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Sustainable urban development in Russia within a green economy framework

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Abstract. The article outlines the author's proposal for sustainable development in Russian regions, focusing on economic priorities in the context of smart cities and green economy integration. The vision highlights the need for addressing new challenges to ensure ecological and sustainable urban development across Russian territories. Drawing from international examples, the authors pinpoint leading nations and establish key indicators for evaluating sustainable development in regions, emphasizing the significant role of advancing a green economy within smart city frameworks. The article is of interest to specialists in the field of regional and municipal management, for researchers, lecturers, graduate students, undergraduates and students economic and managerial universities.

1 Introduction

Identifying the features and benchmarks of sustainable development involves maximizing internal resources and assessing employee satisfaction through continuous monitoring of smart city advancements within a green economy framework. Revisiting the conventional concept of environmental management systems within city and enterprise innovation, alongside implementing the Japanese "Lean Manufacturing" method for sustainable development, enables adaptation to innovative shifts driven by dynamic global environmental and management technologies. These advancements, prevalent worldwide in recent decades, facilitate changes that support Russia's continued sustainable socio-economic growth by transitioning from a traditional economy to a green economy through the adoption of the international environmental standard ISO 14000. This shift in urbanization signifies a movement towards sustainable development.

The current economic system in cities is extremely unstable. This has led to an economic crisis and an environmental crisis that seriously threaten the future of our planet and societies. Both crises could be overcome through a transition to a green economy. The concept of a green economy is based on the idea that the traditional model of economic development is socially and environmentally unsustainable, and argues that we must move towards a new economy that respects natural boundaries and environmental limits while addressing the requirements of marginalized and underprivileged populations.

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The creation and management of smart cities will facilitate the transition to a green economy. This is not only because cities today house the majority of the world's population and engage in economic activity, but also because cities are centers of knowledge and innovation opportunities that are critical to the transition to a green economy. On the other hand, cities, especially in developing countries, are characterized by significant economic, social and environmental problems that prevent governments from taking the necessary steps to transition the world to a green economy. Therefore, the transition to a green economy requires a different transition path that applies to the production and use of urban space. Given the role that innovation and technology must play in the transition to a green economy, the conceptual framework of a green economy city can be based on the idea of a smart city. In light of this background, this chapter attempts to discuss the role that four key urban sectors, namely land use, construction, transport and waste, can play in the transition to a green economy and smart city. Based on previous studies in the scientific literature, the potential of the green economy in these sectors and the internal barriers that need to be addressed for a better transition are highlighted.

In modern unstable economic conditions, the life of cities is constantly exposed to risks from eco-exogenous and endogenous factors. Technological green innovation stands as the primary instrument for fostering the sustainable and competitive growth of the domestic green economy, emphasizing its advancement and integration within lean manufacturing methodologies. It is advisable to use a system of indicators of all internal potentials, such as environmental, economic, innovative, human and intellectual, which takes into account the amount of accumulated resources, the degree of use of potential opportunities for implementation in the lean manufacturing process. Increasing innovative activity in smart cities will become a source of competitive development through the development and control of national environmental policy, innovative and environmental activity of the internal environment, environmental responsibility for making the right decisions and implementing environmental policy, which significantly increases the innovative attractiveness of Russian cities for the growth of a green economy.

In the context of transformational changes in cities, we are constantly faced with internal and external risks and negative factors. To foster sustainable and competitive development during the territorial self-realization process, it is essential to categorize the types of innovations required for seamless citizen self-realization based on comfort levels. We believe that the evolution of innovations in smart cities, aligned with the advancement of a green economy, should encompass a resource portfolio encompassing environmental, production, financial, informational, managerial, and intellectual dimensions. This holistic approach considers resource quantities, the extent of leveraging potential opportunities, and their integration into production workflows.

Obviously, a transformation of innovative activity is necessary for the development of smart cities, which will become a lever for competitive development based on the use of the function of monitoring and assessing the internal environment, which will significantly increase the role of cities, urban culture and urban relations.

It is proposed to improve the livelihoods of the population in the cities of the former Eastern Donbass as there is an outflow of citizens due to the closure of coal mines in search of a new life. Our innovative approach focuses on preserving the citizens' comfort and ecosystem by establishing favorable conditions and generating employment opportunities. We will emphasize strategies for sustainable development and address the escalating challenges associated with urbanization.

The main criteria for assessing smart cities through digitalization:

uninterrupted 4/5G mobile communications;

a large number of Wi-Fi access points;

smartphones as a universal means of managing services;

smart parking;
car exchange services (car sharing);
optimized traffic system;
online access to government services;
waste recycling;
active civic position of citizens;
environmentally friendly energy sources.

2 Materials and Methods

For the analysis of this problem, theoretical and empirical methods, quantitative and qualitative analysis methods, data aggregation methods, expert evaluation method, classification and structuring of information method, comparison method, reference and statistical data were used [1-13].

In evaluating the sustainable development of Russian urbanization within a green economy framework, the authors have curated a set of indicators and innovative approaches for the theoretical measurement of the subject matter. Additionally, tools aimed at achieving a shared objective have been delineated, encompassing macro- and microeconomic analyses (leveraging foreign methodologies for assessing international standards), economic and mathematical modeling, and a methodology for addressing multi-criteria challenges by establishing an additive optimality criterion. The tools for project implementation will be structured considering a comprehensive review of statistical data, information-analytical resources, regulatory documents, and methodological references within the software solution Legislative acts and regulatory documents will serve as the information-empirical basis for the implementation of the project.

It is expected that the life of the created smart cities in the territories of the former single-industry towns of Eastern Donbass will improve the comfort of citizens by creating new jobs.

3 Results

An analysis of the methodology presented in "The Global Competitiveness Report" by K. Schwab highlighted the declines in social and economic indicators in Russia [6].

Drawing upon the findings of a global methodology by renowned economist Klaus Schwab, we present an analysis of the rating for a selected set of five "leading countries" in 2020 based on the prominent qualitative indicator "focus on innovative development" (See Fig. 1). [Reference: Schwab, K. (2019–2020). The Global Competitiveness Report. 91-93 route de la CapiteCH-1223 Cologny/GenevaSwitzerland: 393]

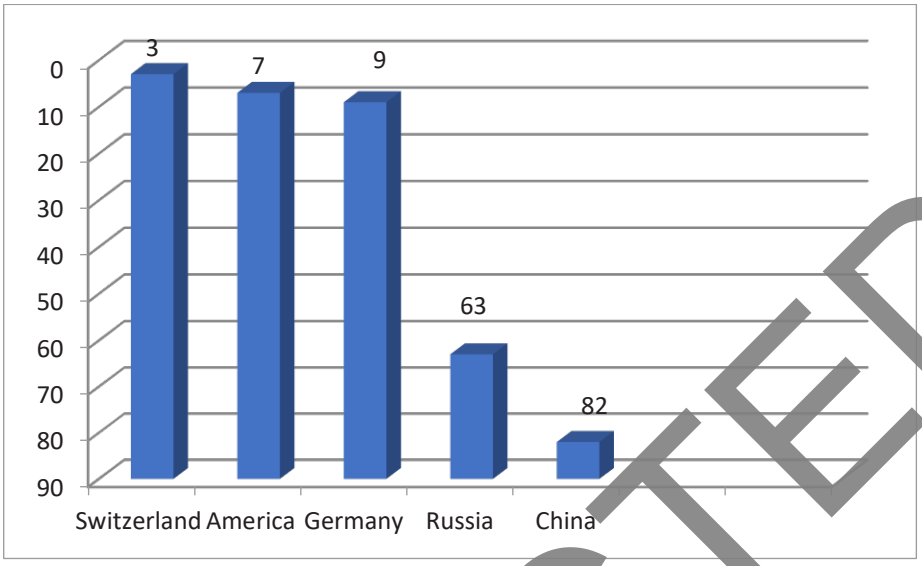

Fig. 1 Country ranking based on the indicator "innovative development" concerning the integration of green economy elements into urbanization

From Figure 1 it can be seen that over the 31-year period of a market economy, Russia ranks 49th in terms of innovative development of the global methodology. Switzerland holds the top position among 144 countries analyzed based on the aforementioned indicator, followed by the United States in 2nd place and Germany in 5th place. China closely trails behind, securing the 28th position in the ranking. Russia has a lot to work on in terms of effective innovative enterprise management. Let's study the indicator from the rating "technological readiness of countries as part of increasing innovation activity in the context of the development of a green economy" (Fig. 2). [ref 2 Schwab, K. (2019–2020). The Global Competitiveness Report. 91–93 route de la CapiteCH-1223 Cologny/GenevaSwitzerland: 393].

Among the countries examined for this indicator, the following leading nations emerged. Switzerland secured the 3rd position globally, followed by the United States at 7th place in the rankings. Germany claimed the 9th spot. Regrettably, Russia ranked 63rd globally despite holding the top spot in natural resources according to the analyzed indicator for 2020. China trailed at 82nd place. Both Russia and China face challenges in advancing technological readiness.

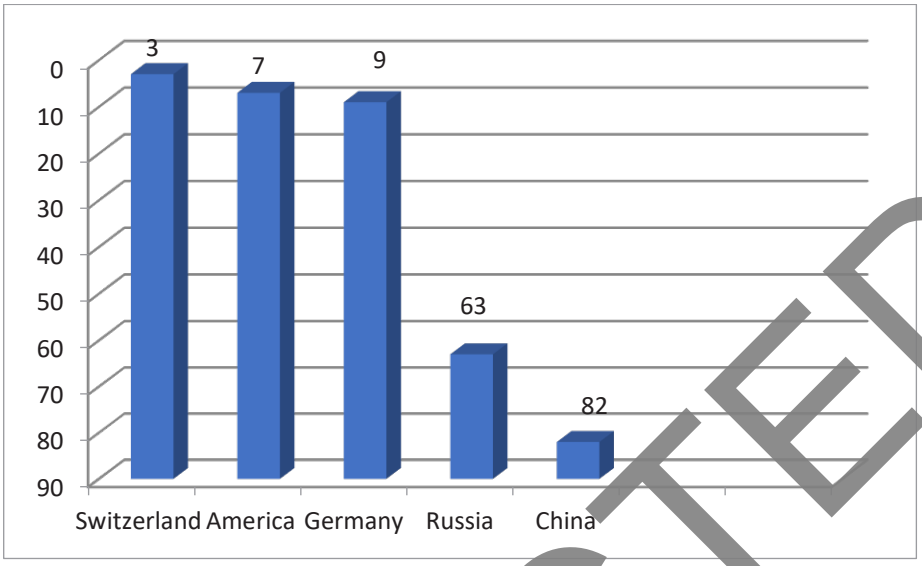

Fig.2. Country ranking according to the indicator "technological readiness for innovation" for 2020

Based on Figure 2, our comparative assessment of the indicator "technological readiness for innovation" and innovative development has identified the following leading countries. Switzerland secures the 3rd position globally, while the United States ranks 7th out of 144 countries. Germany follows closely, holding the 9th spot in terms of innovation development. On the contrary, Russia falls within the red zone in the analyzed indicator for 2020, ranking at 63, and China at 82. These countries face challenges in embracing innovation effectively.

To attain sustainable environmental equilibrium, adjustments to the implementation of international environmental standards across industries and monitoring compliance are imperative. There is a necessity to revise the development blueprint of cities in the Russian Federation, focusing on addressing socio-economic issues by fostering territories transitioning to smart cities, emphasizing the identification of environmental advantages:

- adoption and specification of measures for the implementation of international environmental standards in various industries, monitoring of implementation;
- development of environmental policy for sustainable development of enterprises;
- formation of models for the development of the Russian green economy, taking into account the priority of environmental needs,
- unification of society on the basis of environmental and humanistic values,
- formation of a rule-of-law state and civil society with the ability to protect human rights while showing environmental responsibility for the biosphere.

The Russian Federation is one of the states for which ensuring stable development based on a green economy is of particular relevance today.

There is a need to introduce innovations, technological readiness to implement environmental international standards in the activities of each Russian enterprise to comply with the environmental requirements of the Russian environmental situation and the general development plans of the Russian Federation, aimed at solving socio-economic problems at all levels.

Although cities offer environmental advantages like smaller geographic footprints that affect fewer ecological systems, they also contribute to environmental harm through

emissions, such as the overuse of fossil fuels. Implementing a network of smart city technologies could help alleviate these adverse impacts.

Switching to an electric public transport system would not only reduce fuel emissions, but could also provide the benefit of working closely with the city's energy infrastructure to minimize the impact of battery charging during peak electricity use hours. Additionally, with proper coordination, electric vehicles could also be used to regulate the frequency of the city's electrical grid when they are not being served.

The number of cars used in cities is also expected to decline as municipalities become smarter. Autonomous vehicles or self-driving cars have the potential to change the public's perception of car ownership. It is suspected that the introduction of autonomous vehicles will reduce the number of vehicles owned by civilians, thereby reducing the number of cars on the streets and further reducing emissions of harmful gases.

4 Conclusion

For the sustainable development of Russian urbanization of former mono-territories with their transformation into smart cities with elements of environmental security, close cooperation between all levels (public-private partnership with citizens) is necessary. The emergence of smart cities in the territory of the former Eastern Donbass, in our opinion, will strengthen the position of the Rostov region in sustainable development by creating comfortable living conditions and the welfare of the population with the transition to an innovative trajectory to create a portrait of a smart citizen. The above conditions will strengthen the positions of citizens in their cities and help them realize their potential in the future.

It is proposed to adjust programs for the development of problem areas with an emphasis on the transition of existence in smart eco-cities. The urbanization process is designed to help residents by minimizing the outflow from unfavorable living conditions.

Thus, residents are the key to the life of the territories. The developed Projects of the program for the development of a "smart eco-city" must include goals and objectives to ensure maximum transparency and accessibility of conditions for citizens, as a citizen is obliged to know and adhere to the norms and rules of behavior to ensure environmental culture.

In order to promptly revitalize the Russian green economy, the following steps are essential:

- Boost investments in the digital transformation of smart cities.
- Implement digital technologies effectively.
- Identify and address problematic areas.
- Strategically prepare for the transition of challenged territories into promising ones.
- Offer practical recommendations for harnessing resource potential for innovative development.

These outlined proposals and actions, in our assessment, are poised to enhance the ecosystem and collectively reduce emissions by 10-15%.

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