

# Classification Of Social Systems In The Context Of The Development Of Society: A Systemic Integration Approach

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**Abstract:** The multitude of social sciences and the diversity of the author's methodological approaches in them gives rise to a variety of classifications of social systems that are difficult to reconcile with each other. Having identified three consistent and capable of developing methodological approaches in sociology, economics and political science, it is possible to integrate them into a single methodology of the general theory of social systems. Such a methodology will ensure the construction of a unified classification of social systems. This article analyses the existing methodological approaches in sociology, economics and political science to select, respectively, three methodologies, explores the method of their integration through dialectical and systemological synthesis based on the system integration approach, and develops the theoretical and methodological foundations of the theory of development of social systems. A developmentally capable classification of social systems has been constructed. The new classification of social systems in its development potentially makes it possible to harmonize all existing classifications of social systems.

## 1 INTRODUCTION


A comparative analysis of known approaches and an analysis of theoretical and methodological issues concerning the research into the study of social systems classifications have evidenced diversity and specifics of scientific approaches to investigation of genesis and evolution of social entities. However, an interdisciplinary systemic and holistic approach, which originated and became widespread in Western Europe and the USA in the second half of the 1980s, has been poorly developed yet.


From academic point of view, social system development is aimed primarily at the identification of patterns for social changes that determine the origin of holistic social entities as territorial social structures (regions), and the development laws thereof within a certain territory, or at a certain level of organization. Currently, the research into social changes in terms of identifying functional patterns,


and the laws of spatial and temporal evolution of a social system have become key indicators in the system of social sciences, first of all, in sociology, economics, and political science.


The evolution of approaches to the development of social systems in sociology, manifested itself by the genesis and extension of three independent paradigms (formational, civilizational, and modernization), is characterized by the growth in consistency, and consideration of economic and political factors in social development. In fact, such novel research areas as social economics and social policy have emerged with the formation of a modernization macro-level approach in sociology.


It is obvious that the concept of modernism has acquired a fundamentally new content while returning its former positions in sociology. Therefore, it is advisable to agree with few researchers who speak of neomodernism as a new stage in the development of sociological science. According to

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Kortunov, “a renaissance of some important parameters of the era, preceding postmodernism, began in the second decade of the 21st century. But since no restoration presupposes a return of the ancien régime, then in this case we are still talking about a new stage in the development...” (Kortunov, 2017, 12). It should be noted that the concept of neomodernism is, first of all, characterized by conceptual incompleteness, which “leaves open a wide window of opportunities for further theoretical search” (Kuznetsov, 2020, 29) and, thus, is very promising for solving problems of the development of social systems. According to Kuznetsov, the key features of a new concept of neomodernism are “overcoming postmodern fragmentation, problematization of values and meanings, and return to metanarratives” (Kuznetsov, 2020, 28). It is clear that these features characterize the high commonality of the concept of neomodernism that is currently being formed in sociology. It should be noted that the researchers whose efforts are aimed at developing “traditional modernism” have come to similar results. It was in 2002, when Poberezhnikov noted that “the classical and modern versions of modernization analysis differ significantly. Modification of the theoretical background for the modernization approach contributed to the transformation of rather one-sided and abstract theoretical model, which did not play a significant role in empirical research, into multidimensional and elastic one in relation to empirical reality” (Poberezhnikov, 2002, 168). And today he confirms that “one of the approaches being sensitive to both macro- and micro-level dimensions is modernization approach” (Poberezhnikov, 2019, 37). This makes it legitimate to refer these results to the concept of neomodernism, which significantly expands the number of scientific works related to its formation and development.

An analysis of advances in economic thought regarding the evolution of regional social systems has distinguished a variety of theoretical and methodological approaches. “Historically and logically, there are four directions in numerous theories of regional growth and development: 1) neoclassical growth theories based on the production function; 2) cumulative growth theories, being a synthesis of neokeynesian, institutional, and economic geography models; 3) new theories of regional growth based on increasing returns to scale and imperfect competition; 4) other theories clarifying particular or specific issues in regional growth” (Gadzhiev, 2009, 45-46).

In economic science, the neoclassical theory, the theory of cumulative growth, and the novel theory of

regional growth have undergone evaluative and comparative analysis. The theory of cumulative growth was elaborated on the basis of Myrdal’s concept of cumulative causation, according to which, “the limited advantages of territories can grow and be expanded due to specialization and economies of scale” (Myrdal, 1972). We distinguish the following advantages of the concept of cumulative regional growth. Firstly, the concept takes into consideration the real spatial and temporal configuration of a socio-economic system. Secondly, it specifies innovations and considers their spatial and temporal distribution as the main factor in the economic development of social systems. Thirdly, it determines the conditions for interregional level equalization for economic development of related social systems due to the diffusion of innovations and new industrialization. Fourthly, it creates great opportunities for practical application in solving the problems of economic development of social systems due to apparent starting points and certainty of objects and subjects. Thus, there are favorable prospects for applying the concept of cumulative regional growth for the development of social systems of any country, region, and the entire world.

An analysis of this issue in political science has also evidenced the variety and diversity of the considered development models for the country, its regions, and other legitimate social entities. There are mainly two theoretical and methodological paradigms for the development of social systems formed at the end of the last century. The first paradigm views development management of the country, constituting a coherent social system, and of its regions, being social subsystems, “as a reflection of the whole on its heterogeneity. Its subject is always a certain whole, which addresses some of its actions to its parts. Regional policy is always directed from top to bottom, and from the whole to the parts. This is a traditional view of things” (Smirnyagin, 1995, 91). The second theoretical and methodological paradigm proceeds from the fact that the development vectors for the country and its regions are not set from above, but being generated by joint efforts of the parts (regions) and the whole (country) to preserve unity and integrity. “With such a policy, there is a tendency to overcome a theoretical approach to national interests and their priority over regional interests, which protection being perceived as a case of sedition (parochialism, separatism, nationalism, etc.). In practice, civilized federalism can only favorably develop due to reciprocal actions of federal subjects and the federal center, and not by “tug-of-war” (Tagirov, 1996, 42).

Such a variety, diversity, and inconsistency of approaches to the development of social systems leads to an acute problem of choosing a theoretical and methodological background as a unified scientific theory and methodology for scientific substantiation of decisions. One can assume that this global challenge is due to professionalization in the course of scientific and technological progress in various spheres of the society. It is highly doubtful that this problem could be overcome owing to expert knowledge, as suggested by Raspopov and Tsarkov, "Of course, there should be no illusion: government officials are unable to ensure the precise implementation of these directions. A special network of analytical and consulting centers (think tanks) should be created both under the Government of the Russian Federation and in regional governments, capable to detail the trajectory of the transition to public administration and building harmonious interaction between the main actors of the public space in all regions of Russia. Such centers should provide a link between the power and knowledge, as stated in the United Nations Development Programme" (Raspopov, Tsarkov, 2013, 100).

An analysis of political science concepts for the development of social systems has determined political balance to be an advanced scientific concept. Reflecting primarily the political ideology of conservatism and neoconservatism, this concept does not contradict to other political ideologies and is compatible with the economic concept of cumulative regional growth. Besides, both concepts are consistent with the sociological concept of neomodernism, so that political scientists speak of neomodernism in politics (Gorbachev, 2014) and economists refer neomodernism to economics (Buzgalin, 2016). Being empirical and paradigmatic theoretical and methodological approaches, the three theoretical concepts for the development of socio-economic systems are of universal nature, with high development opportunities, and a unified methodological background. This indicates that any political decision, and any political practice for managing the development of a social system, having been built in accordance with the theoretical concept of political balance, should correspond to the economic content of this development within the concept of cumulative regional growth as an antinomic correlation to the political content of this development. It is evident that these (the political and economic content of development) will manifest synthetic unity and integrity thereof, and the latter corresponding to the concept of neomodernism. In order to ensure identical synthetic unity and integrity

of the three advanced theoretical concepts for the development of social systems, it is essential to create prerequisites for the theoretical synthesis of cumulative regional growth and political balance concepts within the concept of neomodernism. It requires the formation of a unified methodology, and conceptual and terminological apparatus for the three concepts on the basis of a system approach and general system theory. In other words, a systemology-based synthesis of the three advanced scientific concepts for the development of social systems into a unified theoretical and methodological background for theoretical modeling of the development of social systems is imperative.

The program for constructing a general system theory, declared by Ludwig von Bertalanffy (1971), turned out to be infeasible. However, this program has facilitated the formation of a systemic approach being continuously developed as a methodology for interdisciplinary systemic and holistic research. This methodology has resulted in the emergence of numerous systemic concepts and paradigms characterized by variety, diversity, and multiplicity. This state of affairs has demanded to formulate and solve the problem of analyzing theoretical and methodological paradigms of systemic and holistic approach, and substantiate the theoretical background for the systemology-based synthesis of the three concepts (sociological, economic, and political science concept) for the development of social systems.

On the one hand, the analysis has allowed to systematize the paradigms into four groups, characterized by its own formal representation of a systemic subject, and the related formal method. On the other hand, the analysis has distinguished Kleiner's concept of system integration different from other system concepts in its informal origin that requires semantic rather than formal logic to synthetically integrate all formal system concepts and paradigms.

The informal origin of the concept of system integration sets an informal definition of a system. Herein, "a system is understood as a relatively stable integral and internally unified in space or time part of the world, allocated by an observer in terms of spatial or functional characteristics" (Kleiner, 2007, 142). This definition presupposes four basic concepts for building a theory of system integration: space, time, the world, and the observer, being informally linked to each other. This rejects an abstract approach to space, time, and the observer, being done in physics, and doesn't admit an application of formal logic. Therefore, the theory of system integration "proposes

a new spatial and temporal typology, based on the key interaction features of systems with the basic entities of the surrounding world, namely, space and time. The suggested classification is based on the localization features of the system in space and time, that is, bounded/unbounded space and time interval taken up by the system” (Kleiner, 2007, 143). In other words, bounded/unbounded system space and time should be considered within world space and time, i.e. informally. Therefore, introducing the terms of “object”, “environment”, “process” and “project” to designate the basic types of world systems, the author of the system integration concept emphasizes the need to “provide each system type with a relevant economic description” (Kleiner, 2007, 144) in accordance with the proposed basis for a new basic typology of world systems. Having laid the world universality in the basic origin of the system integration concept, it would be more precise to speak on the sociological description of each type of systems. In other words, the system integration concept, involving a novel basic typology of systems, should become the background for a systemology-based synthesis of the three selected concepts (sociological, economic, and political science concept) of the development of social systems.

## **2 MATERIALS AND METHODS**

### **2.1 Purpose and Objectives of the Research**

The purpose of this study is to construct a complete classification of social systems in the context of their development based on a unified general theory and methodology stemming from a systemology-based synthesis of the three theoretical and methodological concepts of the development of social systems, having originated in sociology, economics, and political science.

To achieve this goal, the following research tasks are set:

- An analysis of theoretical and methodological approaches to the research into the development of social systems in sociology, economics, and political science in order to select three theoretical and methodological concepts (sociological, economic, and political science concept), based on the requirements of maximum generality, consistency, and ability to develop;
- An analysis of theoretical and methodological paradigms of systemic and holistic approach,

and verification of a theoretical background for the systemology-based synthesis of the three selected concepts of social system development;

- A systemology-based synthesis of the three selected concepts of social system development, and the formation of a unified theoretical and methodological background for constructing a complete classification of social systems in the context of their development;
- Construction of a complete classification of social systems in the context of their development.

### **2.2 The Rationale for the Research**

The research methods have been chosen in compliance with the stated research tasks. The methods of classical analysis are required to solve the first two problems, since a set of objects with the given structure is subjected to the analysis. The methods of synthesis are essential for solving the third task. The solution of the fourth problem obviously requires the use of classification methods.

A detailed analysis of the problem is to specify the methods to be used, and to reveal the need for other types of methods. This refers to the third problem of creating a unified theoretical and methodological background by means of a systemology-based synthesis of the three selected concepts of social system development (sociological, economic, and political science concept) to ensure the construction of a complete classification of social systems in the context of their development. This means that theory and methodology should appear as a unified system capable of development. Such a unity of theory and methodology is ensured if a informal synthesis. Hence, to solve the third problem, the dialectic synthesis method is required.

### **2.3 Specification and Application of Research Methods**

Consider the methods of classical analysis for solving the first research problem. Classical analysis is applied to a well-known set of theoretical and methodological approaches to the development of social systems in sociology, economics and political science. It is aimed at determining parameters, properties, and characteristics of their semantic structure, and evaluating the status thereof regarding the problem being solved. Herein, the analysis provides a free choice from the sets of theoretical and methodological approaches used in sociology,

economics, and political science, acceptable for the formation of a unified theoretical and methodological background for the development of social systems. Such analysis requires the use of evaluation methods and determination of commonality indices, and the ability to develop the analyzed theoretical and methodological approach. Moreover, it is required to analyze each theoretical and methodological approach for their consistency and the ability to develop in sociology, economics, and political science. In this case, the method of comparative analysis has been applied.

When applying evaluation methods, it is proposed to derive a commonality index for theoretical and methodological approaches based on the type of social systems. It is believed that the type of a set determines its capacity. Then the commonality index can be defined as the ratio of the capacity of the set, determined by this type, to the capacity of social systems. It is obvious that the value of this index can vary from 0 to 1. When constructing an indicator to characterize a theoretical and methodological approach, it is proposed to consider its inductive, deductive, and detailed models of its development. An inductive model facilitates commonality growth, a deductive one promotes its decrease, and a detailed model of development increases the accuracy of the studied theoretical and methodological approach without changing its commonality. Having established a paradigmatic approach in social sciences, the possibilities for the development of theoretical and methodological approaches based thereon are determined by the source of obtaining explanatory theoretical knowledge, if we proceed from the fact that the source of obtaining descriptive theoretical knowledge is nature, i.e. the given social reality. This is due to the fact that the source determines the method for descriptive or explanatory theoretical knowledge extraction, the method for this theoretical knowledge presentation and, consequently, the logical system of the resulting paradigmatic theory, which determines the possibilities of its development. At present, since either empirism or hypothesis are considered to be the source of explanatory theoretical knowledge in the social sciences, we can refer to two types of theoretical and methodological paradigmatic approaches that fundamentally differ in their development capabilities. Firstly, these are empirical paradigmatic approaches that extract explanatory theoretical knowledge from empirism. Empirism, being changeable, transfers this variability to the empirical paradigmatic theoretical and methodological approaches based thereon, as a

potential possibility of any (deductive, inductive, and detailed) development. The nature of this development is determined by empirism itself. Secondly, these are hypothetical paradigmatic approaches, which extract explanatory knowledge from a hypothesis in order to create a paradigmatic theory. Due to the static nature of the hypothesis, such approaches can only be capable of deductive and detailed development. Then, if we take the conditional value of the development opportunity index for the empirical paradigmatic theoretical and methodological approach equal to 1, then the value of this index for the hypothetical paradigmatic theoretical and methodological approach can be taken equal to 0.5. Finally, practical implementation of a comparative analysis for sociological, economic, and political science theoretical and methodological approaches acceptable in terms of commonality and development possibilities is to be carried out using the method of dialectical analysis aimed at identifying dialectical connections between the three analyzed entities. The three original theoretical and methodological approaches will be consistent, if they form a dialectical triad (thesis, antithesis, synthesis), or can be reduced to a dialectical triad by developing the original theoretical and methodological approaches. It is believed that the three theoretical and methodological approaches (sociological, economic, and political science concept) form a dialectical triad, if a one-to-one antinomic correlation is established between the economic theoretical and methodological approach (thesis), and the political science (antithesis), and their dialectical synthesis is a complete correlation of sociological theoretical and methodological approach.

When solving the second problem, the method of structural analysis of theoretical and methodological paradigms of systemic and holistic approach has been applied considering the structures of the selected theoretical and methodological approaches in sociology, economics, and political science. A theoretical and methodological paradigm of systemic and holistic approach has been determined as a theoretical background for the systemology-based synthesis. Its structure should correspond to the structure of the selected theoretical and methodological approaches used in sociology, economics, and political science used when solving the first problem.

When solving the third problem, the systemology-based synthesis of the selected concepts (sociological, economic, and political science concept) for the development of social systems was carried out by similar methods for the formation of conceptual and

terminological apparatus and a logical system obtained by solving the second problem. The formation of a unified theoretical and methodological background for constructing a classification of social systems is obtained.

The constructing a classification of social systems has been carried out by the method of hierarchical classification of spatial and temporal structures of social systems until a complex system of classification of social systems is obtained.

### 3 RESULTS

#### 3.1 Advanced Scientific Concepts for the Development of Social Systems

Some advanced scientific concepts have been identified due to the conducted analysis of theoretical and methodological approaches to the development of social systems in sociology, economics, and political science. In sociology, the scientific concepts of the civilizational, modernization, and the formational macro-level approach have been

analyzed. Herein, the concept of neomodernism has been specified as an advanced scientific concept of the development of social systems. This outcome is confirmed both by higher commonality and development opportunity indices versus indicators for other sociological scientific concepts, and the research results of other scientists.

The concept of cumulative regional growth has been selected as an advanced economic concept for the development of socio-economic systems.

In political science, the concept of political balance has been chosen as an advanced political science concept for the development of social systems.

#### 3.2 Logical-semantic basis of the systemological synthesis

As a result of solving the second research problem, an informal synthetic integration of the system approach concepts based on Kleiner's concept of system integration was obtained. Figure 1 presents a schematic integration of the system approach concepts.

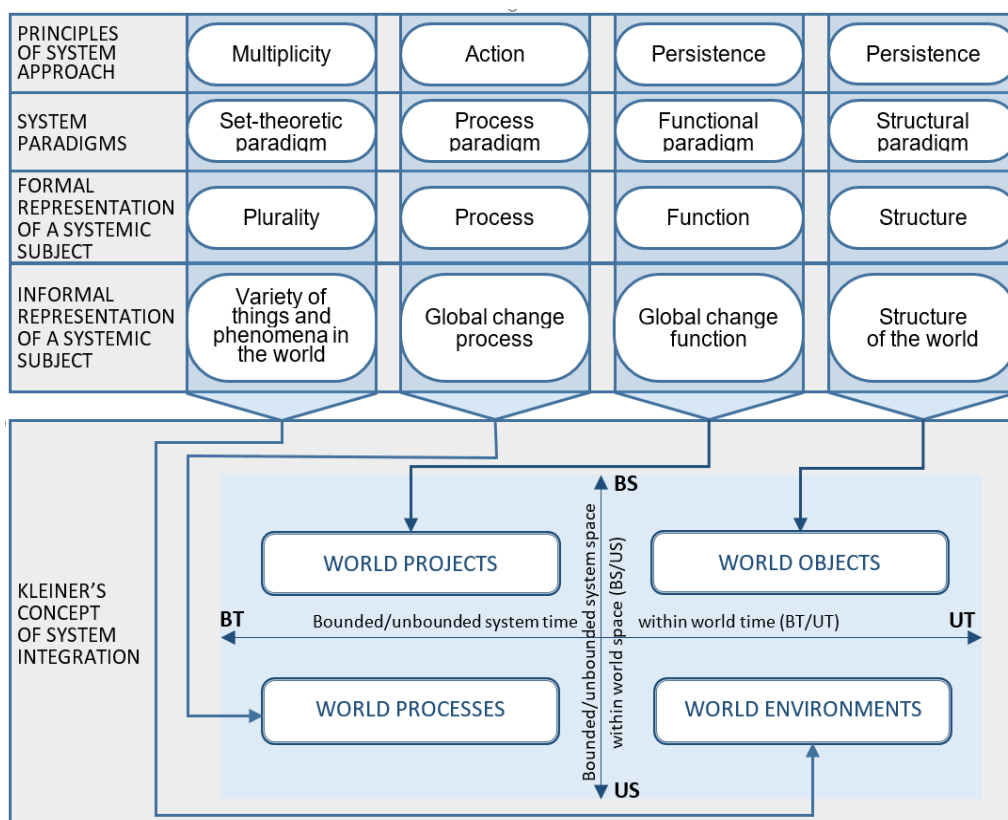


Figure 1: Informal synthetic integration of the system approach concepts based on Kleiner's concept of system integration.

We clarify the basic concepts of the system integration we received, presented in Figure 1.

A system is an internally articulated whole, being a part of the real world of things and phenomena. Both a system, or a thing and phenomenon of the real world included therein are independent and indivisible, and undoubtedly demonstrate this integrity as a specific phenomenon.

Since all things and phenomena of the real world are considered to be an internally articulated whole (that is, a system), we will claim it “a system of the world” to distinguish it from other systems, called “the world systems”. In this case, the system of the world is characterized by world space and world time, and any world system is specified by system space and system time. It follows that the system space is equal to the world space, and the duration of the system time is the same as that of the world time. This cannot be applied to spatial and temporal intensity of systems. In other words, both the system of the world and the world systems possess their own individual intensity of spatial and temporal manifestation. This allows us to introduce the concept of the effective size of the system space and the effective duration of the system time for each world system, and system of the world. It is possible to define spatial localization or boundedness index of the system as the ratio of the effective size of the world space to the effective size of the system space, and temporal localization or boundedness index as the ratio of the effective duration of the world time to the effective duration of the system time. These indices take values from 1 to  $+\infty$ , if we assume that the effective size of the system space does not exceed the effective size of the world space, and the effective duration of the system time does not go beyond the effective duration of the world time. The index value equal to 1 indicates that the system is neither localized nor bounded within world space and world time. Alternately, the index value equal to  $+\infty$  corresponds to the absolute localization and boundedness of the system within world space and world time. The inverse values of these indices, varying from 0 to 1, are indicators of spatial and temporal non-localization, or unboundedness of the world system in world space and time. To determine the types of systems in accordance with the new typology (object, environment, process, and project), we introduce the concept of the critical index value of spatial and temporal localization, or world system boundedness. It is obvious that the inverse values are the critical index values of spatial and temporal non-

localization or unboundedness. The task of determining the critical index values is not posed in this work.

Now we formulate the updated definitions of the system types in accordance with the new typology.

The world system is an object, if the index value of its spatial localization, or boundedness exceeds its critical value, and the index value of its temporal localization, or boundedness does not exceed its critical value.

The world system is an environment, if the index values of its spatial and temporal localization, or boundedness do not exceed their critical values.

The world system is a process, if the index value of its spatial localization, or boundedness does not exceed its critical value, and the index value of its temporal localization, or boundedness exceeds its critical value.

The world system is a project, if the index values of its spatial and temporal localization, or boundedness exceed their critical values.

### **3.3 Logical-semantic basis of the systemological synthesis**

#### **3.3.1 Systemology-Based Synthesis of Advanced Scientific Concepts**

A prominent Russian-American sociologist Pitirim A. Sorokin argued that “in contrast to specific social and psychological sciences, sociology studies common and general properties, rather than certain individual and special aspects or peculiarities of social phenomena” (Sorokin, 1992, 31). According to this assertion, sociology is a general social science, but economics and political science are special social sciences. Herein, a dialectical synthesis is required, which ensures the dialectical development of the semantic logical origin of the system integration concept into a unified informal theoretical and methodological background for theoretical modeling of the development of social systems.

Despite the fact that economics and political science take positions of special social sciences studying “special social phenomena”, we consider the advanced concepts for the development of social systems in economics and political science as special aspects of social development. Figure 2 presents a logical scheme for the dialectical systemology-based synthesis of the advanced concepts for development of social systems.

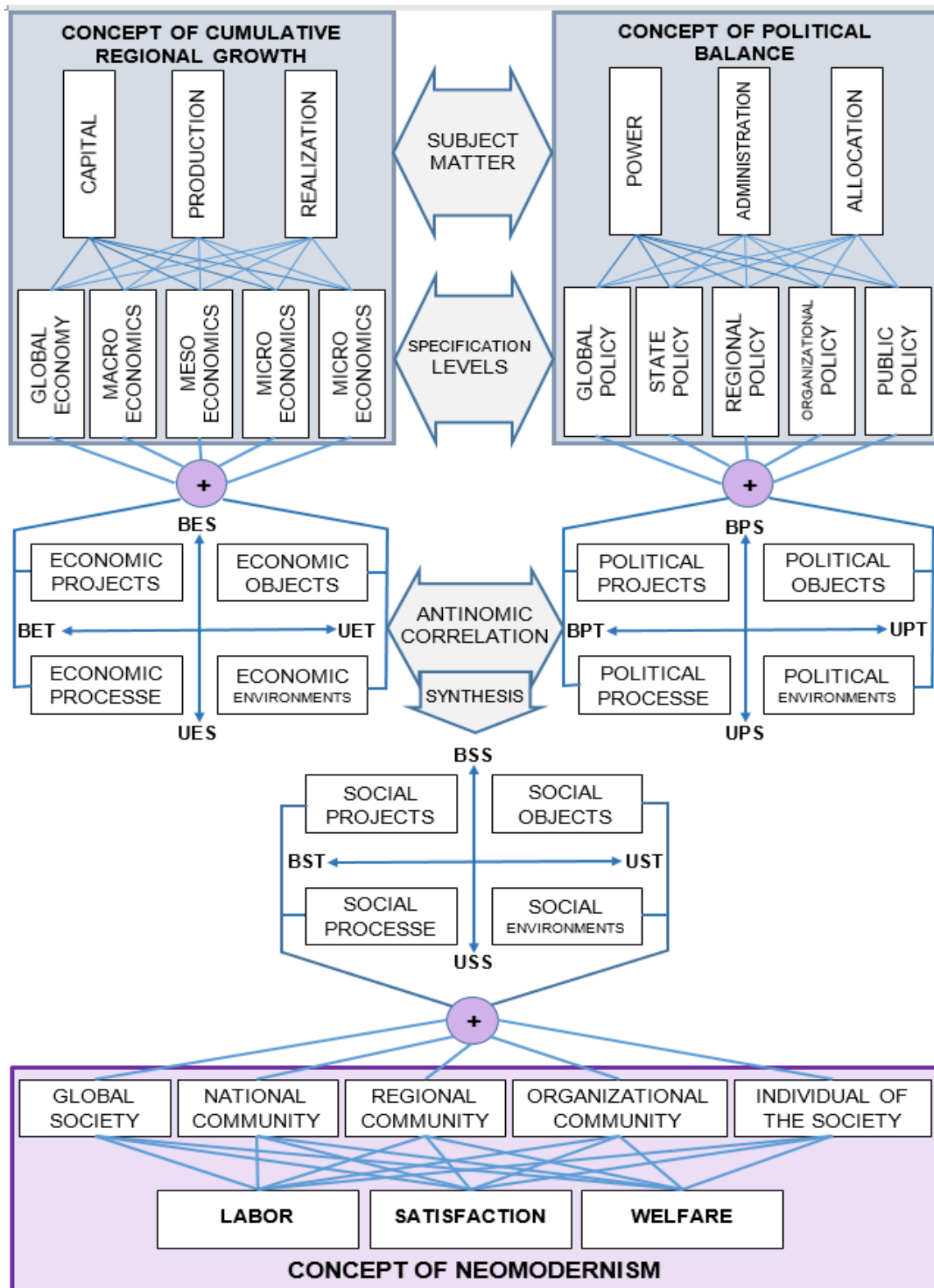


Figure 2: Systemology-based synthesis of the advanced scientific concepts in sociology, economics, and political science using logical semantics for the system integration concept.

Thus, the systemology-based synthesis regards the provisions of the cumulative regional growth concept as an “individual special aspect” of social system development, and the provisions of the concept of political balance are viewed as another “individual special aspect” of the same social system development. In turn, the provisions of the concept of neomodernism should establish their unity therein. This means that there is a dialectical system of relations is established between the provisions of these concepts due to their systemological transformation in the systemology-based synthesis: thesis  $\rightarrow A \leftarrow$  antithesis  $\rightarrow$  synthesis. In the context of social system development, the thesis is considered to be a semantic basis for the actual implementation of this development. Its specific physical realization is the antithesis, which determines the thesis in the synthesis, as a real sense in the actual development of social systems. In accordance with the above and Figure 2, one can put the following dialectical formulas for the systemology-based synthesis of the advanced scientific concepts for social system development:

- capital  $\rightarrow A \leftarrow$  power  $\rightarrow$  labor (1)
- production  $\rightarrow A \leftarrow$  administration  $\rightarrow$   
 $\rightarrow$  satisfaction (2)
- realization  $\rightarrow A \leftarrow$  allocation  $\rightarrow$  welfare (3)
- global economy  $\rightarrow A \leftarrow$  global policy  $\rightarrow$   
 global society (4)
- macroeconomics  $\rightarrow A \leftarrow$  state policy  $\rightarrow$   
 national community (5)
- mesoeconomics  $\rightarrow A \leftarrow$  regional policy  $\rightarrow$   
 $\rightarrow$  regional community (6)
- microeconomics  $\rightarrow A \leftarrow$  organizational policy  $\rightarrow$   
 $\rightarrow$  organizational community (7)
- nanoeconomics  $\rightarrow A \leftarrow$  public policy  $\rightarrow$   
 $\rightarrow$  individual of the society (8)
- economic object  $\rightarrow A \leftarrow$  political object  $\rightarrow$   
 $\rightarrow$  social object (9)
- economic environment  $\rightarrow A \leftarrow$  political environment  $\rightarrow$   
 $\rightarrow$  social environment (10)
- economic process  $\rightarrow A \leftarrow$  political process  $\rightarrow$   
 $\rightarrow$  social process (11)
- economic project  $\rightarrow A \leftarrow$  political  
 project  $\rightarrow$  social project (12)

The first three formulas (1) – (3) establish dialectical relations between the content components of the synthesized scientific concepts for the development of social systems. The following five formulas (4) – (8) determine dialectical relations between the levels of factual description of the development of social systems. Ultimately, the last four formulas (9) – (12) disclose an economic and political dialectical social structure for all four types of world systems.

### 3.3.2 Determination of Basic Concepts

We propose the following definitions of the basic concepts.

A social system is a part of things and phenomena of the real world, correlating with it as an internally articulated whole in this reality. It is independent, indivisible, and integral being demonstrated by its constituent things and phenomena.

A social system of the world are things and phenomena of the real world, considered as an internally articulated whole in their reality. It is independent, indivisible, and integral being demonstrated by its constituent things and phenomena.

Now we proceed from the concepts of world space and world time, system space and system time, the effective size of world space and the effective duration of world time to social concepts of space and time, namely, world social space and world social time, the effective size of the world social space and the effective duration of the world social time. It is reasonable to specify the index of social spatial localization, or social system boundedness as the ratio of the effective size of the world social space to the effective size of the systemic social space, and the index of social temporal localization, or social system boundedness as the ratio of the effective duration of the world social time to the effective duration of the systemic social time.

We propose the updated definitions of social object, social environment, social process, and social project, based on Kleiner’s “new typology of systems”. Systems-objects, systems-environments, systems-processes, and systems-projects possess general specific differences rather than typological ones. Since the problem of forming a unified theoretical and methodological background for theoretical research of the development of social systems is being solved, this requires complex and detailed classification thereof, covering all types of social systems in their spatial and temporal diversity. Such a typological diversity of social systems

involves their logical systematization into groups, classes, and types in accordance with their spatial and temporal development. Therefore, Kleiner's "new typology of systems" is regarded as their basic general classification, establishing common specific differences for all types of social systems.

### **3.4 General Classification of Social Systems**

#### **3.4.1 General Classification, establishing's Common Specific Differences**

We determine the following groups of social systems.

All social systems with the index value of their social spatial localization, or boundedness exceeds its critical value, and the index value of their social temporal localization, or boundedness does not exceed its critical value, are called social objects and referred to the first group (GROUP 1).

All social systems with the index values of their social spatial and social temporal localization, or boundedness do not exceed their critical values, are called social environments and referred to the second group (GROUP 2).

All social systems with the index value of their social spatial localization, or boundedness does not exceed its critical value, and the index value of their social temporal localization, or boundedness exceeds its critical value, are called social processes and referred to the third group (GROUP 3).

All social systems with the index values of their social spatial and social temporal localization, or boundedness exceed their critical values, are called social projects and referred to the fourth group (GROUP 4).

#### **3.4.2 General Classification, establishing's Class Specific Differences**

The concept of system integration introduces another spatial and temporal characteristic of the system, namely, that of homogeneity/inhomogeneity (Kleiner, 2008) in addition to boundedness/unboundedness of space and time of the system. Herein, it is proposed to use this characteristic as the basis for an intraspecific general classification of social systems by subdividing the groups of social systems into classes. For this, it is required to introduce heterogeneity indices of social space and time, and substantiate their critical values for each group of social systems. General class differences are established for each group of social system in accordance with the critical values of these

indices. It is also proposed to use the intensity value of spatial and temporal manifestation of the social system, or rather the distribution of the intensity of its manifestation in space and time. We consider the space of a social system to be homogeneous, if the distribution of the intensity value of its manifestation in space is uniform. Then, the ratio of the maximum value of the intensity of social system manifestation in space to its average value is considered as an indicator of spatial system heterogeneity. The indicator of temporal system heterogeneity of the social system is determined in a similar way. We denote these indicators as the coefficients of spatial and temporal heterogeneity of the social system. It is obvious that the inverse values of these coefficients correspond to spatial and temporal homogeneity of the social system, being called the coefficients of spatial and temporal homogeneity of the social system. The coefficients of heterogeneity can take values from 1 (absolute homogeneity) to  $+\infty$  (absolute heterogeneity), and the coefficients of homogeneity can take values from 0 (absolute heterogeneity) to 1 (absolute homogeneity). In order to establish general class differences for each group of social systems, we introduce the critical values of these coefficients and arrange social systems into several classes. The task of determining these indicators and their critical values is not posed in this work.

Social systems can be arranged into several classes depending on the group of social objects, social environments, social processes, and social projects included therein.

The first class of social systems consists of social objects with the coefficient value of their spatial heterogeneity (homogeneity) being greater (less) than its critical value specified for social objects, and the coefficient value of their temporal heterogeneity (homogeneity) being less (greater) than its critical value accepted for social objects. Such social objects are called mono-objects, representing a class of social mono-objects (CLASS 1).

The second class of social systems consists of social objects with the coefficient values of their spatial and temporal heterogeneity (homogeneity) being greater (less) than their critical values specified for social objects. Such social objects are called poly-objects, making up a class of social poly-objects (CLASS 2).

The third class of social systems consists of social objects with the coefficient value of their spatial heterogeneity (homogeneity) being less (greater) than its critical value specified for social objects, and the coefficient value of their temporal heterogeneity

(homogeneity) being greater (less) than its critical value accepted for social objects. Such social objects are called integrated objects, representing a class of social integrated objects (CLASS 3).

The fourth class of social systems consists of social objects with the coefficient values of their spatial and temporal heterogeneity (homogeneity) being less (greater) than their critical values specified for social objects. Such social objects are called network objects, making up a class of social network objects (CLASS 4).

The fifth class of social systems consists of social environments with the coefficient values of their spatial and temporal heterogeneity (homogeneity) being less (greater) than their critical values accepted for social environments. Such social environments are called natural environments, representing a class of social natural environments (CLASS 5).

The sixth class of social systems consists of social environments with the coefficient value of their spatial heterogeneity (homogeneity) being less (greater) than its critical value accepted for social environments, and the coefficient value of their temporal heterogeneity (homogeneity) being greater (less) its critical value specified for social environments. Such social environments are called structured environments, making up a class of social structured environments (CLASS 6).

The seventh class of social systems consists of social environments with the coefficient values of their spatial and temporal heterogeneity (homogeneity) being greater (less) than their critical values accepted for social environments. Such social environments are called clustered environments, representing a class of social clustered environments (CLASS 7).

The eighth class of social systems consists of social environments with the coefficient value of their spatial heterogeneity (homogeneity) being greater (less) than its critical value accepted for social environments, and the coefficient value of their temporal heterogeneity (homogeneity) being less (greater) its critical value specified for social environments. Such social environments are called interconnected environments, making up a class of social interconnected environments (CLASS 8).

The ninth class of social systems consists of social processes with the coefficient value of their spatial heterogeneity (homogeneity) being less (greater) than its critical value accepted for social processes, and the coefficient value of their temporal heterogeneity (homogeneity) being greater (less) its critical value specified for social processes. Such social processes

are called diffusion processes, representing a class of social diffusion processes (CLASS 9).

The tenth class of social systems consists of social processes with the coefficient values of their spatial and temporal heterogeneity (homogeneity) being less (greater) than their critical values specified for social processes. Such social processes are called diversification processes, making up a class of social diversification processes (CLASS 10).

The eleventh class of social systems consists of social processes with the coefficient value of their spatial heterogeneity (homogeneity) being greater (less) than its critical value accepted for social processes, and the coefficient value of their temporal heterogeneity (homogeneity) being less (greater) its critical value specified for social processes. Such social processes are called integration processes, representing a class of social integration processes (CLASS 11).

The twelfth class of social systems consists of social processes with the coefficient values of their spatial and temporal heterogeneity (homogeneity) being greater (less) than their critical values accepted for social processes. Such social processes are called localization processes, making up a class of social localization processes (CLASS 12).

The thirteenth class of social systems consists of social projects with the coefficient values of their spatial and temporal heterogeneity (homogeneity) being greater (less) than their critical values accepted for social projects. Such social projects are called organizational projects, representing a class of social organizational projects (CLASS 13).

The fourteenth class of social systems consists of social projects with the coefficient value of their spatial heterogeneity (homogeneity) being greater (less) than its critical value accepted for social projects, and the coefficient value of their temporal heterogeneity (homogeneity) being less (greater) its critical value specified for social projects. Such social projects are called infrastructure projects, making up a class of social infrastructure projects (CLASS 14).

The fifteenth class of social systems consists of social projects with the coefficient values of their spatial and temporal heterogeneity (homogeneity) being less (greater) than their critical values accepted for social projects. Such social projects are called information projects, representing a class of social information projects (CLASS 15).

The sixteenth class of social systems consists of social projects with the coefficient value of their spatial heterogeneity (homogeneity) being less (greater) than its critical value accepted for social projects, and the coefficient value of their temporal

heterogeneity (homogeneity) being greater (less) its critical value specified for social projects. Such social projects are called intellectual projects, making up a class of social intellectual projects (CLASS 16).

### 3.4.3 Typology and a Complex System of General Classification of Social Systems

The five formulas given in subsection 3.3.1 that establish dialectical relations between the development levels of social systems in sociology, economics, and political science form the basis for constructing a general class typology of social systems. These formulas of systemology-based synthesis correspond to the five organizational levels of social systems, and are defined as nano-, micro-, meso-, macro-, and mega-levels. Although the five concepts are considered to be levels of social system organization, they are not similar. An exception is the concept of a meso-level, which determines a given social system as a social environment, being limited to some extent. The other four levels of social system organization can be equally attributed to a social system of any group and any class. We assume the level of social system organization to be determined by the nature of social elements and social singular entities (singularities) making up a social system as an internally articulated whole thereof. This approach to the perception of the organizational level requires a precise definition of nano-, micro-, macro-, and mega-social singular entities. We render such notions as follows.

Nano-social singularity is a social human being. Micro-social singularity is an internally articulated whole of nano-social singularities.

Macro-social singularity is an internally articulated whole of micro-social singularities.

Mega-social singularity is an internally articulated whole of macro-social singularities.

We consider a social system to be organized at the nano-level, if it is formed by nano-social singularities as an internally articulated whole thereof, and being a micro-social singularity. A social system is organized at the micro-level, if it is formed by micro-social singularities as an internally articulated whole thereof, and being a macro-social singularity. A social system is organized at the macro-level, if it is formed by macro-social singularities as an internally articulated whole thereof, and being a mega-social singularity. Finally, a social system is organized at the mega-level, if it is formed by mega-social singularities. Social systems organized at the mega-level can be considered to be world social singularities, making up the world social system.

The considered organizational levels of social systems form the basis for the construction of a general classification system of social systems, including their class typology. Such system is characterized by a hierarchical order, which allows developing its structure based on the proposed classification of groups, classes, and types of social systems, without violating its original hierarchical structure. This complex system of general classification of social systems is presented in Table 1.

Table 1: A complex system of general classification of social systems.

Group	Class	Type			
		Nano-	Micro-	Macro-	Mega-
Social object	Social mono-object	Nano-social mono-object	Micro-social mono-object	Macro-social mono-object	Mega-social mono-object
	Social poly-object	Nano-social poly-object	Micro-social poly-object	Macro-social poly-object	Mega-social poly-object
	Social integrated object	Nano-social integrated object	Micro-social integrated object	Macro-social integrated object	Mega-social integrated object
	Social network object	Nano-social network object	Micro-social network object	Macro-social network object	Mega-social network object
Social environment	Social natural environment	Nano-social natural environment	Micro-social natural environment	Macro-social natural environment	Mega-social natural environment
	Social structured environment	Nano-social structured environment	Micro-social structured environment	Macro-social structured environment	Mega-social structured environment
	Social clustered environment	Nano-social clustered environment	Micro-social clustered environment	Macro-social clustered environment	Mega-social clustered environment
	Social interconnected environment	Nano-social interconnected environment	Micro-social interconnected environment	Macro-social interconnected environment	Mega-social interconnected environment
Social I	Social diffusion process	Nano-social diffusion process	Micro-social diffusion process	Macro-social diffusion process	Mega-social diffusion process

	Social diversification process	Nano-social diversification process	Micro-social diversification process	Macro-social diversification process	Mega-social diversification process
	Social integration process	Nano-social integration process	Micro-social integration process	Macro-social integration process	Mega-social integration process
	Social localization process	Nano-social localization process	Micro-social localization process	Macro-social localization process	Mega-social localization process
Social project	Social organizational project	Nano-social organizational project	Micro-social organizational project	Macro-social organizational project	Mega-social organizational project
	Social infrastructure project	Nano-social infrastructure project	Micro-social infrastructure project	Macro-social infrastructure project	Mega-social infrastructure project
	Social information project	Nano-social information project	Micro-social information project	Macro-social information project	Mega-social information project
	Social intellectual project	Nano-social intellectual project	Micro-social intellectual project	Macro-social intellectual project	Mega-social intellectual project

A system of relationships between types of social systems originates at the level of general typological differences thereof. These relationships are similar to general interclass relationships, i.e. they obey the principles of interspecific class and typological conformity, and general typological precedence (succession).

## 4 DISCUSSION

In the course of their origin, formation, development, functioning, and evolution, social systems of various groups would enter into relationships in accordance with certain principles. Firstly, the principle of semantic cumulative causation of the groups of social systems means that semantic content of a social system of one group directly or transitive (according to the transitive chain ... → GROUP 1 → GROUP 2 → GROUP 3 → GROUP 4 → GROUP 1 →...) determines the semantic content of a social system of another group. Secondly, the principle of physical cumulative causation of the groups of social systems means that the physical embodiment of the semantic content of a social system of one group directly or transitive (according to the transitive chain ... → GROUP 1 → GROUP 4 → GROUP 3 → GROUP 2 → GROUP 1 →...) determines the physical embodiment of the semantic content of a social system of another group.

Interspecific relationships between social systems and the principles for the implementation thereof are specified, taking into account general class differences of social systems. Moreover, there are specific general interclass relationships between social systems of the same type, but different classes. Such general interclass relationships should be observed in accordance with certain principles. There are two principles of general interclass relationships between social systems. The first principle is called

the principle of general interspecific class conformity of social systems, and another one being the principle of general class precedence (succession) of social systems.

The principle of general interspecific class conformity of social systems suggests that each class of social systems corresponds to another class of the same type so that general interspecific relations of cumulative causation and determination are established between thereof.

The principle of general class precedence (succession) of social systems indicates that each class of social systems either precedes or follows any class of the same type, or both.

According to the first principle, the sixteen classes of social systems are divided into four groups. Each group is made up of four classes corresponding to each other, capable of entering into relations of cumulative causation and determination. Consequently, each group can be considered as a system of classes of social systems able to develop with inherent evolution type. The first group consists of CLASS 1, CLASS 5, CLASS 9, and CLASS 13. These classes of social systems realize reproductive development through systemic relations of cumulative causation and determination. The second group is formed by CLASS 2, CLASS 6, CLASS 10, and CLASS 14. These classes of social systems implement modernization development through systemic relations of cumulative causation and determination. The third group consists of CLASS 3, CLASS 7, CLASS 11, and CLASS 15. These classes of social systems realize evolutionary development. Finally, the fourth group consists of CLASS 4, CLASS 8, CLASS 12, and CLASS 16. These classes of social systems implement innovative development of social systems transforming thereof into an innovative social system regardless of its class and type.

The order of precedence and the reverse order of succession are established in accordance with the

second principle of general class precedence (succession) between classes of social systems of the same type. The following precedence order is established between the classes of social objects. The class of social mono-objects CLASS 1 precedes the class of social poly-objects CLASS 2. The latter antecedes the class of social integrated objects CLASS 3, which precedes the class of social network objects CLASS 4. The latter can only antecede CLASS 1\* being a new type in the class of mono-objects. The order of succession, as the opposite of the order of precedence, establishes the following order between the classes of social objects. The class of social network objects CLASS 4 follows the class of social integrated objects CLASS 3. The latter comes after the class of social poly-objects CLASS 2, which follows the class of social mono-objects CLASS 1. The latter can only follow the previous (prior) CLASS 4\* in the class of social network objects. Then, the corresponding order of precedence and succession is established between the classes of social environments based on the principle of interspecific class conformity. The class of social natural environments CLASS 5 precedes the class of social structured environments CLASS 6. The latter antecedes the class of social clustered environments CLASS 7, which precedes the class of social interconnected environments CLASS 8. The latter can only precede CLASS 5\* being a new type in the class of natural environments. The following relation has the reverse order here. CLASS 8 follows CLASS 7. The latter comes after CLASS 6, which follows CLASS 5. The latter can only follow the previous (prior) CLASS 8\*. In turn, certain orders of precedence and succession are established between the classes of social processes. The class of social diffusion processes CLASS 9 precedes the class of social diversification processes CLASS 10. The latter antecedes the class of social integration processes CLASS 11, which precedes the class of social localization processes CLASS 12. The latter can only precede CLASS 9\* being a new type in the class of diffusion processes. The following relation has the reverse order here. CLASS 12 follows CLASS 11. The latter comes after CLASS 10, which follows CLASS 9. The latter can only follow the previous (prior) CLASS 12\*. Finally, the following precedence and succession orders for classes of social projects are as follows. The class of social organizational projects CLASS 13 precedes the class of social infrastructure projects CLASS 14. The latter antecedes the class of social information projects CLASS 15, which precedes the class of social intellectual projects CLASS 16. The latter can only

precede CLASS 13\* being a new type in the class of organizational projects. The following relation has the reverse order here. CLASS 16 follows CLASS 15. The latter comes after CLASS 14, which follows CLASS 13. The latter can only follow the previous (prior) CLASS 16\*.

## 5 CONCLUSION

A unified theoretical and methodological background for research development of social systems has been formed on the basis of Kleiner's system integration concept using the systemology-based synthesis of the advanced scientific concepts of social system development (neomodernism in sociology, cumulative regional growth in economics, and political balance in political science). It includes a system of basic general concepts, establishes the characteristics of entities expressed by the basic concepts, and defines groups, classes, and types of social systems to build a complex system of their general classification. Besides, general principles of interclass and interspecific relationships between social systems have been formulated, and a general model for the development thereof has been built.

Thus, on the one hand, the considered principles of general interspecific class conformity and general class precedence (succession) of social systems provide a sufficient theoretical and methodological basis for a general class and specific modeling of the development of social systems. On the other hand, it is required the introduction of a typology for the class sets of social systems.

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