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A NEW THEORY OF ECONOMIC SYSTEMS AND ITS APPLICATION TO ECONOMIC POLICY STUDIES*

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Abstract

The basics of a new theory of economic systems are proposed in this article as a fundamental synthetic field of economics. This theory proposes to unify a description of economic phenomena usually studied by different areas of economics: economic agents, i.e., legal and physical entities, formal and informal institutions, economic processes, and projects. A basic classification of economic systems is developed, their key functions are defined, and the need for power parity of the basic types of economic systems is proved. The results obtained are used to classify the types of national economic policy and elaborate measures aimed at preventing crisis phenomena and building a well-balanced economy.

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A New Theory of Economic Systems and Its Application to Economic Policy Studies

By George B. Kleiner (Central Economics and Mathematics Institute, RAS)

1. INTRODUCTION

The socioeconomic crisis that swept most countries in 2008 has prompted the need to reconsider the assessments of the status and structure of the world economy, the views on the effectiveness of economic policy pursued by most countries, and the relevance of modern economic theory. It is economic theory that eventually shapes both economic policy and, through the latter, economic practice; therefore, the fundamental response of the world economy to the crisis should, above all, deal with economic theory.

Fragmentation became a feature of economics in the last decades with its separation into loosely bound theories lacking a single conceptual framework. Robbins (1935) said about 75 years ago that modern economics was a comparatively young science. Economics as a science has failed so far to attain steady unity. The development of various economic disciplines promotes centrifugal trends. The descriptions of real economic systems and situations, as well as recommendations generated by theory, have become more and more fragmentary. There are cracks throughout the entire structure of economic science. Fragmentation has affected the methodological and paradigm elements of economics, the relationships among the description of various levels of economics (micro-, macro-, and mega-levels), and the links among empirical, theoretical, and conceptual research. At present, economic disciplines are insufficiently linked in terms of methodology and research techniques (Blaug, 1992; Hodson, 2007; Lawson, 1997). This situation erects serious barriers for the development of economic science and its application for the effective solution of practical issues. It seemed possible in the middle of the 20th Century to build a single structure for economic science based on a neoclassical paradigm. Yet the latter has failed to accomplish the task, being first bounded by the rational, then, the non-rational, and, finally, the irrational behavior of agents. The development of the institutional-

evolutionary trend has also demonstrated its evident narrow-mindedness, mostly in describing the dynamics of institutions and their relationships with agents.

It is namely the fragmentation of economic theory that is a causal factor of what Polterovitch called a crisis in economic science (Polterovitch, 1998) and of what is called a crisis of real economy. The global crisis that swept financial, economic, and social spheres in 2008 was triggered not only by a spontaneous combination of unfavorable factors but also by the inability of fragmented economic theory to yield a system-based picture of the economic environment. On this subject, Lawson (2006) said, "Economic theory experiences difficulties in explaining events occurring in the real world and in performing an analysis suitable for economic policy."

The question of how tendencies of disintegration and fragmentation of theory could be opposed needs to be examined. According to Kornai (2002), the answer is to develop a system paradigm as an alternative to both neoclassical and institutional-evolutionary mainstream. An essential component of a system paradigm in economics should become a *unified theory of economic systems*, interpreting properties inherent in economic systems of various levels, nature, and scale. Building such a theory and its application would allow overcoming or reducing most of the above-mentioned types of economic theory fragmentation. Arrow (1995) noted that biological analogies are more relevant for economic theory than generally accepted mechanical analogies. Hahn (1995) expressed the same opinion, but biological systems are significantly more system-like than mechanical ones. All this provokes the idea that, in the future, a systems perspective may become the mainstream in economic theory.

In this article, the basics of a new theory of economic systems are proposed as a fundamental synthetic field of economics. The theory proposes to unify the description of economic phenomena usually studied by various sections of economics: economic agents (legal entities and individuals), formal and informal institutions, economic processes, and projects. A basic classification of economic systems is developed, their key functions are defined, and the need for "power" parity of the basic types of economic systems is proved. The results obtained are used to classify the types of national economic policy and elaborate measures aimed at preventing crisis phenomena and building a well-balanced economy.

2. CONCEPTUAL BASES OF A SYSTEM PARADIGM IN ECONOMICS

According to a system paradigm, the functioning of an economy, i.e., the realization of the processes of production, distribution, exchange, and consumption of material and nonmaterial goods, is viewed through the prism of creation, interaction, transformation, and liquidation of *economic systems*. The principle of methodological individualism, basic to the neoclassical paradigm, gives way to the principle of methodological systematics, basic to a system paradigm. This means that the main actors in economics will not be independent (and spatially separated from one another) individuals, but only relatively independent (possibly overlapping spatially) economic systems. Inter-system interaction is exercised through an inter-system environment that possesses a relevant structure for transporting material and intangible goods. The intra-system environment has a similar structure, which ensures the unity of intra- and inter-system space and the economy in general. According to the system paradigm, the character of "natural" functioning of an economic system is defined not so much by its scale as by its distinctive nature, particularly, by the configuration of its boundaries with the environment.

This paper defines *a system* as a relatively independent part of the environment, stable in time and space, possessing both the properties of external integrity and internal diversity.

Two basic distinctions of the new systems approach may be identified from the classical theory of systems created by von Bertalanffy, Ashby, and Wiener. The first distinction is that, previously, the systems approach mainly relied on an "endogenous," internal perception of the system. It was considered *a priori* as sets of interrelated elements. New systemacy is based on an exogenous, external perception of a system: a system is basically viewed as a certain fragment of reality, allocated in this or that way in space and time. The modern version of the systems approach puts emphasis on the *integral image of reality*, or "gestalt," materialized in the system. Set-theory structures are certainly used in the exogenous study of systems, although they are accompanied with additional aspects that cannot be modeled "pointwise" (Haines, 2000).

The second distinction is related to a substantial enhancement of a subjective component in interpreting a system. Numerous studies of the last decades, which

revealed the role of the subjective factor in economic behavior at all levels, changing the very concept of rational economic behavior, have also affected the perception of the subject area of system theory as far as economic systems are concerned.

We mainly consider economic systems whose creation and functioning secure the processes of production, distribution, exchange, and use of goods and which are impossible without human participation. All the economic systems under examination are "living" systems, meaning that the functioning of each of them is based on the activity of people as individuals, collectives, groups, and/or communities. At the same time, no single person, as an integral whole, can be fully a part of any economic system (except this specific individual), whereas any economic system uses people's various intellectual, physical, emotional, and social abilities.

Evidently, economic systems include enterprises, organizations, countries, and other types of economic objects. However, we believe it would be natural and expedient to regard other economic entities and phenomena as economic systems, such as institutions and institutional sets, social-economic processes, programs, and projects (Kleiner, 2007). On the other hand, the set of goods on grocery store shelves cannot be viewed as an economic system since it is not a living aggregate.

3. A BASIC TYPOLOGY OF ECONOMIC SYSTEMS

Since a system is a part of the environment, relatively stable in space and time,[1] it seems that the parameters of a system should first reflect the specifics of its natural space-time boundaries. The first one to be addressed is the degree of certainty (uncertainty) of boundaries that separate a system from the outside world.[2] Such systems as an enterprise, an individual, or a group of concrete persons, have, as a rule, fixed spatial boundaries and do not possess *a priori* a fixed life time (for enterprises, it is reflected in the well-known notion of ongoing concern). Other systems, for instance, systems of institutional nature (such as the Civil Code treated together with the

[1] Stability may be combined with the translocation of a system in space or in time.

[2] Gumilev's comment (1990) is appropriate in this context: "Let us ask ourselves: What is accessible to a direct observer? It turns out that it is not an object, but its boundaries."

mechanisms of its enforcement), do not possess certain boundaries either in time or space.[3] On the other hand, projects, i.e., the aggregate of measures aimed at achieving a concrete goal (construction of a building, mastering of a new market, establishment of a company, publishing of a book), have, as a rule, well-defined boundaries in time and in space.

We want to underscore that the subjects under consideration are functioning (living) economic systems and that, by a system's boundaries, we mean not just boundaries of space and time virtually occupied by the system at a given moment (such boundaries may be determined by the effect of exogenous forces) but the limits of a system's "natural" functioning immanent (genetically) to a given system. The intervention of external forces can reduce those boundaries (e.g., a company's founders may decide on its liquidation and liquidate it). Thus, there are different degrees of certainty for boundaries separating various systems from the outside world. Such characteristics appear to be essential in distinguishing system properties and functions.

Indices are introduced here for the uncertainty of a system's boundaries in time and space. Let $S = \{s\}$ be the set of all functioning economic systems, and let us put in correspondence with each system $s \in S$ two characteristics, $p(s)$ and $q(s)$, reflecting, respectively, the degree of certainty of the spatial and temporal boundaries of system s. Let $p(s)$ and $q(s)$ take on numerical values, with the values $p(s) = q(s) = +\infty$ corresponding to a case of total (absolute) uncertainty of the system's spatial and temporal boundaries.[4] Let the values $p(s) = q(s) = -\infty$, vice versa, reflect completely (to any desirable accuracy) the known boundaries of the system's location in time and space (a case of absolute knowledge). Finally, let the intermediate values $p(s) = q(s) = 0$ reflect a "normal" degree of certainty of the boundaries of the system s in space and time, as seen by a normal business agent. Now, $p(s) > 0$ ($q(s) > 0$) if the boundaries of

[3] Similar to enterprises, the dates of enactment of Civil Code Articles are known, but, as a rule, their effective lifetime is not known.

[4] The existence of a system's boundaries and the degree of their uncertainty are captured as seen by "a normal business agent" (see Footnote 1 on p.4).

system s in space (in time) are uncertain, and $p(s) < 0$ ($q(s) < 0$) if the boundaries of system s in space (in time) are deemed to be known.

As a result, the entire set of systems $s \in S$ can be divided into four classes:

1) The set S_1 including systems s, for which $p(s) > 0$ and $q(s) > 0$ (the system has uncertain spatial boundaries and an uncertain functioning time span);

2) The set S_2 including systems s, for which $p(s) > 0$ and $q(s) < 0$ (the system has uncertain spatial boundaries and a more or less certain time span of functioning);

3) The set S_3 including systems s, for which $p(s) < 0$ and $q(s) > 0$ (the system has more or less certain spatial boundaries and an uncertain functioning time span);

4) The set S_4 including systems s, for which $p(s) < 0$ and $q(s) < 0$ (the system has more or less certain spatial boundaries and a more or less certain functioning time span).

To visualize the above, we introduce a system of coordinates (p,q) whose X-axis ($-\infty \leq p \leq +\infty$) reflects the degree of uncertainty of the spatial boundaries $p(s)$ of system s and whose Y-axis ($-\infty \leq q \leq +\infty$) reflects the degree of uncertainty of the temporal boundaries $q(s)$; the intersection point corresponds to the case of a "normal" degree of certainty of the system's spatial and temporal boundaries. Each system s is represented by point $(p(s), q(s))$ on this Cartesian plane. Then, the environment) systems, process systems, project systems, and object systems fill, respectively, quadrants I, II, III, and IV of the Cartesian plane (p,q) (Fig. 1 illustrates the location of s1,…,s13 systems belonging to various types on a given Cartesian plane).

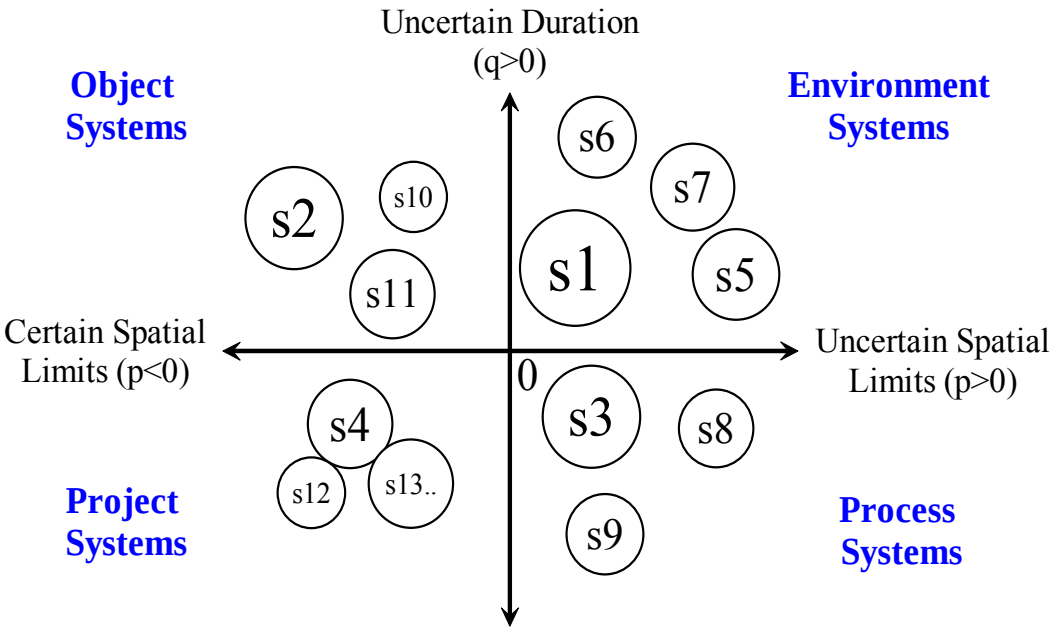

Fig. 1. Breakdown of s1,…,s13 systems into object, environment, process, and project systems

The uncertainty of boundaries and impossibility of drawing a more or less clear demarcation line between the domain in the spatial-temporal continuum occupied by the system and its complement are defined as a system's *unlimitedness* in the literal sense of the word "unlimitedness" (lack of limits). The circumstances under which situations of uncertainty regarding an economic system's boundaries occur need to be established from an observer's point of view. Let us start with unlimitedness in time. Since an economic system, once emerged, exists continuously as a rule, living through all the intermediate time stages from emergence to liquidation, the duration of an economic system will represent interval $<a, в>$ on the numerical time axis $-\infty \leq a,b \leq \infty$. Uncertainty of the interval's boundaries arises if one or both numbers a,b are unknown to the observer or equal to $-\infty$ or $+\infty$. Despite the fact that the life cycle of an enterprise or the life span of any individual is finite, business practice and social customs are based on the assumption of the unlimited existence of an operating enterprise or an individual.

In space, unlike in time, the configuration of an economic system can have as much complexity and as many relationships as possible. Uncertainty of spatial boundaries may be due to remoteness of the boundaries from the location of a specific business agent (observer). It may be due to his limited «information vision» - the so-called information myopia or impossibility of a detailed description of the boundaries (a limited resolving power of the information vision - information hyperopia). Most often, the spatial uncertainty of a system's boundaries is empirically recorded by a business agent if the latter perceives the system's extension in space as virtually unlimited.

Now, systems' limitedness/unlimitedness in space and in time can be used as a basis for a basic typology of economic systems (see Table 1).

Table 1

Division of systems depending on spatial and temporal characteristics (L – limited, U – unlimited either in space or in time)

Size (spatial)	Duration	
	Limited (certain time period)	**Unlimited** (uncertain time period)
Limited (certain size)	LL (the set S_4)	LU (the set S_3)
Unlimited (uncertain size)	UL (the set S_2)	UU (the set S_1)

It is necessary to give a substantive economic description of each of these system types. It has been proved (Kleiner, 2007) that the properties of economic systems from S_1 are similar to those of *the environment*, i.e., a more or less homogeneous matter filling space; those of S_2 class systems are similar to an *object's* properties (an object is a part of the external world, which exists outside a person), properties of systems from S_3 are similar to those of *processes* (a cyclical pattern of a phenomenon's development), properties of systems from S_4 are similar to those of *projects* (a project is a sequence of steps aimed at achieving a specific goal within a specified time period). Examples of object systems are legal entities and individuals, organizations, regions, and republics. They include subnationals, subterritories of the Russian Federation, and countries. Environment systems include the Internet, the stock market, the RF Postal Service, the national legal framework, an institution, and mass

media. Process systems include higher education, science, art, innovations diffusion, inflation, and a country's economic growth. Project systems include construction of a building, enterprise restructuring, elections of a CEO, and hosting of the 2014 Winter Olympics and so on.

Thus, objects, environments, processes, and projects are not only the most significant and widely researched part of economic phenomena and systems but, in fact, exhaust the variety of their types.[5]

The theory being presented makes it possible, on the one hand, to examine all these economic entities and phenomena from the same perspective as integral components of the economy and types of economic systems and, on the other hand, to identify and classify their essential structural and functional distinctions.

It is evident that they have been placed into four non-overlapping subsets, with the accuracy within the degree of precision of input information on systems' boundaries. However, given the imprecision and/or subjective character of input information on systems' boundaries, what has been proposed above appears to be *a conceptual typology* of systems. Actual economic systems often have characteristics of all the four $S_1,\ldots,S_4$ types, although to various degrees. Thus, an enterprise (a system evidently belonging to the class of objects) has a specific internal climate, a specific *environment* («plant environment», «company climate»). Each enterprise implements, on a systems basis, three key *processes*: production, sales, and resource reproduction. The properties of these processes also characterize the enterprise. Furthermore, an enterprise's activity involves, at each given moment, the implementation of a number of projects, e.g., innovation projects. In addition, if a system is an evolving network or an uncertain set of enterprises, it combines the properties of production entities (objects) with properties of communication environments. Hybrid systems also include enterprises treated as a whole together with their authorized service entities and/or franchisees.

[5] Note an interesting morphological opposition: an OBject is linguistically opposed to a PROject. On the other hand, projects (and project-linked events) could be called Excesses, in opposition to PROcesses.

4. VARIATIVE CHARACTERISTICS OF THE ECONOMY

The basic typology of economic systems is important not only for an in-depth understanding of their nature but also for the examination of their functions in the economy. The functions of systems belonging to the same type appear to have common properties, whereas the properties differ for systems belonging to different classes. In what terms the difference is investigated is not evident *a priori*. Therefore, prior to examining the characteristics of the functions of the basic system types in the economy, we will characterize, in general functional terms, the properties of standard economic processes (acts) of the production, distribution, exchange, and consumption of goods.

The substance of *production* is a combination of various types of resources (material, labor, financial, and information) to create goods. The emergence in space of these new goods or new types of goods that did not exist before diversifies the space, reducing the degree of its homogeneity. At the same time, production, as a process, is renewable, continuous, and system-based in nature, which contributes to the stability (continuity) of time. It is evident that production as a process increases the homogeneity of time, i.e., the stability of inter-period links.

Exchange as an economic process or act, contrary to the above, serves to balance the state of its participants, making part of the space surrounding them more homogeneous. However, the situation before an act of exchange differs from the situation after it, which means a decrease in the "homogeneity of time."

Distribution of goods changes the state of objects before and after the act of distribution and reduces the homogeneity of both space and time.

Finally, *consumption*, as a rule, involves a change of the autonomous status and form of the particular good consumed, its inclusion in a respective environment, and its subsequent dissolution in this environment. Meanwhile, the resources lose their specificity. This serves to increase the homogeneity of space. At the same time, consumption as a process of renewal of resources consumed in the previous cycle ensures the continuation of its existence in the following period and, thus, contributes to the continuity of time.

Thus, each of the four standard types of economic processes (acts) changes in a certain way the degree of *diversity* of the economic space and the variability of *the course* of economic time. To describe these phenomena, it is useful to introduce a

special group of characteristics of the economy that reflect the degrees of diversity of space/time. We call them *variative characteristics* of the economy, and we call the processes of their change *variative processes*. Furthermore, we call the impact of functioning of economic systems on these characteristics the systems' *variative functions*.

The importance of the variative characteristics of the economy for all the aspects of economic activity and all the levels of the economy is noteworthy. Thus, investment activity is most effective in the context of the homogeneity of time when investor is confident about the stability of the system; on the contrary, innovation activity presupposes heterogeneity of time. Trade-intermediary activity is related to heterogeneity of space (the existence of various goods in some points of space and their absence in other points); delivery of goods, on the contrary, requires a certain homogeneity of space and a developing infrastructure.

It is also important to note the significance of the variative functions of economic systems for a general characterization of the situation in the economy. The balance of intensity of these functions is closely linked to the notion of harmony of the economy. The notion of harmony rests on proportionality and balance, i.e., a combination of unity and diversity. A harmonious economy is understood to be a form of organization of economic life and activity that achieves an integral spatial-temporal balance and integrity in the context of sustainable evolutionary development.

All this demonstrates that a general economic mission of various types of economic systems should be primarily studied through their influence on the variative characteristics of the economy.

The influence of the above-mentioned processes on the variative characteristics of the economy is presented in Table 2.

We see that the four main economic processes (acts) represent a complete system of possible combinations of changes of the variative characteristics of economy, i.e., of the increase/decrease of space-time diversity; moreover, each combination of values of these features corresponds to exactly one economic act. Each of these processes (acts) realizes *two* variative functions, whereas the realization of each of these functions is distributed between *two* standard processes (acts).

Table 2

Effect of Basic Economic Processes on Variative Functions of Space and Time

Basic Economic Processes (acts)	Variative Functions of Basic Economic Processes (acts)	
	Homogeneity of Space:	Homogeneity of Time:
Production	Decreases	Increases
Distribution	Decreases	Decreases
Exchange	Increases	Decreases
Consumption	Increases	Increases

5. KEY COMPETENCES OF VARIOUS TYPES OF ECONOMIC SYSTEMS

The study of the variative effects of the course of basic economic processes (acts) leads to the conclusion that what is most relevant for describing the results of functioning economic systems is a study of their influence on the variative characteristics of the economy. We analyze the correspondence between types of economic systems and variative functions implemented by them using the methodology applied during the analysis of variative functions of standard economic processes.

We begin with the analysis of the variative functions of object systems. Since an immanent property of such systems is the limitedness of the area occupied by them in space and the unlimitedness of their life span, their functioning during an uncertain period of time should be accompanied with acts to recover consumable resources and preserve favorable functioning conditions. This leads to diversification of the environment, as was evident with the example of a production process (act). A stable functioning of an object per se (and conditions of its functioning) contributes to the continuity of time. Thus, the set of variative functions of object systems coincides with the set of functions in a production process.

Environment systems, being unlimited *a priori* in time and space, promote both inter-period stabilization and inter-territorial homogeneity. The effect of environment systems on space-time conditions is similar to the effect of a consumption process (act).

Project systems, by virtue of their nature localized in space and time, as a rule, diversify both space and time. The situation changes essentially in the part of space occupied by a project system and its environment, following a period and project completion assigned *a priori*. The space status, normally, also changes. From the viewpoint of the features under analysis, it complies with the effect produced by an act of goods distribution.

Finally, a process system that is limited in time but unlimited in space decreases the degree of time homogeneity, as in project systems, and increases space homogeneity, as in environment systems. Therefore, the functions of project systems with respect to the homogeneity features of space and time tally with exchange functions.

Thus, object and project systems are responsible for the dynamics of spatial diversity, i.e., for changes during the transition from one space to another; on the other hand, project and process systems are responsible for the dynamics of time diversity, i.e., for the difference between conditions in neighboring time periods, and object and environment systems are responsible for time continuity. The functions of maintaining harmonic equilibrium between the processes of diversification and unification are distributed between pairs of various types of systems.

The immediate task is now to study in greater detail the distribution of key competences between the systems realizing this function. We will show that each system realizes one variative function as a main one and the other as an auxiliary one. We assume that there is symmetry among standard processes, basic types of structures, and variative characteristics. Each of these groups has exactly four elements, and none of them possesses advantages *a priori* against the other. However, the distribution of each four variative functions realized by a pair of system types is uneven between these types. Each function for one element of the system pair is *the basic one,* and, for the other type, it is *auxiliary*.

We begin with the variative function of space homogenization implemented by the "environment system/process system" pair. Environment systems create conditions, i.e., prerequisites for realizing exchange processes, whereas the maintenance of equilibrium between points of space is realized by process systems. Therefore, the space homogenization function for process systems should be the main one, and that for environment systems should be the auxiliary one. Thereby, the place of the main variative function for process systems turns out to be "occupied" by the space homogenization function. As a result, the second function of process systems, i.e., time diversification, can only be auxiliary for process systems. Now, when analyzing the "project system/process system" pair and realizing the variative function of time period differentiation, we conclude that it is realized as the main one only by the first element of the pair, i.e., the project system. The process system implements the time differentiation function as an auxiliary one.

The next "object system/project systems" pair is responsible for space differentiation. Since the project system already has the main function (time diversification), the space diversification function will be the main one for this type of system.

To complete our analysis of distributing functions into main and auxiliary ones, we conclude that the space diversification function is the main one for object systems.

Thus,

- Environments and processes are responsible for increasing space homogeneity,
- Objects and environments promote time homogeneity,
- Objects and projects diversify space, and
- Projects and processes support time differentiation.

Figure 2 presents the position of economic systems in coordinates reflecting the variative characteristics of economy and the functions of various types of systems in altering these characteristics.

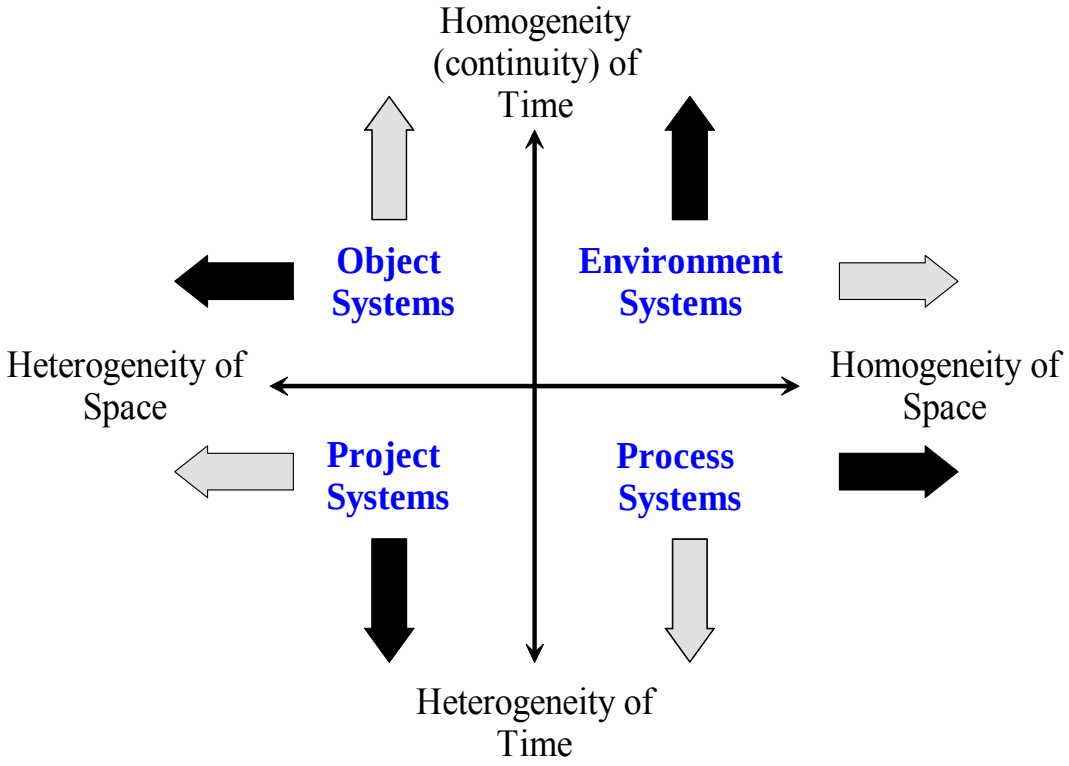

Fig. 2. Main and auxiliary variative functions of various types of systems.
Note: Black arrows point to the main functions; grey arrows point to auxiliary functions.

Now, we can formulate, in economic terms, the key competences (missions) of various types of economic systems. The key competence of object systems is the *organization* of heterogeneous elements into one integral whole in the course of system-based production. The mission of environment systems is to create conditions for *communication and coordination*, i.e., for the exchange between various components of the economy, including transactions. The mission of process systems is *an exchange*, in other words, the equilibration of the status of economic systems participating in this exchange. The mission of project systems is the innovative *transformation* of other types of systems.

The study of the interactions of systems of different types within the framework of a unified system methodology allows solving a number of methodological tasks

aimed at the substantiation of the conceptual apparatus of economic theory. These tasks include:

1. *Classification of types of economic system products.* Use of the basic typology of economic systems allows ascertaining that a *good (commodity)* is a typical product of the object system activity. *A service* is a typical product of the environment system activity. *Work done* is a typical product of the process system activity. *Transformation* of an economic system is a typical product of the project system activity.

2. *Classification of types of organizational culture as interpreted by Handy* (Handy, 1983). Correlation between types of organizational cultures and types of socioeconomic systems can be achieved by the following comparison. A "Zeus culture" (an authoritarian culture) enhances the properties of an organization as an object system; an "Apollo culture" (a bureaucratic culture) enhances the process properties of an organization; an "Athenian culture" (project culture) enhances the properties of an organization as a project system; a "Dionysius culture" (a culture oriented to creating favorable conditions for participants in activities) maximizes the environment properties of an organization.

3. *Classification of types of costs.* There are many classifications of costs in economics, including their division into production and sales costs and transformation and transaction costs. In compliance with the structure of variative processes, the total volume of costs in economics is divided into four types of costs:

- Space diversification (economic diversity);
- Space unification (homogenization);
- Time homogenization (continuity); and
- Time differentiation (diversity).

In the course of budget planning, any organization has to provide for these costs in the form of specific budget items. Furthermore, costs for space diversification are utilized by object and process systems; costs for unification are borne by environment and project systems; costs for homogenization, by environment and object systems; costs for differentiation of time periods, by project and process systems.

6. ECONOMIC POLICIES FROM THE PERSPECTIVE OF THE NEW THEORY OF ECONOMIC SYSTEMS

The conceptual analytical apparatus of the new theory of economic systems described above makes it possible to take a new perspective on the problems of formulating objectives and activities of the national economic policy.

We begin with the general goal of such an economic policy with a brief formulation of a desirable "image" of the national economy. The following options have been used in Russia at different times as such goals:

- The economy should be market-based;
- The economy should be effective;
- The economy should be competitive; and
- The economy should be innovative.

Nevertheless, analysis has shown that none of these slogans can play the role of a strategic long-term goal of the economic policy, since progress in this direction makes good sense only up to a certain extent (Kleiner, 2008(c)). The only acceptable criterion the national economic policy should be guided by is *harmony*, i.e., mutual coherence and interdependence of the function and development of various elements in the economy and society.

The notion of harmony as "unity in diversity" used to conceptualize the world goes back to classical Greek precursors of modern science, the philosophers of the Pythagorean school, i.e., Heraclitus, Plato, and Aristotle. In the Middle Ages, the concept of harmony was further developed by Leonardo da Vinci and later by Leibniz and many other scholars. In economic science, the concept of harmony was treated in the works of Adam Smith, Richard Cantillon, and Francois Quesnay, whereas the term economic harmony was used in the titles of books by Henry Charles Cary, Claude Frédéric Bastiat, and Jean-Baptiste Say. In most cases, the concept of economic harmony was associated in literature with the *laissez-faire* principle and theories of spontaneous order. Classical scholars of the neoclassical paradigm, such as A. Alfred Marshall and Knut Wicksell, referred to the theory of harmony in their desire to substantiate the effectiveness of competitive markets for public welfare. Today, harmony in economics is generally treated as the accommodation of interests,

opportunities, and prospects of agents and social groups. A harmonious economy is characterized by an integral space-time equilibrium and coherence that is subject to a stable economic evolutionary development. It stands to reason that the realization of this requirement at different levels and in different aspects requires meeting several conditions. Ways for achieving harmony at the level of in-company production processes and relations have been actively discussed in scholarly research for a long time (Kaplan, Norton, 1996; Moiseeva, Klevlin, 2003; Freeman, 1984). However, on the whole, the conditions for achieving harmony have not been sufficiently examined in literature.

Basically, normal economic agents have a feeling of harmony when their environment alters within certain limits, not too fast and not too slowly. A basic condition for harmony is a moderate pace of change in the space and time characteristics of the economy. Agents of economic activity do not accept, on an equal basis, excessively frequent and abrupt changes in economic conditions, extremely infrequent changes, an excessively fragmented structure of economic space, and an excessively monotonous structure of such space. In other words, a basic condition for harmony is a moderate pace of change in the space and time characteristics of economy.

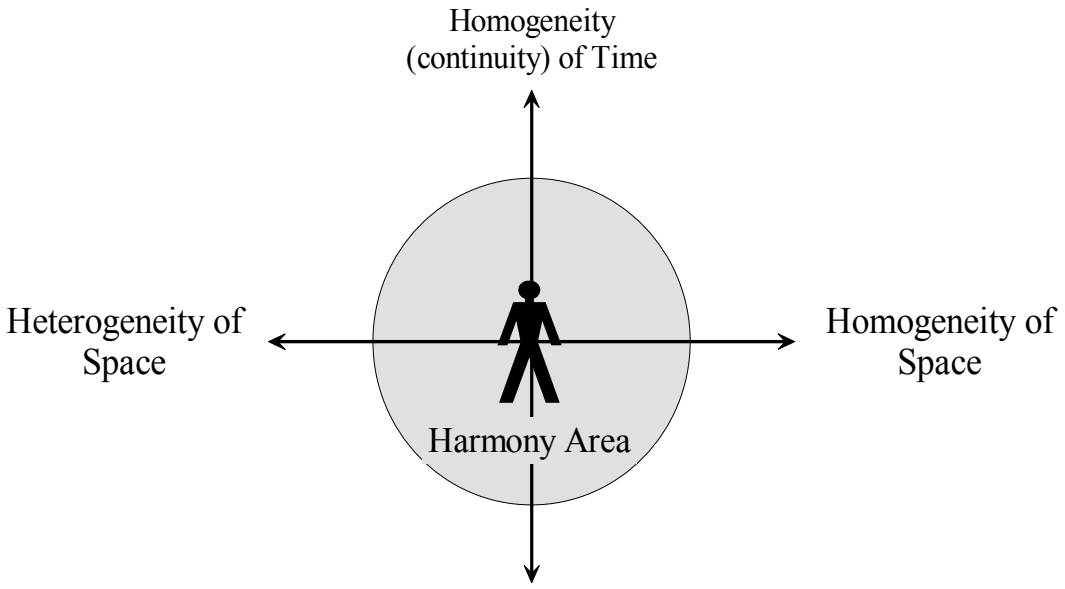

Fig. 3. Harmony area in variative coordinates

Harmony areas can be symbolically portrayed as a domain in a special coordinate space. Let us introduce the system of variative coordinates to reflect the level of homogeneity/heterogeneity of space (X-axis) and time (Y-axis). The point of the intersection of the axes, and a zero reading, corresponds to the most comfortable level of space and time heterogeneity for an ordinary business agent (Fig. 3).

Homogeneity of time and space, in compliance with the concept of immanent functions of systems of various types, as presented in Section 5, depends on space being filled with economic systems of four basic types. Systems of each type function in full only if they interact with systems of all the other types. For a successful operation, an enterprise should have:

- A production project or plan;
- An object, i.e., the company as a legal entity and property complex;
- An environment (e.g., a trade infrastructure) in which the output goes first;
- Processes, i.e., the manufacture of products, their sales, and the recovery of spent resources.

In a general case: *economic object systems* exchange the results of their activity through *environment systems*, which, in turn, are the natural place for the functioning of *process systems*, whereas the realization of *projects* leads to a discrete renewal of existing objects and the formation of new object, process, environment, or project systems.

At the same time, each of them is necessary for a normal course of economic development as well as for the achievement of a harmonic combination of such elements of the economy as stability and mobility, discreteness and continuity, and administration and self-organization. In conclusion, an indispensable condition of harmony at all levels of the economy is the availability of a sufficient number of sufficiently effective and relatively autonomous systems of each of the four types, in other words, their *parity*.

Let us consider the danger for the economy that may come from an impaired system-based parity must be answered. There are many disparity types, each relating to

a particular disproportion among types of systems. Eight types will be examined: a *deficit* of each of the four types of systems and a *surplus*, i.e., a hypertrophied development, of each of the four types of systems (see Table 3).

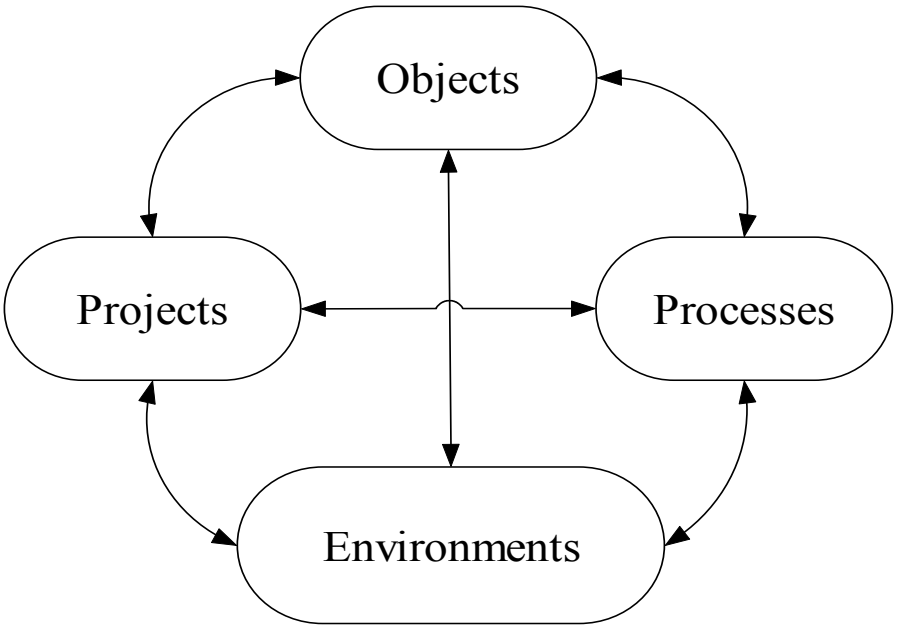

Fig. 4. Relationship among four types of economic systems

A dysfunction in object systems (*object deficit*) results in economic instability and irregularities in supplies of good and services, which are products of the activities of economic objects. Deficiency of projects (*project deficit*) leads to stagnation and the conservation of technologies. A dysfunction of environment systems (*environment deficit*) impedes economic exchange, leads to the self-sufficiency of economies, and enhances uncertainty in the functioning of the economy. Deficiency of process systems (*process deficit*) results in disequilibrium and, eventually, a fragmentation of the economy.

Hypertrophy of systems of various types also brings about negative effects. Thus, transaction costs sharply increase if the number of small enterprises in the economy is excessive. A surplus of realized projects leads to overheating in the economy. An excessive number of powerful environment systems turn out to be a burden for objects, as they limit their capacities and autonomy due to excessive supervision of the activities over objects. Finally, hypertrophy of process systems, first,

leads to exhaustion of objects securing their continuous functioning and, second, promotes bureaucratization of the economy (Table 3).

Table 3

Negative impact on the economy of the deficit/surplus of various types of macroeconomic systems

Type of system	Availability of systems of this type in the economy		Parameters of deficit or surplus level of systems of a given type
	Deficit	Surplus	
Object systems	Instability of economy	High transaction costs	Number of enterprises (to GDP or per person employed)
Project systems	Stagnation	Overheating	Investments into new construction, reconstruction, or retooling of enterprises (to GDP)
Environment systems	Self-sufficiency of the economy; high level of uncertainty of the economy	Narrowing opportunities for economic agents; limitation of their independence	Level of development of legal framework of the economy, transport, information, and energy infrastructure; level of independence of enterprises.
Process systems	Fragmentation of the economy	Bureaucratization	Size of administrative staff; money turnover rate; intensity of dissemination of innovations and new knowledge.

The information above shows the significance of a new approach in the analysis of economic policy, i.e., its "systems" dimension. Along with such dimensions of

economic policy as territory, industry, and innovation, it is essential to analyze the systems dimension, in other words, a policy for supporting and promoting the development of economic systems of a certain type. The options of targeted orientation of economic policy are as follows:

1. An object-oriented approach: support for functioning and development of socioeconomic systems of the *object* type (enterprises, organizations, and complexes).

2. An environment-oriented approach: support for functioning and development of *inter-object environments* (institutions and communication channels), promoting "the right" behavior of objects.

3. A process-oriented approach: support for *processes* of disseminating changes (innovations) between objects.

4. A project-oriented approach: support and financing of *projects*.

Periods of realizing economic policies of each of the above types can be found in the post-war history of Russia. For instance, in the USSR, from the point of view of government support, the priority was given to object systems, such as amalgamations of enterprises or enterprises themselves (regional economic systems in 1957-1964). Liquidation of such systems, specifically, enterprises, was rare. Industrialization, collectivization, outer space exploration, and other macro-projects were implemented through creation and development of corresponding objects.

In the late 1980s to mid-1990s, the main role in the economy was played by environment systems, mainly trade systems (including trade exchanges and "shuttle" trade). The establishment of a market economy was associated with the development of commercial trade systems, and it is commercial (in essence, environment) systems that enjoyed priority in the government economic policy.

In the 2000s, priority in economic policy was given to projects that became a main trend. "Priority national projects" are currently actively planned and executed.

It is anticipated that, in the 2010s, a process component will prevail in the government economic policy, and priority will be given to the organization of processes as regularly recurring, reproducible, and evolutionary changes of conditions

of environments and objects. The place of national *modernization projects* in various spheres of the economy will be taken over by national *modernization processes*.

Generally speaking, there is nothing bad in such alternation. However, to avoid irreversible distortions and to develop prerequisites for harmonization of the economy, it will be necessary to provide *sufficient support to all types of systems* in each period, preventing them from being exhausted.

In light of the information above, the main measures undertaken within the framework of Russia's economic policy during the last five years are examined. Generally, it is evident that the following strategic decisions can be identified:

1. Doubling GDP within a decade.
2. Russia's embarking on the path of innovative development.
3. Setting up "power vertical" institutions.
4. Realization of four "national projects" in education, health services, housing construction, and agricultural production.

At this juncture, the extent to which the list is complete and balanced needs to be examined from the viewpoint of system-based parity.

The first item on the list realizes an *object* approach at the macro level since it is targeted at achieving a certain status by the country's economy. The second item tallies with a *process* approach, since dissemination of innovations is a typical example of an inter-agent process. The third item apparently possesses an institutional, *environmental* character. The fourth item corresponds to a *project* approach.

Thus, in aggregate, we see measures aimed at developing all types of economic systems. Nevertheless, these measures, by themselves, cannot achieve economic system equilibrium in the economy. What is needed is a full-scale systematic effort to develop and implement a special section of the economic policy dedicated to the provision of parity of the economic systems of the four types described above. The organization of monitoring and regulation of variative characteristics of the economy (territorial, social, and temporal) are necessary for maintaining equilibrium between diversity and unification as characteristics of economic space and between volatility and stability as properties of economic time. It is noteworthy that it requires certain

costs that should be borne by the state budget. For this reason, a relevant federal authority, i.e., a kind of "equilibrium service," should be established.

It would be essential for economic systems of each type to obtain legitimate "citizenship rights" in the economy. Today, only certain types of *objects*, such as enterprises, Russian Federation subnationals, and subjects of international law (states) enjoy these rights in Russia. Being established in keeping with the procedure specified by law, enterprises enjoy rights (and obligations) of a legal entity and become full-fledged economic agents. They cannot be excluded from the economic space through arbitrary actions. The majority of *projects*, even national projects, do not possess such "citizenship rights." The legal status of environments, such as the Internet, has not been defined. *Process* systems do not have their specific status except when they have been established as enterprises. However, enterprises operate on the assumption of an unlimited lifetime, whereas projects are implemented within a specified period of time. It would appear that the establishment, liquidation, and supervision of the latter should be approached by society in a special way, distinct from enterprises. The problem of fly-by-night companies having to pretend to be objects but, in actual fact, designed for several transactions is brought about by the lack of legal regulation of the rights and duties of socioeconomic systems of project, environment, and process types.

As shown in Section 4, the harmonious and evolutionary development of the economy is only possible through maintenance of the equilibrium between the volume of organizational-technological innovations (projects) and a pool of proven organizational-technological routines embodied in the activity of economic objects. Effective channels and means for disseminating innovations (environments and processes) are also required. Therefore, the creation of an effective national innovative system, which has recently been proclaimed as one of the most significant goals of Russia's economic policy, should be supplemented with the creation and development of a national system of standards and regulations, which would support the processes of creation, selection, and dissemination of proven innovations.

Object-, project-, process-, or environment-oriented policies should grow into a genuine system-based policy aimed at securing a harmonic economic development of the country.

7. CONCLUSION

The theory of economic systems, the bases of which are set out in this paper, sheds light on some significant properties and functions of such systems. To some extent, these properties are independent of the systems' scale and are defined by their nature, more precisely, by a combination of a system's nature and the nature of its perception by economic agents. Furthermore, an essential subjective component must be accepted in the formation and perception of a system. This is not surprising, since the entire economic science rests on such concepts, which are dependent on subjective perception as "normal business practice." It may be noted that the division of systems into four types can be related to such basic notions as four seasons of a year, four parts in a day, four parts of the world, or four periods in human life. It becomes clear that the consideration of such system types is required for economic analyses of any level. Due to their universality, the low dependence of a system's nature on its scale and the results of systems' analysis with appropriate modifications are applicable to the issues of the management of enterprises and organizations (Kleiner, 2008(b)), to the tasks of overcoming the consequences of the world economic crisis (Kleiner, 2008(c)), and to the elaboration described above of economic policy measures of the country.

Moreover, the proposed theory and classification of economic systems, applied to mega-economic analysis, allows drawing more general conclusions on the general direction in an economic policy, with due account for the mission of each country in the structure of the world economic community. First, the results of analyzing the country's mission depend on the perspective, more precisely, on the level of examination and perception of the subject matter (mega-, macro-, and micro-economic). Basically, any country as an element of the mega-level inherently possesses the characteristics of an *object* (a limited territory and an unlimited *a priori* lifetime). If one includes other possible analysis levels, then the system properties of a country can be characterized by the proportions among the object, environment, process, and project components in its "systems profile". For instance, if a system possesses the marked properties of a project system, alongside with inherent object properties, then the country can be viewed as an object-project system. Skipping the

first, “object” part of the attribute, common for all countries, one can call a country with marked project properties a *project country.* It is natural to refer to countries with a dominant environment, process, or object properties as environment, process, or object countries.

Undoubtedly, such country analysis should be the subject of a separate study. Here, we would only like to give examples of countries that most expressly demonstrate the properties of each system type. The presence of a specific property is mainly a subjective characteristic, and, if we say that a specific system has dominant object properties, it means that the system is perceived by most people as a system limited in space and unlimited in time.

The *US* appears to be a vivid example of a *project country*, the reason for this view being a marked project structure of its activity and the world image of the *US* as a country with an extremely well-organized management of projects in all spheres. Even the very foundation of the *US* is very often viewed not as an objective *process* but as a *project*. USSR, with its five-year plans, centralized planning, and target-oriented programs, can also be described as a project country. Both the establishment and liquidation of the USSR were projects *sui generis*. The two project countries, the USA and the USSR, formed a bipolar configuration of the world, and the liquidation of one of them has unbalanced the world.

Japan appears to be an example of an *object country.* This is related to the country’s critically limited territory and cultivation of national identity. Even the system of life-long employment pioneered in Japan is a characteristic property of the object way of action.

China should be considered as a *process country.* The evolutionary character of development, an in-depth perception of natural and public phenomena, and, finally, the enormous size of its population, which spills over to neighboring territories and the rest of the world without losing ties with their motherland, point to the process nature of China.

It is of value to examine the type of system present in Russia. *Russia* is first and foremost an *environment country*. The fact that it is gigantic territory in an intermediate position between East and West, between Asia and Europe, and between

archaic and modern cultures determines Russia's specific position in the international community. In addition to Russia's participation in uniting Europe and Asia, it also provides some degree of temporal and historical continuity. Many actively modernizing countries are characterized by stage-by-stage and layer-by-layer social dynamics in which obsolete elements permanently disappear from the national culture. On the other hand, in Russia, the dynamics is always two-directional, toward archaic forms and, at the same time, toward modernism and postmodernism.

Sometimes, people say that Russia is too large in territory. However, it is no less significant that Russia's history is expansive. In other words, it is not duration but the manner in which Russia has developed that is important. Russia is not simply a museum storing exhibits of the past; it is *an exhibition* in which, in parallel with archaic societal fragments, including elements of feudalism and even slavery, one can find elements of the world's future social development. Russia is a paradox, leaping ahead in one respects, while lagging behind in the others.

Therefore, throughout most of its history, Russia has had a mixed economy and a mixed society. There are fragments of various technological and socioeconomic modes co-existing in Russia. Russia's crises occur when the power is taken by various "purists" or by leaders striving to rush forward, as a matter of principle, trying to forget their links to the past, or by people who do not accept the future and attempt to reverse history.

The future of the world is to be found on Russia's expanses in a prototypical form. This future is not easily discerned, and it is even more difficult to substantiate it. Russia's mission in the world community is feasible, but it cannot be transported or delegated to another country. It is not only Russia that needs the world community as a space in which to integrate; the world needs Russia as an integrating element, in other words, as an environment capable of uniting spatial and temporal poles. The development of the world community in the 20th and early 21st Centuries has been explicitly affected by Russia and by its successes, failures, challenges, and solutions. The first and the second Russian revolutions, the First and Second World Wars, the rise of totalitarianism, the ideological ascent of Communism, and, finally, the processes of post-socialist transformation in the late 20th Century and Russia's role in

all of these events are hardly disputable and have largely shaped the moral and social face of today's world. It is clear that Russia's influence will continue into the new century.

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