Socio-geographical processes and enhancement of territorial structures of Siberia from the perspectives of national priorities and global challenges of the 21st century

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Abstract. The Laboratory of Economic and Social Geography of the V B Sochava Institute of Geography SB RAS (Irkutsk, Russia) has been carrying out socio-economic research in the indicated field over the past decade. We consider the Siberian macroregion traditionally within the space of Western and Eastern Siberia with the inclusion of the Republic of Sakha (Yakutia). The research results reflect, firstly, the growth path of Siberia in the new millennium, taking into account the multidirectional external and internal factors. Secondly, our findings include the identified spatial patterns of the main socio-geographical structures (specialization of existing industries, infrastructure, market and non-market services and the population) as the basis of regional policy with the aim of sustainable development, ensuring the modern level of quality of life of Siberians. We studied the key Baikal region in more detail.

1. Introduction

Years of research of the collective of public geographers of the V B Sochava Institute of Geography SB RAS (IG SB RAS) have shown the ecological-socio-economic characteristics of Siberian regions in a competitive environment from the standpoint of sustainable development in the pre-pandemic period. Thus, we analysed the development of specialization of industries, services and environmental infrastructure in the priority economic and geographical area, taking into account the factor of the safe development of Siberia, as well as its individual regions in the international economic space. A reflection of the development degree of the territorial division of labour within the national framework is the export structure of the macroregion, highlighted as a determining factor for the development of scenarios of socio-economic development for the short and medium term. The dominant strategy of the federal centre (the Government of Russia), supporting large vertically integrated corporations of raw materials specialization to export markets also contributes to the strengthening of the Asian (eastern) direction in the country's foreign trade. This fact may become a limiting factor in the economic development of Siberia in the future. At the same time, we should take into account the demographic losses of the territory, both due to the migration outflow and indicators of negative reproduction of the population [1-6].
2. Objects and Methods
In our studies, the Siberian macroregion spatially includes the subjects of the Siberian Federal District, the Tyumen Region (as well as the autonomous districts), the Republics of Buryatia and Sakha (Yakutia), as well as the Zabaikalsky Krai. We traditionally consider the most examined Baikal region as the territory of three subjects: Irkutsk oblast, the Republic of Buryatia and Zabaikalsky Krai. When analysing various aspects of economic activity and socio-demographic potential, we were guided by a systematic approach, relied on data from State statistical inquiries, official data from departmental websites and field research. Mapping of indicative basic characteristics of specialization of industries and the service sector of the economic complex of Siberian territories was carried out in dynamics, mainly over 5-10 years. The total number of completed thematic maps for the indicated area (at the macro-, meso- and local level) exceeds 120 units in recent years in published atlases, monographs and edited version.

3. Results and Discussion
We identified the patterns of transformation of the territorial organization of industrial production in the macroregion during the implementation of reindustrialization projects, namely, the shift of industrial production centres into the undeveloped zone from the main settlement zone. Procedures for calculating indices of the reindustrialization potential at the regional level and models of revitalization of Siberian industrial centres with the highlighting the innovative component were introduced into scientific circulations. At the same time, the tendency of the twofold influence of large investment projects on the development of the regions is confirmed, namely, strengthening of the economic potential of the developed territories and the distribution throughout the periphery among the mining industries [2, 7, 8].

The structural transformation of the economic complex of the macroregion is multifaceted. The representation of large trading companies and the development level of retail trade in Siberia are analysed using the typology of regions. The spatial development of modern retail trade in Siberia is determined by the expansion of international and federal network structures, which enhance intra-industry and price competition, scale up the assortment policy, introduce new technologies, and stimulate consolidation processes, while reducing regional and local retailers. Lack of insurance in Siberia was identified. However, it should provide both social security and safety of labour activity at production facilities in Siberia [4, 9-12].

The use of landscape planning technologies has generated new approaches to the establishment of recreational space, taking into account environmental requirements and socio-economic development of the territory. The specificity of the spatial and structural organization of the recreational space of Siberia is determined and a comparative recreational-geographical analysis of the regions of Siberia in the context of their integration into the international tourism system is carried out. Functional recreational zoning, taking into account institutional and legal parameters, determines the spatial and structural organization of recreational activities through a binary classification of recreational zones (settlements and natural areas). An original scheme of recreational zoning based on the landscape approach is proposed:

a) main factors of the ecological, socio-economic state of the region, and
b) combination of the project-based approach as a tool for the development of territories and an active response of society to the destruction of the economic structure (unregulated development of tourist activity) with the allocation of recreational zones of different hierarchical status for sustainable development goals [4, 13, 14, etc.].

The applied approach to the simulation (functional zoning of the territory with the allocation of areas of priority development of tourist activities with special ecological and geographical conditions of use) is the scientific basis for the management of the territorial recreational system of the Baikal natural territory.
The following positive and negative ecological and economic effects of the recreational development of the Siberian regions were revealed:

a) effects of adaptation, based on private models of recreational geography (environment, subject-object, recreation and economy);

b) cumulative effect (increase and accumulation) manifested in the change in the natural environment under the impact of recreational loads;

c) gravitational effect (the unevenness of recreational development and development of territories due to the geographical location of the most significant tourist objects, etc.)

The principles of the territorial organization of tourism in the regions of Siberia have been substantiated, taking into account environmental and socio-economic development priorities [4, 13, 14, etc].

Overall, the study created ecological-socio-economic blocks of maps and their analytical support in atlases, characterizing the socio-economic state and development trends of the macroregion. The patterns of development of the construction industry in the context of both the subjects of the Siberian macroregion and the municipalities of the key Baikal region were also determined. We studied the development of market and non-market services in Siberian regions and analysed activities in the field of production and consumption waste management, taking into account the dynamics of commissioning of environmental infrastructure facilities and planned activities. In addition, we analysed economic indicators characterizing the activities of social insurance and risks, which can assess the development of the Siberian macroregion as a conservative scenario (preservation of the current situation), probably with minor improvements, but with an outflow of the population [1, 3-6, 15].

It was confirmed that investments do not have a significant impact on the life of the local population (case study the Baikal region, where population outflow prevails in more than 2/3 of municipalities) [2].

Significant results were also obtained in the social development of the macroregion. Theoretical approaches to the geographical study of young people's lifestyles were developed. A methodological scheme for a comparative socio-geographical study of the lifestyle of young people is proposed. The content of the concept of “lifestyle” is expanded in the context of the study of local territorial groups of the population. For the first time, adaptation processes during the transformation of lifestyle in the environment of a large city are analysed from a geographical point of view. The study predicted the migration patterns of behaviour of the youth group of the population, and the development potential of the studied key sites [15, 16].

The main post-Soviet trends of migration in Siberia are as follows: decreasing migration “at the place of residence” with increasing “at the place of temporary residence”; centripetal intraregional vector; negative “western” interregional vector; positive vector of interstate migration; migratory depopulation of peripheral territories; deceleration of extensive urbanization due to the depletion of rural demographic resources and rising prices for urban housing. Seven groups of migration problems for Siberian regions were identified based on the analysis of migration flows, combined according to the geographic location, transport development, central-peripheral relations. Upcoming trends for the implementation of socio-demographic potential from the standpoint of sustainable development are proposed for the development of regional policy in the field of socio-demographic potential of Siberia [15-18].

The decrease in the socio-demographic potential due to the narrowed natural reproduction and negative migration of the population complicates the sustainable development of the regions. At the same time, it was confirmed that the climatic factor, without compensatory government measures in the post-Soviet period, has a very negative effect on the interregional migration exchange of Siberia with regions more favourable for human habitation, and in the intraregional exchange it enhances the growth of regional centres [19].

We revealed that the volume of output in the largest cities of Siberia is decreasing and the service economy is developing, where new jobs are being actively created. At the same time, there is a process of gradual “compression” of rural areas and the transformation of its structure from a regional to a linear-nodal one. In the coming decades, the reference frame settlements will be preserved, due to the high inertia of the settlement system and with an increasing trend towards population gathering around
the most important centres and along highways. We distinguished four groups of regional centres based on their economic significance on the territory of the subjects according “activities with higher remuneration” (complete dominance; value above the average; value below the average; low value) [15, 17, 18].

The original methodology for assessing the development of human potential at the municipal level proposed in the Laboratory of Economic and Social Geography is based on statistical data and is applicable for municipalities of the Russian Federation. We have introduced an updated detailed interpretation of human potential necessary to study its territorial differentiation depending on certain natural-ecological, socio-economic and political-legal conditions that provided new insights into the current situation [20].

The ongoing processes of population reproduction in Siberia highlighted a number of trends. In particular, fertility decline as a result of the entry into the reproductive age of mothers born in the 1990s; retirement age of numerous groups of people born in the 1950s; and decline in working age population, into which small groups aged 16 to 25 (born from 1996 to 2003) have moved. The reduction in the socio-demographic capacity due to narrowed natural reproduction and negative migration of the population complicates the sustainable development of regions (between 2015 and 2019, the total fertility rate decreased from 16.1‰ (2015) to 12.4‰ (2019)), and natural population decline affected most of the Siberian regions [15, 17, 18].

The dynamics of urban settlements and agglomerations of Siberia and North China was revealed for the first time against the background of general urban changes. Hence, the following results of urbanization processes in Baikal Siberia and Mongolia were obtained: functional reorganization of space, exacerbation of socio-economic conflicts and changing lifestyle of the population (as exemplified by the domestic Irkutsk and Mongolian Ulaanbaatar agglomerations) [21, 22].

With due regard for sustainable development and green economy, we came to the following conclusions. The research results allow us to state that in the mainstream of green economy in the key Baikal region, the development of a modern environmental protection infrastructure (EPI), as an especially demanded sector of economic activity under environmental restrictions, is very promising. EPI is a block of functionally separate structures, outputs, recycling enterprises, separate waste collection, landfill depositing, waste detoxification, ensuring safe handling of municipal (consumer) and industrial waste. The basic function of EPI corresponds to the main positions of promoting green economy, i.e. mitigation of waste impact on the environment and involving additional resources (secondary material resources) into economic circulation [4-6].

The driver of the economy of the Baikal region on the principles of sustainable development is the development of alternative energy, technology parks, deep wood processing and nomadic animal husbandry, and furthermore, ecological tourism, bottling of Baikal water, traditional crafts that enhance the positive effects of using the natural resource and economic potential of the Baikal natural territory. The year 2021 marks a quarter of a century since the inclusion of Lake Baikal in the List of World Natural Heritage.

4. Conclusions
The research findings provide a comprehensive evidence-based idea of trends of the potential integration of Siberia into the system of global changing and integrated economic spatial relations, taking into account the priorities of sustainable development of the global-glocal transforming space. A systematized understanding of socio-geographical processes and the modernization of territorial structures, especially of current migration processes and demographic problems in Siberian regions, is a scientific substantiation of adjusting regional policy at territorial levels of various scales in the context of management of sustainable development in the macroregion, as well as within the key Baikal region.
Acknowledgement
The study was done at the expense of the state assignment (No. of state registration of the topic AAAA-A21-121012190019-9) and with the support of the Government of Irkutsk oblast and the Russian Foundation for Basic Research (20-45-380012 r_a).

References
[1] Plyusnin V ed Geography of Siberia at the Beginning of the 21st Century 2014 Economy and Population of Siberia (Novosibirsk: Geo) 3 251
[2] Dets I A 2018 Project Approach in Territorial Development: Baikal Region (Novosibirsk: Geo) 139
[3] Zabortseva T I, Grigorieva M A, Dets I A, Ippolitova N A, Rogovskaya N V and Rogov P V 2020 Socio-Geographical Scenarios of Development of the Branches of Specialization and Infrastructure of the Baikal Region: Cartographic Approach Geogr Nat Resour 5 26-32
[4] Modern Russia: A Geographical Description of Our Fatherland. Siberia 2020 (Moscow: Paulsen) 512
[5] Ecological Atlas of the Baikal Region 2017 ed Plyusnin V M (Irkutsk: V B Sochava Institute of Geography SB RAS, V M Matrosov Institute for System Dynamics and Control Theory SB RAS http://atlas.isc.irk.ru (accessed 01 June 2021)
[6] Ecological Atlas of the Lake Baikal Basin 2015 (Irkutsk: Publishing House of IG SB RAS) 145
[7] Tarasova O V and Rudneva V A 2018 Models of Revitalization of Old Industrial Cities: Siberian Cases Economic and Social Changes: Facts, Trends, Forecast 11(1) 148-63
[8] Sysoeva N M and Kuznetsova A N 2019 Baikal Natural Territory in a New Grid of Macregions of Siberia EKO 5 89-105
[9] Grigorieva M A 2019 Large Companies in the Development of Retail Trade in Siberian Regions Moscow Economic Journal 12 (accessed 01 June 2021) https://qje.su/nauki-o-zemle/moskovskij-ekonomicheskij-zhurnal-12-2019-66
[10] Grigorieva M A 2017 Retail Trade in a Large Siberian City: Current State and Development Trends Naukovedenie 9(6) (accessed 01 June 2021) https://naukovedenie.ru/PDF/41EVN617.pdf
[11] Sumenkova L A 2018 the Development of Social Insurance in Market Conditions and its Reflection on the Social Security of the Population of Siberia Fundamental Research 8 100-4
[12] Sumenkova L A 2016 Territorial Organization of Insurance Services in Siberia (Irkutsk) 173
[13] Evstropyeva O V, Bardash A V and Budaeva D G 2019 Methodological Approaches to Tourist and Recreational Differentiation of Territories with Special Conditions of Use Service and Tourism: Current Challenges 13(1) 7-21
[14] Evstropyeva O V, Bibaeva A Yu and Sanzheev E D 2019 Modeling Tourist Flows at the Regional and Local Levels. Experience of Implementation in the CEZ BNT Service and Tourism: Current Challenges 13(1) 86-97
[15] Zabortseva T I and Rogov P V 2018 Structural Features of the Modern Construction Sector in Siberia Geosystems in Northeast Asia. Types, Current State and Development Prospects (Vladivostok: TIG FEB RAS) 35-41
[16] Vorobiev N V, Valeeva O V, Dmitrieva Yu N and Rykov P V 2020 Implementation of the Socio-Demographic Potential of Siberia Geogr Nat Resour 5 33-9
[17] Vorobiev N V 2019 Migration of the Population of Siberia: Post-Soviet Trends Geogr Nat Resour 5 172-77
[18] Vorobiev N V 2020 Migration Tendencies and Problems of Siberian Regions Geogr Nat Resour 5 178-84
[19] Dets I A 2020 Possible Impact of Global Warming and Other Factors Affecting Migration in Russia with Emphasis on Siberia Quaestiones Geographicae 39(3) 111-23
[20] Valeeva O V 2017 Factors of the Formation of the Human Potential of the Baikal Region *Bulletin of the Irkutsk State University. Ser.: Earth Sciences* **21** 28-45

[21] Vorobyev N V, Emelyanova N V and Rykov P V 2018 the Urbanization and Development of Urban Agglomerations in Siberia and North China in the Context of the New Silk Road *Problems of Economic Transition* **60**(8-9) 597-613

[22] Bogdanov V N, Dugarova G B, Emelyanova N V and Enkh-Amgalan S 2020 Comparative analysis of the development of agglomerations (a case study of Irkutsk and Ulaanbaatar) *Geogr Nat Resour* **5** 185-91