

## Article

# Regional Tourism Ecosystem as a Tool for Sustainable Development during the Economic Crisis

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**Abstract:** The paper aims to examine the perspective on the development of regional tourism ecosystems as one of the pillars of sustainable development in Russian regions. In order to meet the research objective, we combined a variety of methods: the Delphi method to analyse expert views and carry out the process of weighting indicators, mathematical and statistical processing of the evaluation results to obtain a comprehensive estimate of tourism development in Russian regions. We moved through four stages, namely: studying the local ecosystems and natural resources; examination of historical and cultural resources; studying the socioeconomic resources in the regions; evaluating the skills and competencies of regional tourist office staff. Using complex sustainability indicators, we attempted to ascertain, on the one hand, how the current state of the tourism industry in Russian regions affects the overall sustainability of regional development. As a result, we presented rankings of the Russian regions depending on their complex sustainability indicators. On the other hand, we attempted to confirm that the availability, implementation, and establishment of novel approaches determine the future possibilities for the growth and strengthening of regional tourism sustainability. We found that there is a need for pervasive integration of innovations into conventional management approaches, including digital instruments supporting successful regional tourism ecosystem development. Finally, we proposed a model of such an ecosystem as a component of an innovative hypercluster.



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## 1. Introduction

In recent years, the tourism and hospitality industry experienced the most severe crisis in its history. The destructive impact caused by COVID-19 led to important shifts in market structure and to business model transformation [1–3]. However, current events, which have altered everyday life not only in Russia but worldwide, have created considerable postponed demand for tourism and hospitality services. Subsequent to the restrictions imposed by COVID-19, the tourism and hospitality sector in Russia encountered significant challenges that hindered its proper functioning. As COVID-19 restrictions were loosened at the beginning of 2022, researchers and industry practitioners were optimistic about a prosperous revival of the tourism business. However, Russia's launch of a special military operation has resulted in new and more challenging obstacles for the Russian tourism and hospitality sector, this time severely impacted by sanctions introduced in 2022–2023. For instance, the EU and US imposed sanctions that blocked Russians from visiting most European countries using air transport. Later, in autumn 2022, additional constraints were placed on obtaining a Schengen visa. As a result, the previously popular Spanish resorts, as well as European sightseeing tours and vacations to Northern Europe, turned out to

be unattainable for Russian travellers. Not surprisingly, Turkey became the most popular destination for Russian holidaymakers in 2022–2023.

In addition, travel and lodging expenses in available foreign destinations skyrocketed. Many tourists began to complain about the imbalanced price–quality ratio. Moreover, an emphasis on outbound and international travel became impossible in 2022–2023 due to currency rate volatility and sanctions imposed on Russian bank transfers.

The aforementioned factors have caused a shift in tourists' demand towards domestic travel. In 2021, domestic tourist flow returned by almost 90% to the pre-COVID level of 2019 and amounted to 56.5 million people, employment in the tourism sector reached 2.3 million jobs [3]. This trend became much more noticeable in 2022–2023. It is also worth noting that Russian tourists, now more sophisticated after visiting foreign destinations, place certain demands on the standard of accommodation and travel services in the country. To cope with the lack of the needed amount of high-quality services, Russian authorities ultimately approved and started the National Project "Tourism and Hospitality Industry" [4]. The proposed law "On the Federal Budget for 2022 and for the planning period of 2023 and 2024" has an explanatory note that 168 billion rubles would be allocated by the federal budget for this National Project in 2022–2024 [5]. A grant competition was held for small- and medium-sized regional businesses and entrepreneurs in the tourist industry as part of the National Project's implementation. As many as 476 projects were funded, totalling 1.2 billion rubles. The tourist cashback program introduced in 2022 has effectively served over 4 million tourists after two years of operation.

In other words, there are positive steps boosting tourism and hospitality sector development in Russia. At the same time, the consequences of the pandemic, aggravated by economic sanctions, continue to affect negatively the Russian tourism industry. One can admit that there is a need in further transformation leading to substantial improvement in all sub-sectors.

In this paper, the authors claim that the active integration of cutting-edge technology to promote sustainable development in Russian regions and to develop digital and regional tourism ecosystems might be an appropriate solution, a way to overcome the current difficulties.

The following research hypothesis was put forward by the authors: a number of factors affect the sustainable development of tourism in Russian regions and, by extension, the sustainability of regional economic development. These factors include the level of tourism potential and infrastructure development, public–private partnerships, and the unique ways in which tourists perceive their opportunities for safe and comfortable recreation. In the process of research, the authors identified, analysed, and evaluated a wide range of factors, including sociocultural, political, and economic ones. The degree to which a particular factor manifests itself will make it possible to either confirm or refute the stated hypothesis regarding the impact of those factors on the region's economic sustainability. It may be argued that the extensive advancement and use of digital ecosystems in regional tourism constitutes a favourable influence factor. Although understudied in the research literature, this issue is highly pertinent both theoretically and practically. We believe that, in practice, tourism ecosystems are developing much faster than they do in theory. We will elaborate on the methodology of the issue in the following section. Digital ecosystems are undoubtedly an example of innovative economic development, but their widespread use also helps improve the interaction between service providers and consumers of tourism and leisure activities, thus increasing the standard for quality and engagement in the service delivery process and thereby addressing some of the challenges of strengthening sustainable development. We believe that the research findings will contribute to the advancement of the theory and practice of the new institutional economy, as well as the theory of innovation and digital economy.

Let us first clarify the terminology. In the literature, there are different meanings of the term "development", most often the following meanings are emphasised: (1) development as structural transformation, (2) human development, (3) development of democracy and

governance, and (4) development as environmental sustainability [6,7]. In this paper, the Brundtland Report (1987) understanding of sustainable development is accepted, namely “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” [8]. This approach is perceived as improving the quality of life of contemporary and future generations, including ecological, cultural, political, institutional, social, and economic components [9,10]. Therefore, all the above meanings are applicable in this case. A controlled structural change of the state, economy, and society is essential to bringing about the shift to sustainable development and thereby increasing the level of overall development.

In 2012, at the UN Conference on Sustainable Development “Rio + 20”, the heads of states formally adopted the “10-Year Framework of the Programme on Sustainable Consumption and Production Patterns”. This Programme aims to establish a worldwide framework that facilitates the coordination of efforts to enhance international collaboration towards the swift implementation of sustainable consumption and production practices in both developed and developing nations [11]. The United Nations Environment Programme (UNEP) has acknowledged tourism as a crucial component of its sustainable development plan. The International Year of Sustainable Tourism for Development was established in 2017 at an important moment in the global community’s development of Sustainable Development Goals (SDGs) and adoption of the 2030 Development Agenda. Sustainable development goals include tourism among other objectives. (SDG-8) Promoting sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all; (SDG 12) ensuring sustainable consumption and production patterns; and (SDG 14) conservation and sustainable use of the oceans, seas, and marine resources for sustainable development [11].

To meet these goals is crucial but not that easy, especially for developing economies [12]. Therefore, the Russian tourism and hospitality sector has to undergo a structural reform in order to foster innovation and entrepreneurship in this sector and to guarantee that domestic tourism expands rapidly based on its own natural and cultural potential, with no harm for nature.

It is worth mentioning that the nation’s economic status, social condition of its citizens, national laws, as well as international and intergovernmental agreements all have an impact on the introduction of innovations in the tourism industry. As a result, each nation has unique drivers and causes behind the development of new tourism-related inventions [13]. However, every nation has a number of defining characteristics, including the population’s growing desire to learn about and become familiar with the lifestyles of other places; the increasing popularity of many traditional and standard travel destinations; growing competition; the rise of standardised global product offerings; and a well-balanced mix of leisure activities and travel facilities to fully satisfy the needs of the most demanding tourists [14].

Digital ecosystems represent a vivid illustration of innovation. In our work, we are trying to discuss the establishment of the regional tourist ecosystem within the framework of sustainable development; thus, it is important to refer to the concept of “ecosystems”. The definition of an ecosystem originally comes from biology. The English botanist, Sir Arthur Tansley, defined an ecosystem as a biological community of organisms that interact with each other and their environment. To thrive, these organisms compete and cooperate, evolve together, and adapt to external threats [15]. This idea was adopted by business strategist James Moore in the early 1990s, when he proposed understanding a business entity as an element of a business ecosystem comprising several interacting parties from different entities rather than as a standalone entity. Moore claimed that the business ecosystem is gradually moving from a random set of elements to a more structured community, like its biological analogy [16].

Ecosystems can be defined as dynamic, constantly evolving networks that produce new value through competition and cooperation [17]. In contemporary tourism literature, the issues of ecosystems are often discussed in connection with the Smart Tourist Desti-

nation methodology structured around the pillars supporting smart tourist destination development: governance, innovation, technology, sustainability, and accessibility. Its effective implementation relies on the close coordination of all the areas and all the public and private agents that directly or indirectly make tourist activity possible within a particular territory [18].

Since tourism is an industry with a high multiplier effect, the development of tourist complexes in many Russian regions is crucial to their long-term and sustainable growth. This is because both positive and negative outcomes of this industry's development are simultaneously "scaled" to the entire economy. Second, the tourist destinations themselves are still developing, and new factors in their evolution are constantly emerging. One such example is the recently started process of turning nature reserves into national parks, which will have an impact on the environment, finances, taxes, marketing, investment, and other areas. Thirdly, the establishment of regional tourism ecosystems will enable the integration of contemporary technological advancements with the state's regulatory role in overseeing the growth of domestic tourism in Russia. This is especially crucial given the current state of crisis in the Russian tourism and hospitality industry as a consequence of the COVID-19 pandemic and sanctions.

## 2. Sustainable Tourism and Digital Ecosystem Concepts

### 2.1. Methodology of a Concept for Sustainable Tourism Development

In 2005, the UNWTO highlighted the following main goals of sustainable tourism:

- (1) economic viability, defined as a guarantee of the sustainability and competitiveness of tourism destinations and businesses so that they can maintain their wealth and guarantee their long-term benefits;
- (2) local prosperity, which means maximising the contribution of tourism to the prosperity of destinations, including maintaining the proper balance of the tourist load in the region;
- (3) quality of employment, understood as an increase in the number of local tourism-related job offers, including the level of wages, conditions of service, and accessibility, without favouring any group over another regardless of their gender, race, physical disabilities, or other factors;
- (4) affordable tourism, which means providing safe and comfortable travel experience to all visitors regardless of gender, race, or physical disabilities [19].

Cernat and Gordon (2012) [20] examine the components of sustainable tourism development: (1) tourism potential of the region; (2) links within economy (networks, clusters); (3) role of tourism in the local economy; (4) development sustainability; (5) tourism infrastructure; (6) attractiveness. Benavides (2001) [21] conducts research on sustainable tourism development in developing countries. Standards for sustainable tourism development in WTO member states are evaluated by Font and Bendell (2018) [22]. Miller (2019) [23] developed indicators for assessing sustainable tourism. Robert, Parri, and Leiserowitz (2005) [24] identified the main goals, indicators, and principles of sustainable development. Jeffrey (2015) [25] identified the main approaches to understanding the concept of sustainable development. Du Pisani (2006) [26] examined the historical prerequisites of the sustainable development concept. The works of Parvis, Mao, Robinson (2019) [27]; Mensah (2019) [28]; Clark and Harley (2020) [29] systematise contemporary scientific methods for the examination of sustainable development.

The Chinese monitoring centre "Observatory of Sustainable Development" is actively engaged in research. The research projects carried out by international experts in the field of strategic tourism development programmes are equally important. For example, Australia's Sustainable Tourism Cooperative Research Centre (STCRC) analysed 76 national and regional strategies and identified conditions necessary to establish the strategy for sustainable tourism development [30]. Many leading European countries are developing their own tourism development programmes, focusing on the concept of sustainable development. The research conducted by the International Network of Research Centres of

Sustainable Tourism (14 units) under the World Tourism Organization is very important and interesting. Since the 1990s, the UNWTO has been among the leaders in the development and application of sustainability indicators in the tourism sector [11]. The organisation operates in close cooperation with the European System of Tourism Indicators and the Global Council for Sustainable Tourism. The primary research areas are: ways to guarantee tourist safety and predict the hazards associated with travelling abroad; ways to guarantee tourist health and handle tourism emergencies at the national level; ways to guarantee environmental preservation when utilising a region's tourism potential; and ways to ensure the sustainable development of tourist destinations in 2023. The investigation of the challenges associated with promoting sustainable development in the tourism industry follows the main directions defined below:

- assuring consistent revenue in the tourism sphere in general and each individual tourism-related business in particular (Phillips., Faulkner, Ashley, De Brine (2022)) [31];
- ensuring employment of the population in the tourism sector, which means ensuring a reliable level of social development (Malatest, MacFeely (2014)) [32];
- institutional level of ensuring sustainable development in the tourism sector, which implies the development of a regulatory framework, control over the expenditures, mainly over the state funds designated for infrastructure projects in this area, and combating bribery and corruption (Gallego, Rosselló-Nadal, Fourie, Tarlow (2022)) [33];
- ensuring innovative development and the inflow of investments into the industry (Nordin, Novella et al., (2006)) [34].

Kuščer et al. (2017) have developed innovative models of tourism for Austria, Slovenia, and Switzerland. They provide a three-dimensional model of Mountain Destination innovation (MDIM) within the framework of the growing popularity of mountain tourism and claim that the level of innovation in sociocultural, natural, political, legal, and technological spheres determines tourism development in general [35]. Among Russian researchers, Rassokhina and her co-authors A.I. Seselkin, K.A. Lebedev, V.G. Gulyaev (2019) [36] revealed that, in contrast to the Krasnodar Region, the Republic of Tatarstan, and the Tyumen Region, Moscow and St. Petersburg were found to be tourist destinations with negative trends. While Moscow and St. Petersburg made considerable improvements during the COVID-19 pandemic, the Republic of Tatarstan and Krasnodar Region still remained among the leaders, along with newly emerged Crimea and Altai. Rassokhina (2021) [37] suggests taking the amount of tourism services provided to the population (in terms of per capita) as the main indicator of tourism sector sustainability. Mischenko et al. (2021) [38] studied the potential of the Altai Region. The research findings revealed the requirements that, if met, should enable the region to experience sustainable tourism development. These requirements involve enhancing the importance and quality of the regional transportation network, developing the Altai Region brand, segmenting the local tourist market, digitalising the sector, using SSM to promote local resorts.

Efremova and Chkalova (2021) [39] assert that the introduction of digital innovations in marketing and promotion of their goods and services is a necessary precondition for the development of sustainable small- and medium-sized businesses. Pashenko (2021) [40] outlines the issues that prevent the Sochi tourism sector from successful development and reduces its ability to become sustainable. These issues include lack of available accommodations in the hotel sector, staffing shortage in hotels and catering facilities, significant increase in the number of people and traffic on the streets, excessive numbers of tourists in beach areas, and the problem of subtropical park restoration. The author sees a possible solution to the problems in the construction of campsites and glamping spots.

## 2.2. Methodology of Digital Ecosystem Concept Development

In the materials of the European Initiative for the Development of Digital Business Ecosystems in the European Union, a digital ecosystem is defined as a combination of a business ecosystem and digital platforms, serving as a type of representation of a business ecosystem in a digital environment. In addition to creating and offering customers cutting-

edge goods and services, the digital ecosystem serves as a digital marketplace that reduces the costs associated with performing business transactions and is beneficial for all parties involved [41]. Kapoor (2018) [42] interprets an ecosystem as a set of economic entities that jointly create new consumer value for a wide range of customers and distinguishes between two kinds of ecosystems: the first develops around a key good or service, and the second, or platform-type ecosystem, forms around digital platforms. The digital ecosystem, according to Subramaniam et al. (2019) [43], is a way to integrate both a customer and a seller ecosystems via the use of communication technologies and a common digital ecosystem. According to Helfat and Raubitschek (2018) [44], digital platforms for multilateral interactions between the major stakeholders—suppliers, customers, governments, and public institutions—form the foundation of digital ecosystems. Kopalle Praveen et al. (2020) [45] underline the role of network effects brought about by the rise of interactive information and communication technologies.

Jacobides et al. (2018) [46] distinguish three generalised approaches to the definition of the category “ecosystem” in modern economic conditions:

- business ecosystems that are built around a single company and its business environment, which represents a network of interconnected economic players (both humans and legal organisations) that influence the key company’s operations directly or indirectly;
- ecosystems that are established around a key innovative technology or innovative product, as well as the production of complementary goods, works, and services;
- digital ecosystems, which are built on digital platforms and combine the primary business with several related businesses that provide related goods and services, are valued more by customers due to their digital interactions. Related businesses that operate within the framework of digital ecosystems have the chance to produce better innovations through network interactions and joint projects [47]. According to Chang and West (2006) [48], business ecosystems in the digital environment and biological ecosystems in the natural environment feature common characteristics. The authors claim that full-fledged digital ecosystems are characterised by such features as: connectivity and interaction of ecosystem participants; self-regulation in order to maintain internal balance; complex structure of interactions; and clustering of participants.

Based on the current provisions of ecosystem theory presented in Ondrus et al. (2015) [49], Teece (2018) [50], Jacobides and Lianos (2021) [51], we have identified the main attribute features of digital platforms and ecosystems (Table 1).

**Table 1.** Attribute features of digital platforms and ecosystems.

Form of Digital Economic Interaction	Nature of Economic Interactions	Key Economic Effects	Nature of Competition
Interaction on the Internet	Combination of market competition and cooperation of economic entities	Effects of scale and diversification	Market (monopolistic) competition of individual entities
Transactional digital platform	Multilateral interaction of economic entities on the platform	Indirect external effects	Competition between digital platforms
Production digital platform	Multilateral interaction of economic entities on the platform	Cross-network effects	Competition within the platform between the participants, between digital platforms
Digital ecosystem	Multi-object and omnichannel interaction environment integrating digital platforms and cluster participants	Cross network effects, diversity effects, feedback effects	Competition within an ecosystem, between ecosystems, between clusters integrated within an ecosystem

Notes: Compiled by D.L. Napolskikh.

There is currently a fast growing amount of academic literature examining the ecosystems of local tourism and smart tourism issues in developed economies [52–56] but surprisingly few papers examine these issues applied to the developing economies. For Russia, Pankeeva and Abalkov (2017) [57] studied the ecosystem approach to tourism development on Lake Baikal and have shown how to identify the most important ecosystem services through a landscape-interpretive approach by utilising the Sarma research training site as an example. Morozov and Morozova (2020) [58], based on the overview of research evolution on environmental issues in international and Russian studies, highlighted that public–private partnerships are the most effective way to establish digital ecosystems in tourism industry. Thus, it can be stated that Russian experts researching the subject of regional tourism pinpoint the primary problems and ascertain opportunities for future development. Strengthening governmental control over the operation of infrastructure facilities, digitalising the industry, branding areas, enhancing the quality of staff and infrastructure, and providing support to small- and medium-sized businesses in this sector are some of these opportunities. It is therefore established that systemic changes must be introduced in order for the tourist industry to function at the regional level.

### 3. Research Results

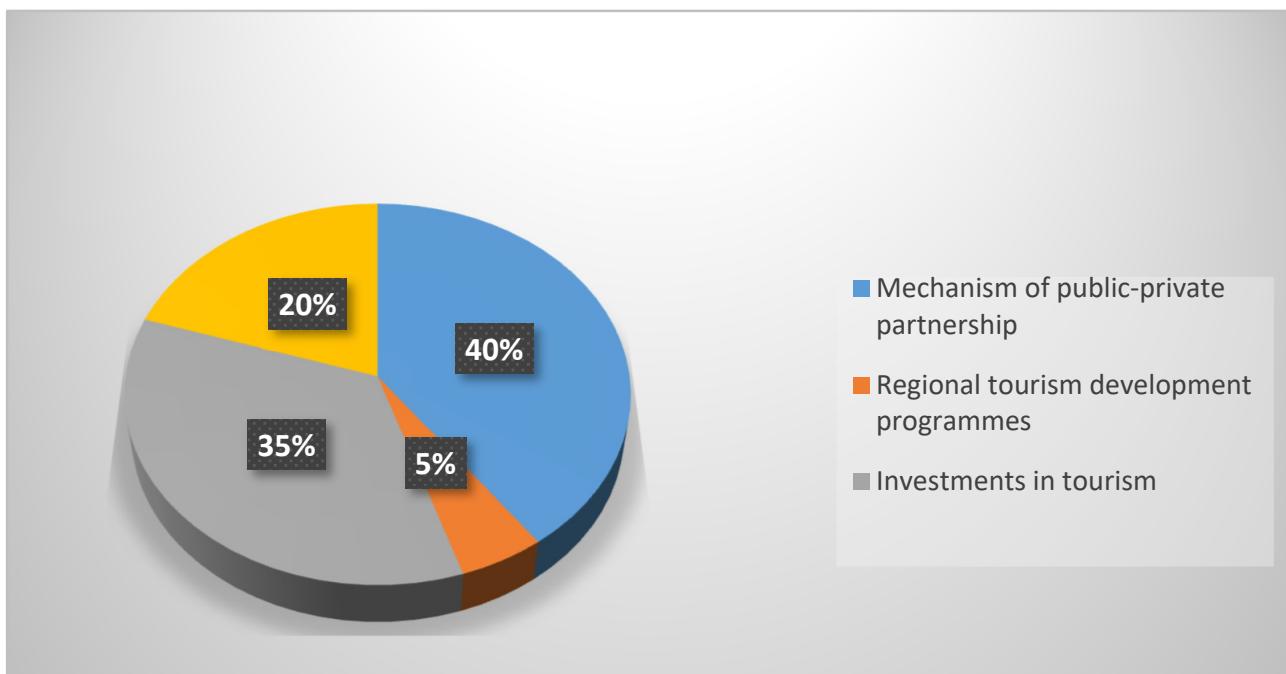
#### 3.1. Analysis of the Sustainable Development Level in Russian Regions

It should be mentioned that our research is focused on the examination of the current state of regional tourism (in the context of the crisis) and the development of digital ecosystems. It comprises several stages and employs a variety of methods. First, we attempted to ascertain the degree of sustainability of regional tourism at the time of the crisis caused by the COVID-19 pandemic and the imposed sanctions. Then followed an indexation of how regional tourist ecosystems are developed. This research, comprising a few sub-stages, is currently an on-going process; therefore, only interim data are currently available. Let us define the research methods used in this study. The paper employs a variety of specific methods to obtain the research result. Analysing expert views using the Delphi method is a common way to carry out the process of weighting indicators. This method is applied when conducting quantitative analyses of how tourism and recreational resources are implemented as well as the sustainability of regional development. In order to develop evaluation classifications consisting of a set of indicators, a merging procedure should be applied for the purpose of transferring from a set of initial indicators to a single one. This single indicator usually ranges from the “poor” condition at the smallest value to the “excellent” condition at the greatest value. Integral estimates for various categories that are acquired in specific units allow for further procedures to be carried out to obtain more complicated indicators. In order to develop a comprehensive indicator of sustainable development in the regions, the aggregate evaluations of natural, cultural, and historical potentials, as well as the socioeconomic situation, should be considered.

It is feasible to turn to an expert survey (top tour operators) in situations where it is objectively difficult to gather statistical data when analysing the current state of tourism, in addition to an optimised set of statistical indicators. Rankings, which are a holistic evaluation of a set of indicators and criteria, are being employed to analyse spatial differentiation in regional tourism development. The degree of sector development in the regions of Russia may be comprehensively evaluated by correlating the evaluation findings, which have undergone mathematical and statistical processing, with expert surveys. In rankings, mathematical and statistical processing of the evaluation results can be correlated with expert surveys in order to obtain a comprehensive estimate of tourism development in the regions of the Russian Federation. Indicators of the environmental index of the Russian Federation are specified in Appendix A. The key stages, research methods, and outcomes are outlined and explained below. First stage: studying the local ecosystems and natural resources; second stage: examination of historical and cultural resources; third stage: studying the socioeconomic resources in the regions; fourth stage: evaluating the skills and competencies of regional tourist office staff.

The practice of regional tourism development attests to the key role that administrative authorities play in establishing the parameters for sustainable tourism development. The development of a technique and a ranking system for the regions based on an examination of the mechanisms of sustainable tourism development is a crucial stage in research [59]. The technique entails several successive steps:

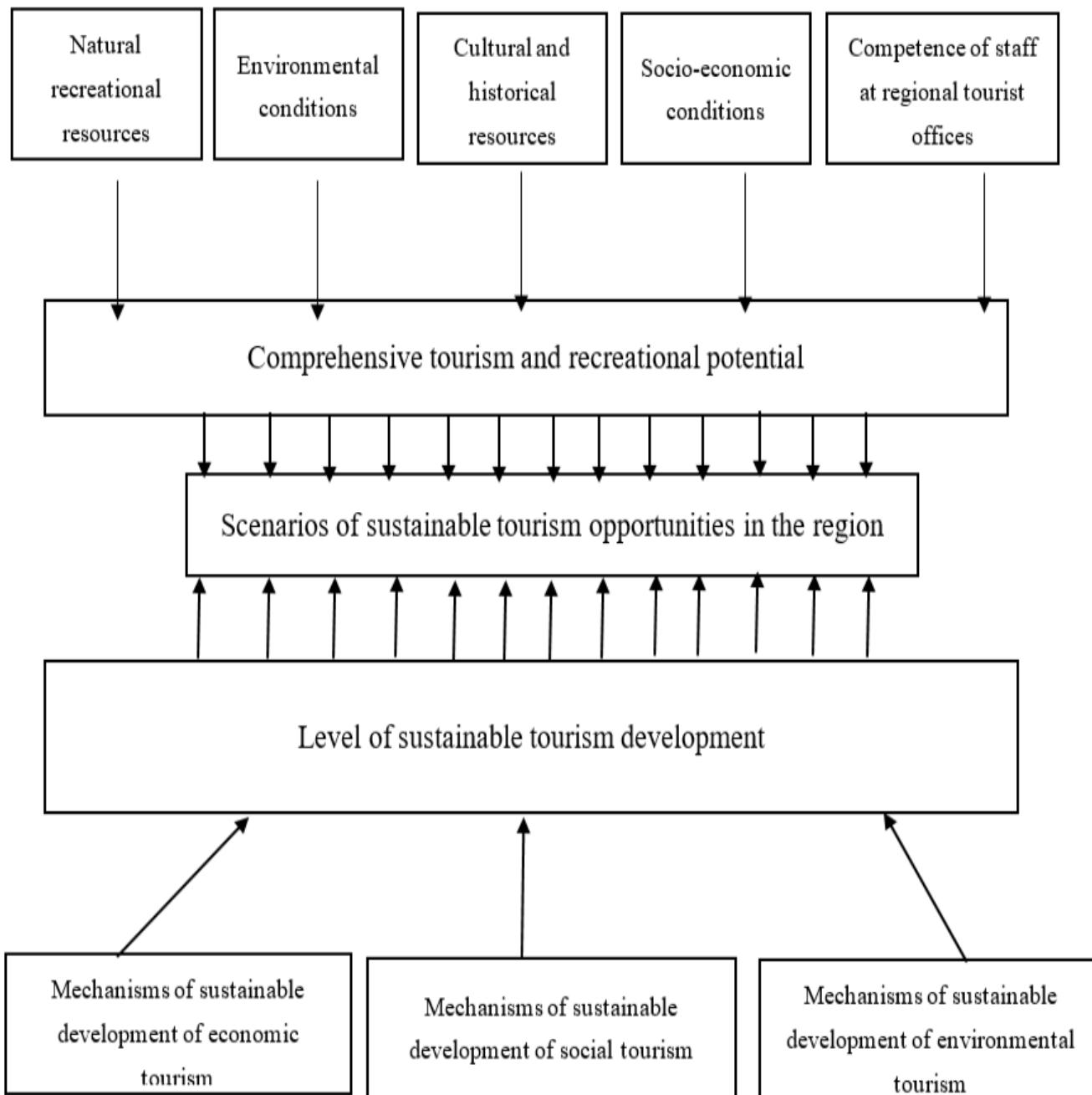
- (1) selection of mechanisms for sustainable tourism development and determination of their weight values based on independent expert evaluations using the Delphi method;
- (2) identification of quantitative and qualitative indicators describing the chosen strategies for the development of sustainable tourism in the region;
- (3) calculation of indicators characterising the mechanisms of sustainable tourism development for each region (Figure 1);
- (4) computation of integral indicators describing the development processes in regional tourism (Figure 2). The integral indicator is computed based on the previously acquired data on tourism potential in the region (Appendix A);
- (5) ranking of regions based on the values of integral indicators: the higher the value of the integral indicator, the higher the position of the region in the ranking. For an overall evaluation of the sustainable development of tourism in the regions, it is necessary not only to conduct a thorough evaluation of tourism and recreational potential while taking into account the level of expertise of regional tourist offices, but also to establish the level of sustainable tourism development based on the analysis of the identified mechanisms and presented in the form of a ranking. A matrix analysis is suggested as a basis for such an evaluation, allowing comparison of the diverse tourist and recreational potential and ranking of regions according to the degree of sustainable tourism development.



**Figure 1.** Economic type of mechanisms for sustainable tourism development.

Based on the research results, it was possible to classify indicators as specified below. In the course of research, the mechanisms for the sustainable development of regional tourism were identified. In accordance with international experience, these mechanisms have been classified into three categories: economic, social, and environmental. Each mechanism referred to as a certain type was assigned a particular weight. All weights of a mechanism together equalled 100%. Each type, in turn, received a specific weight, and the totality of all three types equalled 100% (Table 1). Depending on how important

they are for long-term tourism development, each was given the following particular weights in percent: 40%, 5%, 20%, 25%, and 10%. The aforementioned percentages were acquired through an examination of key economic mechanisms within the studied regions. These mechanisms encompass public–private partnerships, tourism investments, staffing in tourism businesses, and others. The obtained data are presented in Table 2.



**Figure 2.** Interrelation between the integrated tourism and recreational potential and the level of sustainable tourism development in order to project scenarios for sustainable tourism development in the region.

Next, we ranked the regions by the level of their sustainable development. As the scope of the paper cannot accommodate all the steps of this research, we will focus on the most important, thus providing details of the research procedure.

**Table 2.** Characteristics of mechanisms for sustainable tourism development.

No	Type	Weight of a Type of a Mechanism, %	Mechanism	Weight of a Mechanism
1.1	Economic	50	Mechanism of public–private partnership	40%
1.2			Regional tourism development programmes	5%
1.3			Preferences for small, medium, and large businesses	20%
1.4			Investment in tourism	25%
1.5			Marketing of tourism (event calendar, tourist and information centres, participation in national and international exhibitions)	10%
2.1	Social	30	Mechanism of providing access to tourist services in the region	20%
2.2			Staffing of the tourism industry	20%
2.3			Security mechanism	20%
2.4			Mechanism of tourist accommodation	20%
2.5			Mechanism of involving local population to work for tourism and recreation sector	20%
3.1	Environmental	20	Determination and rationing of permissible anthropogenic impact	20%
3.2			Mechanism of ensuring environmental quality by establishing of a system of protected areas	20%
3.3			Environmental regulation mechanism (Environmental Index)	20%
3.4			Mechanism of industrial and environmental regulation (Industrial and Environmental Index)	20%
3.5			Mechanism of socio-ecological regulation (Socio-Ecological index)	20%

In order to determine the level of sustainable tourism development in various regions of Russia, a ranking system was established based on the identified mechanisms. The techniques relied on the primary mechanisms of sustainable tourism development, taking into account their weight and importance. Each of the identified mechanisms was characterised by quantitative or qualitative markers. The following criteria were used to evaluate them under the economic category: availability of public–private partnerships; regional tourism development programmes and their duration; amount of funding in relation to regional budgets; access to preferential taxes and subsidies for tourism development; and the amount of investments in the tourism sector as compared with total investments. For each region, integral indicators that describe the region's level of sustainable tourism development were determined. The total of all the mechanisms within each type equalled 100%, as was the total of all the weight coefficients for all three types. The integral indicator was calculated based on the data obtained at the previous stage, using the following formula:

$$I = SK1 \cdot \sum_{n=1}^{N1} O_{1n} \cdot K_{1n} + SK2 \cdot \sum_{n=2}^{N2} O_{2n} \cdot K_{2n} + SK3 \cdot \sum_{n=3}^{N3} O_{3n} \cdot K_{3n} \quad (1)$$

I—integral indicator of sustainable tourism development in the region;  $O_{1n}$ —average assessment of economic mechanisms;  $K_{1n}$ —weighting coefficient of an economic mechanism;  $SK1$ —weighting coefficient of a set of economic mechanisms;  $N1$ —number of economic mechanisms;  $O_{2n}$ —average assessment of social mechanisms;  $K_{2n}$ —weighting coefficient of a social mechanism;  $SK2$ —weighting coefficient of a set of social mechanisms;  $N2$ —number of social mechanisms;  $O_{3n}$ —average assessment of environmental mechanisms;  $K_{3n}$ —weighting coefficient of an environmental mechanism;  $SK3$ —weighting coefficient of a set of environmental mechanisms;  $N3$ —number of environmental mechanisms.

As a result of research the following classification has been made. The first group with a *high level of sustainable tourism development* included four regions of Russia: Krasnodar and Altai Territories, the Republic of Buryatia, and Yaroslavl region.

The second group with a *relatively high level of sustainable tourism development* included 39 regions: Moscow, St. Petersburg, the Republic of Tatarstan, Kaluga region, Kamchatka, and other regions that are scattered over the country's territory and have effectively implemented sustainable tourism development strategies.

The third group with an *average level of sustainable tourism development* included 33 regions of the country: from the Pskov region in the west to the Magadan region in the east. The fourth group of regions with a *low level of sustainable tourism development* included 7 regions (Krasnoyarsk Territory, Chelyabinsk, Kirov Regions, Komi Republic, Nenets and Chukotka Autonomous Districts, Jewish Autonomous District) (Figure 3).

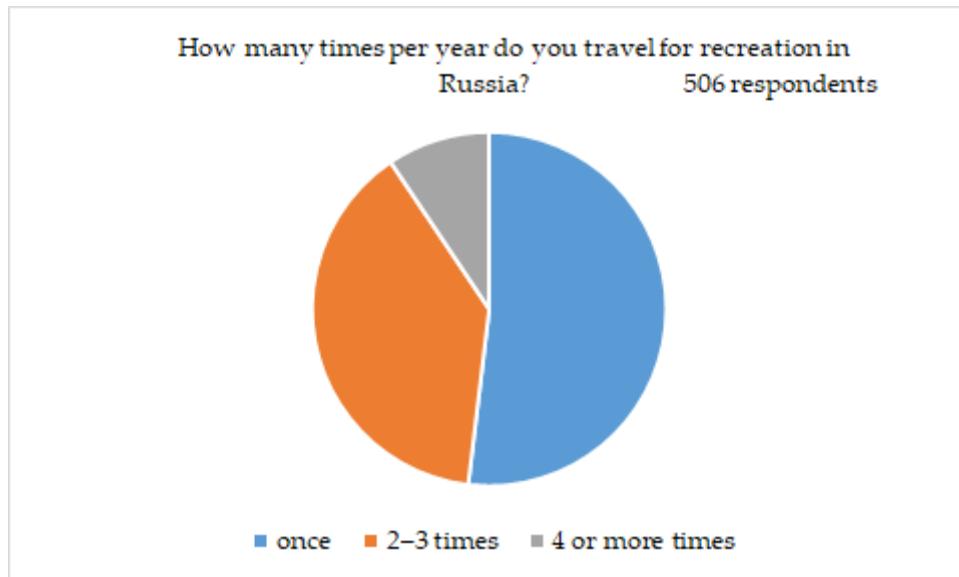


**Figure 3.** Sustainable tourism development in the regions of the Russian Federation.

We will provide feedback from the respondents about the prospects of domestic tourism development in the regions of Russia.

### 3.2. Prospects of Tourism Development in Russian Regions

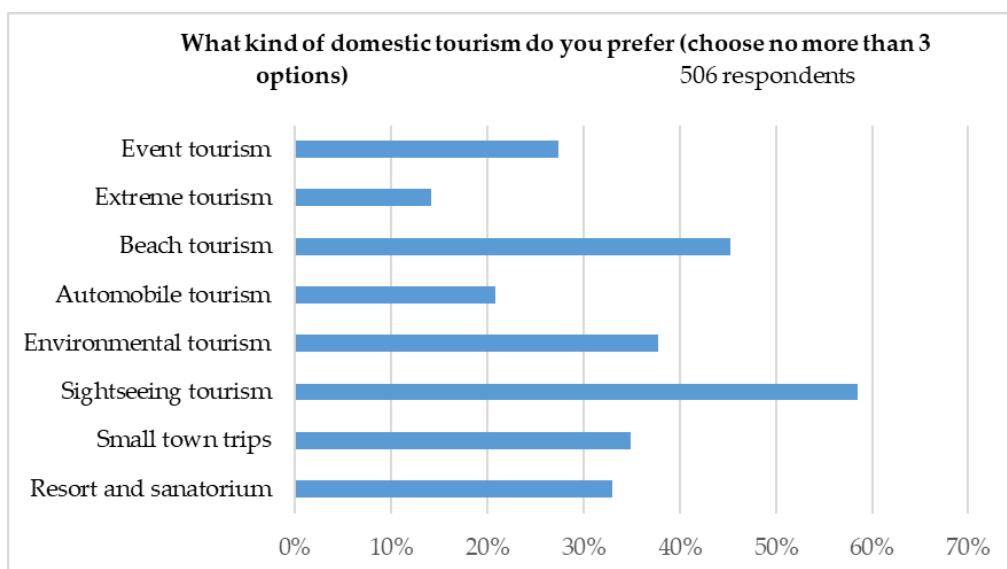
In the first half of 2023, the Department of Service and Tourism of Volga State University of Technology conducted a survey on the prospects of tourism development in the regions of Russia among tourists, tourism experts, and researchers. More than 70 theorists and practitioners in the sphere of tourism from all over Russia were surveyed for their feedback. Additionally, via Google Forms over 500 people from different regions of Russia, of different ages, marital and financial statuses were asked the same 26 questions. Figure 4 shows the distribution of responses of respondents (tourists) on the number of trips to the regions of Russia for recreation. It turned out that more than half of tourists travelled within Russia once a year, 39% 2–3 times a year, and only about 10% travelled for recreation four or more times a year (Figure 4).



**Figure 4.** Frequency of recreational trips in Russia per year (compiled by the Department of Service and Tourism, Volga State University of Technology).

The respondents were also surveyed on the amount of travel expenditure per person. In accordance with the feedback provided, 42.5% of the respondents spent below 30 thousand rubles (as of 2022) and 28% of the respondents spent from 30 to 49 thousand rubles.

Regarding the type of tourism, the respondents gave preference to sightseeing, beach, and eco-tourism (Figure 5). The survey contained questions about gastronomic preferences and the development of folk crafts; 63% of the respondents emphasised that trying local cuisine was an essential component of exploring the region, while 20% of the respondents considered this component to be optional. Regarding local crafts, 77% of the respondents indicated that locally produced souvenirs are a mandatory component of the recreational trip.



**Figure 5.** Types of preferred tourism (compiled by the Department of Service and Tourism, Volga State University of Technology).

It is evidenced that the development mechanisms of regional tourism presume the establishment of an ecosystem (ecosystems) of a regional product. Almost every region has

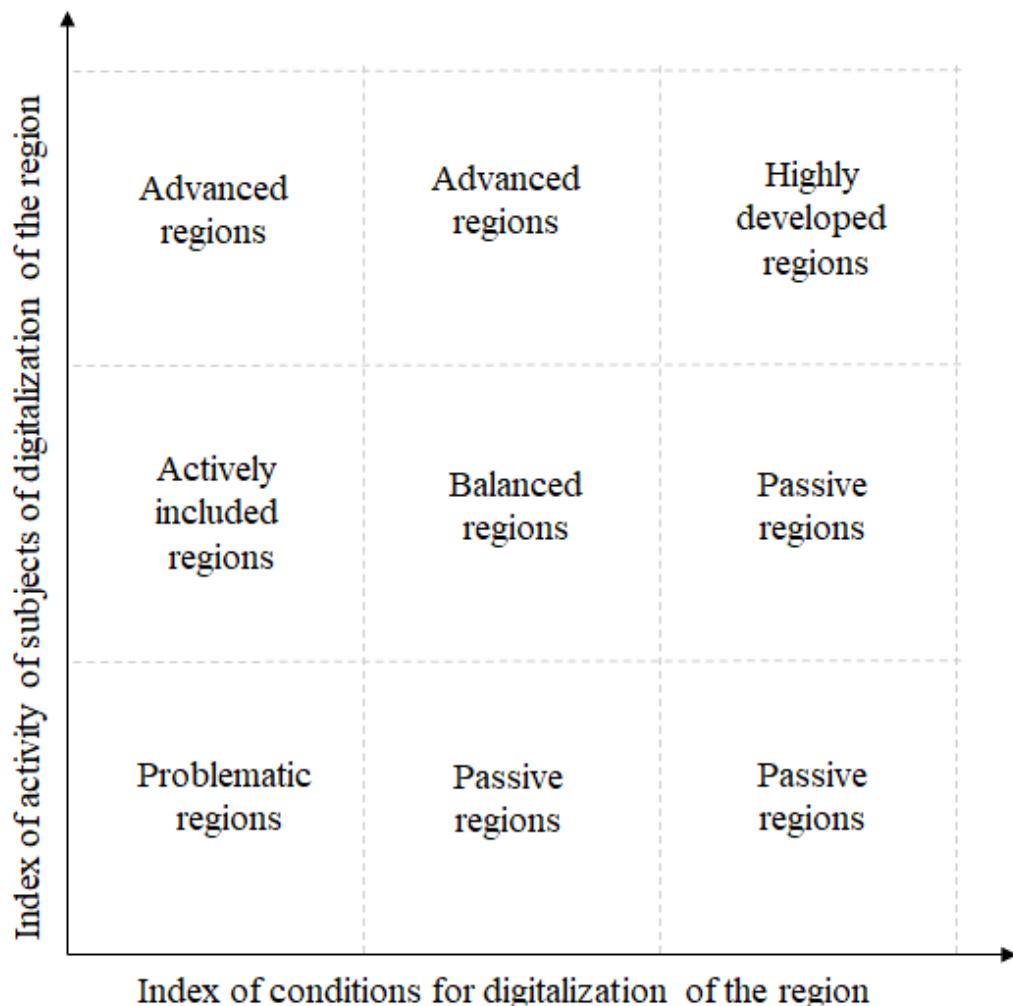
both national cuisine and folk crafts, but they are not necessarily included in the tourist product, therefore, tourists are unaware of them.

### 3.3. Research on the Development of Digital Ecosystems in Russian Regions

During the second stage of research, we analysed the development of digital ecosystems in Russian regions. For this purpose, we considered two integral indices: the Index of digitalisation conditions in the region ( $Idc$ ) and the Index of activity of digitalisation subjects in the region ( $Is$ ). These indexes were developed by the research team of the Northern (Arctic) Federal University named after M.V. Lomonosov [60].

The index of digitalisation conditions of the region includes 14 indicators characterising the level of development of digital infrastructure and digital competencies of the population; the development of science and innovation, the state of digital education, the level of urbanisation of the region, and its financial and energy resources. The index of activity of digitalisation subjects in the region includes 17 indicators identified based on the digital activity of the population, digitalisation of organisations and the government.

Based on the values of these indicators for 2023, each region was included into one of the six categories shown in the digital ecosystem matrix (Figure 6).



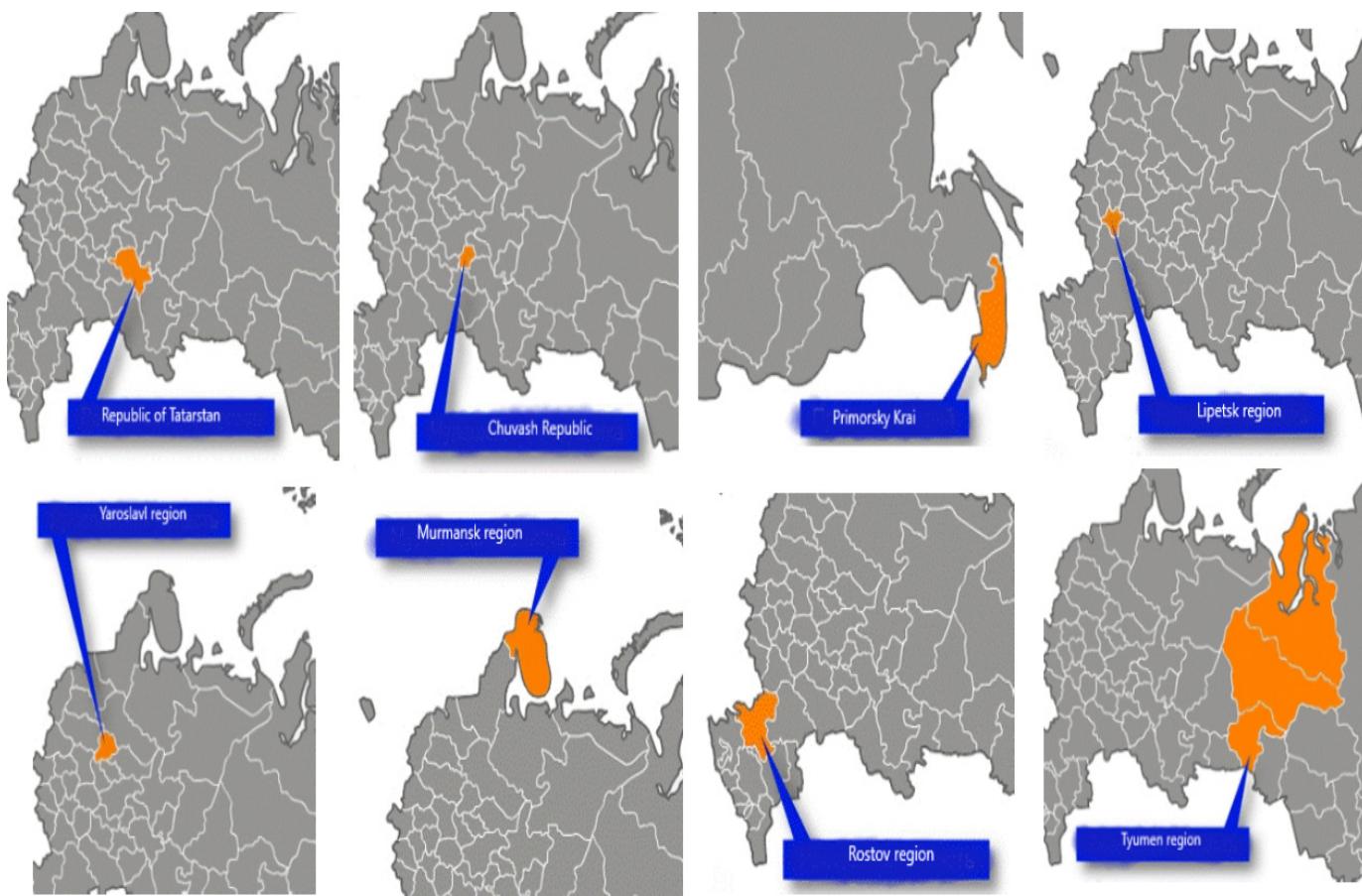
**Figure 6.** Matrix of regions depending on the level of digital ecosystems [60].

Moscow and Saint Petersburg are classified as the most developed regions in terms of digitalisation (Figure 7).



**Figure 7.** City leaders on the level of digitalisation in the Russian Federation.

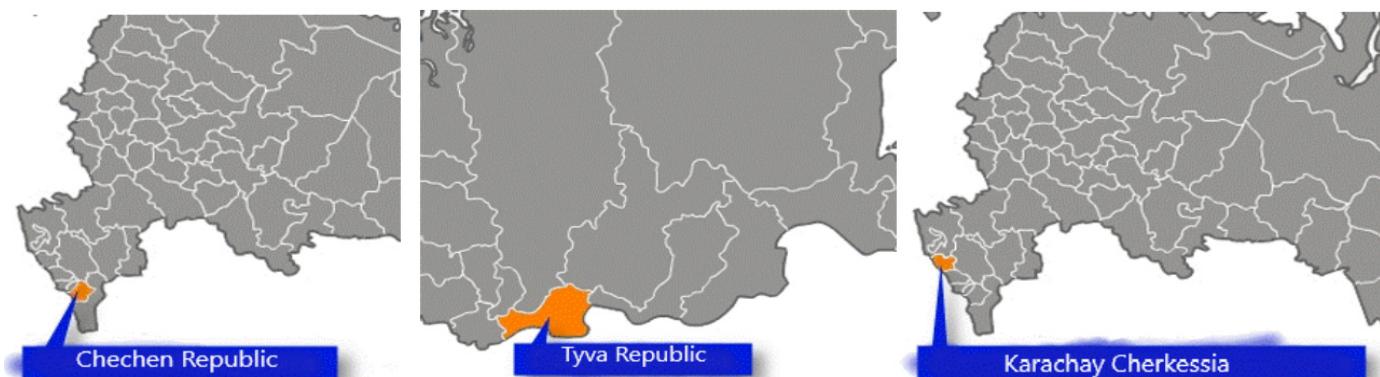
As of 2021, research shows that the following regions took the leading positions: Kaliningrad Region, Lipetsk Region, Moscow Region, Murmansk Region, Primorsky Krai, Republic of Tatarstan, Rostov Region, Tyumen Region, Khanty-Mansi Autonomous Okrug, Chuvash Republic, Yaroslavl Region (Figure 8).



**Figure 8.** Regional leaders on the level of digitalisation in the Russian Federation.

The regions with a rapidly developing digitalisation include the Altai Territory, Astrakhan Region, Belgorod Region, Volgograd Region, Vologda Region, Jewish Autonomous Region, Trans-Baikal Territory, Kabardino-Balkarian Republic, Kirov Region, Kurgan Region, Novgorod Region, Omsk Region, Orenburg Region, Orel Region, Pskov Region, Altai Republic, Republic of Buryatia, Republic of Dagestan, Republic of Ingushetia, Republic

of Kalmykia, Republic of Mari El, Tambov Region, Udmurt Republic. The regions facing difficulties in establishing digital ecosystems are the Karachay-Cherkess Republic, Chechen Republic, and Republic of Tyva. The remaining regions of Russia differ in average index values and are included in the group of balanced regions (Figure 9).



**Figure 9.** Russian regions facing challenges with the level of digitalisation.

Thus, in addition to researching the development of the tourism industry and the sustainability of the region as a whole, we are also examining how particular Russian regions develop digital ecosystems, which enables us to draw more in-depth conclusions. The research is in progress.

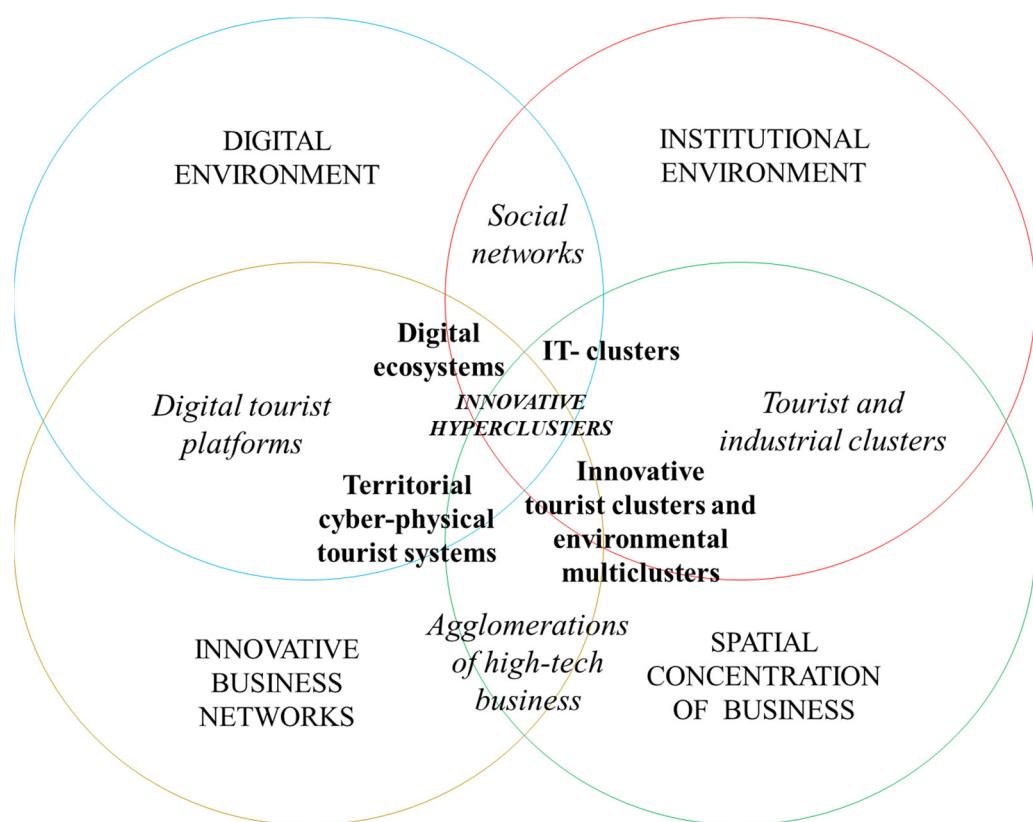
#### 4. Discussion

In sustainable development, the interests of all stakeholders are taken into consideration, provided there is a rational use of tourist resources and a comprehensive partnership aimed at restoring the physical, spiritual, and intellectual health of tourists. A vast variety of resources, including environmental resources, are used by the tourism industry. With the development of tourism, the amount of resources consumed and waste produced are also increasing. The areas used for the development of tourism infrastructure are expanding. Information catalogues include vital details on the nature, environment, culture, and daily life in numerous areas of the world. Based on this information, among other things, travellers may gain a more thorough understanding of the potential possibilities in recreational destinations. The success of environmental protection projects depends largely on the initiatives of the local government, as well as on all the companies involved in the organisation and provision of tourist services.

Local residents and the local economy should profit most from tourism-related activities in the region. The available resources should be used more carefully and rationally, taking into account the specific features of the area. The national authorities should play a leading role in tourism development, at regional, national, and international levels, acting as a regulatory force through laws and taxes. Comprehensive solutions should be found for the difficult situations and problems that travellers, locals, and authorities must deal with as tourism develops. Thus, the issue of the establishment of an ecosystem of regional tourism comes to the fore. We have developed an operational model for further discussion. We are aware that institutional impediments and innovative gaps exist between the components of the traditional “triple helix” model in certain Russian regions. These obstacles might seriously hinder the digital transformation of ecosystems [61]. Therefore, the interaction among innovative cluster participants (for example, a regional cluster of tourism and hospitality ecosystems) on digital platforms and ecosystems can be considered a solution mechanism. We have identified the following vectors of development of digital platforms and ecosystems similar to interaction models of the information society: B2B (Business-to-Business); B2C (Business-to-Consumer); B2ED (Business-to-Education); B2F (Business-to-Finance); B2G (Business-to-Government); B2N (Business-to-Non-commercial); B2SC

(Business-to-Science); CS2F (Science-to-Finance); EC2C (Education-to-Citizen); SC2ED (Science-to-Education); SC2SC (Science-to-Science).

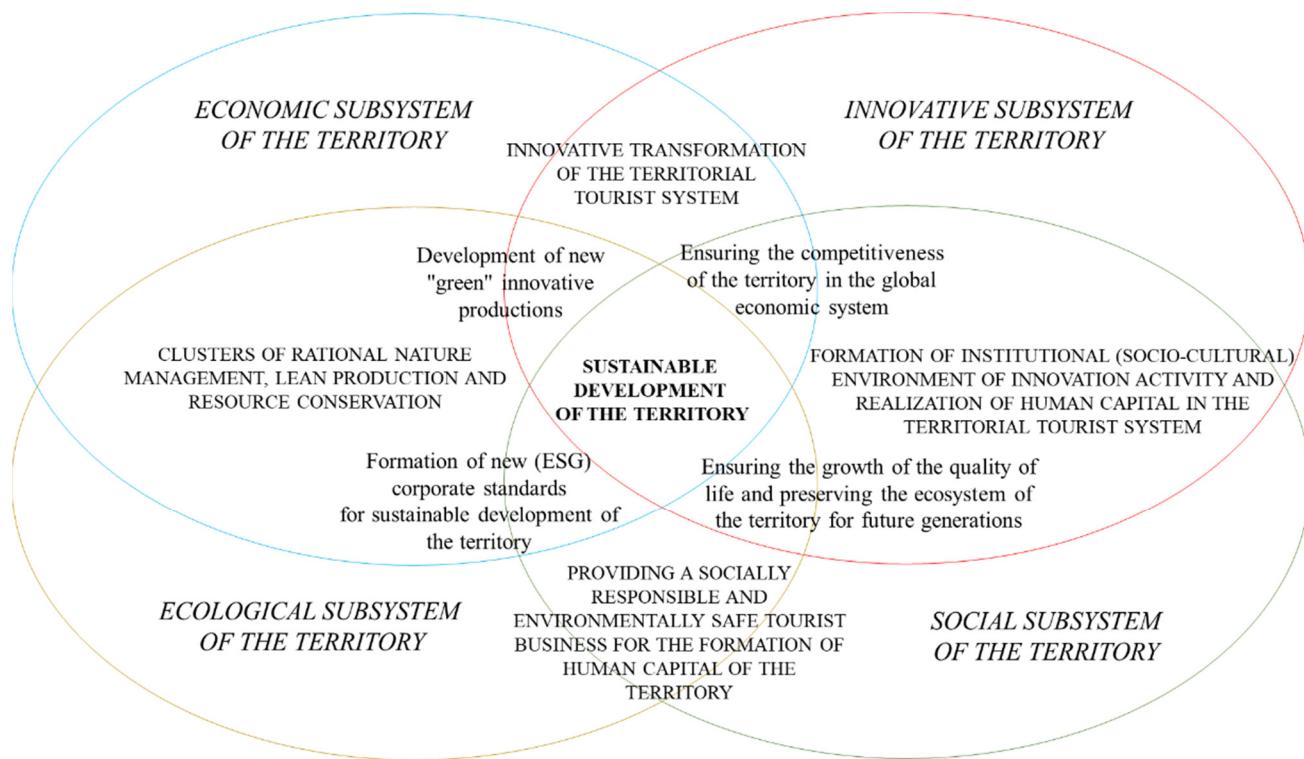
The establishment of digital platforms within the innovation cluster (regional cluster-tourism and hospitality ecosystem) significantly enhances the potential of the cluster management organisation and other cluster development institutions [62]. Digital platforms can be used to offer a range of services to cluster members (tourism subjects and objects) with the goal of reducing the transaction costs associated with innovation activities. These services can also include platforms for autonomous coordination of scientific, technical, and production projects by cluster members. Three primary generalised variables supporting the integration of the production of goods or services in the innovation clusters were identified through the generalisation of the attributive features of the innovation clusters: (1) spatial concentration of production; (2) innovative business networks; (3) institutional environment. The presence of these factors in a region underlies the formation of agglomerations of innovation clusters. The processes of digital transformation in the economy actualise the consideration of the “points of intersection” of the first three factors, with the digital environment acting as the fourth factor (Figure 10).



**Figure 10.** Correlation among different types of clusters, digital platforms, and ecosystems in the conditions of digital transformation.

That is, the model of a tourism cluster (based on digital ecosystems) is included in the model of an innovative hypercluster, which is a successive stage of the model of an innovative multicenter in the digital economy. Innovative hyperclusters (Greek. hyper-over, beyond) are a type of innovative multicenter developing on the basis of digital platforms and ecosystems, characterised by multi-industry specialisation, trans-regional nature of economic activity, and the multicore structure of network interactions among participants [63]. Based on the systematisation of modern provisions of the concept of sustainable development [27], we propose the following definition of sustainable development in relation to the economic development of territories. Sustainable economic development of the territory is a process of expanded innovative reproduction and regular positive

changes in the structure of economic links and relations, characterised by the preservation of overall competitiveness and production efficiency. In this context, the sphere of tourism and hospitality in certain Russian regions can act as a driver of the economic development of territories (Krasnodar Krai, Altai, the Golden Ring, etc.). The graphical interpretation of sustainable development of a region is presented in Figure 11.



**Figure 11.** Graphic interpretation of sustainable development of a region in the conditions of digital transformation.

An innovative hypercluster is a subject of smart specialisation and digital transformation of the economy of its basic area, while for participants located at a considerable distance from the basic area of the hypercluster, it plays the role of a point of digital transition into sustainable development, with a different institutional and innovative environment. Additionally, the suggested models allow for the inclusion of areas outside the development hubs in collaborative innovation initiatives and shared manufacturing chains. We admit that the model of hypercluster development, including ecosystems of regional tourism and hospitality, is quite debatable. Further research is required into this subject. The proposed model of an innovative hypercluster is considered as one of the possible options for adapting the cluster concept to spatial, infrastructural, institutional, digital, and other features for ensuring the sustainability of regional development. We believe that our model of regional tourism ecosystems will change the current situation in regional tourism in a positive way. The prospective scenario of opportunities for sustainable tourism development represents a prospective assessment of tourism development in the region made at certain intervals, provided the regional tourism ecosystem is being established. Scenarios of opportunities for sustainable tourism development is an important element of management in the regions of Russia (Table 3). The current geopolitical situation orients our economy towards the development of domestic and inbound tourism, more efficient use of tourist and recreational potential, its comprehensive assessment, study and implementation of modern innovative mechanisms for sustainable development. We believe that this can be achieved provided regional tourism ecosystems are developed and implemented in the regions.

**Table 3.** Matrix for developing scenarios of prospective tourism development in the regions of Russia.

Ranking of Regions of the Russian Federation Depending on the Level of Sustainable Tourism Development	Leader Regions	Regions with High Potential	Regions with Average Potential	Regions with Low Potential
High level	1	1	2	3
Relatively high level	1	2	3	4
Average level	2	3	4	5
Low level	3	4	5	5

According to the results of research, the Republics of Buryatia, Krasnodar, and the Altai Territories are in the first group of regions that are extremely favourable to the development of tourism, alongside Moscow and St. Petersburg, which provide a wide variety of tourism services and are steadily attracting large numbers of visitors. Fifteen regions make up the second group, which are assessed as quite favourable for tourism development: the Yaroslavl region, Republic of Tatarstan, Kaluga Region, Altai Republic, Leningrad Oblast, Moscow Oblast, Lipetsk Oblast, Sverdlovsk Oblast, Kaliningrad Region, Perm Krai, Khanty-Mansi Autonomous District–Yugra, Rostov Oblast, Tyumen Oblast, Samara Oblast, and Irkutsk Oblast.

In the third group of regions, with relatively favourable for tourism development, there are 27 regions, which is primarily due to the high level of administrative and legal activity of tourist and recreational authorities. This group includes the Republic of Adygea, Republic of Mari El, Kursk region, Smolensk region, Orenburg region, and some other entities of the Russian Federation with underdeveloped tourism potential. In order to enhance the tourism development in these regions, authorities and tourism businesses must play a proactive role and make substantial contributions. There are seven regions in the fifth group with extremely low potential of tourism development. These are the Magadan Region, Krasnoyarsk Territory, Komi Republic, Jewish Autonomous Region, Kirov Region, Nenets and Chukotka Autonomous Districts. These regions are characterised by a fairly low level of tourism and recreational potential and medium or low potential for sustainable tourism development (Table 4).

**Table 4.** Regions of the Russian Federation grouped depending on the level of tourism development.

Regions Extremely Favourable for Tourism Development (First Group)	Regions Quite Favourable for Tourism Development (Second Group)	Regional Relatively Favourable for Tourism Development (Third Group)	Regions with Low Potential for Tourism Development (Fourth Group)	Regions with Extremely Low Potential for Tourism Development (Fifth Group)
The Republics of Buryatia, Krasnodar Territory, Altai Territory, Moscow, St. Petersburg	Yaroslavl Region, Republic of Tatarstan, Kaluga Region, Altai Republic, Leningrad, Moscow, Lipetsk, Sverdlovsk, Kaliningrad Regions, Perm Territory, Khanty-Mansi Autonomous District–Yugra, Rostov, Tyumen, Samara, Irkutsk Region	Vologda Oblast, Tula Oblast, Nizhny Novgorod Oblast, Novgorod Oblast, Republic of Crimea, Astrakhan Oblast, Republic of Karelia, Khanty-Mansi Autonomous District, Primorsky Territory, Tver Oblast, Stavropol Territory, Vladimir Oblast, Saratov Oblast, Voronezh Oblast, Ivanovo Oblast	Chuvash Republic, Republic of Udmurtia, Republic of Mari El, Orel Region, Republic of Kalmykia, Republic of Khakassia, Republic of Adygea, Smolensk Region, Republic of North Ossetia, Murmansk Region, Kursk Region, Orenburg Region	Magadan Region, Krasnoyarsk Territory, Komi Republic, Jewish Autonomous Region, Kirov Region, Nenets and Chukotka Autonomous Districts

However, this does not mean that there is no need to develop regional tourism ecosystems in these regions. This implies that progress will be challenging and necessitate large financial and non-financial contributions, which will bring feasible results in the future. There are now a few instances of digital ecosystem development in the Russian tourism sector, but not many. In October 2023, a National Tourism Portal Russia. Travel was launched based on the RUSSPASS service. This is a tourist portal originated in 2020 in Moscow and the Moscow region that provides opportunities to book hotels, purchase railway and air tickets, and book thematic sightseeing excursions to different cities. As of 2022, there were over 4 million users [64]. It can be stated that the process is going on. However, the pace of development is different in different regions.

## 5. Conclusions

Changes in the structure of the tourism market are significantly influenced by the socioeconomic situation in Russia today, as well as by internal and external impacts. All these led to an increase in domestic and inbound tourism as well as a reduction in outbound tourism, the ratio of which is beginning to reach global proportions. However, noticeable imbalances in the development of tourism have been identified at the interregional level, which implies a more effective use of tourism and recreational potential and sustainable development mechanisms.

Based on the improvement of the methodology, an evaluation of integrated tourism and the recreational potential of sustainable tourism development was carried out. The research assessed the availability of natural, cultural, historical, socioeconomic, and economic resources, as well as the ecological situation in the area and the expertise of local tourism agencies. This research made it possible to classify the Russian Federation's regions into four groups, ranging from the most developed regions to those with the lowest level of tourism and recreational potential. A ranking of the regions of the Russian Federation on the degree of sustainable tourism development has been suggested based on the authors' evaluation methodology for the mechanisms of sustainable development. As a result, five types of regions with different levels of potential for sustainable tourism development have been identified.

An efficient approach to the management of Russian regions required certain scenarios with prospects for sustainable tourism development. The scenarios were based on a combination of spatial interactions of the integrated tourism and recreational potential and were analysed using the matrix approach. The authors categorised the regions depending on the level of sustainable tourism development using the identified mechanisms. As a result, five groups with various scenarios, ranging from highly favourable to stagnant, have been identified.

The authors believe that the establishment of a regional tourist ecosystem would be a crucial and practical step towards strengthening the sustainable development of Russian regions in the face of the current challenging circumstances. The authors proposed The important point is that there are already effective instances of this activity relevant to tourism sector.

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## Appendix A

**Table A1.** Indicators of water protective index of the Russian Federation.

Environmental Index Indicators	
Atmosphere, air	This indicator shows how polluted the air is in the regions of the Russian Federation. The evaluation is based on the ISA index of atmospheric pollution, which considers both the danger class of contaminants and the volume indicators of pollution. This indicator additionally takes into account urgent circumstances involving pollution emissions as well as the modernisation of gas treatment facilities.
Water resources, water	This indicator shows the condition of the Russian Federation's natural waterways (including the oceans, rivers, lakes, groundwater, etc.) and the level of drinking water quality. This indicator also depicts the development and modernisation of sewage treatment facilities, as well as the quantity and quality of wastewater treatment released into reservoirs.
Land resources, soil	The "earth" indicator shows the condition of land resources in Russian Federation regions, as well as the processes of soil degradation and reclamation, desertification, and the application of environmentally friendly land use technologies, among other things.
Specially protected natural areas	It is a measure of the number and size of specially protected areas, as well as their state, any recent events involving their protection, the amount of funding available.
Socio-ecological index indicators	
Living environment	This indicator represents a comprehensive indicator of the comfort of life for people, animals, and plants in a given region of the Russian Federation. This indicator takes into consideration all of the aforementioned indications collectively as well as regional characteristics.
Power/Authorities	This is an indicator of the efficacy of the work carried out by state executive and legislative authorities in the field of nature protection and habitat improvement in a particular subject of the Russian Federation.
Civil society	This indicator serves as an indicator of the level of civic engagement in a variety of activities in a particular entity of the Russian Federation, taking into account the number and degree of activity of local environmental NGOs, the presence of active citizens and associations.
Informational and psychological climate	This is an indicator that serves as a proxy for the processes of openness, freedom of speech and assembly on environmental issues, the independence of regional media, and other factors guaranteed by the Constitution of the Russian Federation.
Education and culture	This is an indicator showing the level of environmental education in the region, taking into account the programmes of environmental education of the population. This indicator also highlights examples of a high (or low) degree of environmental culture among the local governmental authorities and the general public.
Housing and communal services	This indicator is based on developments in the housing and communal services sector. A strong indication of the poor quality of services offered, for instance, would be the numerous accidents or repeated forced shutoffs of the drinking water supply in a given area.
Industrial and ecological index indicators	
Solid household waste	This is an indicator of how much waste is produced in a certain area, how much of it is processed or disposed of, how many illegal garbage dumps there are, how well solid waste management is being implemented, and any difficulties that have arisen.
Science and innovation	This is an indicator of the country's regional environmental technology development, experimental use of such technologies, and information exchange in the environmental innovation sector.
Industrial waste	This indicator defines the development and accumulation of industrial waste in the area, representing industrial waste management policy and practise, including trash accumulated over a span of time.
Environmental modernisation	This indicator evaluates how well new eco-friendly technologies are being integrated into industrial processes. Technologies that adhere to strict guidelines for appropriate environmental effects minimise the degree to which human activity has an influence on the environment.
Business responsibility	This is an indicator that shows how the business climate is in a particular region of the Russian Federation in terms of new environmental business projects being implemented voluntarily, compensation for environmental damage caused by business operations, and charitable business projects.

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