

Activation of Sustainable Development Mechanisms on the Base of Green Projects of the Rail Transport

Natalia A. Zhuravleva¹^a, Liana M. Chechenova¹^b and Miloš Poliak²^c

¹Emperor Alexander I St. Petersburg State Transport University, 190031 St. Petersburg, 9 Moskovsky pr, Russian Federation

²University of Zilina, Department of Road and Urban Transport, Univerzitná 1, 010 26, Slovakia


Keywords: Sustainable Development, Green Projects, Rail Transport.


Abstract: Russia is currently facing its traditional challenge, the necessity of economy diversification, as well as the challenge of the decrease of dependence on raw materials sector. Due to the slowdown in global business activities caused by COVID-19 pandemic, the fall in demand and in prices for fossil fuels may be long-term. What is more, some of the world's major economies are being involved in the global transformation of national economic systems in response to the global climate and environmental crisis. Railway transport of the Russian Federation, representing basically by JSC "Russian Railways", is in a leading position in the world transport system. The Holding's response to these challenges will largely predetermine the pathway of development not only of railway transport, but also the format of the development of the Russian economy for coming years or even decades. The purpose of this study is to determine the relationship between the adoption of a sustainable development policy and the effectiveness of the implementation of the projects of Russia's high-speed railway infrastructure development. The authors argue that the functioning of transport organizations within the framework of the established principles of sustainable development (hereinafter referred to as ESG -Environmental, Social, and Corporate Governance) contributes to the improvement of their operational activities. The research methodology is based on the analysis of international approaches and assessment criteria for ESG factors using analytical procedures to identify cause-and-effect relationships of rail transport development strategy in the Russian Federation within the framework of ESG. The informational background of the study is based on the analysis of the reports of international organizations and the data of JSC Russian Railways in terms of funding, expected prospects and effects. As a result of the study we have found the terms of transformation of sustainable development of rail transport systems in the world and in the Russian Federation under the changes in the geography and commodity markets structure. We have set the favorable prospects through business direct participation in sustainable development implementation and reaching its goals. On this basis, the benchmarks of JSC Russian Railways in terms of sustainable development strategy have been assessed. In order to implement environmental infrastructural projects, the parameters of the compliance of the Russia's railway transport development strategy with the goals of sustainable growth have been established.


1 INTRODUCTION

The last few years the essence of transport systems in general and, first of all, rail transport have radically changed. This is due to a large-scale social, technological process and economic shift in the transport services market, shaped by a new

consumption model. New markets for goods and services appear, old ones shall be destroyed and modified. The geography, structure and types of transportation are changing significantly. The transport system is moving into a green (safe), social (highly mobile) and economical system (Wang et al. 2020; Svatovskaya et al. 2020).

^a <https://orcid.org/0000-0003-3566-9225>

^b <https://orcid.org/0000-0002-2641-9454>

^c <https://orcid.org/0000-0002-9149-2439>

This is due to the discrete transition from one economic structure to another. Despite the huge variety of new mechanisms for constructing a modern economic system, its integrity and consistency is due to the tendency of social consciousness and behavior towards sustainable development, which implies an equilibrium state of social, economic and environmental elements of the system directly related to the innovative format of the global development of mankind, namely creation of new conditions of existence in the preserved technosphere, moral consumption and distribution of resources. This paradigm has been voiced many times by political figures, statesmen and scientists (Viktor Sebestyen, Endre Domokos, Janos Abonyi, 2020). At the same time, the position of business, behavior in the financial and capital markets of many countries, is not unambiguous enough.

The Sustainable Development Goals (hereinafter SDGs) announced in 2015 have effectively displaced the key microeconomic model of systematic growth in profitability and profitability. They have established links between their achievement and investment, changing the pathways of global capital markets. These are 17 Sustainable Development Goals (SDGs) and 169 targets for them. Investors evaluate their effectiveness in a system of 230 indicators, and 192 countries have signed up to this document.

Sustainable development questions have long been in the focus of the Russian business community, but many unresolved problems remain. First of all, there are no studies proving the effectiveness of solutions for sustainable development of infrastructure sectors of the economy, in particular transport. At the same time, for Russian transport companies, more than ever, there is a problem of attracting investments in projects for the development of backbone infrastructure with long implementation periods and a low rate of return. This problem has been especially arisen recently, when the pandemic has brought down the budgets and growth rates of most countries of the world. Current investment trends \$ 10.2 trillion dollars, required investments \$ 11.3 trillion dollars, investment gap \$ 1.1 trillion dollars. At the same time, we see that investment strategies are changing in the world (Saidi et al. 2020).

They shall be guided better to the projects of Sustainable Development that contribute to the solution of complex problems of the optimal balance between economic, environmental and social development. Moreover, Sustainable Development is necessarily associated with the economic growth of

national economies, business and international corporations.

It should be noted that the financing mechanism for sustainable development projects is focused on the investment dominant of Green projects. At the end of 2019, the volume of the market for "boiler" corporate securities and certified ESG bonds amounted to \$ 700 billion, 927 issuers carried out almost 6 thousand issues. The largest share of issued green bonds in the world falls on the corporate sector (about 25–35% of the annual volume). Within this category there can be both corporate green loans and project loans, as well as securitized issues for green initiatives. In addition, in the structure of annual green placements, 6-10% are sovereign bond issues of different countries, and about 3-10% are green papers of regional and municipal authorities.

As of mid-October 2020, the total volume of green bonds in the world increased and amounted to 926.8 billion dollars. According to the results of the last three years, the USA remains the leaders in green bonds: 2019 - 59 billion dollars, 2018 - 40 billion dollars; further China: 2019 - \$ 27 billion dollars, 2018 - \$ 33 billion dollars and France: 2019 - \$ 31.4 billion dollars, 2018 - \$ 16.7 billion dollars. Countries such as Ecuador, Greece, Saudi Arabia and Turkey made the first attempt to issue this instrument in 2019. Russian issuers entered the green bond market in 2018, along with representatives from Fiji, Iceland, Indonesia, Lebanon, Namibia, Portugal, Slovenia, Thailand and Venezuela.

2 METHODS

The purpose of this study is to determine the interconnection between the adoption of a sustainable development policy and the effectiveness of the projects implementation for the development of backbone infrastructure in Russia. Our task is to prove that the activities of transport organizations within the framework of ESG contribute to the growth of value added and improve their activity.

The research materials were reports of international development banks such as the African Development Bank (AfDB), the Asian Development Bank (ADB), the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), the Inter-American Development Bank Group (IDBG), the World Bank Group (WBG) and also the Islamic Development Bank (IsDB) for green investment and the activities of such funds as the Climate Investment Fund (CIF), the Global Environment Facility Trust Fund (GEF), the Global

Energy Efficiency and Renewable Energy Fund (GEEREF). Data from the combined report of international development banks on climate investments (The World Bank, 2020) were investigated. The criteria of Green Bond Database Methodology (2020), press release of the Bank of Russia dated 06/08/20 “Climate Change: Impact on the Financial Sector” (2020) are taken as the basis.

If we start from the data of the Global Infrastructure Hub for the next decade, then the world needs for financing infrastructure to support sustainable development by 2030 will amount to at least \$ 296 billion (about 0.3% of world GDP), or about 10% of the estimated expenditures made in the same year. According to experts, by 2040 it will be necessary to invest an additional 0.6% of global GDP, or about \$ 819 billion.

According to a 2018 study by the World Bank Group, Russia will need about 4–8 trillion rubles in financing to move to the best available technologies (BAT) as part of the “greening” and “decarbonization” of the economy (considering this need for industry as well). Moreover, investments by 2020, taking into account climatic factors, were supposed to amount to about \$ 9.3 billion in renewable energy sources (RES) and \$ 47 billion in urban infrastructure (of which 47% - modernization of buildings, and 13% - transport). This includes projects in the energy sector, waste disposal, water treatment, transport, construction. The World Bank, among other things, indicates that the transition to a Green economy in Russia is possible through the development of Green public procurement, especially considering that government customers are a significant segment of consumption in a country with a market accounting for about a third of GDP.

During the calculation, the Russian Union of Industrialists and Entrepreneurs Indices (Figure 1) in the field of sustainable development are used - at present it is the main independent tool for independent assessment of Russian companies, which is included in the International Base for Sustainable Development Ratings (GISR). When forming the methodology for compiling the indices, both the international approach to this problem and the assessment criteria for ESG factors were taken into account, that made it possible to expand the format of using indices in the field of sustainable development through the development and inclusion of sectoral and thematic indices, which is also reflected in our study.

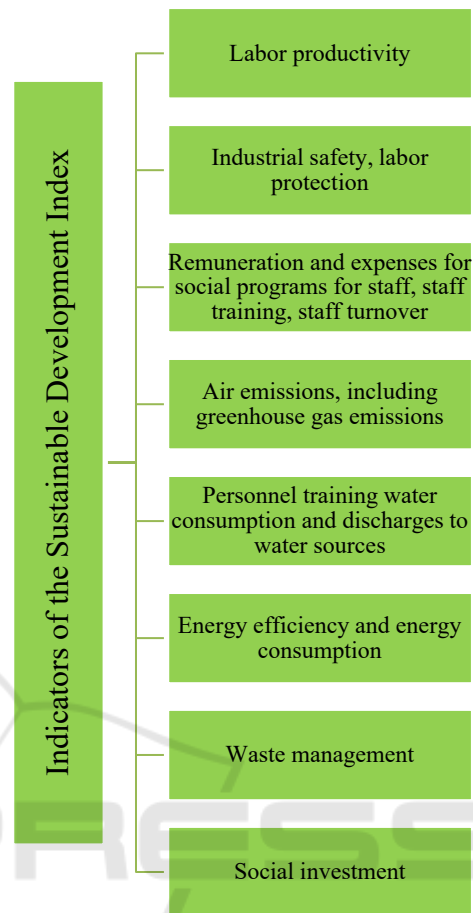


Figure 1. Indicators of the Sustainable Development Vector Index.

3 RESULTS

3.1 The Conditions for the Transformation of Sustainable Development of Rail Transport Systems in the World and in the Russian Federation against the Background of Changes in the Geography and Structure of Commodity Markets Have Been Determined

The efficient transportation service possession shall be ensured when the long-term curve of the average costs of TLS acquires a descending character. In the case of rail transport systems, this is possible when high-speed traffic projects confirm the effect of increased profitability due to increased network

density and travel speed. Operational costs decrease as the productivity of the railway line increases, as the fixed cost of providing track shall is spread over an increasing number of traffic units. To detect the effect of the speed of the railway network, a high degree of infrastructure utilization shall be required with an increase in the transportation speed: the higher the degree of utilization, the better the economy of the infrastructure, the more profitability can be provided to its owner and user. Infrastructure development shall be provided by the factors presented in Figure 2.

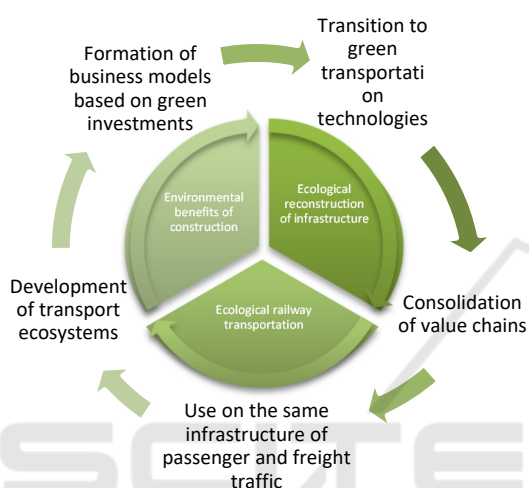


Figure 2. Infrastructure development factors.

3.2 Favorable Prospects from the Direct Participation of Business in the Implementation and Realization of the Goals and Objectives of Sustainable Development Have Been Established

According to the Global Infrastructure Hub (2021), Russia will need at least \$ 1 billion in investments by 2030 (or about 23% of the level of investments in infrastructure by the same year) to cover the lack of funds for sustainable development (in terms of energy and water resources). By 2040, this gap could reach \$ 3.97 billion and exceed 2% of GDP. According to our calculations, Russia needs at least 5.9-7 trillion rubles for the part of its green projects by 2024. In this assessment, we included the creation of infrastructure for the processing of household waste, the renovation and development of urban public transport, minimal landscaping and landscaping, bringing the share of renewable energy to 4-5% of the total generation volume, as well as the minimum necessary measures

in the field of environmental protection and restoration.

We expect that up to half of this amount will be covered by the state within the framework of existing programs. In our opinion, full financing of environmental projects and their effective implementation are impossible without involving business (Fig. 3). However, the benefits from environmentally friendly technologies and equipment, as well as environmental protection measures, are still significant. At the same time, companies invest in them not only and probably not so much for the sake of protecting the environment, but for increasing their productivity, the ability to gain access to new markets and also within the framework of GR and PR campaigns.

Features of business involvement in activities to achieve sustainable development goals	- Direct foreign investments
	- Combined financing
	- Official Support for Sustainable Development Concept
	- Social investments
	- Responsible business conduct

Figure 3. Features of business involvement in activities to achieve the SDGs (according to the OECD).

It should be noted the assessment, given by the World Business Council for Sustainable Development (WBCSD), of the importance of private business in achieving sustainable development goals, since none other than a private investor is interested in development and is the driving force of economic growth, directly creating jobs, financial flows, introducing innovative technologies.

3.3 The Assessment Was Made of the Reference Points of Russian Railways in the Sustainable Development Strategy

Shifting the volume of passengers and freight traffic from more intensive transport modes, in terms of emissions of harmful substances into the atmosphere, to rail transport will significantly reduce the amount of such emissions and reduce the negative impact on the environment. Today, only 12% of rail transport systems can be classified as energy efficient kinds of transport. Statistics of harmful substances emissions into the atmosphere per passenger carried by rail is recorded in third place in Russia in comparison with other kinds of transport.

The attraction of green finance instruments by Russian Railways is aimed at supporting the environmental benefits of the construction and reconstruction of infrastructure and rail transport in order to reduce energy consumption and minimize greenhouse gas emissions and other emissions harmful to the environment. These goals are consistent with the strategy for the development of rail transport

in the Russian Federation until 2030, the main activities of which include the electrification of the railway system.

One of the tasks of JSC Russian Railways in the field of ecology is to ensure environmental safety. This is enshrined in the Environmental Strategy of Russian Railways until 2020 and for the future until 2030 (Fig. 4).

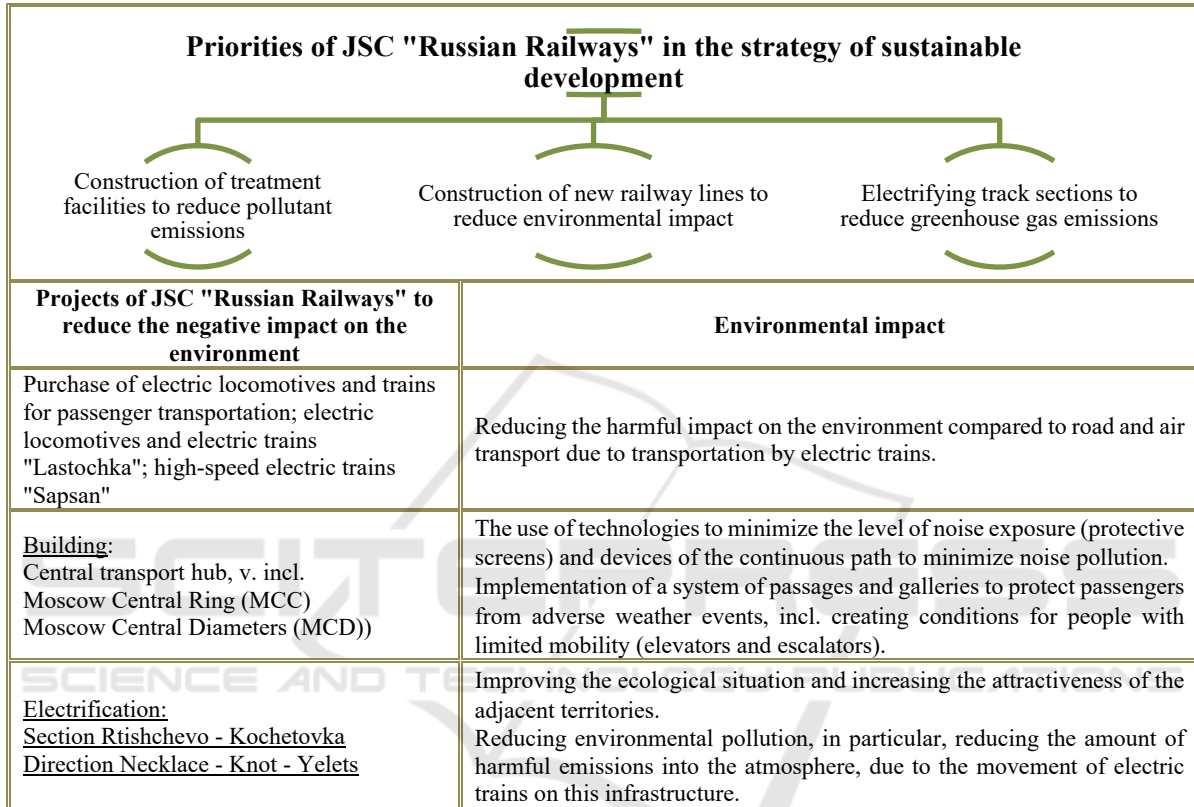


Figure 4. Projects of JSC "Russian Railways" in the format of a sustainable development strategy.

The main criteria for selecting projects for targeted financing by "green" instruments were:

- objectivity in terms of environmental impact and transparency of calculations, for example, reducing emissions of harmful substances into the atmosphere;
- the importance of environmental impact compared with alternative types of passenger transportation.

3.4 Justified Support for Green Finance Instruments for the Implementation of Environmental Infrastructure Projects

Green finance instruments are used both within the framework of public-private partnerships and during

corporate projects launching. These include green loans, green bonds, securities, and sovereign green bonds. So far, there are only a few Green players in the country among funds and banks. Due to the lack of a well-developed legal framework in the field of green financing and regulations on investments in such instruments for long-term investors, the development of the transport sector in Russia is inactive. At the same time, business is especially interested in a timely "readjustment" to responsible financing, since otherwise it is likely to lag behind developed countries and lose the opportunity to raise money in the global financial market due to non-compliance with environmental standards.

According to study by the World Bank Group, Russia will need about 4–8 trillion rubles in financing to move to the best available technologies as part of

the “greening” and “decarbonization” of the economy (considering this need for industry as well). Moreover, according to assessments in this study, investments by 2020, taking into account climatic factors, were supposed to amount to about \$ 9.3 billion in renewable energy sources (RES) and \$ 47 billion in urban infrastructure (of which 47% - modernization of buildings, and 13% - transport). This includes projects in the energy sector, waste disposal, water treatment, transport, construction. The World Bank indicates that the transition to a

Green economy in Russia is possible through the development of Green public procurement, especially considering that government customers are a significant segment of consumption in a country with a market accounting for about a third of GDP.

Over the past few years, the global green finance market and especially in its broadest part - the segment of green bonds - has seen a steady growth and popularization of this financial instrument. One of the participants in the green bond market is Russian Railways (Table 1).

Table 1. Issues of green bonds of Russian Railways (Forum 1520, 2020).

Name of indicator	Bond code		
	XS1843437036	CH0522690715	RU000A102564
Issue	May 2019: The first deal of Green bonds of Russian Railways	March 2020: Issue of Russian Railways Green Bonds in CHF	September 2020: Issue of Perpetual bonds of Russian Railways
Standards	International Capital Markets Association (ICMA)	International Capital Markets Association (ICMA)	International Capital Markets Association (ICMA), VEB RF
Price determination date / Book closing date	May 16, 2019	March 5, 2020	September 24, 2020
Maturity	May 23, 2027 (8 years)	March 12, 2026 (6 years)	Without fixed maturity
Issue value	€ 500,000,000	CHF 250,000,000	RUB 100,000,000,000.
Coupon	2.200% fixed, annual	0.840% fixed, annual	7.25% floating, every 182 days
Key details of the deal	The first ever Green Eurobond issue in Russia and in CIS	The first ever Green Eurobond issue in Swiss francs in Russia and in CIS	The first bond issue in the history of Russia, which received confirmation of compliance with Russian and international standards of Green financing

3.5 The Parameters of the Compliance of the Strategy for the Development of Railway Transport in Russia, Including Urban Rail Transport, with the Goals of Sustainable Growth Have Been Established

Over the nine months of 2020, the situation mostly hasn't changed. The use of funds for the Environment reached only 30.4 billion rubles, or 42.2% (Investments in infrastructure. Ecology. 2020). According to this indicator, it is in the penultimate place among national projects: only the Digital Economy is worse, which only 20.6% of the approved money has been spent (Table 2).

4 DISCUSSION

A new vision of economic growth through infrastructure investment and job creation with a focus on green development appeared in 2007 after the global world crisis, when the green sectors of the G20 economies took up about 16% of anti-crisis expenses. This situation can be viewed as the primary pilot for the Green New Deal concept. At that time, Russia did not make possible to switch to a diversified economic development course. Currently, this transition is not only possible, taking into account the relatively favorable economic situation, but also necessary, since the omission of the possibility of avoiding dependence on raw materials can have irreversible consequences for the national economy of the Russian Federation.

The transition to a sustainable global economy requires increased financing for investments that

Table 2. The parameters of the compliance of the strategy for the development of rail transport in the Russian Federation with the goals of sustainable growth (source - compiled by the author).

National projects	National goals	State programs	Sustainable Development Goals
<ul style="list-style-type: none"> - "Comprehensive Plan for the Modernization and Expansion of the Main Infrastructure" - "International Cooperation and Export" (89.1 and 49.6) 	<ul style="list-style-type: none"> - Technological Development Accelerating. - Ensuring Accelerated Adoption of Digital Technologies - Entry of the Country into the Top-5 Largest Economies in the World 	<ul style="list-style-type: none"> - "Development of the Transport System" - "Scientific and Technological Development" 	Resilient Infrastructure, Inclusive and Sustainable Industrialization and Innovation
<ul style="list-style-type: none"> - "Environmental Protection" (66.3 and 42.2) - "Economic Development and Innovative Economy" - "Development of Industry and Increasing its Competitiveness" - "Reproduction and Use of Natural Resources" 	<ul style="list-style-type: none"> - Technological Development Accelerating. - Ensuring the Accelerated Adoption of Digital Technologies. - Entry of the Country into the Top-5 Largest Economies in the World 	<ul style="list-style-type: none"> - Ecology 	Transition to sustainable consumption and production models
<ul style="list-style-type: none"> - "Digital Economy" (73.4 and 20.6) - "International Cooperation and Export" 	<ul style="list-style-type: none"> - Ensuring the Accelerated Adoption of Digital Technologies. 	<ul style="list-style-type: none"> - "Economic Development and Innovative Economy" - "Development of Foreign Economic Activity" - "Scientific and Technological Development of Russian Federation" 	Strengthening the means to achieve sustainable development and revitalizing global partnership mechanisms

provide environmental and social benefits. The capital market through green, social and sustainable bonds and also bonds linked to sustainability, can play an important role in raising capital to finance these needs.

The main discussion about the goals and essence of sustainable growth, shown by Eileen de Jong, Marjanneke J. Vijge (2021), confirms that the problem of sustainable development is becoming of great importance for global and national economies and coordinated actions between them. At the same time, the importance of the SDGs is emphasized in the formation of relations: developed and developing economies, towards partnership and management of the agreed SDGs in the interests of global growth.

Thus, a comparative analysis of sustainable development goals and programs carried out by Ranjbari, et. al. (2021) shows the extent and direction of their changes because of of Covid-19 influence. The author's systematization of 17 sustainable development goals in five areas made it possible to

identify priority ones in the current environment: SDG 12 (Responsible consumption and production) and SDG 9 (Industrialization, innovation, infrastructure), that, makes it possible (in their opinion) to implement the remaining SDGs, primarily, ensuring solutions to poverty eradication, good work and partnerships for sustainable development. The results of quantitative studies of programs implemented under the SDGs, presented in the work, determine the vector of harmonization of research related to Covid-19 in the field of sustainability.

Implications for the core SDGs: poverty alleviation, good health and well-being, marine and terrestrial ecosystem conservation and actions because of climate changing have been explored (Richard Fenner and Thomas Cernev, 2021). The authors ground the need to shift the accents of the SDGs to planetary and human health, arguing that they exactly ensure progress in achieving all the sustainable development goals. The scenario analysis

made in the work shows the priority of the economic imperative in terms of providing humanity with livelihoods. At the same time, the risks of the new geopolitics are emphasized.

Issa Ibrahim Berchin, José Baltazar Salgueirinho Osório de Andrade Guerra (2020) believe that the rapid and severe economic Covid-19 crisis for all countries threatens the achievement of sustainable development goals, changing their priorities.

An analysis of 75 national SDGs implementation reviews conducted by researchers Viktor Sebestyen, Endre Domokos, Janos Abonyi (2020) showed that gender equality is the most discussed goal worldwide (77% of analyzed voluntary national reviews). Goog work and economic growth is the second most studied goal at 76%, while zero poverty is the least targeted goal, mentioned in only 48% of national documents.

Compromises between environmental and social priorities are suggested by Yang et al. (2020) using synergistic effects from combinations of SDGs (EU). The greatest synergies were found in SDG 1 (Poverty Alleviation), mainly SDG 2, SDG 3 (Good health and well-being), SDG 5 (Gender equality) and SDG 8 (Goog work and economic growth”).

Along with the need for sustainable development, the time required for transdisciplinary approaches and collaboration to bridge the gap between science and practice is constantly growing (Jost et al. 2021). This study explored the feasibility of developing an online platform called CoLabS specifically for virtual meetings and learning to support collaboration within and between communities to accelerate efforts to achieve sustainable community development CoLabS: A Collaborative Space for Transdisciplinary Work in Sustainable Community Development.

A methodology for measuring performance in achieving the Sustainable Development Goals associated with the transition to green growth is presented in Acosta et al. (2020). The article discusses the results of achieving the Sustainable Development Goals (SDGs) in the field of protecting natural capital by dividing the concept of green growth into four main components (i.e. environmental quality, reducing greenhouse gas (GHG) emissions, protecting ecosystems and biodiversity, and also cultural and social value). The work fills an important research gap as the comparative analysis of sustainability targets clearly articulates indicators of protecting natural capital against global green growth indices.

Jonathan Moyer and Steve Hedden (2020) examines a dynamic baseline scenario for global development “midway” (Common Socioeconomic Pathway 2) using the model integrated assessment

(“International Future”). The authors suggest that for all variables studied here (nine indicators for 186 countries = 1674 indicators for countries), 43% have already reached the target values by 2015. Targets shall be projected to be reach 53% variables for countries by 2030.

Apparently, research on this question is at an early stage of development. We have the opportunity to observe the process of transition to new standards, technologies and tools that may be successful or fail in the future, but, nevertheless, are of exceptional value for science.

5 CONCLUSIONS

The study confirms that Russia and the transport sector in particular have made little progress in solution of global environmental problems. At the same time, the format of sustainable development of rail transport based on “green” projects is not only useful in terms of protecting and restoring the environment, but also relatively profitable, since it assumes the presence of “green” investments from private business, which generates the idea of environmentally friendly transport as financially attractive. In fact, any infrastructure projects can be considered sustainable if they comply with the principles of sustainable development. In a narrower sense, “green” can be any initiative that meets certain environmental requirements. In world practice, there are facts when infrastructure facilities were created using PPP mechanisms and were subsequently certified according to “green” standards.

Undoubtedly, the shift in stereotypes about development will lead to the transformation of production and consumption technologies, which, in turn, will affect the emergence of new business models of transport companies and a change in the structure of the cost of transport services.

REFERENCES

- Wang, X., Wong, Y.D., Yuen, K.F., Li, K.X. (2020). Environmental governance of transportation infrastructure under Belt and Road Initiative: A unified framework. *Transportation Research Part A: Policy and Practice*. Vol. 139, pages 189-199.
- Svatovskaya L., Drobyshhev I., Mikhailova K., Khamenok N. (2020). *Criteria of Green Geocoprotective Technologies in Transport Construction*. In: Petriaev A., Konon A. (eds) *Transportation Soil Engineering in Cold Regions*, Volume 2. *Lecture Notes in Civil*

- Engineering, vol 50. Springer, Singapore. https://doi.org/10.1007/978-981-15-0454-9_45
- Saidi, S., Mani, V., Mefteh, H., Shahbaz, M., Akhtar, P.(2020). Dynamic linkages between transport, logistics, foreign direct Investment, and economic growth: Empirical evidence from developing countries. *Transportation Research Part A: Policy and Practice, Elsevier*, vol. 141(C), pages 277-293. <https://doi.org/10.1016/j.tra.2020.09.020>
- Supporting countries in unprecedented times. *The World Bank*. [Annual Report 2020]. <https://www.worldbank.org/en/about/annual-report#anchor-annual>
- Green Bond Database Methodology. (2020). <https://www.climatebonds.net/certification/certified-bonds>.
- Izmenenie klimata: vliyanie na finansovyy sektor. Bank Rossii. (2020). [Press-reliz]. <https://cbr.ru/press/event/?id=6823>
- Global Infrastructure Hub. (2020). <https://www.gihub.org/>
- Ekologicheskaya strategiya OAO "RZHD" na period do 2020 goda i perspektivu do 2030 goda (ot 21.05.2014, v red. ot 22.06.2016). <https://company.rzd.ru/ru/9353/page/105104?id=958>.
- Sistemnyy format mezhdunarodnyh delovyyh sobytij na prostranstve 1520 (2020). PRO//Dvizhenie. <https://railwayforum.ru/>
- Investicii v infrastrukturu. Ekologiya. 2020. InfraOne Research. [Analiticheskij obzor].
- de Jong, E., Vijge, M.J. (2021). From Millennium to Sustainable Development Goals: Evolving discourses and their reflection in policy coherence for development. *Earth System Governance*. Vol. 7, No 100087. <https://doi.org/10.1016/j.esg.2020.100087>
- Ranjbari, M., Shams Esfandabadi, Z., Scagnelli, S.D. et al. (2021). Recovery agenda for sustainable development post COVID-19 at the country level: developing a fuzzy action priority surface. *Environment, Development and Sustainability*. <https://doi.org/10.1007/s10668-021-01372-6>
- Fenner, R., Cernev, T. (2021). The implications of the Covid-19 pandemic for delivering the Sustainable Development Goals. *Futures*. Vol. 128, No. 102726. <https://doi.org/10.1016/j.futures.2021.102726>
- Berchin, I.I., Osório de Andrade Guerra, J.B.S. (2020). GAIA 3.0: Effects of the Coronavirus Disease 2019 (COVID-19) outbreak on sustainable development and future perspectives. *Research in Globalization*. Vol. 2, No. 100014. <https://doi.org/10.1016/j.resglo.2020.100014>
- Sebestyén, V., Domokos, E., Abonyi, J. (2020). Focal points for sustainable development strategies—Text mining-based comparative analysis of voluntary national reviews. *Journal of Environmental Management*. Vol. 263, No. 110414. <https://doi.org/10.1016/j.jenvman.2020.110414>
- Yang, S., Zhao, W., Liu, Y., Cherubini, F., Fu, B., Pereira P. 2020. Prioritizing sustainable development goals and linking them to ecosystem services: A global expert's knowledge evaluation. *Geography and Sustainability*. Vol. 1, Issue 4, pages 321-330. <https://doi.org/10.1016/j.geosus.2020.09.004>
- Jost F., Newell, R., Dale, A. (2021). CoLabS: A collaborative space for transdisciplinary work in sustainable community development. *Heliyon*. Vol. 7, Issue 2, e05997. <https://doi.org/10.1016/j.heliyon.2021.e05997>
- Acosta, L.A., Maharjan, P., Peyriere, H.M., Mamiit, R.J. (2020). Natural capital protection indicators: Measuring performance in achieving the Sustainable Development Goals for green growth transition. *Environmental and Sustainability Indicators*. Vol. 8, No. 100069. <https://doi.org/10.1016/j.indic.2020.100069>
- Moyer, J.D., Hedden, S. (2020). Are we on the right path to achieve the sustainable development goals? *World Development*. Vol. 127, No. 104749. <https://doi.org/10.1016/j.worlddev.2019.104749>