

## Modernization of a Region as a Heterarchical System



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**Abstract.** Modern world is dynamic, variable and full of risks, which requires the development of flexible and dynamic mechanisms to modernize regional social systems. For modern Russian regions, different in pace of development and people's quality of life, it is important to develop such theoretical and methodological approaches to based to identify resources and problem areas of modernization. The research novelty lies in the analysis of modernization in a region using the theoretical and methodological capabilities of the system approach, the concepts of heterarchy and modernization. We emphasize the overlap of subject fields of terms "heterarchy", "region", and "modernization" in matters of principles (value basis) of modernization process management in the region using the heterarchy resources. Based on the results of the monitoring sociological study conducted during 2010–2016 in the Astrakhan Oblast using the interview method at the place of residence according to the Standard Methodology of the all-Russian program "Socio-Cultural Evolution of Russia and its Regions", we revealed the strengthening of the vertical of power, that is, hierarchical relations in the institutional and regulatory sphere. The growing institutional heterarchy, whose purpose is to complicate and imitate social institutions, is manifested

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in predominant non-market motivation among the residents of Astrakhan, as well as in fluctuations in values of market and non-market motivation, depending not only on the socio-economic, but also political situation. The imitation of socio-economic institutions demonstrates the dysfunction of life-supporting sphere of the region's socio-cultural space and is a problem area of modernization of the region. Intellectual heterarchy ("the war for standards") is fixed in reducing support for basic values simultaneously with the strengthening of primary social networks in the structure of the background knowledge of the region's population. Moreover, the changed system of values is manifested in the reduced standard of social claims regarding the perception of the standard in assessing own health and the environment. Intellectual heterarchy in the region is complemented by geographical one as migration substitution of the population in a region with higher social demands by the carriers of nomadic mentality with low social claims. The existing heterarchies may indicate that the Astrakhan Oblast as a system is close to the reorganization phase which means the transition of the region's system to a more sustainable state due to its simplification. With appropriate organizational design, low social claims of the region's population may become the modernization resource of the region.

**Key words:** region, modernization, heterarchical system.

### Introduction

The complex concept of "region" in modern social and humanitarian knowledge is studied in the context of various theoretical and methodological paradigms: structural and functional (system) [1, 2], institutional [3], neo-institutional [4, 5], spatial-territorial [6, 7], network [8], socio-cultural [9, 10], reproductive [11], synergetic [9], etc. Close attention to regional systems is caused by the global trend towards local autonomy amid globalization processes. Thus, there is growing relevance of studying not only the region as a system with properties typical for all systems, but also the specific feature of this system due to the rootedness of actions of subjects in a certain socio-cultural space.

The performance of social processes, their risks accompanied by specialization of sub-systems, their increasing interdependence, requires the development of not only forms of adaptation of regional systems to the challenges of our time, but also flexible, dynamic mechanisms for their modernization based on preventive impact. Accordingly, the application of new methods and approaches to understanding the modernization of territories is updated, which is especially important in Russia amid the regions'

existing conditions taking into account their various development level.

It is also necessary to take into account that a social system amid instability is unbalanced, the value of random, individual factors increases. Accordingly, there is a need to study insignificant (from the point of view of historical process) but large-scale (from the point of view of richness of social life, uncertainty of forecasts) periods, as well as the micro-social level of the modernization process, resources of network informal practices and their demand when implementing modernization of specific areas.

### Theoretical and methodological framework

In our opinion, an interdisciplinary approach is promising when studying the regional system which faces the issue of finding resources for effective responses to the challenges of our time. The purpose of the study is to analyze the modernization process in the region using theoretical and methodological capabilities of the system approach, the concepts of heterarchy and modernization. This will enable to identify the region's development stage, identify resources and problem areas of the region's modernization.

As for the theory of heterarchy, its main provisions are developed by D. Stark. Heterarchy

is referred to as a special way of arranging social space characterized by intensified social relations, their growing complexity, internal diversity and organizational reflexivity, and interdependence of elements of social systems in a dynamic social life in the modern era [12, 13]. The application of conceptual ideas put forward by D. Stark proved to be productive for modern social and humanitarian knowledge. For example, in philology, the concept “heterarchy” is used in the study of models of spontaneous monologues of narrative and reasoning where heterarchy is assumed “at the level of voicing internal speech, putting a thought into a word, which ultimately forms a strong hierarchy at the macro-structural level, i.e. at the level of a completed text” [14, p. 264]. In psychology, the analysis of self-reflection in the structure of consciousness substantiates the thesis that “self-reflection is a basic procedural tool of consciousness arranged based on the principle of heterarchy” [15, p. 6]. Interdisciplinary studies of integration of an individual amid variability of modern society development through the concept of heterarchy lead to a conclusion about the cross-functional diachrony in the socialization process, which is caused by contradictions of “internal “institutional” formations of an individual..., intra- and inter-system relations of subordination (hierarchy) and coordination (heterarchy)” [16, p. 104].

Historians are developing a heterarchical model of political genesis, which was formed among primitive peoples based on “military democracy” (in particular, among East Slavs – based on long-term preservation of equalitarian traits) [17]. The application of conceptual provisions of the theory of heterarchy made it possible to draw a fundamental conclusion about the plurality of ways of social evolution, whose ideas originate from ideas of K. Marx about the Asian mode of production and the two paths of statehood development. The first way of evolution

– hierarchical – is based upon the vertical of power and centralization and is characterized by concentration of wealth among the elite, the existence of networks of dependence and patronage, a reflection of social differentiation in funeral rituals, control of the elite over trade of items of conspicuous consumption, development of crafts for the requirements of the authorities, and the presence of cults of leaders, their ancestors, the reflection of statuses and hierarchy in an ideological system and architecture. The second – heterarchical way – is characterized by wiser distribution of wealth and power, more moderate accumulation, segmental social structure, economic efforts of the society aimed at solving collective goals (food production, construction of fortification, temples, etc.), universalizing cosmology, religious worship and rites. The architecture emphasizes a standardized way of life” [18, p. 19]. In our opinion, the features of hierarchical and heterarchical relations highlighted by historians in the analysis of paths of statehood development are applicable in the study of the modern era.

In economics, in order to develop a methodological framework for modeling the interaction and development of territorial socio-economic systems it is required to hold economic analysis of organizational forms having the characteristics of a heterarchy, in particular, the existing dense networks of “intertwined property rights that permeate industries and sectors of the economy, extend over their borders, affecting mostly enterprises and banks most” [19, p. 91].

It is noteworthy that the provisions of theories of heterarchy and network analysis (in particular, in line with the latter – the idea of M. Granovetter about the strength of weak ties in the society [20]) are conceptually close. The use of such theories is especially productive in the sociological analysis of phenomena and processes as they are aimed at addressing issues about methods of relations between elements of social systems,

in particular, “the interaction of the micro-level with the structures of the macro-level” [20, p. 31]. A number of scholars use the concept of “heterarchy” and “network society” as synonyms in the study of economic activities (“network economy”) [21], virtual organizations [22, p. 80], and management methods [23]. It is noted that the focus on mutually beneficial cooperation, lack of hierarchy or its reduced importance, the formation of the structure of “horizontal relations” are the characteristics of both social networks [24] and heterarchies. Other researchers insist on fundamental differences between network and heterarchical approaches. For example, N.N. Kradin, analyzing the strategies of political genesis uses the terms “hierarchical” and “network” as synonyms, identifying the heterarchical path with the cooperative one [18, p. 19]. According to I.V. Krasavin, the ratio of the concepts of “hierarchy”, “network”, and “heterarchy” is more complex. “In the process of differentiation, hierarchies multiply; networks are a tool for multiplying arranged structures; together they form a heterarchy, which is a “complete” model of community relations as a multiple whole” [25, p. 36].

We should recall that the term “heterarchy” was first used in 1945, at the dawn of the computer age, by W. McCulloch in the analysis of neural networks [13, p. 79]. This is probably why the theory of heterarchy is used in the study of new media, Internet communications as a system-forming element of a fundamentally new system of public relations based on rejection of spatial integration, inability to produce one-way object-subject models, poor coordination, unpredictability, uncontrollability [26, pp. 53-54; 27, pp. 6, 9]. Although it should be noted that foreign researchers are exploring the reverse process – from heterarchy (non-linear, flexible, open, auto-poetic, unarranged networks; short-term projects: for example, fashionable web-

design; staff change, part-time job) to hierarchy (“direct corporate work”; long-term prospects of relations with customers; professional advice) [28] based on one of the companies of new media industry in London, which may be, in our opinion, a reflection of the process of Internet communications becoming institutional.

As for the modernization theory, we have already turned to the analysis of its theoretical provisions [29, 30]. The application of provisions of the heterarchy and modernization concepts to analysis of regional processes is very productive since there is an intersection of the subject fields of the concepts of “heterarchy”, “region”, and “modernization”: heterarchy is referred to as a form of organization [13], management and political decision-making [31, p. 43; 32]; modernization – as a controlled process consciously initiated by the authorities [29, 30, 33], and hierarchy and manageability are the characteristics of a region as a self-organizing system along with territoriality and the ability to integrate/disintegrate [34, 35]. Thus, a common objective in identifying the nature of the concepts “heterarchy”, “region” and “modernization” is to address the issues about the nature, principles (values) of management in the situation of ““sewing” the background knowledge of ontological uncertainty and non-equilibrium basic compositions of social life pushing the society towards chaos and uncontrollability” [36, p. 27].

In the framework of the theory of heter-archy there is still no developed conceptual model of management. According to D. Stark, heterarchy as a new way of organization lies between two poles – market, based on the relations of independence, and hierarchical based on the relations of dependence, while heterarchies are dominated by the relations of interdependence, the minimum degree of hierarchy and organizational heterogeneity [12].

There is also a point of view, according to which heterarchy and hierarchy are opposed as two extreme points of control over systems on the axis of “self-organization-organization” [31, p. 43; 37, p. 13; 38, pp. 262-263]. But a number of researchers dispute the use of the concept of heterarchy as the main antonym for hierarchy [39]. Hierarchy and anarchy as principles of ordering are polar; heterarchies exist between these poles within fluid relations between the state and the society [40]. E.E. Bocharova, noting the opposing nature of many characteristics of hierarchy and heterarchy, emphasizes that these categories are not mutually exclusive. “Heterarchy is often defined as “a multiple hierarchy”, as a set of differentiated but interdependent levels in a unified system, each with their own principles, mechanisms of organization... All these levels are significant, but may not always be functionally equal; however, the overall multidimensionality of the heterarchy is supported by the complexity of each level” [16, p. 106]. The researcher draws attention to the fact that hierarchies are dominated by management (super-ordination) and subordination relations, while in heterarchies – coordination relations [16, p. 106]. According to V.A. Osipov, heterarchy can be studied in terms of “interaction and interpenetration of hierarchical and network structures, horizontal and vertical processes ... which leads to a sharp increase in socially useful activity, emergence of new meanings of resources” [32, p. 40]. A similar point of view is expressed by I.V. Pavlyutkin. The nature of heterarchy, in his opinion, lies in symbiosis of two forms of organizations – several formal organizations (hierarchical structures acting according to formal rules and procedures) and networks of spontaneous communication. As a result of this symbiosis, humanitarian entrepreneurial activity emerges [41, pp. 47-48].

There is also a view that heterarchy is opposed to the state as a kind of complex political monopoly, while heterarchy is a condition for

legitimization of this monopoly [42]. In this regard, ideas that state can initiate the simulation hierarchy [42] creating pseudo-hierarchy are being developed [32, p. 41]. In our opinion, these ideas are reflected in terms of the concepts of the Lefiathan state standing against social structures. But there is also an idea of a state as a central “joint” of the heterarchy responsible for meta-management [43]. Such an idea is akin to an ideal model of management presented by Lao Tzu, a Chinese philosopher, founder of taoism, who thought that the best ruler is one that people simply know they exist [44]. Within the framework of the theory of heterarchy, such ideas are conceptualized in the idea that self-organization processes should be understood as the transfer of control to autonomous frequent organizations, and “control implies only creating conditions for the emergence of heterarchical systems. Setting goals for autonomous parts is a specific way to create such conditions” [31, pp. 46-47]. Ideally, the state is able not only to simulate, but also to create a heterarchy, creating conditions for their emergence. Moreover, “facing complex challenges, the highest governance level can increase chances of survival of the entire system, not only limiting freedom, but sometimes, on the contrary, expanding the diversity of lower levels, encouraging creativity and thus facilitating self-organizing trends. It is freedom of lower levels that reliably absorbs the variety of situations in a proactive and aggressive environment that leads to creative solutions to difficult problems...” [37, p. 15].

As for the system approach, heterarchy can be considered in the context of complex systems as a type of dynamic heterarchy (along with a complete dominant and incomplete dominant hierarchies and holarchy). “A complex system whose structure is defined as a heterarchy is described by a fluid situational network [45, p. 47]. The principle of heterarchy is necessary for fixing the fact “that none of them performs a permanent leading role in the development of structural

subdivisions of the social whole...” [36, p. 27]. Ideas about multiple centers of development and strengthening of internal diversity and organizational reflexivity in the theory of heterarchy also intersect with ideas about regionalism as a characteristic of a multipolar model of the world order and the postulates of neo-modernist concepts of multicultural modernization about the possibility of transition from traditional society to modern industrial one taking into account civilizational features [46, 47]. Based on this we can conclude that any civilizational specific characteristics with an appropriate organizational design and structure can become an important modernization resource. The creation of such design and such structures is a managerial objective. There is a growing importance of competent goal setting and solution of such problems in heterarchical systems. “In the network-centric model of management the system error is reduced with the improvement of the quality of management decisions (compared to the hierarchical organization). With the deteriorating quality of management decisions the error a network-centric system is increased (compared to the hierarchical organization). ... Network-centric management techniques have the greatest positive effect in industries with a high quality of management decisions” [23, p. 26].

The study of a region as a heterarchical system also clarifies procedural issues, namely, at what development stage the system is located, what ties – horizontal (self – organization) or vertical (organization) – currently prevail. As noted by D.M. Bondarenko, social systems can change their internal organization, developing towards heterarchy or hierarchy, which is determined by the political culture and the relations between people. “As a rule, heterarchical relations and institutions are more developed in societies with direct interpersonal relations are highly valued or at least not less valuable than the depersonalized and formalized relations...” [48].

As a result, it is necessary to develop situational management models, whose implementation will provide maximum development effect with minimal resources. The researchers have already identified the advantages and disadvantages of implementing heterarchical and hierarchical models depending on certain conditions and challenges of the environment. The advantages of heterarchies are: their adaptability due to their flexible structure subject to rapid adjustment; autonomy of economic elements of the system, which “helps minimize lost profit due to the most complete implementation of environmental conditions” [38, pp. 262-263]; capacity for self-organization, that is, a solution to specific problems under unstable conditions with a rapidly increasing complexity [31, pp. 43-44]; predominant motivation “based on belief, turning people into a team of co-thinkers by bringing together their models of reality, goals, points of view, vision of problems”; creating opportunities for decision-making for the one closest to the problem; promoting initiative, effective use of human resources, creating conditions for training future leaders, using the potential of capable people [37, p. 13, 16].

The advantages of hierarchical systems include the ability to “minimize costs through effective resource allocation by strictly formalized activities” [38, pp. 262-263]; efficient solution to “sustainably developing issues with a predictable complexity level that helps adjust the pace of decision-making from a single centre...” [31, p. 44]”; simplified control reducing the likelihood of errors due to the inexperience of performers; excluded possibility of “parasitism”; creation of conditions for using the experience and knowledge of senior management; relative predictability; efficient use of various resources, except human [38, p. 16]. “The emphasis on hierarchical structure is justified in stabilized conditions without tough competition and under monopoly functioning” [38, p. 15].

### Materials and methods

The hierarchical principles of organization are necessary for the socio-cultural space of our country to preserve integrity. Russia also has its differentiated vast space characterized by potential “bottom up” heterarchical self-organization. Here we can also use the term “holon”. “Holon, being a whole, is also a part of another whole. For example, our federal state has a holonic structure. Each holon (separately taken people, family, industrial and public associations of people, municipal unit, constituent entity) is sufficiently autonomous; however, when solving common objectives holons interact among themselves, relying on the existing regulatory legal acts or effectively concluding direct agreements. Each holon in a holonic system is a kind of a “building block”... Management processes in holonic systems are based on heterarchical and hierarchic principles... in holonic systems, the flexibility of a heterarchy is combined with the stability of a hierarchy” [49, p. 42].

The image of a region as a building block emphasizes the role of a separate region in preserving the unity of the architectural structure of the Russian state. The Astrakhan Oblast (as a building block) occupies a strategically important geopolitical position in the South of Russia and the Caspian Sea, lies at the intersection of major trade routes. Its socio-cultural space has historically developed at the intersection of East and West and is characterized by heterogeneity and multiculturalism, which is manifested both in economic life (gas industry, fish, vegetables, melons...) and in marginal consciousness value, due to the historically formed multi-confessional and multi-ethnic culture and enhanced by the scale of modern migration flows. The mentality of Astrakhan people is prevailed by a rural type with lower social claims, and collectivist attitudes [for more details see 29].

To study the modernization processes in the region we use analysis of statistics, performance

of human development indices (HDI) and modernization indices (calculation method proposed by the Chinese Academy of Sciences [33]), as well as the results of the sociological monitoring study supervised by E.V. Karga-polova in the Astrakhan Oblast using the method of interviews at the place of residence according to the Standard Methodology of the all-Russian research program “Socio-cultural evolution of Russia and its regions” (heads and tools developers at the federal level: N.I. Lapin, L.A. Belyaev, Center for Socio-Cultural Change, Institute of Philosophy, Russian Academy of Sciences (CISI IF RAN) [50]. The first stage was held in January 2010 (N=1000), the second – in May–June 2012 (N=600), the third – in April–May 2016 (N=1000). The sampling is stratified, quota-route. Quota controls are: “sex”, “age”, “type of settlement”, “ethnic structure”. Sampling error – 3%. Data processing and analysis was performed using SPSS 17.0. The matrix was developed by experts of the Center for Socio-Cultural Change at Institute of Philosophy of the Russian Academy of Sciences.

The tools of the standard methodology include interview questions devoted to various aspects of the region’s life. In this article, we analyze the answers of Astrakhan residents to the questions that help get an idea of the complex relations (“interweaving”) of hierarchic and heterarchical relations, the degree to which the hierarchical organizational structure and informal practices of the population agree, the elements of the social system, which can be used as a modernization resource; as well as the problems that stand in the way of this process.

We also conducted a comparative analysis of performance of indices of modernization, human development and the performance of results of sociological monitoring study obtained in the Astrakhan Oblast. The monitoring results in the region are compared with results of surveys in other Russian regions where

the study was conducted using a similar method. This helps increase the reliability of results.

### Research results

Consider the modernization processes in the Astrakhan Oblast at the macro-level of the country's hierarchical structure – in the socio-cultural space of the Southern Federal District (FD). According to modernization indices, in 2011 the Astrakhan Oblast managed to overcome the system lag and enter the “middle” stage of primary modernization [29, 51]<sup>1</sup>. This qualitative change in the region is reflected in HDI performance: since 1999, all constituent entities of the Southern FD, as well as Russia as a whole, significantly increased their HDI and its components, but only the Astrakhan Oblast managed to improve its position in the ranking of Russia's constituent entities: it moved up 20 positions – from 41 in 1999 to 19 in 2013<sup>2</sup>.

The results of the second wave of socio-logical monitoring study in the Astrakhan Oblast on the all-Russian research program “Socio-cultural evolution of Russia and its regions” (in 2012): compared with the results of the first wave (2010), the integrating value core strengthened – (in 2010 the integrating value core of Astrakhan residents included two values – human life and family, in 2012 there already are six of them – human life, family, communication, order, well-

being, and tradition)<sup>3</sup>. These results indicate the growing support for basic values by the residents of Astrakhan in this period of time. A similar trend is observed in the results of the all-Russian monitoring “Values and interests of the Russian population” [52, p. 20], as well as in the Chuvash Republic and the Vologda Oblast [53, p. 68; 54, p. 67-69; 55, p. 78]. Moreover, non-market motivation of labor activity decreased slightly (from 57.4% to 53.4%) (*see Tab. 1*), a decrease in protest potential was observed, etc. (from 45.2% to 35.1%) (*see Tab. 2*) [for more details, see, for example, 29].

After 2013 the indicators of primary (industrial) modernization in the Astrakhan Oblast begin to decline as well as in all regions of the Southern Federal District (*see Figure*). In the Republic of Adygea in 2015 the situation changed even by stage: the region returns to the stage at which it had been until 2011 – “traditional, preliminary” from the stage “below medium”. The Astrakhan Oblast managed to maintain its position on the classification of modernization stages. Although HDI in the region increased in 2014, the Astrakhan Oblast was two places down among Russia's constituent entities – from the 21st to the 23rd – due to the reduced GRP per capita and life expectancy<sup>4</sup>.

<sup>1</sup> Source: IAS “Modernization”. Available at: <http://mod.vsc.ac.ru> (accessed: 03.05.2017).

<sup>2</sup> Source: UN Development Programme. Human Development Reports (HDI) in Russia. Available at: <http://www.undp.ru> (accessed: 03.03.2017).

<sup>3</sup> The value system of the population of the Astrakhan Oblast is studied based on the method of studying the value structure developed by N.I. Lapin. The purpose of the method is to identify value clusters guiding the behavior of individuals and other social actors in terms of main functions of the society in Russia and its regions as socio-cultural integrities. During the analysis, fourteen values were divided into two clusters: integrating and differentiating. Integration is referred to as the main function of basic values. In turn, the function of differentiation based on a smaller part of basic values is to preserve and change the structure of statuses and roles. The division of values into clusters and layers is arranged basis of the compliance of weighted average assessment of a particular value to the corresponding point interval (interval limits are established through the research methodology). Within each cluster there are two hierarchical layers. The components of the integrating cluster are the integrating core (over 4.4 points) and the integrating backup (3.91–4.39 points), the differentiating cluster is represented by the opposing differential (3–3.9 points) and the conflict-generating periphery (2.99 points or less). The integrating core consists of fundamental values. The layer of the integrating backup includes second-order values (stock). The opposing differential includes values that many people refuse to accept as their own guidelines. The conflict-generating periphery includes values denied by the majority of people [50].

<sup>4</sup> UN Development Programme. Human Development Reports (HDI) in Russia. Available at: <http://www.undp.ru> (accessed: 03.03.2017).

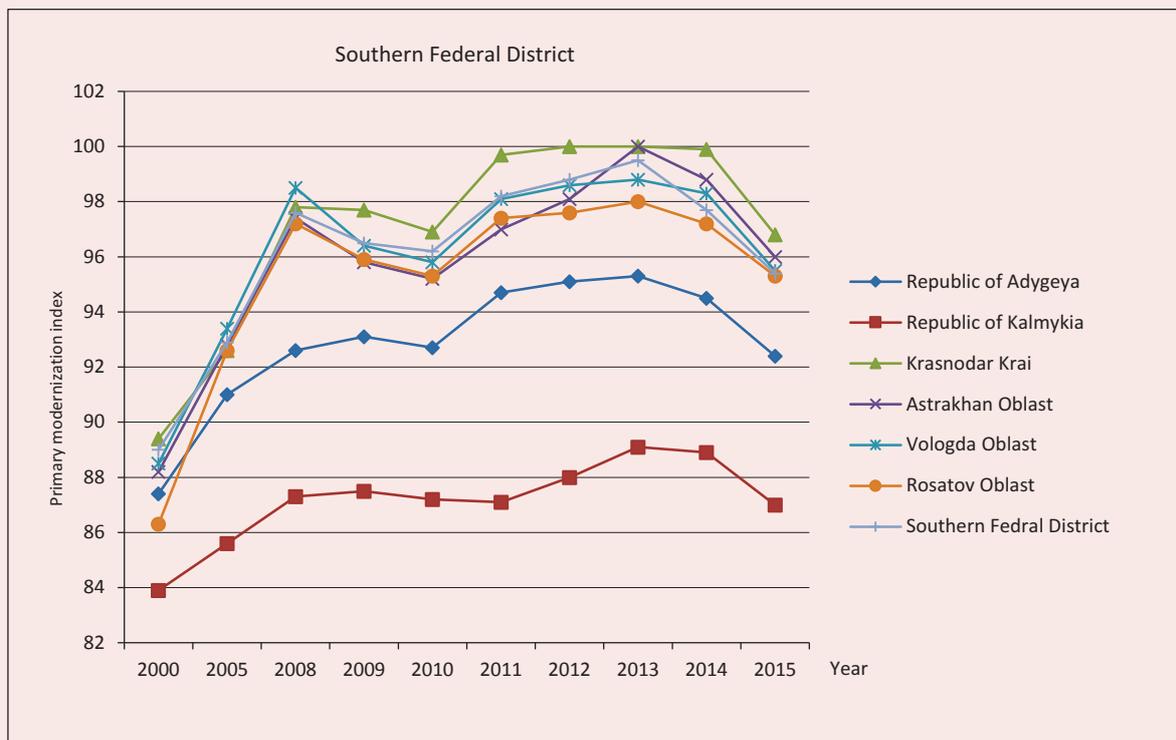
Table 1. Answers to question “What kind of job would you prefer today if you could choose?” among Astrakhan residents (% of respondents)

Variant	2010	2012	2016
With medium yet stable income and confidence in the future	47.4	41.9	43.5
With medium yet stable income	10.0	11.5	13.0
With medium yet stable income with more free time or easier job	5.4	6.2	9.1
With high income even if there is no guarantee for the future	14.6	12.4	18.2
Own business despite all risks	12.5	15.0	11.7
Undecided	5.3	5.3	1.8
No answer	4.8	7.7	2.7
TOTAL	100	100	100

Table 2. Answers to question “Are you ready to take part in protests (against declining standard of living and quality of life, violation of human rights and freedoms)?” among Astrakhan residents (% of respondents)

Variant	2010	2012	2016
I am ready	23.8	16.1	18.2
I think I am ready	21.4	19.0	25.8
I think I am not ready	15.8	21.5	21.9
I am not ready	26.0	27.7	26.2
Undecided	10.5	12.4	4.6
No answer	2.5	3.3	3.4
TOTAL	100	100	100

Figure 1. Chart: primary modernization trends in the Southern Federal District



Source: IAS “Modernization”. Available at: <http://mod.vscs.ac.ru> (accessed: 03.05.2017).

Consider how the decline in modernization and human development indicators was manifested in the state of the Astrakhan Oblast as a socio-cultural system in 2015–2016 in line with perceptions about the institutional, intellectual, and geographical heterarchy [56, pp. 233-241].

As for *the institutional heterarchy*, according to V.S. Martianov, its nature in the modern society lies in complication and simulation of institutions [56]. It is noteworthy that within the institutional and regulatory sphere of the region in the past decade a strengthening of the vertical of power,

that is, hierarchical relations, has occurred. This is reflected in statistical indicators of number and share of government employees among total workforce. In 2015, 16,145 people were employed in government bodies and local self-government in the Astrakhan Oblast. Since 2000, the number of employees in public administration has increased, being in 2014, compared to 2013, already more than 40%. This is, just like in other regions, due to the increased share of officials working in territorial executive bodies, that is, in government entities at the regional level whose activities are regulated by presidential decrees and government resolutions. By 2015, the number of officials in the region working in these entities amounted to 8,882 people, which is about half of total bureaucracy in the region. The volume of this social group reached its maximum value in 2014 (9,214 people), which was almost three times more than in 1995<sup>4</sup>.

According to the results of the third wave of sociological monitoring study in 2016, an increase in institutional trust was recorded in the region. Compared with the results of the second wave of the monitoring study (2012), trust in the Prosecutor's office increased by 20.3%, in the Legislative Assembly, the region's Duma – by 13.9%, the police – by 17%, the government – by 12.2%, trade unions – by 11.6%, municipal and local governments – by 11.2 %, the Governor – by 10.6 %, the court – by 9.7 %, regional offices of political parties – by 9.5 %, and the media – by 5 %. All social institutions (except the media) exceeded the levels of 2010.

But, despite the strengthening of the vertical of power and the growing institutional trust, in 2016 only one out of five Astrakhan residents (20.4%) felt completely safe when walking alone

in their neighborhood after dark, about half of the respondents (44.3%) – relatively safety; about one out of four respondents (23.6%) said it was not safe; every tenth resident of the region (9.8%) – “not safe at all”. Every fifth Astrakhan resident gave an affirmative answer to the question “Have you or your family members been victims of robbery, assault, or violence over the past five years?”. The level of protest potential in 2016 returned to the level of 2010 (see Tab. 2).

A clear demonstration of the institutional heterarchy in the socio-economic sphere (namely, the simulation of institutions of market economy) is the predominance of non-market labor motivation among the population of the region and fluctuations in labor motivation – from market to non-market, which depend on both market and political situation (see Tab. 1). Institutional heterarchy is also manifested in the distribution of employees in enterprises by ownership. Thus, for the entire research period, about 40% of the region's residents are employed by government institutions. Also, according to the survey, the share of employees in enterprises of various forms of private ownership is reduced: in 2010 it was about 35%, in 2012 – about 30%, in 2016 – about 23 % (see Tab. 3). According to the survey results, since 2010 the share of employees at joint-stock enterprises with state participation, private enterprises, collective farms, state farms, agricultural cooperatives as their primary employment has reduced. In 2012, the maximum number of self-employed was recorded, but in 2016 this share returned to the level of 2010. In 2010 about one in every ten people (10.8%) was engaged in side job, in 2012 – one in every 12–13th (7.9 %), in 2016 – every 5–6th (18.9 %). A large share of “side jobs” (4.4%) in 2016 accounts for state-funded institutions – schools, hospitals.

The motivation of employment in enterprises by form of ownership also varies from wave to wave. Thus, in 2010, about 40% of Astrakhan residents wanted to work at private enterprises,

<sup>4</sup> *Russian regions. Socio-economic indicators, 2009: statistical book*. Rosstat. Moscow, 2009. Available at: [http://www.gks.ru/bgd/regl/b09\\_14p](http://www.gks.ru/bgd/regl/b09_14p) (accessed: 13.02.2016); *Russian regions. Socio-economic indicators, 2016: statistical book*. Rosstat. Moscow, 2016. Available at: [http://www.gks.ru/bgd/regl/b16\\_14p](http://www.gks.ru/bgd/regl/b16_14p) (accessed: 13.02.2018).

Table 3. Answers to the question “What is the type of enterprise (institution) you currently work as your main employment?” (% of respondents)

Variant	2010	2012	2016
State or local government bodies	n/a	n/a	13.6
State-funded organization or institution (e.g. school, clinic, etc.)	n/a	n/a	13.3
State, municipal enterprise	41.9	38.9	11.1
Joint-stock company with state participation	10.2	6.5	4.3
Joint-stock company without state participation	3.4	5.4	3.3
Personally owned company	1.9	2.7	2.4
Private enterprise (not owned)	14.0	7.5	10.3
Collective farm, state farm, agricultural cooperative	3.9	1.4	0.4
Farming enterprise	0.9	0.8	0.4
Private subsidiary farm	1.1	0.1	0.7
Self-employment	2.0	7.3	2.5
Other	1.7	0.4	0.7
I have no permanent job	6.5	6.9	0
Undecided	0.8	1.7	0.9
No answer	11.0	11.0	2.9

which was approximately equal to the desire to be employed in state-owned enterprises and institutions. The majority of people among those who want to work in private enterprises in 2010 would prefer to work at personally owned enterprises (15.9 %). In 2012, the share of those wishing to work in the private sector increased compared to 2010 by 9.8% and amounted to 47.9%, which exceeded the share of those willing to work at state-owned enterprises as their primary employment by 12.8%. In 2012, most people in Astrakhan would like to work at their own private enterprises and engage in self-employment. In 2016, the share of Astrakhan residents who would prefer to work at private sector enterprises not only decreased to the level of 2010, but also became much lower than the share of those wishing to work at public sector enterprises (37.9% against 51.5%).

**Intellectual heterarchy** is a kind of a reaction to a monopoly of the state’s system of values; it is a sensitive indicator of “divergence of legal and legitimate, real and possible in the existing social organization” [56, p. 241]. D. Stark stresses that “heterarchies are organizations with multiple ideological positions” [12, p. 124], “complex

adaptive systems, where many principles of performance assessment intertwine. They are heterarchies of values” [13, p. 77].

Intellectual heterarchies in the structure of the background knowledge of Astrakhan citizens are manifested in the growing socio-cultural distances, which is manifested, first of all, in a significantly decreased support of almost all basic values while maintaining their hierarchy: in 2012 the average support score of all values comprised 3.99 points, in 2016 – 3.56 points on a five-point scale, which is significant in this rather short time range and can not be explained by the usual statistical error in the framework of our methodology for the study of the value system: the decreased support was so significant that all values were located in clusters of the integrating reserve, the opposing differential and the conflict-generating periphery, while there were no values in the integrating core. It is noteworthy that a significant decrease in support for basic values in the same period was recorded by the results of the all-Russian monitoring “Values and interests of the Russian population” [52, p. 20] and the results of a survey in the Vladimir Oblast [57]. Moreover, another manifestation of intellectual

heterarchy is recorded in the results of monitoring the growing share of those Astrakhan citizens who rarely visit cultural institutions (in 2016, already about half of them), but one in every three people begins to visit them more often. We cannot but rejoice that the latter group consists of young people predominantly.

Primary social networks are strengthening along with the increasing marginality of the value consciousness of Astrakhan citizens. Thus, the importance of family values in the structure of primary social networks increased by 10% from 2010 to 2016: in 2010, answering the question: "Among which people do you have maximum mutual understanding?", 71.9% of respondents chose "family", in 2016 – 81%. The importance of friends increased by 2.9 times (from 18% in 2010 to 52.3% in 2016). The importance of colleagues and neighbors increased significantly; this trend was already evident in 2012 (from 5.8% to 16.7% and 4.3% to 13.5% respectively).

Intellectual hierarchies are manifested in the population's disregard for the deteriorating objective indicators of the environment in the region and the growing positive estimates of air (from 21.5% in 2010 to 28.1% in 2016) and water purity (from 20.6% to 32.7% in the same period). Although during the same period in the region there was the most significant dynamics of reduced use of fresh water among the entities of the Southern Federal District – from 2335 million m<sup>3</sup> to 794 million m<sup>3</sup>, that is, 2.9 times, and the level of pollutants atmospheric emissions in 2016 continues to exceed the level of 1990<sup>5</sup>.

We believe that this indicates a decreased level of social claims in terms of solving the priority problems of surviving with minimum planning horizon, on the one hand. On the other hand, it is a demonstration of behavior of consumers

whose economic interests prevail over all others (for more detail see [58]). The lowering level of social claims is also seen in the increased self-assessments of people's own health. The share of Astrakhan residents who assess their condition as fine increased from the first to the third wave from 28.3 to 40.3%; the share of respondents who "sometimes fall sick", on the contrary, decreased from 43.7 to 37.6%. Although people's dissatisfaction with the current health system is growing at the same time, which demonstrates its dysfunction as a social institution. According to the monitoring results in 2010 and 2012, the number of people satisfied with medical care amounted to about 15%, in 2016 – this number reduced by half and comprised only 7.2%.

**Geographical heterarchy** is manifested in the distancing of alternative sources of power and norms in geographic space or in a milder form – inducement to emigration [56, p. 233]. Geographical heterarchy is manifested in the socio-cultural space of the region primarily in the growing emigration request. The share of Astrakhan residents who want to leave the region increased from 4.6% in 2010 to 8.2% in 2016; the share of those who want to leave Russia increased from 1.8% to 3% in the same period. The share of those who are happy to live in the Astrakhan Oblast, on the contrary, decreased from 29.6% to 19.9%. The number of respondents who do not have any feelings for the region also increased (from 9.8 to 16.1%).

The potential of geographical heterarchy in the region is enhanced by the fact that the Astrakhan Oblast is a historically formed crossroads of migration flows [59]. In recent decades a migration influx of young working population from the republics of the North Caucasus and Central Asia is recorded [29]. Such an influx in a multi-ethnic and multi-religious region leads to increased ethnic tensions recorded in the monitoring results (see [29] for more detail). The adaptation of young migrants with

<sup>5</sup> *Russian regions. Socio-economic indicators, 2010*. Available at: <http://www.gks.ru/bgd/regl/b10-14p/Main.htm> (accessed: 28.09.2017); *Russian regions. Socio-economic indicators, 2017*. Available at: [http://www.gks.ru/bgd/regl/b17\\_14p/Main.htm](http://www.gks.ru/bgd/regl/b17_14p/Main.htm) (accessed: 28.09.2017).

predominantly low professional qualifications is the objective of the region's system of education, whose potential, according to the ranking, is growing. Thus, according to the calculations of the Vologda Research Center of RAS, during 1990–2010 the region improved its status among Russia's constituent entities in terms of consolidated index of science and education development and moved up from 67 to 37th place [60, p. 179-180].

#### **Analysis and explanation of research results**

Thus, the analysis of modernization processes in the region based on the system approach, concepts of modernization and heterarchy has led to the following conclusions.

1. The application of the theory of heterarchy in various paradigms of modern social and humanitarian scientific knowledge – philology, psychology, sociology, economics, history, political science, network, system, etc. – indicates its significant theoretical and methodological potential. At the same time, interdisciplinary analysis reveals a number of contradictions in the application of conceptual approaches of this theory, which is expressed in different (sometimes opposite in meaning) interpretations of the connection of the concept of “heterarchy” with other concepts, and various interpretations of the influence of heterarchies on social processes.

2. The following items are promising for the analysis of modernization processes in the region in theoretical and applied aspects:

- research conclusion that subject fields of the concepts of “heterarchy”, “region”, and “modernization” overlap in terms of addressing the nature, principles (values) of management, as well as vectors of modernization of regional systems based on multipolarity, internal diversity, and regional specific features;

- the image of a region as a complex social system based on hierarchical (stability) and heterarchical (flexibility) relations that are not mutually exclusive. Such a system can be

upgraded by changing its internal organization towards a heterarchy or a hierarchy. This emphasizes the importance of competent goal making and solution of management tasks, development of situational management models whose implementation will provide maximum development effect with minimal resources. The specific features of system development with appropriate organizational design and structure can become the most important modernization resource;

- conceptual provisions on the Leviathan state opposing public heterarchical entities and the state as a central joint of a heterarchy engaged in meta-administration.

3. The socio-cultural space of the Astrakhan Oblast can be represented as a system the evolution of which consists of four states: growth and accumulation, adaptation, accumulation of changes, and transformation [61]. The current state of the system can be called turbulent, unstable due to change of stages of its state. The state of the region's system can be currently identified as a stage of accumulation of changes or reorganization, which means that the system is close to transformation, that is, the a transition to a new qualitative and stable state, in our case, by simplifying the system. The simplification of the system is manifested in lower level of social claims among part of the region's population along with strengthened value of primary social networks and reduced support for basic values. This process is amplified by the geographical heterarchy, which is manifested in the complex process of migration substitution of social groups with higher social demands by the carriers of nomadic mentality with low social claims. The carriers of this type of consciousness are stable; they have lower level of social claims, but reduced social capital manifested in the quality education and high-level professional competence. This strengthens the economic mindset to simple survival. Moreover, they have developed their own understanding of

basic values. Paradoxically, the simplification of the system with an appropriate organizational design and structure can become the region's modernization resource. The sensitive area of modernization is the complex nature and simulation of socio-economic institutions, which shows the dysfunction of the life-supporting sphere of the region's socio-cultural space.

Thus, based on interdisciplinary synthesis of the system approach, concepts of modernization and heterarchy, analysis of statistical

information, performance of modernization and human development indices, we analyze the results of the sociological monitoring study, modernization processes in a particular Russian region, identified the development stage of the regional system, and the resources and problems of modernization in the region in terms of a complex "overlap" of hierarchy and heterarchy relations. The obtained results can be applied in daily management of the regional society in a difficult and unstable transition period.

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