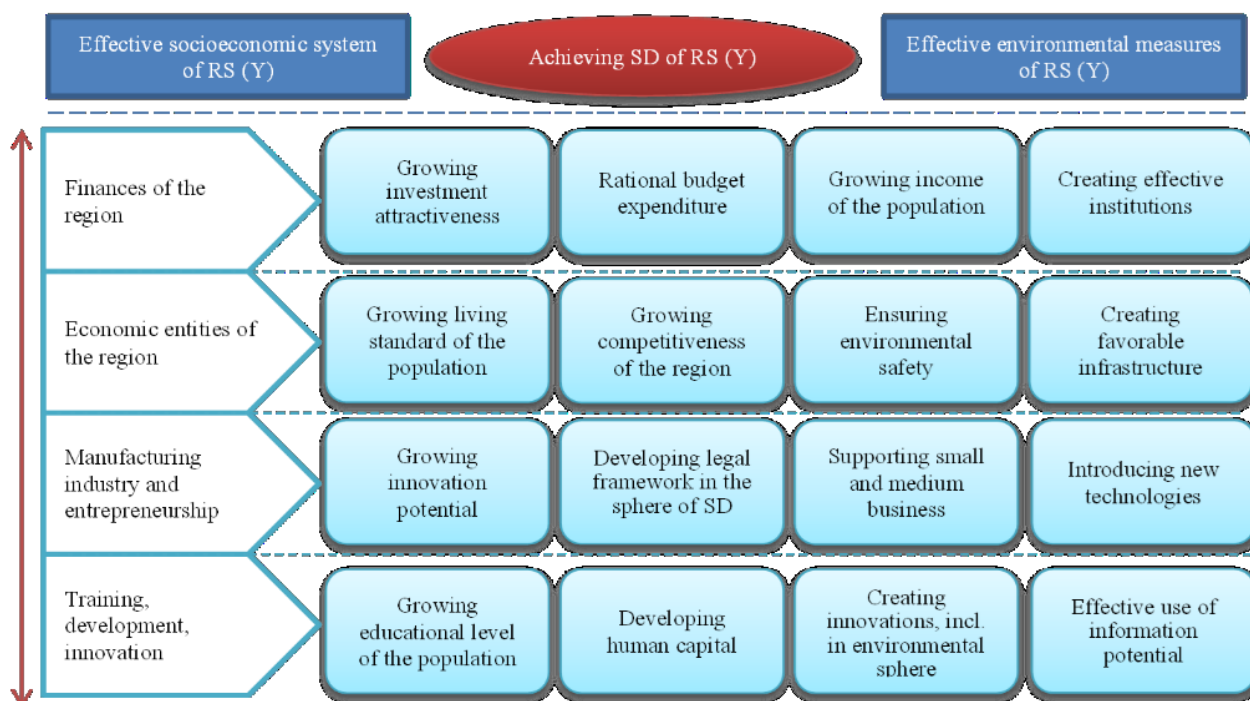


Fig. 4. Strategic development map of the Republic of Sakha (Yakutia) (compiled by the authors)

Figure 4 is formed on the basis of an analysis of strategic documents at the regional level and the identification of explicit and implicit goals that can contribute to the achievement of sustainable development of the region. Then, based on the analysis of the literature and available regional statistics, indicators were selected for these goals, which make it possible to measure the achievement of these goals (Table 3). So this map contains a summary of the development strategy and illustrates certain goals of the strategy. Relying on the strategic development map for the Republic of Sakha

(Yakutia), strategic goals and objectives were determined, as well as the indicators that reflect the sustainability in the region. Based on the analysis of the SD in the region, expert opinion, statistics, as well as the development strategy of the Republic⁶ [38–44], indicators were obtained for every component of the BSC, which are shown in Table 3. All indicators are divided into two groups: main indicator which could be used for total assessment of all component goals together and it can influence on additional indicators; and additional indicators help to assess some aspects for separate goal of this component.

⁶ PORA, “Polar Index. Regions. The sustainable development ranking of Russian Arctic regions”, Moscow, 2018; The Law of the Republic of Sakha (Yakutia) dated December 19, 2018 2077-3 N 45-VI “On the strategy

of socioeconomic development of the Republic of Sakha (Yakutia) until 2032 with a target vision until 2050”.

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Table 3

Sustainable development indicators of the Republic of Sakha (Yakutia)

Projections	Strategic goals	Indicators
Finances of the region	Growing investment attractiveness	<i>Main indicator:</i> Tax payments from business, % of GRP
	Rational budget expenditure	<i>Additional indicators:</i> Gross Regional Product (GRP) per capita, thousand \$
	Growing income of the population	Gross domestic expenditure on R&D, % of GRP
	Creating effective institutions	Financial support to the population, \$ Level of investment risk, score Number of tools introduced to support business, pcs. Average salary in the region, \$
Economic agents of the region	Growing living standard of the population	<i>Main indicator:</i> Unemployment rate, %
	Growing competitiveness of the region	<i>Additional indicators:</i> Life expectancy, number of years
	Ensuring environmental safety	CO ₂ emission levels, thousand tons
	Creating a favorable infrastructure	Number of the commissioned infrastructural objects, pcs.
Manufacturing industry and entrepreneurship	Growing innovation potential	<i>Main indicator:</i> Investments into the development of new technologies and innovations
	Developing legal framework in the field of SD	<i>Additional indicators:</i> Number of small and medium enterprises, pcs. Support of small and medium business, \$
	Supporting small and medium business	Number of signed partnership contracts, pcs.
	Introducing new technologies	Number of patents and licenses, pcs. Share of innovative enterprises in the total number, %
Training, development, innovations	Growing educational level of the population	<i>Main indicator:</i> Personnel with tertiary education, people
	Developing human capital	<i>Additional indicators:</i> Number of students per 1000 people, people
	Creating environmental innovations	Environmental expenditure, m. \$
	Effective use of information potential	Population per 1 hospital bed, people Number of scientific publications in the region, pcs.

Note. Compiled by the authors.

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Interrelationship of the sustainable development indicators of public joint stock company "ALROSA" and the Republic of Sakha (Yakutia). ALROSA actively integrates its production at the time when the SD strategy is being implemented. However, an important thing is to assess the results of such integration using company performance indicators. That is the reason why the company key efficiency indicators are worked out.

According to the corporate reports, ALROSA ensures monitoring and control over the compliance with

the principles of SD. Nevertheless, it is worth measuring to which extent these principles are met using quantitative methods, rather than relying on the formal results of ALROSA.

The first stage in studying the company efficiency indicators in this work is to analyze the company SD management system and the CSR. Figure 5 illustrates the management structure of these issues in ALROSA. The figure demonstrates the main areas of activities of the company in ensuring its own SD under the leadership of the Managing Director and the Board of Directors.

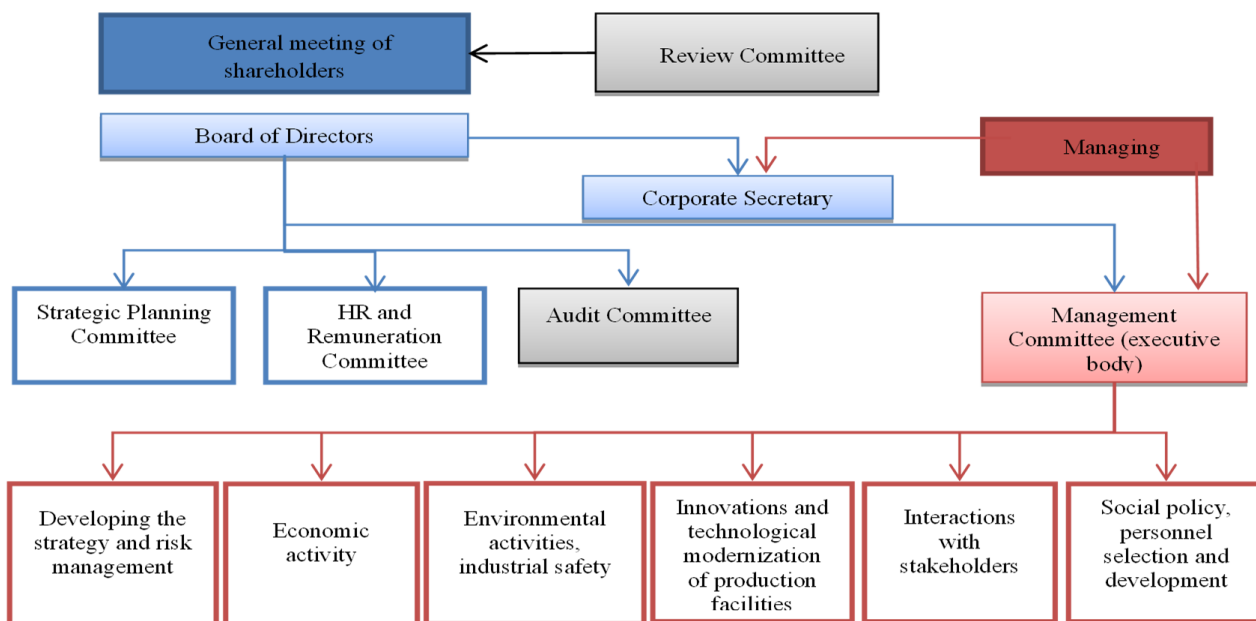


Fig. 5. SD and CSR management structure of ALROSA (compiled by the authors: Official website of ALROSA, "Policy in the field of sustainable development and corporate social responsibility of PJSC ALROSA," 2018. Available at: alrosa.ru (accessed: Aug. 10, 2021))

Based on the sustainable development goals and objectives of ALROSA as well as on the research into the activities of the company⁷, a strategic map was compiled for ALROSA so that the former could implement its SD strategy (Figure 6). The map obtained illustrates the main components of the company's BSC, as well as the strategic areas for achieving SD by the enterprise. The goal that has been set can be fulfilled via an effective socioeconomic development strategy and a well-thought environmental policy.

The financial component is represented by the finances of ALROSA. The company, whose main goal is to maximize profits, pays a lot of attention to its financial resources and their distribution. The client component is transformed into a totality of stakeholders that can be represented by the direct consumers of ALROSA products, the population of the region where the company is based, and the government authorities of the Republic of Sakha (Yakutia), who are

interested in a positive influence of the enterprise on the region. The internal business processes are represented by the production processes of the company, since optimizing production has a direct impact on the performance and SD of the company. The training and development component, similar to what was done for the region, is expanded through the inclusion of the innovation category. An essential element in the development strategy of ALROSA is the development, training, and lifelong learning of the personnel at all levels of administration and operational production. In order to encourage the progress, ALROSA has to introduce and work out innovative production methods, use new technologies in the value chain of its products, in particular, such technologies that ensure the implementation of the ecological component of SD and help to effectively protect the environment.

⁷ Official website of ALROSA, "Policy in the field of sustainable development and corporate social responsibility of PJSC ALROSA", 2018. Available at: alrosa.ru (accessed: Aug. 10, 2021).

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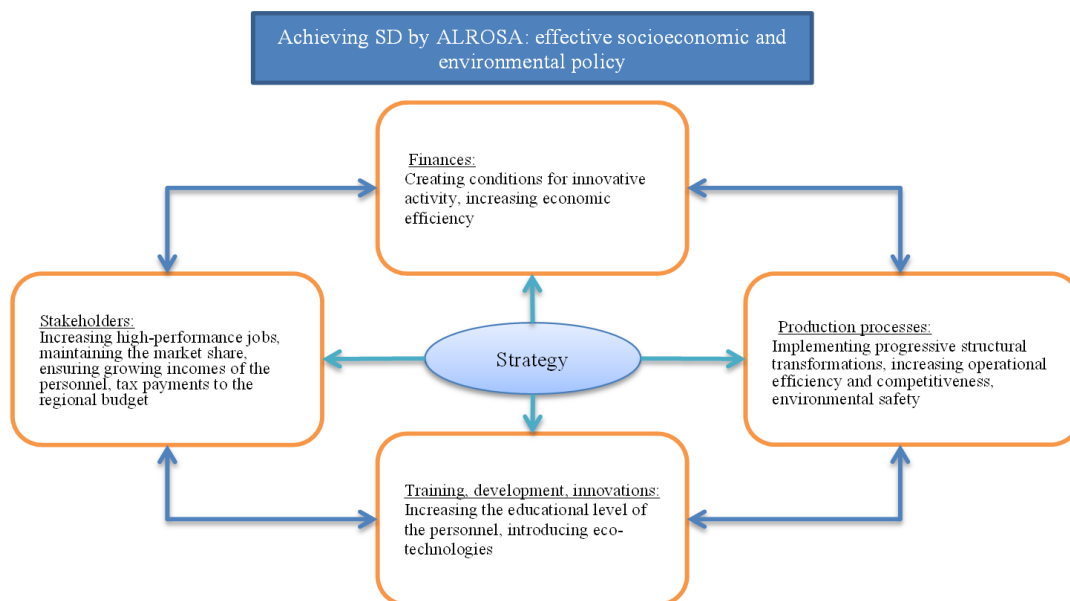


Fig. 6. Strategic map for the implementation of the SD strategy by ALROSA (compiled by the authors)

Given the strategic goals of ALROSA, a BSC was formed to reflect the efficiency of the company in its SD strategy, as shown in Table 4. All indicators are divided into two groups: main indicator which could be used for total assessment of all component goals together and it can influence

on additional indicators; and additional indicators help to assess some aspects for separate goal of this component.

Based on the above results, indicators, and the strategy of socioeconomic systems, a scheme was created to illustrate the expected interrelationships between the region and the company, which is represented in Figure 7.

Table 4

Key efficiency indicators of ALROSA in achieving SD

Projections	Strategic goals	Indicators
Finances	Creating conditions for innovative activity	<i>Main indicator:</i> Sales revenues <i>Additional indicators:</i> Number of licenses and patents Return on sales Share in the sector
	Increasing economic efficiency and investment attractiveness	
Production processes	Implementing progressive structural transformations	<i>Main indicator:</i> Costs of re-armament and replacement of run-down equipment <i>Additional indicators:</i> Environmental costs Emission levels
	Increasing operational efficiency and competitiveness	
	Environmental safety	
Training, development, innovations	Increasing the educational level of the personnel	<i>Main indicator:</i> Share of employees with tertiary education <i>Additional indicators:</i> Number of R & D items that have been developed and introduced into production, including in the field of environment
	Introducing eco-technologies	
Stakeholders	Increasing high-performance jobs	<i>Main indicator:</i> Tax payments to the regional budget <i>Additional indicators:</i> Average salary Number of employees in the enterprise Number of high-performance jobs Number of signed partnership contracts Market share the company
	Maintaining the market share	
	Ensuring growing incomes of the personnel	
	Increasing tax payments to the regional budget	

Note. Compiled by the authors.

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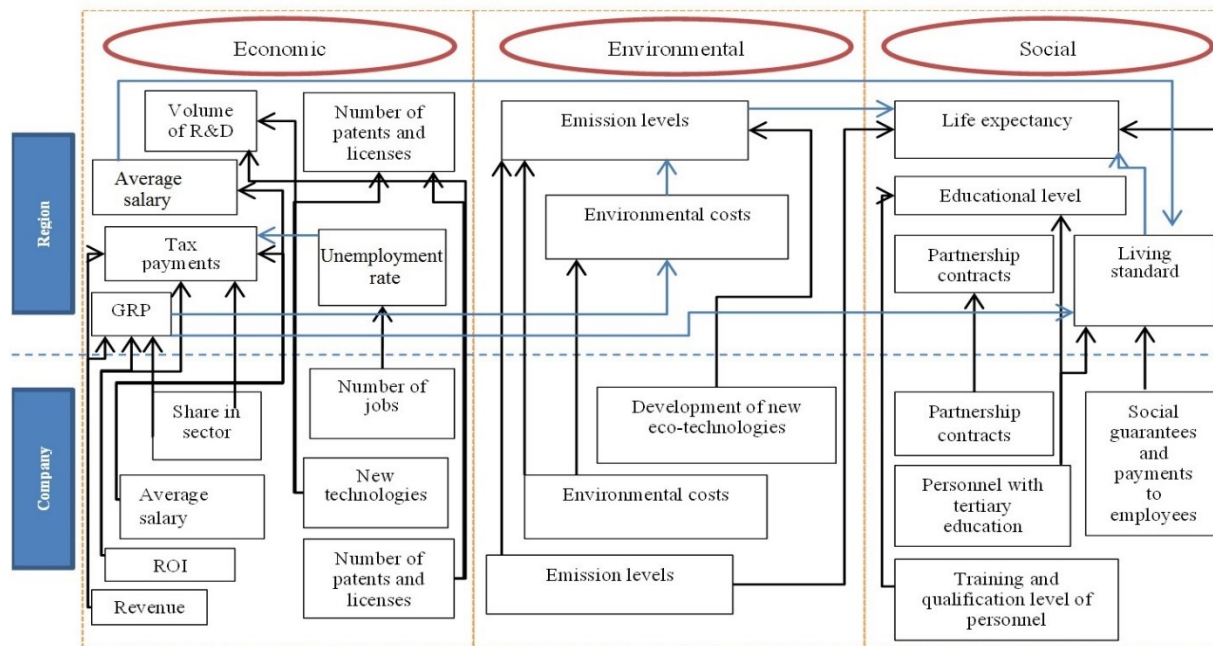


Fig. 7. Framework capturing the interrelationship between the development indicators of company and the region (compiled by the authors)

The expected interdependencies between the indicators of the region and the company are marked in black, while the relationships between the regional indicators are marked in blue.

Among the indicators of the economic block, the sales revenues obtained from selling ALROSA diamond products have a direct influence on GRP and the amounts of tax payments into the regional budget. The company's ROI indices also affect these indicators of the region. The level of the average salary of ALROSA personnel has an impact on the amounts of tax payments and on the level of the average salary in the region. The big share of the company on the world diamond-mining market ensures the replenishment of the regional budget, which is reflected in the indicators of GRP and tax payments. The unemployment rate in the Republic of Sakha (Yakutia) is influenced by the jobs offered to the population in the largest company of the region.

The innovative component of the region's development is reflected in relation to the volume of R & D and the quantity of the licenses and patents in the region as well as the number of new technologies introduced in the operations of ALROSA and the patents and licenses the company has.

The following indicators affect the environmental development status of the region: emission levels, environmental costs, and the development of new eco-technologies. These indicators have an impact on the emission levels and environmental costs in the region, respectively.

One of the most important indicators of regional development is life expectancy. It is a complex indicator that reflects a number of factors affecting the living standard

of the population. The company can influence the life expectancy in the republic if it reduces pollutant emissions in the environment. Another way to increase the life expectancy and the living standard of the population is to provide social guarantees and payments to the personnel of the company. The level of education in the Republic of Sakha (Yakutia) is reflected by the level of education and qualification of the personnel working in the company, which operates on the territory of the region. Cooperation contracts between ALROSA and other organizations influence the development of partnership both inside and outside the republic.

Thus, thanks to the impact on the above indicators of ALROSA, it seems possible to increase the standard of living and the level of SD in the Republic of Sakha (Yakutia). In the corporate sustainable development strategy, ALROSA should pay attention to reaching the objectives that will contribute to the development of the region.

Limitations of research

The main goal of this paper was to identify the most common SD indicators in the strategic documents of regions and companies. Then we aimed on the conceptual relationships and interdependencies between socio-economic levels identification. It gives us the opportunity to build econometric models based on the conceptual scheme of the relationship and the proposed indicators. But there are three main limitations with this set of indicators.

1. The set of indicators in the strategic documents of regions and companies is not full enough and it is based on the goals and activity of one level excluding the interdependence between levels.

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2. The conceptual modeling goal is building of econometric model for quantitative assessment of interdependence in the case of this paper. So we have to use the indicators which are available in the statistical database for companies and regions. The statistical data are not full.

3. The set of indicators is not final. It can be adjusted depending on regional characteristics and the company's activities specific features. Also it can be adjusted if the new data is available.

Conclusion

The concept of “sustainable development” includes the trinity of social, economic, and environmental development of territorial socioeconomic systems. A sustainable development strategy must consider the mutual influence of these spheres when at least one of them is affected. A specific feature of sustainable development is that it is aimed at meeting the needs of future generations. The concept is currently of utmost relevance for policy makers and managers, that are dealing with the urgency to achieve results. In order to monitor the results of the implemented strategies assessment frameworks and indicators are required.

At the current stage of development of the world community, it is essential that all management levels should be committed to the principles of SD: global, macro, meso and micro levels. The paper addresses

a relevant gap in the literature: the absence of frameworks allowing the assessment of the interactions and interdependencies between levels. In fact, extant research provides a wide set of approaches to assess SD at the different levels, but treats them as silos, not considering the potential interactions and interdependencies between. This research offers a novel framework to assess the SD at corporate and regional level and their mutual influence.

The development of framework considers the set of indicators already proposed in the extant literature, covering the three dimensions of SD: social, economic, and environmental. It draws on the BSC methodology and adapts it to the region and to the corporate SD strategies and activities, considering a real case: the public joint stock company ALROSA and the Republic of Sakha (Yakutia) a region in the Russian Federation. Although it was developed from a particular case, the proposed framework is particularly useful for regions where a large company dominates the socio-economic system of the region.

The proposed framework (see Figure 7) reflects the influence of the company's indicators on the region and the mutual influence of regional indicators on each other. It reveals through which indicators the company has an impact on the level of the region's SD. By influencing the selected company's indicators, the level of SD of the region can be improved.

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