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**THE CONCEPT OF TERRITORY'S SOCIOECONOMIC  
GENOTYPE**

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**Abstract**

The article presents the concept of socioeconomic genotype of territories as an emerging field of research at the intersection of genetics and economics. According to authors' opinion, any region has its own peculiarities that are inherited by generations and influence the social and economic development of its territory. The paper develops a conceptual and categorical apparatus in the field of economic genetics. A region is defined as a socio-economic organism with multi-layered memory. Based on this memory the structure of the economic functioning of its society is reproduced. The authors give definitions to such concepts as social and economic genotype, genetic profile of a region, region's genetic codes. The genetic codes of a region determine its predisposition to transformations. Different types of such codes are described. The application of the genetic approach can increase the socio-economic efficiency of decisions made by public authorities and adapt the decisions to the specifics of a particular territory.

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## 1. Introduction

The current slowdown in economic growth makes it necessary to search for new sources and drivers of economic development at the level of both the country as a whole and specific regions. To solve the problem we propose to use genetic approach that make it possible to identify regional peculiarities formed by previous generations and inherited by the territory. Understanding of identified genetic traits can contribute to the effectiveness of state economic regulation. Why can we use genetic approach for our study? Popper (1952) believed that disciplines differ in their research subjects, but at the same time a scientist examines the problem (not the subject of the research), while problems are able to cross the boundaries of any disciplines and their subjects. Thomas Kuhn as well points out that almost any significant discovery or revolutions in the field of science begins with a break with traditions, old thinking and old paradigms (Kuhn, 2012). The interdisciplinary and the possibility of research methods integration was also justified by Neumann and Morgenstern (1944). They believed that it is equally important for a researcher to reveal the causes and patterns that determine progress in other sciences, and to study why the application of these principles can or cannot lead to the progress in the economy.

Genoeconomics (Benjamin, 2007; Benjamin et al., 2012) is emerging field of research at the intersection of genetics and economics. Currently, several levels of economic research use the genetic approach. The first level is the level of nanoeconomics, when the economic behavior of an individual is studied (Fletcher, 2011, 2017, 2018; Fletcher & Boardman, 2013; Taubman, 1976). At this level researchers use genetics to study the source of a person's achievement of financial well-being and success in society. The second level is micro level, where metaphor of the genetic code is used for studying companies' development. The proponents of the idea try to identify some deep-lying basis for the behavior of organizations (Baskin, 2012; Honold & Silverman, 2002; Kaptein, 2017; Neilson et al., 2004; Wachter, 2008). The third level is macro level or the level of macroeconomics. At this level researchers study countries and look for the links between estimates of genetic diversity and per-capita incomes in the countries (Ashraf & Galor, 2013, 2018; Conley & Fletcher, 2018). We offer a separate level of economic genetics – meso level. Unlike the previous research levels of economic genetics, meso level concerns a local territory as the research object. Therefore, our research is aimed at revealing the genetic approach in the economy at meso level, the level of local territories. Economic genetics of meso level shows how the socio-economic system in the process of its development retains a certain integrity, not only in functional and structural terms, but also in time. The main task of regional economic genetics is the formation of a holistic, scientifically based understanding of the processes and events occurring in a particular territory.

## 2. Problem Statement

The genetic approach in modern economic research has become a very noticeable trend, manifested in an increasing number of scientific papers (Bell & Kandler, 2017; Conley et al., 2014; Freese & Shostak, 2009; Tang, 2016). Therefore, there is a high need to develop a conceptual and categorical apparatus in the field of economic genetics. A serious obstacle in solving this problem is the gap between the empirical and theoretical levels of knowledge of this subject area. The available scientific descriptions of the applicability of the genetic approach in different countries and regions are still reflected in separate theoretical statements

describing the features of their origin and development, but a complete scientific understanding of socioeconomic genotype of the territory as a phenomenon in the economy has not developed yet. The identification of the problems of social and economic development of regional economy, based on the development of the genetic approach, will allow us to define them more precisely, to understand their place among similar organizational and economic phenomena and to identify their inherent positive and negative effects.

### **3. Research Questions**

The subject of the study is the phenomenon of regional social and economic genotype as a factor of sustainable territory development. Therefore, the study raised the following questions:

- What regional social and economic genotype is?
- What region's "genetic profile" is?
- What region's genetic codes are?
- What methodological peculiarities and functions does regional social and economic genotype have?

### **4. Purpose of the Study**

The purpose of the study is to present genetic approach for studying regional social and economic issues as well as to develop research vocabulary for the phenomena of genoeconomics at meso-level.

### **5. Research Methods**

The main research methods are general scientific methods of system analysis and scientific generalization, the method of analogies and expert assessments, as well as computational, analytical and logical methods that allow formalizing the socio-economic genotype of the territory.

### **6. Findings**

The regional system does not come out of nowhere. It has deep roots of its origin, which show not just a change in the state of the system, but its significant changes caused by the further inability to exist in the existing forms of functioning and the focus on changing this form through reaching a qualitatively higher level, including through structural changes. This, in turn, indicates that the genetic approach is an integrative approach that combines systemic-functional and systemic-historical scientific approaches.

The genetic approach makes it possible to determine the unchanging basis of the economic development of an industrial region, and the impulse and progressive directions of its functioning. We believe that this research approach is focused on the study of endogenous factors of heredity and variability of methods and tools of economic activity, which as a result of socio-economic selection are transmitted and, most importantly, are perceived by the next generations.

There are three levels of regional development research that differ in the degree of depth of the study of cause-and-effect processes. The first level represents the events that are the tip of the iceberg and have the character of quickly realized processes and phenomena. The second level represents the long-term events caused by the historical course of development of a particular territory. The third level is the synthesis of territory's historical events and patterns of its society development.

For economic regional genetics, the third level is the most informative. Based on this level the selection of objects for the study of properties and their regular interactions is assumed. In our opinion, the third level provides the birth of new concepts, the number of which will be minimal, and their meaning is simple and clear.

The transformation processes at all subsequent levels also depend on the changes occurring at the third level of the depth of endogenous factors.

For example, if at the lowest level the laws and principles of functioning of industrial enterprises and infrastructures connecting their activities are formed, then at the second level there are resource flows and sources of production, and at the first – technological structures and market specifics.

Therefore, it can be argued that at the third level of endogenous factors, universal rules and norms of economic behavior of business entities are laid down. That is, enterprises operate according to their own corporate rules, which are subject to the laws of the territory generated at a higher, state level. This once again shows the formation of a certain order of evolutionary and genetic development of the territory.

These are five postulates of a territory's socio-economic genotype.

- A region is a socio-economic organism with metabolism within it. The main "natural" elements (organs) of this organism are enterprises, the population, universities, and authorities.
- Any region has a multi-layered memory, on the basis of which the structure of the economic functioning of its society is reproduced, as well as the ways of interaction of its members and their connections are determined.
- The space of the genetic codes of the region determines its predisposition to transformations.
- In the morphology of the region there are different types of codes, some determine the processes that occur slowly, others are responsible for the rapidly changing processes and situations that occur in the economic practice of the region.
- Genetic codes are in multi-level relationships: object-specific and interspecific. The stable compounds of the first form the core of the socio-economic genotype of the region, the compounds of the second form its genetic profile, reflecting the statics and dynamics of the processes occurring in the territory.

The genetic code of the territory's economic development conserves historically accumulated information and transmits it to all elements of the regional system. Consequently, the economic genetics of regions studies the economic development of the territory through the prism of mechanisms of change; mechanisms of inheritance; mechanisms of selection of principles and methods of management in this region, based on the codes of the territory.

The five postulates listed above make it possible to identify the basic goal of the economic genetics of regions. It is the creation of a scientifically based approach that allows us to use the identified causal patterns of economic relations in the practice of regional management and to determine the internal structures of the region with the allocation of elements of the past and present that are inherited by the future regional society, with the identification of promising elements of development that require support.

Based on this understanding of economic genetics at meso-level, the following functions of it can be distinguished. Firstly, the system function that allows us to consider the region as a live (open) socio-economic system. The features of such a system are the ability to combine resources, the ability to increase the number of economic resources used in the process of economic activity, the focus on the diversification of production factors, the reproduction of conditions and relationships in the process of implementing economic activity. Secondly, the structural function that allows us to identify the features of self-organization of subsystems of the regional socio-economic system, as well as the multilevel institutional space. Thirdly, the evolutionary function that allows us to determine the heredity, variability and development potential of the regional economic system.

Each of these functions makes it necessary to further development of economic genetics as a fundamental science.

We propose to apply the meso-level genetic approach in solving the problem of identifying the protective mechanisms of a region that resist external and internal influences, ensuring its integrity and viability in the conditions of systemic economic transformations of society. The integration of such mechanisms is embedded in the social immunity of the territories, which is responsible for the development of the region's ability to withstand potential risks of external and internal shocks and creates conditions for systemic recovery after destructive events, thanks to the availability of internal resources and assets that were not previously used. This functionality of social immunity allows us to state that it is responsible for inheriting the protection of the considered society against adverse factors and gives it the necessary set of properties, which together represent the potential for sustainable economic development. Thus, social immunity, which is an inherited defense mechanism, affects the sustainable development of the economy.

The economy of the territories develops steadily when three main social conditions are met. 1) The stimulation of the productive potential of the society takes place on the basis of trends in the development of the human capital of the population (the action of mechanisms to improve the well-being of the population). 2) Economic productivity is supported on the basis of meeting the basic needs of the population in consumption and employment (mechanisms for increasing the labor potential of the population). 3) Ensuring a high quality of life in society is based on a steady increase in the number of working-age population, corresponding to the necessary productivity of the economy (the action of mechanisms to activate the labor potential of the population).

These conditions of sustainable economic development determine certain types of protective mechanisms, the effectiveness of which forms social immunity. The author's method of applying the genetic approach to the identification of social immunity is to identify these protective mechanisms and assess their functioning in the context of three consecutive methodological stages.

According to Martishin (2014), socio-economic genotype is a mechanism that implements the laws and evolutions that are the most important characteristics of the socio-economic system of the region. We

interpret the socio-economic genotype as a generator of cause-and-effect patterns of regional economic development, which contains certain endogenous constants of the industrial development of the territory. These constants are elements of the past and the present that are transformed into heritage to future generations and require support to achieve the economic well-being of society. This understanding of the socio-economic genotype suggests that it is based on social memory, which is responsible for the preservation and transmission of information in the temporal and spatial dimensions (Myslyakova et al., 2020).

Rebane (1982) defined social memory as the universal basis of both social and individual cognition. Each society has its own individual mechanism that records its history of development and reproduces the established types of socio-economic relations. The evolution of society depends on the evolution of social memory

Thus, the socio-economic genotype is manifested in the recording of the «social heritage» of the regions in order to identify the characteristic features of the territories that have a direct impact on the development potential of the territory and its possible reactions to certain external influences, including from state authorities. In this concept, we include both cultural achievements that are valuable for humanity, and all life experiences stored in the memory of the population and materialized in specific products of its vital activity. In other words, the social inheritance is the totality of all the information stored in the minds of the passing generations.

Social inheritance is less subject to programming than biological inheritance. There is no fatal immutability of programs for the reproduction of established relations in society. Under certain shock socio-economic conditions, certain "programs" are destroyed and the dominant value system is changed, which subsequently leads to significant transformations or the emergence of a fundamental picture of the world. The process of obtaining a social inheritance is even more complicated, since the new generation always chooses what is worth excluding from the heritage from memory, and what is worth accepting, realizing and using in their lives, adapting to the new economic conditions. Therefore, there are problems in selecting information about the past according to its significance for the needs of the present and the future. The studying of social inheritance allows us to understand the main evolutionary stages of the formation of social memory in the context of ensuring social continuity, through which the new generation inherits both social relations, and the achievements of material production, and the forms of spiritual life, which it later disposes of in the course of its life.

However, it is impossible to track all the processes of creation and development of social memory. The processes of historical acceleration influence the increase in social memory volume. Therefore, the "fullness" of historical events directly depends on the types of social and economic activities of each individual that form certain social ties between people and groups of people, and is also determined by the life expectancy of both an individual and a society localized in a particular territory. An increase in life expectancy causes an increase in the "fullness" of a person's memory.

In recent years, the number of social events is significantly higher than in previous centuries. The density of social connections between individuals has increased due to digitalization. This has led to the fact that today human history clearly has a greater density coefficient than ever. This, in turn, affects both the amount of social memory transmitted to the new generation, and large-scale selection, the selection of

the necessary and unnecessary parts of social memory for further use. The latter can cause an increasing conflict of generations who simultaneously live in the territory, but who turn out to be carriers of different social memory. In addition, the presence of different generations with different social memory on the territory can lead to the fact that different age and social strata of society will react differently to the same mechanisms of state regulation. This indicates the need for direct study of this process in the development of the policy of scientific, technological and spatial development of the region. At the same time, it is necessary to analyze the age pyramid of the population and the dynamics of demographic processes, as well as to characterize the social behavior of each generational group that is part of the modern social regional formation.

The genetic code of a region is a system of its hereditary records that determines the specifics and predisposition to various endogenous and exogenous processes. Depending on its type, the genetic code determines the specific features and properties of the territorial socioeconomic system, and is able to control the formation of the final results of management. The identification of the types of regional development codes that are essentially units of socio-economic evolution, as well as the conditions and patterns of their mutation, is one of the scientific tasks of this work.

The socioeconomic genotype of the region determines the effectiveness of the implementation of the scientific and technological policy of its development by generating an evolutionary accumulation of changes in the production, social and institutional systems of its hereditary records, reflecting the specifics and predisposition to various endogenous processes.

The regional level of government in the process of forming scientific and technological policy has to be based on developed mechanisms and instruments of state regulation that are common for the entire territory of the Russian Federation. Therefore, it is necessary to have a certain mechanism for adjusting and adapting the general system of state regulation in relation to a specific territory that has its own development characteristics. This mechanism is based on data on the genetic profile of the territory.

The evolutionary approach to the study of the development of territorial systems through the determination of their genetic profile allows us to identify processes that have been formed over a long time and have had such a significant impact on the territory that all future states of the territorial system depend on them. Therefore, the identification and accounting of these "genetic codes" in the present time allows us to improve the quality of socio-economic forecasts by identifying specific development factors for certain types of regions

Each region has a set of specific defining and dynamic codes that provide a two-level system of hereditary memory of the territory, which determines the specifics and features of economic development. The synthesis of these codes is a genetic profile of the territory, reflecting the specifics of the industrial development of the region's economy in the context of a specific dynamic code. At the same time, it is not a simple sum of the existing codes, it contains a certain system connection between them, in which archetypal algorithms and principles of economic behavior of business entities are encoded, as well as ways of socio-economic continuity and the heritage of society.

The genetic profile consists of production code, social code and innovation code. Production code is responsible for the economic specialization of the region, the production platform and the technological features of the real sector of the economy. Its structure is specialization of industrial development of the

economy and the contribution of basic industries to the GRP of the region. Social code is responsible for the social memory of the industrial development of the region. Its structure is specialization of the regional employment structure and the quality of labor resources. Innovation code is responsible for the systematic generation and implementation of innovative technologies in the industry on the territory. Its structure is the costs of innovation in the region and the share of innovative products in the total volume of industrial production.

Thus, a new result of the synthesis of rational, organizational and evolutionary scientific trends concerning the economic development of the region is the understanding of it as a socio-economic organism. Within the organism the so-called metabolism takes place, the processes of self-maintenance of existence occur through the formation and genesis of socio-economic sources of development and the processes of self-development on the basis of economic reproduction and preservation of hereditary features of being and management. This understanding of regions allows us to assert that each of them has an individual genetic profile that represents the multi-level memory of the territory, reproduces the morphological structure of the economic functioning of its "organizational" systems and determines the code connections of their basic actors. The obtained scientific conclusions can serve as a basis for the development of the economic genetics of the territory. A theoretical and methodological approach to modeling the genetic profile of the region has been developed. The main idea of this approach is that each region has its own genetic profile, the formula of which reflects a set of "defining" codes. It is the genetic profile that has a significant impact on the potential of the region. It determines the possible vectors of its economic development, and the mutual connections of the "defining" codes (industrial, social and institutional), typical for this territory, determine the possibility of full use of the existing potential and allow identifying new directions for stimulating the innovation activity of the region.

## **7. Conclusion**

The theoretical provisions of the author's approach can be briefly presented as follows:

- the "genetic" profile of a region reflects a set of "defining" genetic codes: industrial, social, and institutional ones;
- the heterogeneity of industrial and economic environment of regions is caused by "defining" and "dynamic" genetic codes;
- the code connections that have the greatest impact on the transformation and emergence of "dynamic" genetic codes are not always obvious, for the most part they are hidden in the depths of the evolutionary development of society and are blocked by events and processes occurring in the economic reality;
- industrial regions, the generation of production codes of which is associated with the manufacturing industry, as a rule, have high potential for industrial and economic development and reserves for its expansion, but this requires strengthening the institutional codes, namely, improving the regional innovation policy;

- the genetic profile of the region depends on the dominant social stratum and determines the possibilities and limits of generating, selecting and implementing possible options for socio-economic solutions;
- the decision to organize the transition to a new type of industrial and economic relations should not contradict the genetic profile of the region and should be aimed at strengthening the generation of defect-free "dynamic" genetic codes.

In general, it can be noted that the use of the genetic approach in economic research at the territorial level can triple the effectiveness of the use of established methods. First, economics can make a tangible contribution to the theoretical and empirical basis for understanding how market forces and behavioral responses mediate the influence of genetic factors. Second, the inclusion of genetics in economic analysis will help researchers identify and measure important causal relationships that may or may not be hereditary. Finally, the application of the genetic approach can increase the socio-economic efficiency of decisions made by public authorities and adapt them to the specifics of a particular territory.

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