European Proceedings of
Multidisciplinary Sciences
EpMS

www.europeanproceedings.com
e-ISSN: 2421-826X

DOI: 10.15405/epms.2024.09.95

MTMSD 2022
I International Conference «Modern Trends in Governance and Sustainable Development of Socio-economic Systems: from Regional Development to Global Economic Growth»

SUSTAINABLE DEVELOPMENT AND INFRASTRUCTURE

Fatima Dakhaeva (a)*, Khadzheiva Eliza (b), Adlan Baikhanov (c)
*Corresponding author

(a) Kadyrov Chechen State University, Grozny, Russia, dahaevaf@mail.ru
(b) Grozny State Oil Technical University, Grozny, Russia, Eliza.Khadzheiva@mail.ru
(c) Chechen State Pedagogical University, Grozny, Russia, baykhanov925@mail.ru

Abstract

This study aims to analyze the interplay between sustainable development and infrastructure projects. The primary objective is to discern how infrastructure projects can either contribute to or hinder the achievement of sustainable development, as well as identify key factors influencing this relationship. A comprehensive methodological approach was employed to achieve the research objective. Literature analysis, statistical data, and econometric methods were used to examine the impact of infrastructure projects on sustainable development indicators. Additionally, case studies, expert interviews, and project analyses were conducted. The research revealed that well-designed and implemented infrastructure projects can serve as a crucial catalyst for sustainable development. The effective utilization of infrastructure can foster economic growth, social inclusivity, and environmental preservation. The importance of project management, stakeholder engagement, and consideration of social and environmental factors were underscored as critical components for the successful convergence of infrastructure projects and sustainable development. These findings provide a foundation for developing strategies and policies conducive to more effective synergy between infrastructure and sustainable development in the future.

Keywords: Economic development, economic efficiency, infrastructure, institutional environment, sustainable development, social and economic modernization

https://doi.org/10.15405/epms.2024.09.95
Corresponding Author: Fatima Dakhaeva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2421-826X

1. Introduction

Social and environmental problems - inequality, poverty, resource depletion, climate change - continued to worsen and began to have a negative impact not only on the environment and society, but also, as a result, on economic development in the long term. To solve global problems, international initiatives began to be created - the UN World Summit in 1972 and the UN program - UNEP, aimed at encouraging respect for the environment and creating opportunities to improve the quality of people's lives. The summit was the first global event in the field of environmental protection and marked the beginning of the discussion of the concept of sustainable development. The concept of SD was formalized through the work of the UN Commission on Environment and Development, also known as the Brundtland Commission. In 1987, the commission published the report “Our Common Future” and defined sustainable development. It is this formulation that is most used in determining SD (Ovchinnikova & Lavnov, 2019). Sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs - Our Common Future, 1987 (Makarova, 2021). The UN Sustainable Development Goals are shown in Figure 1.

Figure 1. UN Sustainable Development Goals

At the end of the 20th century, the idea of sustainable development was first positioned as a call to global action. The concept found its continuation at the UN conference in Rio de Janeiro, when the “Declaration on the Environment” was signed and the “Agenda for the 21st Century” was adopted (Ilyasov, 2018). The Agenda has become a program for the development of states in the coming millennium, taking into account social, economic and environmental aspects. In addition, in 2000, 189 states decided to achieve the Millennium Development Goals (MDGs) by 2015 in order to eradicate poverty and the main problems that cause it. Currently, sustainable development is becoming increasingly important. In 2015, the world needed to form a new course to achieve sustainable development. The 2030 Agenda for Sustainable Development was adopted. It included a wide range of 17 Sustainable Development Goals (UN SDGs) and 169 targets. The goals are universal for any country, are inseparable

https://doi.org/10.15405/epms.2024.09.95
Corresponding Author: Fatima Dakhaeva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2421-826X

from each other and require an integrated approach to their achievement, and also take into account all three aspects of SD - economic, social and environmental (Barzaeva & Ilyasov, 2022). Now the UN SDGs serve as the main benchmark for achieving sustainable development and are taken into account in the development of most plans and strategies in the public and private sector. They are a roadmap that covers almost all spheres of human life (Taranova et al., 2021; Vorontsova et al., 2019).

2. Problem Statement

Addressing well-being improvement, poverty reduction, employment increase, and the enhancement of education and healthcare quality represents pivotal challenges for countries globally. The widespread adoption of sustainable development goals by contemporary nations, including Russia, underscores the need to scrutinize the integration of these goals into national policies and programs. Additionally, it is essential to assess the extent to which these sustainable development goals contribute to the realization of the aforementioned critical societal objectives.

3. Research Questions

1) Integration of Sustainable Development Goals (SDGs):

i. Question: To what extent have sustainable development goals been seamlessly integrated into the overarching national policies of Russia?
ii. Context: Understanding the depth of integration is crucial for assessing the commitment of the country to the principles of sustainable development on a policy level.

2) Operationalization of SDGs in Practical Programs:

i. Question: How are these sustainable development goals translated into tangible and operational programs and initiatives at the national level?
ii. Context: Exploring the practical implementation of SDGs provides insights into the effectiveness of policy translation into actionable initiatives.

3) Measurable Impacts on Societal Objectives:

i. Question: What measurable impacts can be identified, showcasing the contribution of sustainable development goals to the improvement of well-being in Russia?
ii. Context: Evaluating tangible outcomes aids in understanding the actual influence of SDGs on key societal objectives such as well-being improvement.

In the realm of contemporary governance, the integration of sustainable development goals (SDGs) into national policies represents a significant paradigm shift. For Russia, as with many other nations, the adoption of SDGs reflects a commitment to addressing critical societal challenges. This research seeks to unravel the depth of this commitment by posing three crucial questions.

Firstly, we delve into the integration of SDGs within the national policy landscape. Understanding the extent to which these global sustainability objectives are seamlessly woven into the fabric of Russia's overarching policies provides a foundational perspective (Kaishev, 2013; Klishina et al., 2017).

https://doi.org/10.15405/epms.2024.09.95
Corresponding Author: Fatima Dakhaeva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2421-826X

Moving beyond policy statements, the second question scrutinizes the practical side of things. We aim to explore how these SDGs are translated into actionable programs and initiatives at the national level. This involves a closer look at the operationalization of the goals and the tangible steps taken to bring them to life.

Lastly, the research seeks to measure the impact of these sustainable development goals on key societal objectives, particularly in the context of well-being improvement. By identifying measurable outcomes, we can gain valuable insights into the real-world contributions of SDGs to the betterment of society.

Collectively, these questions and their subsequent exploration aim to shed light on the integration, implementation, and impact of sustainable development goals within the unique context of Russia's national policies.

4. Purpose of the Study

The study aims to comprehensively examine the role of infrastructure in economic development and sustainable progress, building upon the acknowledgment of its benefits dating back to the World Bank's 1994 World Development Report. While recognizing its positive impact on economic growth, poverty reduction, and environmental sustainability, the study focuses on the crucial caveat that these benefits materialize only when infrastructure is effectively utilized and aligns with existing demand.

The active involvement of G7 and G20 in fostering sustainable infrastructure development becomes a central point of investigation. The creation of the Global Infrastructure Hub in 2014 serves as a key milestone, promoting reliable and resilient infrastructure through supporting existing projects, launching new programs in G20 countries, and fostering competency development and best practices in project management (Seifert & Gams, 2011).

Furthermore, the study delves into the 2016 G7 summit's approval of 5 principles for quality investment in infrastructure. These principles, emphasizing good governance, economic impact, social and environmental considerations, alignment with strategic development plans, and effective resource mobilization, serve as a foundation. Subsequently, the formulation of 6 principles of Quality Infrastructure Investments (QII) in 2019 at the G20 summit in Osaka reflects an evolution that accounts for the environmental, social, and economic dimensions of infrastructure. The purpose is to analyze how these principles contribute to the overall quality and sustainability of infrastructure facilities, shaping the landscape of global infrastructure development.

5. Research Methods

The study employs a multi-faceted approach to comprehensively investigate the sustainability of infrastructure projects, leveraging the evolution of international recognition and knowledge-sharing platforms. Two distinct groups of tools are utilized for assessing sustainability at both international and national levels: Accounting Tools and Project Assessment Tools.

https://doi.org/10.15405/epms.2024.09.95
Corresponding Author: Fatima Dakhaeva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2421-826X

1) Accounting Tools:

i. SASB Industry Reporting Standards: Consisting of 8 standards, these focus on a holistic assessment of infrastructure, spanning energy, waste management, water supply, etc., with a comprehensive consideration of environmental, social, and governance aspects.
ii. Thematic Reporting Tools: Including TCFD, Lifecycle Assessment GHG Protocol Tool, and The GHG Protocol for Project Accounting (Project Protocol), these tools prioritize climate information disclosure, aligning with climate-focused reporting initiatives.
iii. UN Sustainable Development Initiatives: Encompassing the UN SDGs and UN PRI principles, these initiatives serve as foundational elements for the development of standards and non-financial disclosures.

2) Analysis and Evaluation Tools (Project Assessment Tools):

i. CEEQUAL Sustainability Assessment System: This tool, primarily utilized in the UK and Ireland, facilitates a detailed analysis and assessment of the quality and effectiveness of individual infrastructure projects, with over 300 projects already evaluated.
ii. Envision (US and Canada): Developed by the Sustainable Infrastructure Institute in collaboration with the Zofnass Sustainable Infrastructure Program at Harvard University, it provides a regional perspective on project evaluation.
iii. IS Infrastructure Project Evaluation and Rating Scheme (Australia and New Zealand): Developed by the Australian Council for Sustainable Infrastructure, it has grown internationally since 2017, offering a detailed assessment of infrastructure projects.
iv. Greenroads Guide: Focused on assessing the sustainability of transportation infrastructure projects, this tool covers roads, railways, bridges, tunnels, ports, airports, etc.
v. Pearl Rating System (UAE): This system provides recommendations and requirements for evaluating projects in four aspects - environmental, economic, cultural, and social. Unlike other systems, Pearl is mandatory and is incorporated into building codes.

These diverse tools are employed to ensure a comprehensive and nuanced analysis of sustainable infrastructure projects at both the macro and micro levels, encompassing international standards and specific project evaluations.

5.1. Sustainability and Infrastructure

From an economic perspective, sustainable infrastructure generates positive economic returns, taking into account all benefits and costs, creates jobs, stimulates GDP growth, increases productivity, and provides quality and affordable services (Shmatko et al., 2016). Socially oriented infrastructure implies inclusiveness (accessibility for people, regardless of any signs) and respect for human rights. It stimulates the reduction of poverty and allows people to access the services they need. Green infrastructure aims to preserve and restore the environment, reduce air pollution and greenhouse gas emissions, minimize and properly manage waste, take into account the development of the territory and preserve biodiversity. It is resistant to the effects of climate change, such as emergency situations (fires, floods, etc.) (Podkolzina, Belousov, et al., 2021). At the same time, sustainable infrastructure contributes

https://doi.org/10.15405/epms.2024.09.95
Corresponding Author: Fatima Dakhaeva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2421-826X

to the achievement of national and international commitments, including the Paris Agreement and the UN SDGs, and is based on a transparent management system throughout the life cycle.

5.2. Developing a Sustainable Infrastructure in the World

There is a serious lack of infrastructure in the world to provide a growing population with the necessary living conditions. The existing infrastructure cannot cope with the solution of many social and environmental problems and is characterized by a high level of depreciation. In this regard, the demand for sustainable and high-quality infrastructure facilities is growing. To reduce the infrastructure deficit, it is already necessary to invest $3.2-3.7 trillion28 annually. McKinsey estimates that current infrastructure spending of $2.5-3 trillion a year is only half the $6 trillion needed to meet projected demand. According to the Global Infrastructure Hub, the largest infrastructure investment gap (over $200 billion) is observed in 11 countries of the world (Podkolzina, Taranova, et al., 2021). The total infrastructure deficit of these countries is $10.3 trillion, of which about 60% is in middle-income countries. However, despite the existing deficit, investors need to increase not only the quantity, but also the quality of infrastructure investments. This will manage environmental and social risks, as well as increase the efficiency of infrastructure and bring profit to investors in the long term. Financing the infrastructure deficit will require funds from both public and private investors. Currently, private investment accounts for up to half of total infrastructure funding - $1-1.5 trillion per year, and 65-75% of this is corporate investors. The rest is accounted for by institutional investors, who are also showing an increasing interest in sustainable projects and more often take into account ESG factors. KPMG research shows that 85% of surveyed institutional investors are interested in sustainable development and investments in projects that take into account the principles of SD (Elbuzdukaeva et al., 2019). Energy is one of the main sources of greenhouse gas emissions through the use of fossil fuels - oil, coal and gas. In this regard, many countries are striving to abandon the use of traditional energy and expand the use of renewable energy to achieve carbon neutrality and the agreements of the Paris Agreement. According to The Economist, oil and gas consumption will gradually decrease from 2022, and the annual growth rate of oil in 2026-2030 will be . will be only 0.4%. Over time, the demand for coal will disappear completely, especially in North America and Europe. Now the share of coal in the energy market in Europe and the United States is rapidly declining and is 19% and 13% respectively (Sugaipova & Gapurov, 2018). Many countries are phasing out the use of fossil fuels to reduce GHG emissions. China, one of the largest emitters of greenhouse gases, aims to reduce emissions by more than 65% by 2030, as well as increase the amount of forest reserves and the total installed capacity of wind and solar energy to 1.2 billion kW30. The EU, the third largest emitter of greenhouse gases after the US and China, has decided to cut greenhouse gas emissions by 55% by 2030. The new target will require an additional $424 billion31 per year in infrastructure investment. In recent years, carbon dioxide emissions in Europe have been reduced by reducing the use of coal.

6. Findings

The study reveals significant environmental and climate-related risks impacting various sectors, including telecommunications, utilities, and transportation infrastructure. Key findings include:

https://doi.org/10.15405/epms.2024.09.95
Corresponding Author: Fatima Dakhaeva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2421-826X

1) Telecommunications Infrastructure Vulnerabilities:

i. Sea level rise and flooding pose threats to telecommunications infrastructure, necessitating the implementation of more robust cooling systems to mitigate the impacts of rising global temperatures.

ii. A global study conducted by the C40 Cities Climate Leadership Group highlights that approximately 300 coastal power plants, serving over half a billion people, are at risk of flooding by 2050 due to sea level rise.

2) Demand for Sustainable Transport Infrastructure:

i. There is a growing demand for sustainable transportation infrastructure, driven by concerns over greenhouse gas emissions and biodiversity loss.

ii. Transport infrastructure ranks among the top contributors to greenhouse gas emissions and adversely affects biodiversity by disrupting natural ecosystems.

iii. Furthermore, transport infrastructure is susceptible to emergencies, further emphasizing the need for sustainable solutions to mitigate risks.

These findings underscore the critical importance of addressing environmental and climate-related challenges in infrastructure planning and development. They highlight the urgent need for implementing sustainable practices to enhance resilience and minimize adverse impacts on both infrastructure and the environment.

7. Conclusion

The global COVID-19 pandemic has underscored the inadequacy of existing infrastructure in responding promptly and effectively to emerging global crises. The crisis has impacted various facets of life, exacerbating sustainability challenges and revealing critical deficiencies in infrastructure resilience. Key observations and implications include:

1) Infrastructure Challenges during the Pandemic:

i. The pandemic has laid bare the vulnerabilities of infrastructure, particularly in the areas of medical services, water provision, and electricity supply crucial for combating health crises.

ii. A significant issue emerged with the lack of essential resources in healthcare facilities worldwide, with 2 out of 536 lacking access to water and hand sanitizer. Additionally, one in four healthcare facilities in developing countries lacked electrification.

2) Reconsidering Infrastructure Approaches:

i. The conclusion emphasizes the imperative to reconsider current approaches to infrastructure construction, placing a heightened emphasis on sustainability aspects.

ii. There is a pressing need to integrate sustainability considerations into the construction of new infrastructure, aiming to enhance resilience and better prepare for and counter future crises

In light of these findings, the conclusion calls for a paradigm shift in infrastructure planning and development, urging stakeholders to prioritize sustainability to fortify infrastructure against unforeseen challenges. This shift is essential to not only address the immediate impacts of crises like the pandemic but also to build a more resilient and sustainable foundation for the future.

https://doi.org/10.15405/epms.2024.09.95
Corresponding Author: Fatima Dakhaeva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2421-826X

References

Barzaeva, M., & Ilyasov, R. (2022). Sustainable development of the global labor market in the context of the transformation of the industrial complex of the digital economy. *Baku: Reliability: Theory and Applications*, 152-164. https://doi.org/10.24412/1932-2321-2022-470-476-484

Elbuzdukaeva, T. U., Gelagaeva, A. M., & Sugaipova, A. M. (2019). Migration Processes In The Chechen Republic At The Turn Of Xx Century. In D. K. Bataev (Ed.), Social and Cultural Transformations in the Context of Modern Globalism. *European Proceedings of Social and Behavioural Sciences* (Vol. 58, pp. 2690-2696). Future Academy. https://doi.org/10.15405/epsbs.2019.03.02.313

Ilyasov, R. K. (2018). Spline modeling and analysis of relationships in the economy with the possible presence of regression switching points. *St. Petersburg State Polytechnical University Journal. Economics, 11*(4), 165-175. https://doi.org/10.18721/JE.11412

Kaishev, V. K. (2013). LéVy Processes Induced By Dirichlet (B-)Splines: Modeling Multivariate Asset Price Dynamics. *Mathematical Finance, 23*(2), 217-247. https://doi.org/10.1111/j.1467-9965.2011.00504.x

Klishina, Y. E., Glotova, I. I., Uglitskikh, O. N., Tomilina, E. P., & Podkolzina, I. M. (2017). Peculiarities of the financial policy of non-profit organizations in the macroeconomic unstable environment. *Espacios, 38*(34), 34. https://www.revistaespacios.com/a17v38n34/17383434.html

Makarova, A. V. (2021). Actual problems of cybercrime investigation in the Russian Federation. *Actual problems of disclosure and investigation of crimes committed using the Internet: Collection of materials of the All-Russian Scientific and Practical Conference* (pp. 149-153). Belgorod State National Research University.

Ovchinnikova, N. O., & Lavnov, M. A. (2019). Features of Evidence in Criminal Cases of Cybercrime. *Problems of the criminal process, criminalistics and forensic examination, 2*(14), 9-14.

Podkolzina, I. M., Belousov, A. I., Uzdenova, F. M., Romanko, L. V., & Chernikova, O. A. (2021). Forms of financial fraud and ways to minimize risks. *Modern Global Economic System: Evolutional Development vs. Revolutionary Leap. Institute of Scientific Communications Conference, 198*, 2197-2205. https://doi.org/10.1007/978-3-030-69415-9_241

Podkolzina, I. M., Taranova, I. V., Paytaeva, K. T., Revunov, S. V., & Abrosimova, T. F. (2021). Innovative approaches in financial support for regional economic security. *The Challenge of Sustainability in Agricultural Systems. Lecture Notes in Networks and Systems, 205*, 549-558. https://doi.org/10.1007/978-3-030-73097-0_62

Seifert, K. A., & Gams, W. (2011). *The genera of Hyphomycetes.* CBS, Reus. https://doi.org/10.3767/003158511X617435

Shmatko, S. G., Agarkova, L. V., Gurnovich, T. G., & Podkolzina, I. M. (2016). Problems of increasing the quality of raw material for wine in the stavropol region. *Research Journal of Pharmaceutical, Biological and Chemical Sciences, 7*(2), 725-730.

Sugaipova, A. M., & Gapurov, S. A. (2018). *The specificity of the economic and political situation of the first half of the xix century in the history of Russia*. 675-679.

Taranova, I. V., Podkolzina, I. M., Uzdenova, F. M., Dubskaya, O. S., & Temirkanova, A. V. (2021). Methodology for assessing bankruptcy risks and financial sustainability management in regional agricultural organizations. *Lecture Notes in Networks and Systems, 206*, 239-245. https://doi.org/10.1007/978-3-030-72110-7_24

Vorontsova, G. V., Chepurko, G. V., Ligidov, R. M., Nalchadzhi, T. A., & Podkolzina, I. M. (2019). Problems and perspectives of development of the world financial system in the conditions of globalization. *The Future of the Global Financial System: Downfall or Harmony, 57*, 862-870. https://doi.org/10.1007/978-3-030-00102-5_93