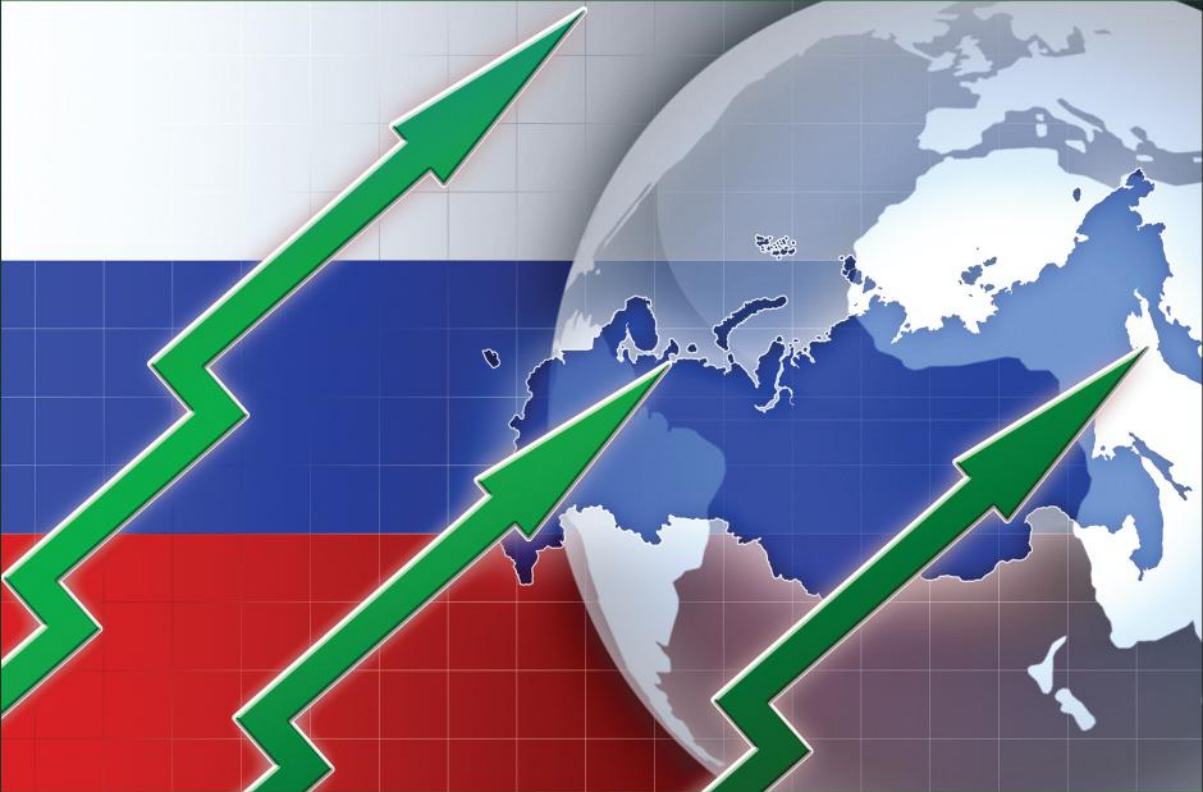




A VOLUME IN
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REIMAGINING SOCIOECONOMIC DEVELOPMENT OF RUSSIA

NEW DIRECTIONS, THEORY, AND PRACTICE

MARINA L. ALPIDOVSKAYA
LUDMILA A. KARASEVA
ELENA G. POPKOVA, EDITORS

Reimagining Socioeconomic Development of Russia

**New Directions,
Theory, and Practice**

A Volume in Advances in Research
on Russian Business and Management

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*Financial University under the Government
of the Russian Federation*

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INTRODUCTION

NEW VISION AND CURRENT DIRECTIONS OF SOCIOECONOMIC DEVELOPMENT OF RUSSIA

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Russia has entered a new era of its socioeconomic development. Four contemporary challenges define the shape of this new era. The first challenge is associated with global innovation trends and the Fourth Industrial Revolution. In recent years, there has been an acceleration in the rate of innovative development of the world economy.

To take its place in it as a progressive economy with leadership positions in target markets, Russia needs to overcome high technological barriers to entry in world markets, having mastered the massively available technologies actively used in them. It is also necessary to introduce and

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adjust the use of advanced technologies in the production and distribution of Russian products, which are just emerging and allow the formation of long-term competitive advantages.

However, in the long term, this is not enough. In order not only to achieve technological leadership but also to maintain it, Russia needs to launch and ensure the effective operation of a mechanism for continuous technological modernization of the economy and entrepreneurship. The proactive creation and implementation of innovations and advanced technologies should become a regular practice (undergo institutionalization), embedded in the philosophy of business, and enshrined in its organizational culture.

The transition to Industry 4.0 deserves special attention, which requires ensuring Russia's digital competitiveness in high-tech markets and market segments. "Markets of Tomorrow," which shortly will become vectors of global economic growth, are being formed today. Entering them and gaining advantageous positions is Russia's strategic priority.

The second challenge is to achieve and maintain sustainable development despite various global shocks and internal contradictions. The first and most important step on the way to sustainable development has been made in Russia—a national regulatory framework has been formed, which legislatively enshrined support for the sustainable development goals (SDGs). The next step is related to the formation of a "tree of goals," the distribution of powers and responsibilities.

The experience of the largest and most progressive Russian enterprises has shown how much business can do to implement the SDGs. Their successes should serve as an example and market incentive for the massive integration of the SDGs into corporate development strategies, as well as into day-to-day business and consumer practices for responsible production and consumption.

A serious problem to be solved in this process is the imbalance in the regional economy of Russia. Each region must find its unique path of socioeconomic development and successfully follow it. It is also necessary to establish the interchange of innovations and technologies among the regions of Russia in order to maximize their contribution to improving the quality of life of the population. Russia's impressive success in reducing income inequality has formed a solid foundation for the balanced development of the Russian regional economy.

The implementation of the SDGs and the balanced development of the regional economy should continue even in the face of external threats, among which, of course, the most important place is the COVID-19 pandemic and the global crisis. The indicative experience of 2020 demonstrated that Russian society can withstand even such a dangerous viral threat and

maintain unity, despite the social distance, due to a common culture and a strong national idea.

Groundbreaking technologies can be fastest possible introduced into practice to solve acute problems of socioeconomic development. A striking example of this is the Russian framework for combating the virus threat. At the same time, the lockdown also showed that not all digital services are fully managed—many of them need improvement, which will ensure their flexible scaling and stable operation even in emergency conditions.

The third challenge is the instability, uncertainty, and inconsistency of international economic relations. Previous international agreements are rapidly becoming obsolete and revised, which requires the launch of new partnership programs with the participation of Russia. One of the most promising such programs is the Eurasian Economic Union (EAEU), which makes an important contribution to the socioeconomic development of Russia. Integration processes at the level of the world economy and regions of Russia require flexible and proactive management.

The problem of Russia's economic security deserves special attention due to its acuteness and versatility. This problem covers a wide range of significant issues of socioeconomic development from food security, demography, and health care to cybersecurity and protection of national interests in world markets. A systematic accounting and comprehensive management of economic security risks are required.

The fourth challenge is the need for a practice-oriented legal framework and the search for a balance between the preservation of traditions and the progress of society. The legal framework and mechanisms, as well as social institutions, should, on the one hand, maintain the uniqueness and preserve the identity of the national culture, but, on the other hand, leave opportunities and stimulate its development. Society must be stable and progressive in order to support the socioeconomic development of Russia.

Training personnel to support strong economic growth is a priority issue. The burgeoning Industry 4.0 is in dire need of highly skilled and creative digital personnel capable and inclined to lifelong learning. The education market and the labor market in Russia must interact and collaborate even more closely to ensure a synergistic effect in the form of rapid and high-tech economic growth, which could lead to an “economic miracle” in Russia in the coming years.

Each of the identified challenges of our time corresponds to the current direction of the socioeconomic development of Russia. This has defined the logic and structure of this book, which is divided into the following four sections. The first section examines innovation and digitalization in the modern model of Russia's socioeconomic development. The second section is devoted to topical areas of sustainable socioeconomic development of Russia and its regions. The third section reveals the foundations

of international cooperation, integration and economic security in the socioeconomic development of Russia. And finally, the fourth section, which concludes the book, covers the social and legal aspects of Russia's economic development.

Thus, this book is devoted to the reimagining socioeconomic development of Russia in the unity of all the main directions of this development. The value of the book lies in the fact that it acts as a connecting link and provides a transition from theory to practice, forming not only a scientific methodology but also a useful guide to action for government regulators and subjects of corporate governance in Russia.

PART I

INNOVATION AND DIGITALIZATION IN THE MODERN MODEL OF SOCIOECONOMIC DEVELOPMENT OF RUSSIA

CHAPTER 1

A NEW REALITY

The Close Interaction Between Economic Theory and Practice

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ABSTRACT

After the global recession of 2008–2009, the signs of a new reality are becoming more apparent in public practice: stagnation in the economy, inhibition of integration interactions, increased nationalism, environmental crisis, etc. The mass of accumulated problems from previous changes has become redundant for the modern economy, which means that it is necessary to focus the opportunities, that economic theory possesses, on the consistent resolution of such problems and the creation of conditions for further development. However, the new reality highlights the dangerous gap between economic theory and practice, which alienates it from participating effectively in that process. The authors explore many specific manifestations of the gap between economic theory and practice, drawing on the principles of a systemic approach, revealing the contradictions that arise here, and attracting interdisciplinary opportunities. At the same time, these manifestations are considered in the space-time continuum of interaction between economic theory and practice in the conditions of the new reality. The authors are focused on the issue concerning the degree of conformity of fundamental studies in economic theory to the needs in the development of state economic policy basis, in the

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field of investment analytics, risk assessment, and management, corporate governance, project management, project financing, human capital, spatial economy. The results obtained by the authors represent one of the advanced research directions for social and economic studies resulting in the novelty and polemical nature of theses, conclusions, and recommendations of this chapter.

A NEW REALITY: THE CLOSE INTERACTION BETWEEN ECONOMIC THEORY AND PRACTICE

Intermittently, during the development of social sciences, there appear conditions where cascades of new facts about social and economic life cannot be rationalized within the existing theory. In this context tasks that the society is trying to set out based on the theory capabilities fail to yield solutions mainly due to being incorrectly stated—applied theses of the current theory are already not consistent with the reality. The more dynamic and profound transformations in the economy and society are, the more adequate reorganization of the respective theory is required to reach the frontiers sufficient for interpreting new experience-based data and stating urgent practical tasks correctly. A new reality, established in the social and economic life after the 2008–2009 Global Recession and adamantly showed itself with violent shocks struck the world community in 2020, pushes economic theory for the most rapid movement to a level of development that meets practical requirements.

Purpose of the Present Study

The recent decade shows growth of processes evidencing quality changes taken place in the economy and society that suggests a transition to a different state of the social and economic system defined as the new reality and this concept has become widely used (Krugman, 2017). However, many aspects of the contents of such a state, as well as place and specific historic tasks of the new reality within the modern world evolutionary process, remain controversial. In an attempt to advance in exploring this state, we highlighted the new reality predominant features manifested in modern processes quite distinctively (Ermolenko, 2020):

- sharp aggravation of competition at all levels of the social and economic life; rapid devaluation of existing competitive advantages, inability to rest on laurels of previous achievements beyond the scope of short-term periods (Minakir, 2014);

- passing of the threshold of pending problem accumulation has arisen during previous technological shifts and tremendous social and economic reforms which means the transformation of these issues into insuperable obstacles for further development. These obstacles are global while also containing special, national-local features suggesting peculiarity of ways and their solutions within the integration of efforts of all countries in the world. These are top priority issues that cannot be put away the same way some big cities try to shove away waste dumps they accumulated. These issues have to be resolved here and now, which sets the place and determines tasks of the new reality in the evolutionary process of the modern world (Florida, 2011; Naumov, 2019);
- complication of the evolutionary process within the boundaries of the current state of the social and economic life, its inundation with various hard-to-predict or completely unpredictable factors, the nonlinearity of development expressed in abundant trend reversals that deprives the society of the opportunity to efficiently use the same resources and regulatory instruments of the social and economic life as well as to expect the success of long-term strategies (Burlingham, 2016);
- spike in the disparity of social and economic processes occurring globally, with wide gaps in productivity, capitalization criteria, incomes, living standards, development rates, state of institutes and infrastructure platforms, investment prospects, and so forth (Capello, 2019).

The establishment of the new reality highlights a specific life cycle, which is common to the modern epoch loaded with profound, dynamic, and overlapping transformation processes. This cycle comprises two alternating reverse phases:

- the phase of intense transformations where pending social and economic problems gradually turn into idiomatic foot weights for the society;
- the phase after passing the threshold of pending problem accumulation into the point of bifurcation where the objective necessity for problem resolving and ambiguity overcoming is urgently manifested. Effective resolution of such problems creates conditions for transition to intense transformations within the next life cycle with a new economic growth quality; the attempted refusal of resolving the issues puts the society in long-term stagnation.

METHOD

The terminological construct “new reality” denoting the final phase of the specific cycle development of a new epoch corresponds only to the initial approximation to the understanding of process peculiarities of this phase and opens wide possibilities for inconsistencies. Within the context of this chapter, we intentionally opt out of searching for other variants of definitions of such processes to ensure continuity in the studying of the stated issue. However, it is appropriate to assume that further studies of these processes will lead to renouncing of the original terminological construct in support of another construct that is more specific in describing the social behavior when it passes the threshold of accumulation of unsettled social and economic problems related to intensive transformations (Brizhak & Ermolenko, 2017).

Transition to the new reality loaded with urging development problems, trend reversals, confrontations of dissimilar forces, bifurcations reintroduces instruments to social and economic studies which have been once proposed by dialectics: threshold of measure of transformation; transition to a new quality state; generation, aggravation, and resolution of contradictions; stages of the established narrative disapproval, and so forth (Naumov, 2013).

Synthetic tasks of the new reality defy solutions while staying within the narrow boundaries that once were set for various research; they require multidisciplinary resources and the development of broad outlines of the global picture. Respectively, resorting to multidisciplinary interactions and worldview vision indicates dramatic rethinking of positivism hypotheses that were prevalent in scientific studies for a long time (Mamedov, 2017).

The new reality creates a special historical diverge point when choosing a further development path for different countries in the world:

- one direction assumes consolidation of national efforts and search for qualitatively new approaches and mechanisms to solve pending problems in contradictory conditions of the combination of partnership with other countries and tough competition with them (Arrighi, 2006). The weight of evidence suggests that this direction will generate future leaders of the world evolution process;
- the other direction within the new reality suggests the focus on tracing errors of the prior development, searching for the guilty, and attempting to correct what has already happened in the past, that is, to get even with history somehow. By doing so, the burden of pending problems remains practically unchanged, or it is augmented with new components. This path buries the

countries, which choose it, into a kind of historical swamp where their power verticals, business, and civil society actors drown and the disastrous combination of the society stagnation elements and crisis develops. Moreover, there is a high probability to get trapped in so-called “self-isolation” promoting conditions for escalation of national growth costs. There are reasons to suggest that this is the path that generates future outsiders of the global evolutionary process related to its remote periphery.

Times of the new reality makes demands that countries cannot ignore. If no changes take place in response to relatively soft signals indicating the necessity of urgent solution to pending problems related to ecology, climate change, reproduction of people’s health potential, generation of creative human potential, and so forth, then the respective new reality actors get strong blows with devastating consequences for the economy and the entire society. Eventually, pending problems in these countries will be resolved anyway, but at fundamentally different timing, material, and human costs.

The new reality cuts off many established value chains that unbalance the economy and society; the disequilibrium state dominates in it (Valras, 2000). Actors of social and economic life here lose or obtain their positions, income flows, significantly modify their stand in the world and their judgments. This also fully applies to the links between economic theory and practice when the theory no longer sets the stage for advanced development trends and meets new practice requirements.

The Gap Between Economic Theory and Practice

Among various pending problems to be resolved in the new reality, we have highlighted a huge gap between economic theories and practice that prevents their efficient interaction. Here we see a polarized environment. On the one hand, the new reality practice suggests that theory should appreciate and capture a variety of completely new objects, actors, processes, as well as problematic nodes requiring solutions. On the other hand, economic theory tries to preserve unchanged those concepts of its subject areas, its method, principles, functions, structure which were formed some decades ago, long before the new reality emerged. The acquaintance with its long-present agenda and main hypotheses leads to the conclusion that it separates itself from the most complicated aspects of modern transformations: transitions to a new qualitative level; contradictions; trend reversals, and so forth. See if you can find in it objective laws of modern social and economic development, delimitation of different stages, methods of resolving conflicts arising in the process of transformation, and so forth (Skousen, 2016).

It can be assumed that conceptually the theory takes shape once and forever, and we can talk only about adding a new “floor level” to the already existing logical construction or altering several immaterial details (Galbraith, 1976). In the meantime, the new reality requires changing to be introduced to the entire logical construction of the theory; figuratively speaking, the old foundation of the economic theory “building” no longer ensures its stability amidst a soared “wind” load of current changes. Just adding new floor levels and changing separate parts of its “building,” economic theory follows practice, giving up on “tempo battle” so much needed in modern science.

The idea of the economy as an ongoing process, a perpetual phase change of one and the same fundamental cycle plays a key role in the existing logical construction of the economic theory. Based on this idea, it is impossible to interpret facts introduced into practice by the new reality, as they reflect the intermittent nature of major social and economic processes (Mises, 1966). With the threshold of multiple unsettled problem accumulation passed, the idea of the development as of a relatively smooth flow does not work anymore, as we are dealing with a jogged line comprised of several multidirectional legs each standing for a single trend. Respectively, this jogged line cohesiveness comprises certain trend reversals implying the need for analysis of qualitative changes and contradictions that arise in every trend reversal. It raises a purely rhetorical question of whether the existing economic theory is ready to deal with respective tasks.

A fundamental idea of the economy is a continuous process that served as the basis for a balanced development concept realized in the Soviet economy and social system, which historical limit exposed itself during the transition to a new epoch full of enormous technological shifts and associated social and economic transformations. Thus, attempts undertaken during sharp changes of conditions of the evolutionary process to develop and implement five-year plans based on fixed social needs and costs of social labor faced sharp changes in such needs and costs within much shorter periods than five years.

The practice of the new reality needs a markedly different fundamental idea of the economy taking into account the intermittent nature of modern development and trend reversals at junctions of the legs that make the jogged line of this process. The idea of life-changing turns of economic dynamics that N. Kondratiev once defined while analyzing long cycles of the economic environment, is popular in the new reality conditions. The concentration of stress in the face of the delayed growth builds up economic disparities, disorients ruling groups in complicated economic space, and expands political, military, and social conflicts (Kondratiev, 1989).

Attempts to practice forecasts that were developed on the ground of basic concepts of economic theory in order to prepare human factor of the

modern economy resulted in a controversial imbalance typical for many countries of the modern world: redundancy of specialists with standard competencies out of demand in the labor market as opposed to an acute deficit of highly developed specialists needed for rapidly changing modern processes (Jacobs & Mazzucato, 2016). Such imbalance repeats a built-in constraint of economic theory that tries to describe specialist training for the new reality using the classical concept of complex labor value as a multiplied cost of simple labor. Based on such a concept, the obvious practical conclusion is made that this imbalance does not represent a serious problem and can be solved by adding competencies and turning a worker who does simple labor into a worker who does a complex one, reducing the problem to additional training.

Schumpeter (1982) was among the first to note that the mentioned conception is insufficient for interpreting the entrepreneurial potential of the economy. The new reality is abounded with complex, challenging problems and creates a demand for unique specialists with high-developed, almost exclusive competencies, which cannot be interpreted with a pair of categories “simple labor—complex labor” operated by the economic theory so far. Efforts to implement educational programs for specialist training based on outdated postulates of economic theory are doomed to failure. When solving issues that require creative potential, it is necessary to use qualitatively new theses yet to be developed in the process of economic theory transformations.

The new reality sets up requirements for the economic theory assessment in a professional, unbiased, and exacting manner by putting forward some complex unconventional tasks that require creative transformation and reprioritization of the theory. Amidst mainstreaming issues related to fundamental changes of the entire social and economic life, economic theory cannot afford to make fine minor details of outlived processes or go for new classifications of archive data. It is aimed at dealing with seedlings of the future of the economy and the entire social system that strive through the problems of the present (Marx, 1969). However, implementation of this requirement encounters limitations resulting from positivistic approaches dominating in theoretical-economic studies. Worldview agenda is unusual for modern studies of the economic theory; in-depth studies of the modern world economic picture are extremely rare. At the same time, theoretical-economic studies based on unsubstantiated concepts, constructs, perspectives, together with active foul playing, that is, substitution of true theoretical knowledge for the wrong one, are quite numerous in academic literature.

It is impossible to meet the needs of contradictory and rapidly changing practice if the methodology of the modern economic theory is detached from dialectics, achievements of advanced philosophic thought, including

concepts of scientific theory paradigm-shifting, a combination of compatible elements of research approaches, and so forth. Papers related to the evolution of the economic theory methodology are extremely rare in academic literature, though the new reality practice is in desperate need of fundamentally new approaches to a variety of pending urgent problems.

One of such problems in the new reality is the economy and society digitalization. Emerged during technological shifts, this process leads to dynamic and profound social-economic transformations and produces contradictory outcomes. On the one hand, it boosts many operations, reduces costs, expands communication space within the community, opens new management opportunities, and so forth. On the other hand, it eliminates many occupations forcing the affected population to seek scope for their skills, provides immense opportunities for covert surveillance on private life, shapes a negative prospect for a “digital forced labor camp,” and so forth. There is an acute contradiction of a leading modern transformation, and the concern is that the existing economic theory is definitely not ready to be a part of its solution. The same is true for outcomes of other technological advances—the theory systematically evades their in-depth analysis opting to deal with applied issues like serving the interests of new platform and technology builders and participating in their product promotion campaigns instead of elaborating on new subject domains.

The new reality deals with a variety of new areas of social and economic activity that emerged in the past few decades raising pressure on different branches of the tree of economic science that discover new research sectors, additional tasks, and receive new responsibilities. It leads to the explosive development of such branches as management, finance, risk assessment, spatial economy, social economy, and so forth. Figuratively speaking, the top of the economic science tree branches forth and becomes heavier that suggests adequate development of its trunk structure, in other words, economic theory. Its active interaction with various new branches of the economic theory tree, including new ones, ensures the efficiency and sustainability of the latter (Kleiner, 2017).

If the trunk structure does not provide for the needs of such interactions, the entire structure of the science tree gets weaker, and the risk of its collapsing increases. In addition, dynamically growing branches without getting what they need from economic theory are forced to pursue answers to their questions, in other words, create their economic theory. It results in a paradoxical situation—branches of the economic science “tree” have to take on the role of the trunk structure while losing a common theoretical and methodological platform intended for their integration. In practice, it is displayed in excessive competition between the branches in the area where they are encouraged to lean on theoretical consensus and not to expend energy on hopeless discussions. In the new reality context, the

economic science tree trunk plays an increasingly important worldview role triggering a set of tasks of economic theory to activate the theoretical search, update the arsenal of applied approaches, and intensify its development.

RESULTS

Opportunities of the New Reality

The new reality makes many stringent requirements to the society as well as provides qualitatively new opportunities for solving pending problems. However, such opportunities are hard to see, they must be found and unveiled, and that is a mission-type objective of modern science. Based on experience of recent years, we have listed a range of opportunities for bridging the gap between the economic theory and practice arising under the new reality conditions.

The first opportunity involves the availability of theoretical resources to provide a qualitatively new fundamental idea of the economy as of an intermittent process that is comprised of many multidirectional parts which links cannot be enabled by relying on one stiff algorithm, one social and economic policy. Such process is affected by many hard-to-predict or completely unpredictable factors; it is comprised of relations forms that deal with various development levels, hybrid entities, rapidly changing internal and external environment conditions meaning that risk assessments need to be adjusted (Vernadsky, 1989). Respectively, in order to provide a highly sought perception of the economy, the economic theory needs to use achievements of other research strands:

- discrete process theory (physical studies);
- hybrid form and mutation theory (biological studies);
- bifurcation concept (evolution theory studies);
- heterogeneous system theory (systems studies);
- probability system (mathematical studies), and so forth.

This perception will allow theoretically correct interpretation of various phenomena of the new reality, as well as corresponding scientific knowledge increment providing for further development of the economic theory.

The second opportunity for bridging the gap between the economic theory and practice arising amidst the new reality involves this theory going back to the roots, rethinking the background under the necessity of stringent requirements, which the new reality specifies. On the one hand, the economic theory will be able to get rid of everything outdated,

insignificant, or failing to endure over time. In doing so, it will release resources and space for further development. On the other hand, it will be able to fill in its development landscape with new subject domains; introduce new notions, constructs, concepts, contradictions capturing the modern practice realia, as well as revive expanding objective laws of the economy and society movements, which always makes scientific work special against various types of social activity.

From the perspective of the new reality, going back to the roots and rethinking of theoretical background also enable advancing of the economic theory methodology and discovering the key to major problems of the day. Stagnation of methodology dents public confidence in the economic theory, while a breakthrough in this direction offers it an opportunity to take an active part in defining and solving pending problems accrued from previous transformations. This breakthrough calls for a dialectical method, without which objective contradictions, thresholds of problem accumulation, and stages of negation of the new reality occurrences will miss theoretical interpretations, and the economic theory will lose many elements of knowledge that the reality is “loaded” with.

The breakthrough in methodology also involves the elaboration of the economic theory paradigm applicable within the new reality environment. Defining the way of interaction between subject domains and the method, this paradigm builds the theory internally, sets the tone of its movement. The transition to a qualitatively new state marking the beginning of the new reality assumes the current theory paradigm shift. In its turn, a variety of problem nodes that is typical for the new reality requires the development of a whole complex of approaches specific to particular nodes. In this situation, it is essential to combine compatible elements of different methodological approaches and expand multidisciplinary search space taking into account specific features of tasks suggested by the new reality, which creativeness assumes mobilization of resources unusual for the previous period of the history such as capabilities of social psychology, intuition theory, cognitive theory, esoterics, and so forth.

The third opportunity for bridging the gap between the economic theory and practice arising amidst the new reality includes the development of new directions of theoretical analysis that did not exist before but are needed at the current stage. As the new reality practice badly needs creative potential to resolve many complex problems, the economic theory research space should bring up a new trend related to a group of tasks for supposition evaluation, generation, and development of the mentioned potential. This trend brings back to the theoretical analysis of the categories of initiative, free power of an individual, suggested by Karl Marx (1974), and also opens a new chapter in elaborating the human capital issue.

Processes of creative potential generation and realization, as well as its capitalization in the form of human capital, cannot be theoretically interpreted using common categories of labor force, simple and complex labor, as these categories are intended for the analysis of standard processes and their preconditions based on well-defined algorithms. Creative potential, creative activity, and human capital pertain to a higher level of development of social production forces. Commitment to innovations common to this level transforms the middle class that is traditionally viewed as a cornerstone of social stability. If you equip the middle class with creative potential and provide conditions for the realization of such potential through the development of innovative technologies and products, the output achieved can be in the form of enhanced public functionality of the middle class and explosive growth of its performance, together with a transfer to a completely new social organization without the predominance of giant corporate structures and government (Ermolenko, 2020; Naumov, 2019).

Thereof, we need to revisit the concept of zero growth shifting the emphasis from the global economy volume growth to sustainable technology-based resource consumption, which may improve the life of society through pollution abatement and product quality improvement. Such a focus shift calls for middle-class creative potential. Half a century ago this shift proved impossible in the context of fierce competition of state monopoly capital for resource and finished product markets, and military and political dominance. The new reality looks for the realization of the middle class's creative potential and exercises demand for developing solutions to support its reproduction in crisis situations (Adizes, 2009).

The COVID-19 pandemic put the middle class at a serious disadvantage, flagging a possibility of bankruptcy for many entrepreneurs. In this situation, it became necessary to revise established theoretical ideas and applied recommendations on governmental support for various social groups in a crisis environment. Attempts to rest on the traditionally strong support of "pillars" of the national economy and meeting the minimum requirements of most insecure people are fraught with a loss of a significant portion of the middle class, which after a sharp deterioration of their well-being will deplete most of their creative potential so much needed to address challenges of the new reality. An in-depth theoretical study of this issue could form new theoretical ideas and develop effectively applied recommendations to retain and enhance the middle class's creative potential in a prolonged crisis. But do the ruling elite need such recommendations while trying to sit on a barrel of gunpowder with a traditional smoking pipe in hand?

Elaboration of the internal logic of management innovations that have a huge potential for transformation of present-day production functions,

structure, and institutions could be another new area of theoretical analysis popular in the new reality environment. The explosive growth of such innovations is typical for the new reality and opens opportunities for the generation of additional problem domains within the economic theory studies:

- system analysis of social and economic development projects of different levels, which are expectedly prevailing in the new reality. Due to its flexibility and discreteness, a project form is immanent to the environment of multiple trend reversals, the impact of hard-to-predict factors, and the presence of negative synergetic effects driven by the interaction of multiple acute problems. It is crucial to have projects focused on development instead of economic growth; consequently, they require fresh ideas, objectives, structures, leaders, and truly creative thinking, that is, creative potential of their participants. Performance analysis of flexible project teams and outcomes of periods with stable trends enables the economic theory to gain knowledge increment crucial for a comprehensive understanding of the new reality and effective interaction between the economic theory and changing practice (Mintzberg, 2019);
- development of theoretical grounds for a new public management model in the highly uncertain environment typical for the new reality. One of the most important lessons that humankind learned from the COVID-19 pandemic in 2020 consists in the necessity to modify many functions of a modern state for their effective socialization, encourage its social responsibility based on performance results and decrease the level of bureaucratization through a partnership with business participants and social society structures (Platon, 1992; Marx, 1974). Successful resolution of these tasks requires knowledge about the theoretical basis of the desired model to be gained from the experience accumulated by various countries in the new reality.

The fourth opportunity for bridging the gap between the economic theory and practice arising in the new reality includes in-depth analysis of experience in applying outcomes of serious technological shifts and associated social and economic transformations. It will allow giving an accurate social assessment of a productive potential that results of such shifts comprise, and correctly define a method of its realization for solving problems of the new reality. Thereof, there is an illustrative practice of assessing and applying previously mentioned digital platforms, technologies, and instruments, which initially were viewed as some magic remedy able to

bring the society to an unprecedented level of development within a short time (Skousen, 2016). However, very soon there appeared tendencies of extensive use of digital opportunities to tighten bureaucratic control over people's private life, and certain governmental, corporate, and management entities started pushing to become newly appeared architects of the "digital universe" by turning other participants of the national community into personnel taking care of that universe. Leaving aside attempts of the government and management entities to function as a supreme force, we suggest assessing their attempt to turn the society into a group of doers serving goals identified by those entities and embodied in the form of digital programs through hi-tech platforms, technologies, and instruments (Brizhak, 2020).

In this situation, success would have constituted a refusal to solve issues of the new reality and an attempt to add to them the problem of "digital slavery" for humankind. The new reality needs entities capable of strategic and socially responsible actions rather than mindless doers or indifferent managers, whose activity once led to the accumulation of a critical mass of unsettled social and economic problems (Mintzberg, 2019).

By analyzing the previous experience of using digital breakthrough outcomes in hi-tech developments, the economic theory can reveal internal contradictions of this process and also justify the need to use such outcomes for intensive free power development of people of the new reality and their successful capitalization in the form of human capital. These results will enable a major step in bridging the gap between the economic theory and practice of the new reality.

CONCLUSION

Summarizing the above-stated theses and conclusions, we can make a general comment on ways for bridging the gap between the economic theory and practice that is apparent in the context of the new reality, and transfer to which is linked to finding of a specific life cycle typical to the modern epoch full of deep, dynamic and overlapping transformation processes.

This life cycle consists of two opposite alternating phases: the first one is the phase of intensive transformations where unsettled social and economic problems are accumulated; the second phase follows when the threshold of unsettled problem accumulation is passed, and the social system reaches the point of bifurcation with an acute need to resolve these problems. The second phase that creates conditions for transferring to the next cycle characterized by the economic growth of a new quality was given the name of the new reality.

The gap between the economic theory and practice makes an important component of the unsettled problems array of the new reality. It is associated with the economic theory “crystallization” into a complex of inflexible rules detached from rapidly changing realities, attempts of stabilization of its subject domains, the rigidity of the research method, and disregarding the need for developing new directions of theoretical studies of modern social and economic life processes (Brizhak & Chikanova, 2022).

The new reality not only captures the dangerous gap between the economic theory and practice but also provides bridging opportunities involving in-depth analysis of the experience accumulated by the society in using significant technological shifts and related social and economic transformations.

The first opportunity involves the availability of theoretical resources to provide a qualitatively new fundamental idea of the economy as of an intermittent process that is comprised of many multidirectional parts which links cannot be enabled by relying on one stiff algorithm. The second opportunity involves the economic theory going back to the roots, rethinking the background under the necessity of stringent requirements, which the new reality specifies.

The third opportunity includes the development of new directions of theoretical analysis that did not exist before but are required by the new reality. As the new reality practice badly needs creative potential to resolve many complex problems, the economic theory research space should bring up a new trend related to a group of tasks for supposition evaluation, generation, and development of the mentioned potential. The fourth opportunity includes an in-depth analysis of experience in applying outcomes of serious technological shifts and associated social and economic transformations. It will allow giving an accurate social assessment of a productive potential that results of such shifts comprise, and correctly define a method of its realization for solving problems of the new reality.

The results obtained by the authors represent one of the advanced research directions for social and economic studies resulting in the novelty and polemical nature of theses, conclusions, and recommendations of this chapter. The authors hope that their work will promote scientific search in this direction.

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CHAPTER 2

THE MODERN ECONOMY OF RUSSIA A NEW REALITY

Prospects for the Future

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ABSTRACT

The relevance of the scientific article is determined by the authors' appeal to the specific question of the future development of the Russian economy after a short period of restrictions on economic and social activity caused by the spread of the coronavirus. The presented data on the macroeconomic economic indicators of the development of the Russian Federation, as well as statistical studies that examine and analyze the behavior and moods of economic agents, confirm that the economic crisis caused by the coronavirus infection is manifested in a drop in the overall level of supply and demand, in the labor market this is manifested in unemployment caused by the deterioration of the situation of small and medium-sized businesses in the service sector and related to the sale of nonfood products, the demand for which has fallen sharply due to restrictive conditions and falling solvency of the population.

Of particular importance are the analysis of current macroeconomic indicators and the consideration of the behavior and attitudes of economic agents during this period, as well as the features of the 2020 crisis caused by the coronavirus pandemic and subsequent restrictive measures by the state.

The scientific novelty of the article is due to the need for deep, comprehensive research to understand how, after a short period of restrictions on economic and social activity, to balance the losses and determine the future development of the Russian economy, to find a way out of the crisis and restore the economy, so that Russia enters a new long-term growth trajectory.

THE MODERN ECONOMY OF RUSSIA: PROSPECTS FOR THE FUTURE

The relevance of this article is explained by the need for further development of the Russian economy, which will have to recover and enter a new long-term growth trajectory.

The authors conducted a serious study of the current economic development of Russia, its recovery after the crisis, and the search for prospects for the Russian economy to enter a new long-term growth trajectory.

The article identifies and reveals the main problems caused by the COVID-19 pandemic and the collision of the domestic economy with a large-scale deterioration in the situation on commodity markets and falling oil prices. The authors consider the behavior and moods of economic agents as the most complete characteristics of the Russian economy during this period. Special attention is paid to the support measures proposed by the President of the Russian Federation, the Prime Minister of the Russian Federation, the Mayor of Moscow, as well as to the analysis of support measures aimed at increasing investment activity and increasing investment growth rates.

METHOD

The solution to the task was carried out through comparative, logical, and statistical analysis, and structure analysis, mutual respect, and the dynamics of the phenomena in the documentation and information areas based on information from books, newspapers, legal acts, and the internet. The descriptive method, including the techniques of observation, interpretation, comparison, and generalization, is fundamental for the undertaken research.

“Corona Crisis” and the State of the Russian Economy

Currently, Russian society is in a state of complete disorientation caused by the coronavirus pandemic. In our state agenda as rapidly in the regions gradually removed the restrictions discussed past “popular vote,” the controversy erupted about the upcoming second and third wave of the epidemic, and the Deputy Prime Minister Russian Federation Tatyana Golikova calls to prepare for higher education institutions to continue distance learning (“Golikova Urged Universities to Prepare,” 2020). So how did the domestic economy react to all these events?

The crisis that emerged in 2020, caused mainly by the pandemic and subsequent restrictive measures on the part of the state, has some features. First, there is a drop in the overall level of supply, reduces the potential level of production capacity in the medium-term trajectory, rising unemployment—services almost stopped, small and medium businesses in distress. Second, there is a sharp contraction in demand households and firms are losing their ability to pay. Third, the financial crisis was caused by a decline in the solvency of individuals and legal entities, which was caused by a drop in supply and demand. In addition to the above characteristics, the economic situation has affected several “surprises” in this time, and it was not aware of the timing of disease control measures, it was not known how long is compressed oil demand and what will be the price, and, third, the global “surprise” is the lack of information on the scale of “artificial coma” in the economy, as the focus of its impact on various sectors of the economy. And many of these “features” and “surprises” are still evident.

Current Macroeconomic Indicators

Due to the COVID-19 pandemic according to estimates available to date, Russia’s gross domestic product (GDP) in 2020 fell by 2–8% (Voskoboinikov et al., 2020, p. 4), 8% by claimed by the Accounting Chamber of the Russian Federation (“Kudrin Predicts an 8% Drop,” 2020), 2% by claimed by the HSE Development Center Institute, and the Central Bank of Russia occupies an average position of 4–6%. The World Bank’s June report predicted a 6% drop in Russia’s real GDP compared to last year (World Bank, 2020, p. 4).

The most obvious, the relevant data are for April 2020, exactly one month to fully reflected “mode working days with the preservation of workers their wages” (“Putin Extended Non-Working Days,” 2020)—due to the spread of COVID-19 April 2020 have been announced by the President of Russia after hours with pay to employees (Federal State Statistics Service, 2020, p. 2082). So, specifically in April 2020, Russia’s GDP, according to the review of the Ministry of Economic Development of the Russian

Federation, decreased by 12% (The Gross Domestic Product,” 2020). For the same four months at the level of 1.9%. The biggest decline was in the consumer services sector. And the volume of paid services that are provided to the population decreased in April by 37.9%, which is caused by restrictive government measures. Retail trade turnover decreased by 23.4% in April, mainly due to a drop in the nonfood segment, but the turnover of food products decreased insignificantly. The scale of the decline was more moderate in the industrial production, it was 6.6%.

Thus, the report of the Ministry of Economic Development of the Russian Federation notes that the unemployment rate reached 5.6% of the labor force, for the first time since June 2016. Thus, the annual growth in the number of unemployed in April 2020, according to the Federal State Statistics Service, was 21%, according to their data; the unemployment rate in April was 5.8% (Federal State Statistics Service, 2020). The employment rate in April 2020 was 58.1%.

In the first quarter of 2020, the domestic economy faced a large-scale deterioration in the situation of commodity markets and falling oil prices. However, the Russian economy was able to maintain the stability of financial markets thanks, first, to the floating exchange rate of the ruble and the inflation targeting regime, and second, to the budget rule. And, thirdly, the policy of devaluing the banking sector, which has been implemented since 2016. Thus, the exchange rate has already strengthened after the March shock, inflation is under control and significantly below the target level, and federal loan bond rates are lower than at the end of February. The situation in the oil market has improved significantly. The price of \$30 per barrel of Brent is not so high, but better than \$18.

In May 2020 the material on the study of consumer sentiment in the first quarter of 2020 was published (Lipkind et al., 2020). According to the survey, the deterioration of the financial situation was noted by 27% of respondents (12% improvement), the deterioration of the financial situation over the next 12 months was noted by 17% (13% improvement), 34% of respondents negatively assessed the changes in the economy over the past year, and 15% of respondents positively. Most of the respondents said that they expected prices to change in the direction of their growth.

The institute also published a paper on the assessment of economic sentiment in the first quarter of 2020 (Lipkind & Ostapkovich, 2020). About half of the respondents noted the negative impact of insufficient demand for products/services, which limited the activities of the organizations of the most basic sectors of the economy.

However, there is also the most relevant research (Ostapkovich et al., 2020), concerning the assessment of the business climate in the industry as early as April 2020. The researchers noted a strong drop in business confidence since 1995. The main blow from the pandemic and the oil

shock fell on the manufacturing industry, as the most innovative and with the most qualified personnel.

Thus, the presented data of macroeconomic indicators of the economy of the Russian Federation, statistical studies examining and analyzing the behavior and sentiments of economic agents, confirm the above theses and economic crisis caused by the coronavirus infection is manifested in a drop in the overall level of supply and demand in the labor market is evident in the unemployment caused by the deterioration of the situation of small and medium-sized businesses in the service sector; in industry, it is manifested in the deterioration of the manufacturing view. The situation of firms associated with the sale of nonfood products has also deteriorated, the demand for which has fallen sharply due to restrictive measures and a decrease in the solvency of the population.

A Nationwide Economic Recovery Plan

The measures to support the domestic economy were announced shortly after the introduction of anti-epidemic measures. The public paid special attention to the support measures proposed by the President of the Russian Federation, the Prime Minister of the Russian Federation, and the Mayor of Moscow. To systematize all of the proposed measures is difficult, however, to highlight areas in which this assistance should be: firstly, the minimum monetary support of the population (“Nabiullina Spoke About the Risks,” 2020) in comparison with the experience of foreign countries (Zhulin et al., 2020, p. 102), and second, it focuses on preferential loans, grants, and guarantees to the detriment of the “living money” third, support is mainly focused on large business, so as soon as he can enter the list of strategic enterprises; included in the list of preferential revolving loans with reduced requirements for borrowers due to the guarantees of the Ministry of Finance also subsidized loan rate is 6%, other firms were offered salary loans; small and medium enterprises from the list of affected branches can receive subsidies in the amount of 1 minimum wage. Also, 200 billion rubles were allocated to the regions from the federal budget.

In early June, a draft national plan for the recovery of the economy and income of Russians was presented, which will take place in several stages—until the end of 2020, the stabilization of the economy, until the second quarter of 2021, its recovery, and by the fourth quarter, ensuring the growth of at least 2.5% per year. The project contains both previously announced state support measures and some new ones. According to Prime Minister Mikhail Mishustin, the plan consists of 500 events (“The Government Has Developed a Plan,” 2020). Its targets were a drop in the unemployment rate to 5% and a 2.5% annual growth in the gross domestic product by the

end of 2021. The draft also presents various measures to support small businesses, including refusal to index insurance premiums paid by sole proprietors for the period 2021; “transitional” tax regime for taxpayers who have lost the right to apply the simplified tax system; liberalization of the consequences of a bankruptcy for bona fide individual entrepreneurs. The project also contains support measures aimed at increasing investment activity and increasing the rate of investment growth. The project also contains measures for sectoral assistance—airlines provide state guarantees for loans for the purchase of aircraft. 30 billion rubles will be allocated to complete the construction of problematic shared-equity construction projects. And already on June 8, the Prime Minister’s order to finalize the national plan for economic recovery by June 19 became known (“Mishustin Instructed to Finalize” 2020).

The events related to the recovery from the crisis in 2020 in the oil market. The implementation of the OPEC+ agreement on reducing oil supplies has recently brought very tangible benefits to Russia. For example, the national currency has stabilized and is strengthening, and the country’s foreign trade balance has also stabilized. The increase in oil prices caused by the agreement on production reduction between the main oil-producing countries and the “exit from the artificial coma” of the Chinese economy caused by the lifting of quarantine measures, the easing of the same restrictions in Europe and the United States, which contributes to an increase in oil demand, also had a positive impact. Russian export-grade Urals also became more expensive, reaching \$12 per barrel by the beginning of June.

DISCUSSION

When talking about productivity growth due to the recovery from the 2020 crisis, some economists draw an analogy between the crises of 1998, 2008, and 2020. In one of the works, the recovery is associated with an increase in demand for raw materials on world markets and the reaction of the expanded mining complex, just by analogy with the recovery of 2008 (Voskoboynikov et al., 2020, p. 6).

The authors call the improvement of the efficiency of the expanded mining complex along the entire chain, namely production, sales, transportation, stimulating technological catch-up by reducing barriers to the adaptation of advanced technologies, reviewing measures to support the productivity growth of nonresource industries, and maintaining complex, successful export-oriented industries in the context of the crisis, as contributing measures to restore growth in the medium term in 3–5 years.

The experts of the Bank of Russia reviewed the existing nonfinancial crisis and identified four channels (the channel of the balance of payments; prices of financial assets; income) impact on the domestic economy,

reviewed the consequences of this crisis mainly on the banking sector of the economy and noncredit financial organizations; and suggested ways to reduce the negative effect of this crisis. In their work, they concluded that they are more thoroughly prepared for the shocks of 2020 in comparison with 2008 and 2014, due to the easing of the monetary policy of the Bank of Russia. However, they focused on one important issue—the need to help borrowers restore their financial situation.

The exact timing of a complete recovery from the crisis in 2020 is unknown for the domestic economy, or the global economy as a whole. Most economists argue that the success and speed of our economic recovery depend on the pace of global economic recovery and the establishment of balance in the oil market, and the Central Bank's policy during the crisis is not criticized. The budget rule played a special role in the stabilization of the domestic economy, which ensured the stability of the currency in the most shock periods. But some experts are inclined to believe that our economy is in for a recession. Obviously, in this case, the most important task is to prevent the transition of the domestic economy into a phase of depression.

RESULTS

The recovery of the Russian economy after the crisis in 2020 will be associated with an increase in demand for raw materials on world markets and an assessment of the long-term costs associated with the coronavirus pandemic. To implement the national action plan, it is necessary to ensure the restoration of employment and income of the population, economic growth, and long-term structural changes associated with supporting import substitution and exporters to enter foreign markets. “The strategic objective of such a nationwide action plan is not only to stabilize the situation, but, most importantly, to support citizens, enterprises, and businesses at the exit stage,” Putin said. “We also need to achieve long-term structural changes in the Russian economy” (“Putin Tapped His Fist,” 2020). The goal is to achieve a stable trajectory of economic growth and income growth, ensuring the implementation of national development goals (national projects).

CONCLUSION

Thanks to the coronavirus, the global conditions of Russia's economic policy have changed dramatically. And the discussion of its consequences has become one of the most popular topics among economists. Some expect global changes from the “coronavirus,” while others believe that

the world will simply gradually return to its former track. Central banks are likely to be in the middle of these positions. The crisis radically changed the future forecasts of the world economy, and at the same time changed the policy of central banks. But, according to economist Oleg Shibanov, they will be influenced by two trends—the desire to digitize the economy and the intensification of interstate cooperation despite the likely economic deglobalization (“Global Changes or a Small Adjustment,” 2020).

In terms of its consequences, the current crisis caused by the spread of coronavirus infection may be more severe than the crises of 1998 and 2008. In the coming years, the Russian economy will have to recover and enter a new long-term growth trajectory. However, we can say that the experience already gained in the crises of 2008 and 2014, the existence of the budget rule will provide greater stability in the field of the foreign exchange market, the credit market, and the financial sector.

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CHAPTER 3

THE ISSUE OF OBJECTIVITY OF THE ONTOLOGY OF SOCIETY IN THE AGE OF DIGITALIZATION

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ABSTRACT

The main goal and objective of this research is to discover significant changes in social ontology under the influence of the digitalization process. The critical analysis shows that the categories of the ontology of society have recently been explored in economics, politology, history, and applied sociology. These explorations do not fully take into account the features of social ontology and therefore they often fall down into the position of physical-mechanical understanding of the ontology. They leave out of consideration significant changes in ontological phenomena of society, which are manifested in the

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objectification of ideality, questions of the truth and falsity of ontologized ideality. Such factors of social ontology actualize the research into its intertemporal changes from the perspective of metaphysics. The authors used hermeneutic method, comparative analysis, theoretic synthesis, and such principles of dialectical logic as historicism and concretion in the course of the research. The research into ontology issues by A. Pickering, L. Daston, P. Galison, M. DeLanda and other authors was of great methodological help. Research results consist in the identification of genetic basis of the objectification of ideality, disclosure of both positive and negative consequences of digitalization, extension of social networks, as well as the logical and methodological value of the definition of trueness of the ontology of ideality.

INTRODUCTION: CONTEMPORARY DISCOURSE ON THE ISSUE OF OBJECTIVITY OF SOCIAL ONTOLOGY

Under the influence of accelerated and wide-scale penetration of contemporary information and digital technologies in all sectors of economy, social, political, and spiritual spheres of society, as a result of formation of virtual trade-economic, financial, educational, and other forms of activity, the intertwining of objective and subjective factors, true and false information becomes more tense. In such a situation, the comprehension of reliable knowledge of social phenomena and processes, the substantiation of objectivity of acquired knowledge and developed theories becomes a challenging and most pressing issue of contemporary social epistemology and creation of economic and sociophilosophical doctrines of sustainable development of society (Akhmedova, 2019).

It should be taken into account that the features of the issue of objectivity in social sciences are due not only to the complexity, ambiguousness of objectivity of the ontology of social being from the perspective of materialism and idealism, but also to the formation of virtual reality associated with accelerated development of digitalization. Unlike ontology of objects of natural sciences, excluding the intertwining of materialistic and idealistic, objectivity and subjectivity, in the ontology of society, as an object of social sciences; the researcher encounters dialectical unity, mutual transition between objectivity and subjectivity, materiality and ideality, not corporeal reality in social being.

It is commonly known that the content of one of pivotal ontological categories of social philosophy—"social being"—includes long-standing human relations. The specific features of these relations consist in their objectivity, though they are formed, passing through conscious particular interests of individuals, who, according to M. DeLanda, are endowed with "bounded rationality" (DeLanda, 2006, pp. 5, 48). However, the abovementioned relations are developed and maintained regardless of

their will and desire, manifested within the framework of these relations. It is these materialistic, but immaterial relations constitute the greater part of social being, that is, social ontology, determine its objectivity. However, materiality and objectivity are not identical; this is actually what we have to substantiate.

METHODOLOGY

The authors of the presented chapter conducted the comparative conceptual and hermeneutic analysis of contemporary research, relying on the principles of objectivity, systematicity, and methods of dialectics. The analysis of contemporary discourse on the issue of objectivity of the ontology of society was of great methodological help. We should make special emphasis on the methodological importance of works by J. R. Melvin, A. Pickering, L. Daston, P. Galison, M. DeLanda, and E. Popkova.

The ontology of social reality as well as its categories are still understudied and underdeveloped in contemporary social philosophy and in other social sciences, including in economics. This has recently been noted in Russian (Makhamatov et al., 2020) and foreign academic papers in philosophy (Brassier, 2017; Daston & Galison, 2018; DeLanda, 2006, 2017; Pickering, 2017; Shapiro, 2011), sociology and economics (Ioseliani, 2019; Melvin, 1990; Popkova, 2019).

In papers of J. R. Melvin, E. Popkova and others, the analysis of the ontology of economic being of society are only reduced to the research into specific nature of geography of the economic area, and economic timeline (Melvin, 1990; Pickering, 2017; Popkova, 2019). However, the grounds of objectivity of these and other ontological forms of social matter are rarely touched upon.

In this regard, well-known American political philosopher Ian Shapiro points out that the complexity of defining objectivity of the ontology of society results in a peculiar kind of “escape” of social and human sciences from independent research into social processes (Shapiro, 2011, p. 25). Hence, the question of objectivity of research results will get lost in cloud-world. Indeed, according to Andrew Pickering, only the solution to the question of objectivity in cognition allows finding the real being in its temporary establishment (Pickering, 2017, p. 154).

When asked “What is objectivity?”, Daston and Galison (2018) point out that “to be objective means to strain after knowledge which is not marked by prejudice or skill, imagination or judgement, desire or aspiration” (p. 54). However, this definition by these authors, which can be accepted only partially, suffers from incompleteness, since it does not cover the features of the ontology of society. Specific nature of their understanding

of objectivity is due to the fact that they explore the issue of objectivity in scientific cognition. However, the value of their work consists in the study of the issue of objectivity as an independent and important scientific and philosophical issue. They demonstrate once again that the research into ontology issues, objectivity of truth, features of the cognitive process—a task of philosophy. The same is noted by DeLanda (2017) with regard to social sciences, who claim that only “philosophers can help clarify the ontological grounds behind each individual theory of society” (p. 36).

M. Delanda (2017) sticks to anti-essentialism in his philosophy of ontology, is a critic of general universal categories of metaphysics and a supporter of moderate nominalism. He claims that social ontology mainly involves individuals, socioeconomic institutions and cities, and only then—results of their interaction. However, these results are not passive; possessing real social being, they have a reverse influence on the basis of their occurrence. According to him, the results of interaction of abovementioned ontological factors become the objective factors of the “flat” ontology of society themselves. “Flat ontology” allows considering “individual things in existence” and the results of their interaction as objective phenomena of the ontology of society” (pp. 43– 48).

An active scientific discourse is being conducted on the topic under study in the work of Vasyukov (2008), which defines the theoretical basis of this research.

RESEARCH RESULTS

Ideality in the Ontology of Society

The issue of the ontology of society consists in the fact that its structure includes ideality as objectivity, but secondary to social being, social space, and time, rather than in the complexity of its structure. It is commonly known that the pioneers of Marxist philosophy, drawing on the category of social being, created the concept of the materialistic understanding of society in its historical change. In this concept, the category of practice is preceded by the category of social being as a more abstract and broad category. First, it is considered as a category for the materialistic solution to the correlation of the materialistic constituent factor in society with human consciousness as an ideal component. And only then, from the perspective of materialism, the content of the category of practice is revealed in a staged manner as a social-historical and materialistically transforming human activity.

Based on a brand-new and broader understanding of being not only as a natural and corporeal concept, but also as objectively necessary long-

standing human relations, they create a more advanced and consistent form of materialistic philosophy, coming from the materialistic understanding of history. In their dialectical materialism, the cognition of society and its history comes from new understanding of ontological concepts of being and consciousness.

Thus, Marxist philosophy introduces a new ontological concept “social being” in the social philosophy, which is understood as the system that is independent of human will and desire, long-standing human relations in the sphere of material production and in other spheres of social life. Karl Marx (1973) substantiated these relations as objective relations which determine substantial relations. Hence, according to new materialism, being both in nature and in society acts as primary to consciousness, thought and ideality. In Marxist materialism, the contents of concepts of being, objectivity and materiality are significantly enriched and the limited nature and narrow-mindedness of the scientific understanding of being and materialistic as corporeal is overcome.

In dialectical materialistic understanding of ideality, a profound change in the content of the concept of objectivity in social reality is more evident. According to dialectical materialism and materialistically focused psychology science, for example, according to Galperin (2003) and Leontiev (1977), the concept of ideality is reflective of philosophical essence of consciousness and is one of essential features of the ontology of society.

According to psychology and epistemology, ideality is initially formed in human consciousness as subjective; internalized reality actually becomes permanent in concepts as a thought.

However, the forms of existence of ideality are much broader and more diverse than the being of consciousness. Indeed, ideality, being the product of operation of consciousness, cognitive activity of an individual, also exists beyond consciousness. It, that is, ideality, also acts as something estranged from consciousness; hence, it is not subjective but social reality existing beyond consciousness of an individual.

The social form of reality of ideality is manifested, first, in language and writing; second, in social information space, which is increasingly expanding and becoming more intense with the development of information technology and digitalization. Third, ideality as an objectified thought is manifested in forms, imparted by a man to natural objects, and ways of connecting natural formations differing in quality, as well as processes in the course of his/her material transformational activity.

The philosophical concept of ideality as an objectified form of being in the content of human consciousness, his/her intellectual wealth, and creativity was developed by Ilyenkov (1991). He followed Hegel's philosophy and Marx's doctrines on the material form of the manifestation of consciousness, to reveal that ideality is the manifestation of social

essence of human intelligence, and therefore it exists beyond human consciousness, is only occurring in public space and is a generalized form of the content of thought of an individual, objectified and estranged from an individual. In Fichte's terms, objective ideality is *non-ego* of an individual.

Ilyenkov (1991) wrote that "ideality" in general is the characteristic of such tangible (objectified, embodied, subjectified) images of social and human culture, that is, traditional ways of social and human activity, standing against an individual with his/her consciousness and will as a special "supernatural" objective reality, as a special object comparable to the reality as existing in the same space with it (this is exactly why it is often confused with it), actually existing in traditional philosophic language (p. 249). Objective manifestation of ideality beyond individual consciousness should not be reduced to its tangible medium. Wood, metal, stone, water, sand, oil, and so forth, are only necessary means of acquisition of the materialized form of its being beyond human consciousness by thought. The necessary ground for objectifying the thought of an individual, formation of the objective form of existence of ideality is the social-historical essence of an individual, the collective nature of his/her employment (Marx & Engels, 1955).

Objective being of ideality is not identical to materiality. It is objective as a thought existing beyond consciousness, "estranged" from its creator and "frozen" in a tangible medium. Ideality always stays dependent and derived from materiality.

According to Ilyenkov (1991), ideality is also secondary due to the fact that it "only exists where there is an individual who carries out his/her activity in forms that were predetermined before him by the previous development of mankind" (p. 223). Therefore, one can say that the objectivity of ideality as an element of the ontology of society makes philosophical categories of social being and objective reality more specific.

The objectivity of ideality as an element of the ontology of society gives rise to an interesting philosophical issue, which deserves attention. Against the background of expansion of digitalization spheres, especially internet space, activation of social networks, the issue of trueness of the thought "estranged" from consciousness of an individual becomes extremely pressing. Indeed, according to the classical definition, the truth is the conformity of the content of consciousness to objective reality. What if this objective reality is the objective form of ideality in the form of information in the Internet and mass media? When it comes to the objectivity of ideality as a form of materialistic cultural component of social ontology, it is not that hard to solve the question of truth. However, the issue of truth of the content of objectified ideality is complex and ambiguous. Here the issue of truth concerns not the attitude of the content of consciousness of an individual to the object of cognition, but is referred to the attitude of the

content of the informational form of objective ideality—mass media, information in social networks, and so forth—to what and how it is reflected in it. It requires a system of scientific analysis methods—hermeneutic, genetic, and synergistic approaches, comparative analysis approach, and so forth.

Therefore, “objectivity” as an ontological category of society is more complex than materiality. If the latter denies subjectivity, then the category of objectivity, through the example of objective ideality, includes objectivity and subjectivity, truth and falsity.

Objectivity of the Ontology of Society

Our research has shown that the major ontological category of objectivity is much broader than materiality in terms of its content. Therefore, the concept of the category of social being is broader than the concept of physical reality, corporeity, since social being includes naturally and historically established objective and necessary human relations which do not have any single atom of corporeity in them. Objectivity of these relations by no means rules out the role of consciousness in the implementation of these relations. According to DeLanda (2017), subjects that have their own ontological status and participate in the interactions, “are endued with limited rationality, allowing them to pursue their own interests within certain limits” (p. 48).

However, the real state of the ontology of society, that is, the achievements of social-historical reality, such as Spinoza’s necessity, determines the objective content and limits of interests of individuals. In this sense, Spinoza believed that freedom is a cognized necessity. It is only exteriorly where desires, particular interests and the choice of individuals act as something purely subjective. Here, we quote the words of Marx, who said that “distinctive economic masks of persons are only an embodiment of economic relations” “human relations in the social process of production become corporeal in nature, independent of their control and conscious activity” (as cited in Leontiyev, 1977, pp. 95, 103).

The digitalization process, the formation of virtual reality introduces significant additions in the features of objectivity of the ontology of society (DeLanda, 2006; Ioseliani, 2019). On the one hand, many financial-economic, scientific research and other operations are simplified and accelerated as a result of deepened digitalization. As James R. Melvin (1990) showed in his research, spatiotemporal characteristics of the economic sphere of society significantly change. On the other hand, however, many professions are gradually “dying out,” knowledge is rapidly becoming obsolete, and the practice of hiring under the employment contract for a definite period after

which a competition is held has become widespread. Someone will be able to pass competitive selection, and someone will not (Makhamatov et al., 2020). Thus, many employees *de facto* become “specialists employed under temporary employment agreement,” as there is no guarantee that the contract with a particular employee will be extended. In addition, requirements to the employee are also changing rapidly. The labor market is becoming “flexible,” dynamic, that is, uncertain, and unstable. An enormous social group of relatively young people is formed; who Standing (2014) has determined as *precariat*, as they have no sustainable employment, thus their socioeconomic status is unstable as well (p. 36). In the meantime, digitalization gives rise to new specialities, branches of manufacture and social services. A peculiar kind of “creative class” is formed, which determines the emergence of new technologies both for production and for other spheres of social life (Florida, 2011, pp. 22–23). As is noted by well-known American sociologist and philosopher Richard Florida, their creative activity results in the “emergence of new principles of time structuring in society—and not only in the context of daily employment, but also throughout life in general” (Florida, 2011, p. 29).

The dynamic change in the social structure of society, the formation of the ever-increasing “class for itself” as *precariat* and the “creative class,” as well as the disappearance of other social groups which “become history,” formation of new specialists and social groups as the products of globalization and digitalization, significantly change and complicate the nature of objectivity of the ontology of social being.

Drawing on our research, we have come to the following conclusion. First, objectivity of ontological factors of society means independence of the formation of socioeconomic and political relations of people from their will and subjective desires. Second, objectivity consists in material results of practical human activity, which, as was rightly pointed out by DeLanda (2006), have a reverse influence on their creators that is on consciousness, mindset of people (DeLanda, 2017, p. 47). Third, the materialized forms of being as results of mental labor, that is, objectified ideality, the information forms of which may be both true and false, are considered as objective.

CONCLUSION

As evidenced by contemporary discourse, the objectivity of the ontology of social being against the background of large-scale implementation of the digitalization process in social life becomes one of the topical issues of modern social and human sciences. Drawing on our research, we have come to the following conclusions. The core of the content and special features of objectivity and ontological categories of social philosophy is

mainly constituted by the fact that the objects of these categories are human activity, their relations that develop in an objectively necessary manner, and objectified ideality, in other words, the results of cognitive activity of people. The specific features of social ontology are also determined by the multilevel nature of factors of social life, determining the system of human relations, social psychology, that have an impact on various aspects of the ontology of society and facilitate its historical change.

Our research has brought us to the conclusion that contemporary digitalization, while creating virtual web space, the high-speed information realm aggravates the issue of the truth of objectified ideality, that has a huge impact on social psychology and introduces significant changes and complications in the ontology of society. Digitalization, through technological improvements, also contributes to the acceleration or dilation of economic time and time characteristics of being in various spheres of society (DeLanda, 2006; Melvin, 1990; Pickering, 2017).

Moreover, our research results consist in the fact that they reveal the objective grounds for the necessary variability of the ontology of society and substantiate the importance of a new take on the dynamic nature of social ontology, reveal the contemporary contradictory nature of its objectivity, to timely determine the truth of objectified ideality, which will guarantee the achievement of particular concepts of the essence of dynamically changing social being and society in its integrity.

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CHAPTER 4

FORMATION OF CLUSTERS IN THE DIGITAL ECONOMY

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ABSTRACT

The purpose of this research—on the basis of the systematization of modern scientific research in the field of cluster economics, to investigate the current conditions for the formation of cluster formations that contribute to the effective introduction of digital and innovative technologies, digitalization of industry and the service sector; conduct clustering of Russian regions depending on indicators of innovative activity and innovative development of regions and develop cluster development strategies.

The methodology used in this research is an overview and analysis of published scientific materials. Theoretical methods were used: description, analysis and synthesis, additive method, functional analysis method. Neural network modeling methods using the Deductor technology platform were used.

It is shown the modern formation and development of the digital economy determines new directions for the formation of cluster strategies. Digital technologies allow to create clusters with organizations with different geographical situations, which significantly increases the efficiency of interaction, reduces transaction expenses and risks, and also contributes to the digital transformation of organizations. The results of neural network modeling of cluster formations in Russia revealed a strong variation in the number of regions by innovative clusters and the ametric nature of the development of innovation in the country.

The scientific results can be used to create a strategy for the development of innovative digital clusters, as well as to improve state and regional innovation policies in the field of digital technology development and digitalization.

INTRODUCTION

In the digital economy, great attention is paid to innovative developments in the sphere of enterprise digitalization, the use of innovative information and communication technologies to increase the competitiveness of products. One of the methodological approaches to the effective dissemination and introduction of innovations and business development is the cluster approach (Karaev et al., 2007).

Traditionally (Porter, 1990), a cluster refers to a spatial agglomeration of economic activity, which includes geographically connected enterprises of suppliers, producers, and other organizations that compete, but also carry out joint activities in a certain branch or group of branches of the national economy. Cluster formations have both vertical and horizontal connections. Vertical connections imply processes of acquisition and sale over the process chain. Horizontal links allow the integration of enterprises and horizontal scaling of similar types of products with the joint use of specialized resources, technologies, institutions, and so forth.

The change in the theoretical provisions of the cluster approach led to the development of an interpretation of the concept of “cluster.” Thus, in the UN document “A Brief Overview of Policy Options to Create an Enabling Environment for Innovative Development” (Synopsis of Policy Options for Creating a Supportive Environment for Innovative Development, 2008), the basic features of clusters are indicated:

- geographical concentration of interconnected cluster organizations;
- industry specialization;
- a significant number of similar and economically related cluster entities;
- competition and cooperation (as the main types of interaction among firms—members of the cluster);
- compliance with the required critical mass in cluster size;
- long-term and viable clusters;
- involvement in innovative processes.

In research, van Lente and van Til (2007) develop a cluster approach, complementing it with a strategic business planning tool – a technological roadmap, which will lead to increased technology and innovation.

The development of information technologies and the digital transformation of the economy determine new trajectories for the development of cluster formations (Letiagina & Trifonov, 2020; Rakicevic et al., 2019). Currently, digital clusters are being created, among the positive aspects of which are the creation of high-paid jobs and support for entrepreneurship that contribute to long-term changes in the socioeconomic development of the regions (Curtis & Kelly, 2017).

In the digital economy, geographical proximity ceases to be a significant factor in the formation of clusters. Digital platform models allow to develop partnerships with organizations located in different regions and significantly reduce transaction expenses and risks. Matkovskaya (2017) also wrote about the contradictory application of a geographical approach to the formation of clusters, which proved that in a favorable market environment around the main production of innovative and competitive products there are many enterprises. They form an effective value chain characterized by investment attractiveness and development potential. In addition, enterprises located in different geographical areas cease to compete for the territory's resources, its investment opportunities and support for regional authorities.

The authors used the materials from Synopsis of Policy Options for Creating a Supportive Environment for Innovative Development (2008) in this chapter.

METHODOLOGY

The construction of the cluster is connected with the need to combine within one special zone production business projects in a specific technological

area, fundamental developments and modern systems for designing new products and preparing the production of these products. The actual integration of knowledge and technology exchange cycles within the unified management system will allow building the underlying institutional structures of the future cluster, which unites several fundamentally new technological industries.

Wang (2011) in research proved geographical proximity, social behavior coordination mechanism, and government intervention are prerequisites for industrial cluster development. However, in the digital economy, when creating a cluster, the geographical factor ceases to be significant, inferior to the confidential association of enterprises of different types of activities on the basis of mutually beneficial cooperation and the synergistic effect of joint activities, which will contribute to the scaling up of innovative developments, including in the field of digital technologies. New economic ties and business models will allow to launch a mechanism for digital transformation of industries and organizations of the previous techno-industrial structure.

Clusters contribute to the development of research and development and the adaptation of innovations to the country's economy. Cluster education actors can respond more quickly and effectively to consumer needs by providing easy access to innovative digital technologies used in activities. The cluster approach involves the integration of subjects into inter-firm cooperation, which leads to a reduction in the cost of research and development without compromising the number and quality of digital innovations.

The cluster approach has influenced municipal, regional, state economic development policies around the world. It has also made a significant contribution as a method of understanding regional economies, as a tool for involving industries in collective problem-solving and as a tool for organizing the delivery of services within departments, services and public sector functions. (Waits, 2000). Cluster strategies allow for the integration and targeted use of resources in a manner consistent with the multiple objectives of economic development programs: recruitment, retention, expansion, and creation of new enterprises.

An important component of cluster growth is the entrepreneurial process. The number and volume of enterprises in the cluster is usually affected by the activities of entrepreneurs who can create new companies as by-products or as a result of layoffs.

For the formation of cluster formations that contribute to the effective introduction of digital and innovative technologies, digitalization of industry, the following 10 indicators have been selected characterizing innovative activity and innovative development of the regions of Russia:

X1 – share of domestic research and development costs in gross regional product (GRP) (%);

X2 – number of scientific workers (people);

X3 – coefficient of inventive activity (%);

X4 – increase in high-performance jobs in the constituent entities of the Russian Federation for 2018 (%);

X5 – labour productivity index in% of the previous year (%);

X6 – applied advanced production technologies (units);

X7 – number of advanced production technologies created (units);

X8 – level of innovative activity of enterprises (%);

X9 – share of innovative goods, works, services, in the total volume of shipped goods, works, services of industrial production organizations (%);

X10 – percentage of organizations using broadband Internet access in the total number of organizations (%).

The indicators are selected in accordance with the statistical accounting methodology approved by the Federal state statistics service of Russia. These indicators characterize the next points:

1. innovation activity characterized by indicators of forms of federal statistical observation No. 4–innovation “Information on the innovation activity of the organization” and No. 2–MP innovation “Information on technological innovations of a small enterprise”;
2. advanced production technologies (federal statistical observation form No. 1–technology “Information on the development and (or) use of advanced production technologies”).
3. use of intellectual property (form No. 4 “Information on the use of intellectual property”).

The system of these indicators allows to comprehensively assess the innovative development of the regions of the Russian Federation in the digital economy.

To simulate cluster formations, the Deductor analytical software package is used—a modern software tool for extracting, visualizing, and analyzing data. The work investigated 89 regions of Russia.

RESULTS

The results of the research indicate the regions of the Russian Federation were grouped by the investigated indicators into four clusters. Clusters No. 1 and No. 4 made up regions with high values of indicators of innovative potential and digital transformation (Moscow, St. Petersburg, most of the regions of the Central, Volga, and North-Western federal districts). Cluster No. 2 included regions with low values of the investigated indicators (most of the regions of the Southern, North Caucasus, Siberian and Far Eastern federal districts), and cluster No. 3 is characterized by values of indicators that vary about average values for the Russian Federation (regions of the Ural Federal District).

The main characteristics of the distribution of the indicators, which are shown in Table 4.1, indicate a lack of symmetry in their distributions. The asymmetry expressing the deviation of the distribution of indicators from the symmetric distribution relative to the averages is positive for all indicators, except for the indicator “the share of organizations using broadband internet access in the total number of organizations” (X10).

Table 4.1

Descriptive Statistics

Indicators	Average value of the indicator in Russia	Dispersion	Standard deviation
X1	0.701	0.768	0.876
X2	8,028.46	64,10 ⁸	25,318.7
X3	1.015	1.094	1.046
X4	12.993	41.725	6.459
X5	102.655	8.745	2.957
X6	2,999.141	12,213.650	3,494.803
X7	18.412	970.864	31.159
X8	11.599	34.81	5.90
X9	5.319	40.,36	6.353
X10	85.820	34.48	5.872

Source: Compiled by the authors.

In the scientific literature, the following main cluster strategies are identified as widely used throughout the world:

- defensive,
- offensive,
- promising,
- pre-cluster consolidation.

Each cluster offers its own cluster strategy.

The offensive development strategy of cluster No. 1, which includes Moscow, St. Petersburg and the Moscow region, will increase competitiveness by providing additional digital platforms and services contributing to digitalization and digital development, as well as through investments in new digital opportunities.

Promising cluster strategies allowing transforming the assets of the regional economy into competitive enterprises will allow the regions of the Central, Volga and North-West federal districts included in cluster No. 4 to stimulate the growth of technological enterprises in related areas. The importance of modifying assets in organizations to support digitalization is described in a research by Isaksen et al. (2020).

For cluster No. 2, which included regions with low values of the studied indicators, defensive strategies will be suitable to eliminate the shortcomings of the economic infrastructure of the regions of the Southern, North Caucasus, Siberian, and Far Eastern federal districts. Such strategies may include:

- regulation aimed at creating a more open business environment for the digital economy;
- increasing state support for research and education policies, stimulating the creation and development of new digital technologies and research in the digital sphere;
- development of digital infrastructure.

Such strategies generally do not require collaboration among the enterprises in the cluster.

The development of cluster No. 3, characterized by average values of indicators of innovative potential and digital transformation (regions of the Ural Federal District of Russia), will be positively influenced by pre-cluster consolidation strategies that allow to gain digital advantages by organizing cooperation among groups of enterprises that at the initial stage may not have such a scale or position as a cluster. Sometimes consolidation strategies are more appropriate as networking strategies, as they tend to

bring enterprises together and require their active participation (Psilos & Broun, 2008).

CONCLUSION

The research allows integrating a cluster approach into the digitalization processes of organizations, industries and territories. Modeling of data on the innovative potential of regions and their digital development makes it possible to determine strategic directions for adjusting management decisions on the formation of digital development strategies and innovation policies of regions.

To improve the efficiency of digital development in cluster entities, it should:

1. Use the strengths of regions, geographical, and resource advantages of territories.
2. Promote the self-organization of cluster entities, support regional cluster initiatives at the expense of the federal budget.
3. Encourage production enterprises, scientific and educational organizations, regional authorities, nonprofit organizations to pool resources for the implementation of integrated cluster strategies.
4. Develop a skilled workforce. Projects and programs should be developed to provide training, infrastructure, suppliers of materials and components, joint prototyping and industrial designs, as well as to assist in the creation of new enterprises.
5. Integrate clusters with regional universities and research institutes. Historically, federal-funded R&D has not been linked to regional industrial development. Bridging this gap can create the regional technological base necessary for the development of regional enterprises and industries.
6. Develop public provision of long-term commitments. Given the long-term planning horizon for serious R&D programs, enterprises must understand that government programs to stimulate and support research infrastructure will be consistent, predictable, and sustainable.
7. Support measures: Given the increasing global competition in key industries, government grants, credit guarantees, tax incentives and other financial incentives can influence corporate management decisions about the size and direction of investment in R&D and manufacturing.

The research is of practical importance both from the point of view of the actual development of the cluster approach and from the point of view of forecasting the digital development of business in the regions of Russia. Further research should aim at elaborating development strategies, models, and organizational and economic mechanisms for managing modelled regional clusters of digital and innovative development.

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CHAPTER 5

INDUSTRY 4.0 AS A TOOL FOR REGULATING MARKET STABILITY

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ABSTRACT

The research aims to verify the hypothesis put forward and determine the prospects for Industry 4.0 as a tool for regulating market stability.

The study uses the following scientific research methods: classification, problem and comparative analyses, synthesis, cause-and-effect relationships analysis, hypothetical-deductive method, formalization method, and strategizing method. They are used to determine the impact of Industry 4.0 on market stability. Using the correlation analysis, the relationship between various market indicators, their variation, and the digital competitiveness

index are determined. The article considers the following indicators: market size (10th pillar: Market size), the efficiency of commodity markets (7th pillar: Product market), innovation potential (12th pillar: Innovation capability) to be market indicators. Countries from the top 20 of the global ranking of the World Bank for 2020, according to the value of the index of doing business for 2020, were selected as objects for the research.

The cross-correlation of market indicators and their variations with digitalization (Industry 4.0) have been studied. It was determined that developing countries have a greater potential in terms of the impact of Industry 4.0 on market indicators.

It was proved that Industry 4.0 reduces the variation of market indicators, and therefore it needs to tighten state regulation. This issue is recommended for further research.

The global economy barely managed to recover from the financial and economic crisis of 2008, when a new crisis due to the COVID-19 pandemic happened. The modern development of the economy in the conditions of the strongest economic crisis and the global transformation of the world system from industrial development to the information organization of activities both have a contradictory effect on market stability, and therefore need regulation. On the one hand, there was a critical decline in market concentration after the COVID-19, which is likely to lead to even greater market volatility. On the other hand, Industry 4.0, by increasing the availability of digital technologies, makes it possible to eliminate barriers to the international exchange of goods, create the potential for optimizing the economic activities of business systems, open up opportunities for entering world markets and doing transnational business.

During the past few years, commodity markets have been influenced by two trends. The first one is represented by globalization and increased global competition. The second trend is the diffusion of Industry 4.0 technologies in the context of the transition to a new technological order. This article considers the hypothesis that Industry 4.0 can act as a mechanism for regulating market stability in commodity markets.

In addition, a feature of the post-COVID-19 era is that, unlike previous economic crises, almost all entrepreneurial structures were forced to one degree or another to switch to Industry 4.0 to one degree or another. At the same time, the transition to a digital type of business was carried out under the control of states and the COVID-19 set a high speed of digitalization of all processes of enterprises' activities. The new, regulated format of the industrial revolution reduces risks associated with the transition to Industry 4.0 and maximizes benefits. In this regard, the problem of marketing management after the COVID-19 with the condition of the influence of digital technologies is becoming highly relevant.

The purpose of the study is to verify the hypothesis and determine the prospects for regulating market stability based on Industry 4.0.

MATERIALS AND METHOD

The development of Industry 4.0 is described in works of Agumbayeva et al. (2019), Alpidovskaya and Popkova (2019), Belik et al. (2020), Bozhuk, Maslova, et al. (2019), Haabazoka et al. (2019), Karanina and Loginov (2016), Karanina, Ilysheva, et al. (2017), Karanina, Loginov, et al. (2017), Lysova et al. (2020), Popkova (2019), Popkova and Gulzat (2020), Popkova and Sergi (2020), Popkova et al. (2019), Ragulina (2019), Ragulina et al. (2019), Savel'eva, Lapteva, et al. (2017), Savel'eva, Prokopenko, et al. (2017b), Sergi (2019), Sergi et al. (2019), Sozinova (2018, 2019), Sozinova, Burtseva, et al. (2019), Sozinova, Nabokikh, et al. (2019b), and Zavyalova et al. (2018).

Marketing activities are studied by Bozhuk, Evdokomov, et al. (2019), Bozhuk and Pletneva (2018), Kataeva et al. (2017), Savel'eva et al. (2019), Sozinova et al. (2017), Zhgulev et al. (2018).

The conducted content analysis on the selected topic showed that only certain aspects of the problem have been studied sufficiently, while the general scientific understanding of the influence of Industry 4.0 on the market indicators' stabilization is in the process of formation and requires further scientific research.

The methodological apparatus of the research is based on the methods of correlation analysis. They are used to determine the impact of digitalization, the indicator of which is the Digital Competitiveness Index, IMD, on market indicators in 2019, as well as their variation within 2016–2019. Market indicators in the study are market size (10th pillar: Market size), the efficiency of commodity markets (7th pillar: Product market), innovation potential (12th pillar: Innovation capability).

The study is conducted on the example of the leading countries (from the top 20) of the World Bank's global ranking for 2020 in terms of 2020 Ease of Doing Business Index. Initial data are given in Table 5.1.

RESULTS

According to the data from Table 5.1, we compiled Table 5.2 for further research, and the following results of correlation analysis were obtained (Figure 5.1 and Figure 5.2).

Table 5.1

Statistics for Calculating the Integral Indicator of Marketing in 2016–2019, Rank

Year	Position in the ranking of doing business, 2020	Developed countries (top-10)					Developing countries (top-20)						
		New Zealand	Singapore	Denmark	South Korea	U.S.	U.K.	Malaysia	UAE	Thailand	Russia	China	Turkey
2019	IMD, Digital Competitiveness Index	86.026	99.373	95.225	91.297	100	88.691	82.39	90.295	68.434	70.406	84.292	59,793
2019	10th pillar: Market size	66	27	55	14	2	8	24	32	18	6	1	13
	7th pillar: Product market	3	2	12	59	8	21	20	4	84	87	54	78
	12th pillar: Innovation capability	27	13	11	6	2	8	30	33	50	32	24	49
2018	10th pillar: Market size	67	27	55	14	2	7	23	28	18	6	1	13
	7th pillar: Product market	4	1	15	67	3	12	24	11	92	83	55	76
	12th pillar: Innovation capability	27	14	12	8	2	7	17	35	51	36	24	47
2017	10th pillar: Market size	64	35	57	13	2	7	24	29	18	6	1	14
	7th pillar: Product market	5	2	10	73	3	6	26	11	65	60	38	127
	12th pillar: Innovation capability	20	9	10	18	2	12	22	25	50	49	28	69
2016	10th pillar: Market size	64	37	58	13	2	9	24	27	18	6	1	17
	7th pillar: Product market	6	2	13	77	4	5	24	11	71	49	39	126
	12th pillar: Innovation capability	23	9	10	20	4	13	22	25	54	56	30	71

Source: Global Investment Competitiveness Report (2019), Global Investment Competitiveness Report (2016, 2017, 2018), IMD (2020) Institute of Scientific Communications (2020).

Table 5.2

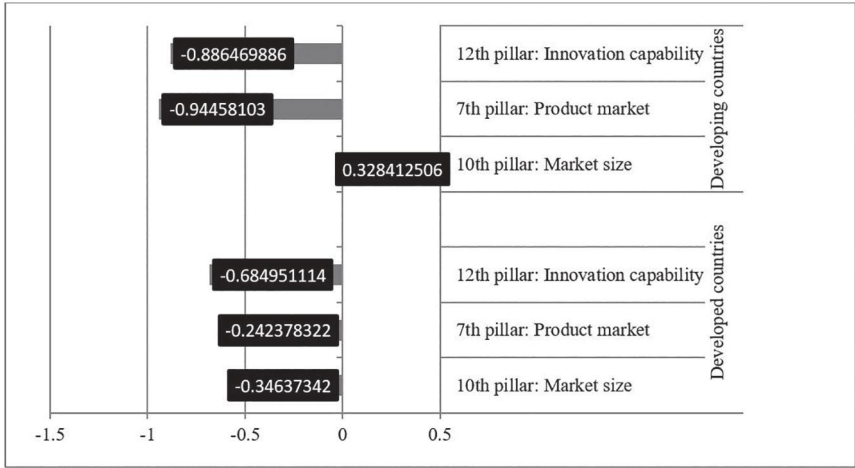
Calculation of Indicators for Correlation Analysis

Year	Position in the ranking of doing business, 2020	Developed countries (top-10)						Developing countries (top-20)					
		New Zealand	Singapore	Denmark	South Korea	U.S.	U.K.	Malaysia	UAE	Thailand	Russia	China	Turkey
2019	IMD, Digital Competitiveness Index	86.026	99.373	95.225	91.297	100	88.691	82.39	90.295	68.434	70.406	84.292	59.793
Standard deviation	10th pillar: Market size	1.528	4.619	1.155	0.577	0.000	0.577	0.577	2.082	0.000	0.000	0.000	0.577
	7th pillar: Product market	1.000	0.577	2.517	7.024	2.887	7.550	3.055	4.041	13.868	14.572	9.539	28.885
	12th pillar: Innovation capability	4.041	2.646	1.000	6.429	0.000	2.646	6.557	5.292	0.577	8.888	2.309	12.166
Average	10th pillar: Market size	65.667	29.667	55.667	13.667	2.000	7.333	23.667	29.667	18.000	6.000	1.000	13.333
	7th pillar: Product market	4.000	1.667	12.333	66.333	4.667	13.000	23.333	8.667	80.333	76.667	49.000	93.667
	12th pillar: Innovation capability	24.667	12.000	11.000	10.667	2.000	9.000	23.000	31.000	50.333	39.000	25.333	55.000
Variation	10th pillar: Market size	0.023	0.156	0.021	0.042	0.000	0.079	0.024	0.070	0.000	0.000	0.000	0.043
	7th pillar: Product market	0.250	0.346	0.204	0.106	0.619	0.581	0.131	0.466	0.173	0.190	0.195	0.308
	12th pillar: Innovation capability	0.164	0.220	0.091	0.603	0.000	0.294	0.285	0.171	0.011	0.228	0.091	0.221

Source: Compiled by authors.

Figure 5.1

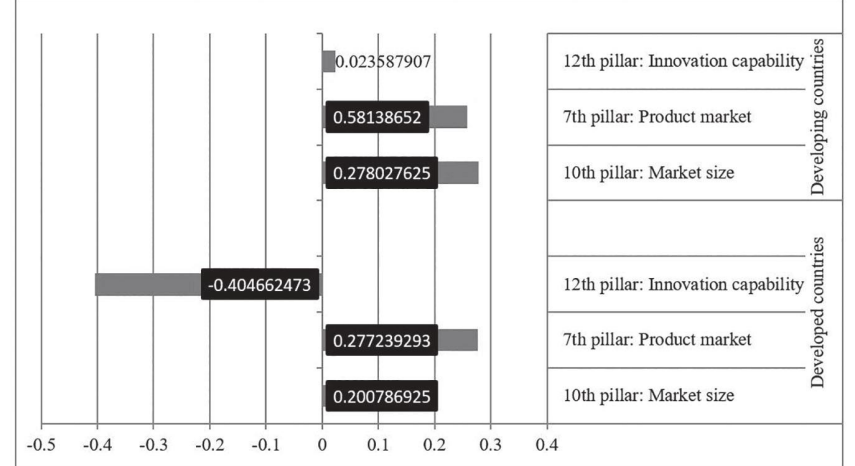
Cross-Correlation of Market Indicators with Industry 4.0 in Developed and Developing Countries



Source: compiled by the authors.

Figure 5.2

Cross-Correlation of Variation of Market Indicators with Industry 4.0 in Developed and Developing Countries



Source: compiled by the authors.

As it can be seen from Table 5.2, the variability of the market size does not depend on the country; the standard deviation of the market size is approximately equal to that in developed countries as in developing countries. The indicator of innovation potential has the greatest variability, while the variability of the innovation potential of developing countries is higher than in developed countries. At the same time, the variability of the efficiency of commodity markets is much higher in developing countries than in developed ones.

According to Figure 5.1, in the top 20 countries, Industry 4.0 has a great impact on market indicators in developing countries (–88.6%, –94.5%, 32.8%). Because of the reciprocal nature of the indicators (IMD: the higher, the better; market indicators: the lower, the better), we get the following qualitative interpretation of the indicators:

In Developed Countries

- market size is not determined by digitalization (correlation–34.6%);
- the efficiency of product markets is not determined by digitalization (correlation–24.2%);
- innovative activity is determined by digitalization (correlation–68.5%), while the more developed the technologies of Industry 4.0, the higher the innovative activity in the market.
- In Developing Countries
- market size is not determined by digitalization (correlation 32.8%);
- the efficiency of product markets is determined by digitalization (correlation—94.5%), while the greater is the development of Industry 4.0 technologies, the higher is the efficiency of product markets;
- innovative activity is determined by digitalization (correlation–88.6%), while the more developed the technologies of Industry 4.0, the higher the innovative activity in the market.

Also, it has been found out (considering the reciprocal nature of the indicators) that the variation of market indicators decreases under the impact of Industry 4.0 technologies, which was shown by a positive correlation between the studied indicators. An exception is the market indicator of innovative activity in developed countries, which increases its variation under the impact of digitalization development. This is probably due to a very high innovative activity of previous periods.

CONCLUSION

Thus, the working hypothesis has been scientifically confirmed. Industry 4.0 allows the improved regulation of market stability. However, the opportunities of the digital economy and Industry 4.0 are only marginally used in the formation of market stability, which prevents the “recovery” of competition in global markets.

Based on the analysis of market indicators’ statistics, it has been found out that the variation of market indicators is reduced under the impact of Industry 4.0. In addition, it was proved that in developing countries, digitalization determines market indicators, which shows a more pronounced potential for using Industry 4.0 technologies in developing countries.

Consequently, Industry 4.0 acts as an instrument for regulating market stability and needs tightening of state regulation. This issue is recommended for further research.

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CHAPTER 6

THE ROLE OF THE REGULATORY “SANDBOX” IN INCLUSIVE AND INNOVATIVE DEVELOPMENT OF THE ECONOMY

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ABSTRACT

The purpose of the chapter is to develop algorithms for evaluating new products and services of commercial banks, which they can test on a limited number of clients and in a reduced version of the permit, to determine the best option for deciding on the development and implementation of new innovative technologies based on the Russian financial “sandbox” of the Bank of Russia.

The authors note the need to improve the current piloting system, the mechanism for selecting and implementing projects accepted for testing on the “sandbox.” The regulatory “sandbox” system used by the Bank of Russia can only be effective if a limited number of participants and technologies are studied. As the experience of other countries shows, an increase in the volume of testing should be accompanied by the involvement of an additional number of experts in these processes. This will increase the efficiency of the

current system for the selection of the projects, the conclusion on which must be given by the expert council.

It is shown that the current system for selecting projects should be modernized, expanded the composition and powers of expert councils, and built a new tool into the mechanism of functioning of the “sandbox.” Besides, the chapter notes that regulators must understand the processes of innovation development and make decisions based on careful monitoring and market analysis. Regulators who have some doubts and questions should also be able to consult suppliers of similar products at any time.

Improving the regulatory “sandbox” system adopted by the Bank of Russia will expand the scope of testing, which will facilitate the rapid introduction of digital products and services, and raise the standards of its reliability, transparency, and security.

INTRODUCTION

The development of fintech will increase competition in the financial sector, which will increase consumer choice and facilitate access to financial products and services, as well as create additional risks in financial intermediation. The sharp increase in the number of new participants, as well as the volume of products and services they offer, will create new challenges for financial stability. To fully protect consumers, financial authorities in most countries of the world are creating regulatory “sandboxes” that will promote the development of financial innovations, but at the same time, regulate and control the risks associated with these processes, as well as reform existing legislation to meet the needs of the developing digital economy.

The scientific and methodological basis of this study was determined by existing research and publications on the problem posed by such scientists and researchers as Auer (2019), Boissay et al. (2019), Cornelli et al. (2020) and Wechsler et al. (2018).

METHODOLOGY

Regulatory “sandboxes” offer a controlled testing environment for new products and services that they can try out on limited number of customers and at a limited permission. The testing is carried out under the supervision of regulators: participants in such operations receive advice that helps them navigating algorithms for solving their marketing policy, building customer relationships, solving regulatory problems, and regulatory support of new operations. Regulators use “sandboxes” to study the effectiveness of new financial technologies and market development trends, and identify

associated risks at the stage of emergence while they are limited and not launched into the mass retail market. The main purpose of “sandboxes” is to stimulate innovation by facilitating access to financing for participants in such transactions in the early stages of a project. Since innovative financial technologies offer new products, which create a high level of uncertainty in their effectiveness, such products face serious regulatory problems and asymmetric information, arising between participants, insufficient funding flow for product development and its final implementation.

Currently, about 50 countries have already introduced regulatory “sandboxes” for the development of fintech, which in the international economic literature is understood as a process of introducing technologically secure financial innovations that can lead to the emergence of new business models of activities, applications, business products with an appropriate material effect on financial markets, institutions, and processes of providing financial services (CGAP-World Bank, 2019). Modern financial innovations suppose the use of new technological advances, such as Artificial Intelligence, Machine Learning, Blockchain Technology, Big Data Analytics, and the Internet of Things, which create new challenges for maintaining the confidentiality of personal information, countering cyber risks, and introducing new regulatory and right of use.

The relevance of the introduction of regulatory “sandboxes” is recognized by the majority of supervisory bodies united by the Basel Committee but the practical implementation of such a mechanism is uneven across countries. Some countries have already accumulated considerable experience in using regulatory “sandboxes” but there is relatively little information about their performance, the amount of financing they attract, investors and industries, and the channels of the “sandbox” impact on capital flow generated for the innovative development of financial technologies.

Of greatest interest is the experience of the United Kingdom, which was the first to introduce and successfully use the regulatory “sandbox” to facilitate companies’ access to financing for new projects. As studies of foreign economists show, companies that have joined the funding of “sandbox” projects at the initial stages of the project get a more significant effect from their participation in the debt capital. The influence of the “sandbox” on the success of the project is noted through several channels: first, the “sandbox” acts as a new marketing approach for potential investors, since the simple entry into the “sandbox” leads to recognition, publicity, and therefore to an increase in the popularity of all project participants among potential clients. Second, the “sandbox” smoothes out information asymmetry, since participation in it is a guarantee of the project quality. Third, the “sandbox” reduces regulatory uncertainty and costs because “sandbox” specialists assist participating companies and banks with project

design and resolve their legal issues related to product and service provision (Auer, 2019).

The analysis, carried out by foreign economists, shows that the strongest positive effect of the “sandbox” has on small and young companies that are in great need of debt capital. Participation in sandbox projects increases the transactions volume; this is especially noticeable for transactions with venture capital. Second, the start of the sandbox project shows an increase in the number of entrant investors in the national economy, as well as an increase in the volume of debt cross-border capital. Large companies get less synergy from “sandboxing” because they already have certain competitive advantages in the market. The strongest effects associated with fundraising occur in the first two quarters after the project starts on the “sandbox”, and already four quarters after the start of operations, the positive effect of the “sandbox” practically ceases to be felt. “Sandboxes” are not immune to the negative external macroeconomic influences and market failures that may require government support and participation to stimulate innovation. Besides, a situation may arise when equilibrium investments and technical capacities in the market become excessive for the current needs of market participants. This happens when market participants are not ready for new products and services, the initial investment of venture capital may be ineffective, and the information of the project participants about the state of the market is not reliable. Under these conditions, market participants can make bad decisions that violate data privacy, financial stability or harm the welfare of consumers (CGAP-World Bank, 2019).

The “sandbox” in the U.K. operates on a cohort (group) basis with two six-month testing periods per year, with each test group averaging about 25 companies. According to the latest data, about 118 companies were admitted to the “sandbox,” most of which are start-ups, small and medium-sized businesses that work in the field of retail banking, wholesale financing, retail and wholesale investment and lending, and insurance business.

The “sandbox” process has four main steps: application, selection, testing, and exit. The U.K. Financial Conduct Authority (FSA) publishes a list of forms selected for each round of the “sandbox” from a pool of applicants based on various criteria. The selected companies should justify the importance of the innovations being introduced for the English consumers of services, their innovations should be improved models of existing products and services, and therefore should contribute to the development of competition. The “sandbox” provides companies with the opportunity to consult with their experts to help process approvals and help the company to navigate the regulatory environment throughout the testing process. After receiving permission from the company’s “sandbox,” they test their products in a limited market; customize their products and

services according to the regulatory requirements and stages of technology development, as well as at the stage of issuing a final assessment of the effectiveness of the tested products. At the last stage, companies must go through the regulations for conducting the final assessment with the help of the “sandbox” employees, after six months the companies submit the final test report and exit the “sandbox.” Based on the piloting, the «sandbox» issues a permanent permit (license) for such operations (Financial Conduct Authority, 2020).

Uncertainty in regulation prevents investors from investing in projects and products, the regulatory framework of which is not spelt out in legislation. Even successful and large fintech companies are forced to rebuild and radically change their business models to meet ever-changing requirements. According to a World Bank report, regulatory constraints are major barriers to innovation in fintech. In turn, consultations of trained specialists on specific issues of introducing new products and technologies reduce the costs of companies and also help to reduce the risks of using technologies that can disrupt the business regulatory environment and damage the stability of the financial system. In the final test report, the final results are formulated and an opinion is given on planning further actions. Companies that want to continue working with the business model tested in the “sandbox” apply for a permit, and as an alternative, there is a procedure for changing the business model from the activity and bringing it in line with the requirements of the current legislation (Cornelli et al., 2020).

Regulatory surveillance and ongoing consultations with the regulator during the testing period give confidence to investors that they keep regulations, so they can operate freely in the market. Also, such a system makes it possible to reduce the unfavorable selection of participants in the financial innovation market, reduce the moral risks of selection, improve the management of the companies involved in piloting, and also offer the consumers of financial services innovations with obvious targeted advantages.

The work of the “sandboxes” is still ambiguously assessed by foreign economists and analysts. Some studies indicate that “sandbox” testing regulators can slow down or even stop processes of the financial innovation implementation. Some researchers point out that “fintech sandboxes” represent a normative selection approach that is harmful to consumers, producing unequal conditions between “sandboxed” start-ups and increasing companies’ access to capital is only an intermediate goal of “sandboxes.” Many economists argue that “sandboxes” cannot control the impact of the introduced innovations on the processes of maintaining financial stability in the long term. They cannot assess the impact of the consumer surplus on financial stability, since the effects of the introduction of innovations will manifest themselves only after implementation and will manifest themselves after several years. In addition, the “sandbox” generates information

asymmetry between piloting participants because British investors know their home market better than foreign investors, so they have informational advantages that are not always related to the quality of their products and services, which limits the selection of new investors (World Bank and Cambridge Center for Alternative Finance, 2019).

The Bank of Russia launched its “sandbox” mechanism in April 2018. The priority areas of the Russian regulatory “sandbox” are Big Data technologies, Machine Learning, distributed ledgers, biometric and mobile technologies, open interfaces, and digital profile technologies. To implement the project, the “Main directions of development of financial technologies for the period 2018–2020” were developed and adopted, which lists the main tasks of the “sandbox” implementation. The Bank of Russia has also formulated its role in the functioning of the regulatory platform in Russia and identified the following areas: testing hypotheses about the positive effects for the financial market and consumers from the introduction of new financial technologies; determining the degree of admissibility of innovative technologies in the Russian financial market; analysis of the risks of using new financial technologies in Russia, as well as the formation of models of potential threats arising from their use; development of plans and roadmap, legal and technological support for the introduction of innovative technologies and services in Russia (Bank of Russia, 2020a).

RESULTS

The mechanism of the regulatory “sandbox” in Russia is built based on two forms of piloting—testing and a limited regulatory experiment, which will be carried out in stages. The first stage will be testing new technologies in a limited environment without risks to consumers. At the second stage, a “limited regulatory experiment” will be carried out providing for the implementation of a targeted process of applying innovative technologies in real conditions under the control of the Bank of Russia, together with interested government bodies. The regulatory materials of the Central Bank of Russia note that the second stage of the “sandbox” launching will require changes in the current legislation of Russia; the expansion of the powers of the Central Bank and individual state bodies involved in this project. After amending the legislation on individual projects, a limited experiment may be conducted to minimize the risks identified during the testing phase. Thus, the Bank of Russia assumes the main responsibil-

ity for the implementation of this process, selection of participants and ensuring their regulatory support at all stages of the project: review processes, assessing the feasibility of considering the submitted application for participation in the project, piloting the project and deciding on the advisability of implementing the submitted technology, roadmap approval. The Central Bank does not aim to attract new investments at the stage of project review and implementation, as well as “sandbox-based” venture financing in Russia; for these purposes, separate programs have been developed.

Besides, the exclusion of financing new projects from the “sandbox” mechanism is also explained by the fact that a new system of regulation of the legal regime is just beginning to emerge in Russia and amount of participants is limited. For the entire 2019, the Bank of Russia received only 44 applications from banks and other companies to participate in the “sandbox.” Only five services were tested in 2019.

At the end of 2020, the Bank of Russia received 51 applications for piloting innovative financial services, and to date, 11 services have been piloted. In February 2020, the Bank of Russia, based on the “sandbox”, completed an audit of a blockchain platform for issuing and circulating digital rights, which allows digitizing goods, services, securities and other assets (Bank of Russia, 2020b).

A feature of the new site is its ability to issue hybrid tokens backed by various assets. Any organization will be able to issue digital tokens on the site, which expands the opportunities for companies and firms to raise funds, and also creates convenient investment tools.

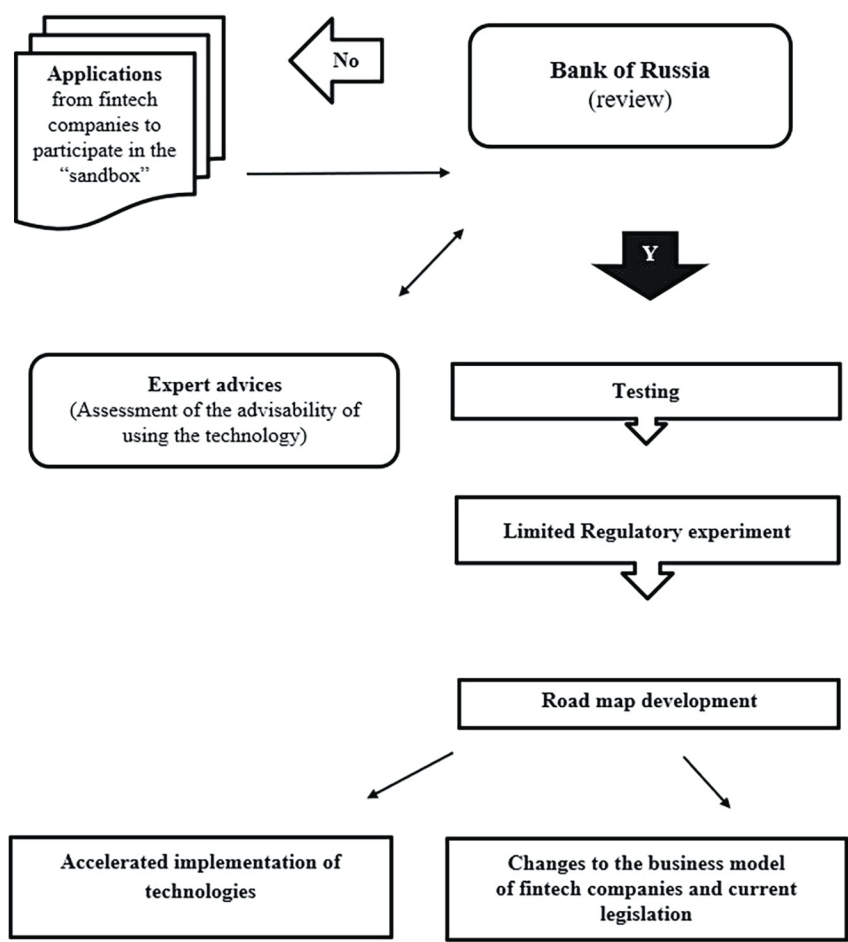
The blockchain platform today is one of the most ambitious projects of the Russian “sandbox,” its business model was rebuilt following with the needs of consumers. Following the piloting results, the Bank of Russia proposed to amend the current legislation and include it in the draft law “On digital financial assets” provisions required to implement and develop such solutions in the emerging digital asset market.

Despite the obvious successes, attention should be paid to some excessive simplification of the system for selecting project participants. The Bank of Russia assumes the main responsibility for the implementation of the project, resorting to the services of experts only in certain cases. This piloting system can only be effective if a limited number of participants and technologies are studied. As the experience of other countries shows, an increase in piloting volumes should be accompanied by the involvement of an additional number of experts in these processes. In this regard, the mechanism for the selection and implementation of the project currently in force at the Bank of Russia should be modernized taking into account the growth of its popularity

The decision-making process for the development and implementation of the new innovative technologies based on the Russian financial “sandbox” can be represented as a picture on the Figure 6.1.

Figure 6.1

A New Mechanism for Piloting Financial Services in the Regulatory Sandbox of the Bank of Russia



Source: Compiled by the authors.

Streamlining the current procedure for piloting projects based on sites allows improving the selection of projects, the conclusion on which should be given by expert advice. Currently, two expert councils have been created at the Bank of Russia—the Interdepartmental Expert Council, which includes representatives of government agencies, and the Expert Council with market participants, including representatives of specialized financial associations and development institutions but their activities, are carried out on an irregular basis and are advisory. It is necessary to expand the composition and powers of the Expert Councils and build them into the adopted mechanism of the “sandbox” functioning.

Consultations with leading experts and in a world practice are often carried out at the last stages of implementation. In most countries, regulators consult with bankers after the “sandbox” structure has been developed. This happens as a result of several reasons: prevailing stereotypes of thinking, that is, confidence that regulators always know best what to do; reputational risk (fears that consultation with financial service providers might be understood as a weakness of supervisors), lack of confidence (direct interaction with companies and banks may reveal gaps in the skills and experience of the regulator), and in some cases, poor awareness of the capabilities of new service providers, who often formulate ideas in technological jargon. All these problems can be solved by increasing the transparency of supervisory bodies, by formulating a clear procedure for the project implementation.

Consultation with practitioners and experts early in implementation is the right way to go but it should be borne in mind that regulators need to have a deep understanding of innovation development processes (based on careful monitoring and market analysis) to implement the regulatory “sandbox” to achieve specific goals. Regulators who have some doubts and questions should be able to consult not only with experts but also with suppliers of similar products.

Essentially, the “sandbox” is a testing ground for new business models to help regulators assess potential risks. The ultimate aim is to be aware of the risks, to mitigate them if necessary, and provide market participants with the opportunity to use new technologies. In addition, a more careful selection of projects will reduce the time and cost of their implementation.

Guided by the “sandbox” approach, the Bank of Russia calibrates regulation according to the identified risks in innovative financial operations. This approach also encourages dialogue and multilateral cooperation between fintech companies and various participants in the financial sector. The goal is to achieve a government-wide approach, policy coherence, and prevention of regulatory arbitration.

In Russia, the Federal Law dated 31 July 2020, No. 258-FZ “On Experimental Legal Regimes in the Field of Digital Innovation in the Russian

Federation” was adopted, which is to enter into force at the end of January 2021, it provides for the introduction of innovations in nine different sectors of the Russian economy. The adoption of this law has generated interest in using a system of experimental legal regimes. Since July 1, 2020, Moscow has opened its own “digital sandbox,” which simplifies working with digital data. However, at present, new technologies are most successfully implemented in the Russian banking system.

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CONCLUSION

Eventually, fintech innovation must work for the benefit of consumers. Digitization has great potential to foster inclusive growth. Regulators must ensure that the development and implementation of digital finance solutions meets high standards of transparency, product suitability, security, and privacy.

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CHAPTER 7

THE DEVELOPMENT OF ARTIFICIAL INTELLIGENCE AS A FACTOR OF ECONOMIC GROWTH IN THE CONTEXT OF DIGITALIZATION

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ABSTRACT

Developments in the field of artificial intelligence (AI) will be distributed in all sectors of the economy. Currently, AI is used increasingly in many business functions, including marketing, customer service, cost reduction, and product improvement. Although there is a large amount of research on AI, there is no assessment of AI role as a factor of economic growth in the context of digitalization. The purpose of this article is to develop a conceptual framework

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for determining the business strategy of AI as a factor of economic growth in the context of digitalization based on research conducted over the past decade. It is proved that a successful Development of AI program requires companies to deal many elements of digital and analytical transformation: defining the business case, creating the right data ecosystem, creating or purchasing appropriate AI tools, adapting workflows, capabilities, and culture. In particular, it is emphasized that leadership from the top, managerial, and technical capabilities, as well as unhindered access to data are key factors in the development of AI.

Today, the whole world is gripped by a pandemic called the COVID-19. The pandemic has engulfed all humanity. The pandemic is breaking the existing living conditions at lightning speed. It does what it takes years to do in normal life. For example, as a result of a government directive, Russia was forced to switch to distance education. At any other time, this issue would have been discussed. And in the context of a pandemic, it is different. As you know, “violence is the midwife of progress.” So what is the progress during the pandemic? Progress lies in the transition from the traditional economy to the digital one at an accelerated pace. At the same time, social stratification is becoming more acute, and cyber threats are growing immensely, which are rapidly leading humanity to significant disruptions (turbulence) in the global market system, especially against the background of the unpredictable consequences of the COVID-19. At the same time, AI technologies are beginning to spread in various industries. The use of AI will be increased in various business functions, including management, marketing, customer service, and so forth. Although there is a large amount of research on AI but those that focus on economic growth are quite rare, and there is no holistic conceptual framework that brings information about the role of development of AI in economic growth. The largest technology companies are already competing in AI technologies and applications to improve their processes, and therefore results.

Modern domestic economists are fascinated by the problem of the development of AI as a factor of economic growth in the context of digitalization. “In the broadest sense, the process of ‘digitalization’ is usually understood as a socio-economic transformation initiated by the mass introduction and assimilation of digital technologies, i.e. technologies for the creation, processing, exchange and transmission of information” (Nosova & Grankina, 2019). The development of AI should be considered “as a new phenomenon in modern Russian economic life” (Nosova et al., 2018). The development of AI is a startup in the transformation of economic activity on a global scale. This is acceptable, but we must not lose sight of the core problems of socioeconomic development, which include solving the problem of accelerated economic growth under the influence of AI. Traditionally, it was believed that economic growth could be achieved only

as a result of developing new productive forces, especially in the sphere of manufacturing industries. In the context of digital transformation, the focus is on the development of AI in digital business. For such development to be possible, it is necessary to have not only good IT specialists but also a powerful digital sector, where digital equipment is directly created, especially in terms of creating robotics. In other words, the problem of economic growth can not be solved only by increasing the quantity of AI specialists technologies are needed as well.

In this regard, this work aims to develop a conceptual framework for determining the role of the development of AI in economic growth based on the study of such issues as the pros and cons of AI, business functions and AI, industries, and AI, as well as the workforce and AI. We must understand that the rapid growth of the Russian economy largely depends on the development of AI. Clearly this is not today, and not even tomorrow. AI is our future. But the one who becomes a leader in this field will be the ruler of the world.

METHODOLOGY

The term “artificial intelligence,” first used in a research paper presented by John McCarthy and his colleagues in 1955, is defined “as the science and technology of creating intelligent machines, especially intelligent computer programs” (McCarthy et al., 1955). Since then, terms such as AI, machine learning, deep learning, cognitive computing, and machine intelligence have become frequently used in scientific research. Computer science scientist Pedro Domingos argues that “AI is the goal; AI is the planet we are heading for; machine learning is the rocket that will take us there. And big data is the fuel” (Conick, 2016). AI research slowed down in the 1970s and 1990s due to the hype about negative results from its implementation.

However, gradually a wide range of AI applications gained real business value when three significant developments—better algorithms, mass data availability, and more substantial hardware—allowed AI to move beyond human cognitive abilities in visual recognition and natural language processing. Despite the fact that research related to AI has been around for more than half a century, the number of studies devoted to the use of AI in business has been gaining momentum recently. The main idea of the economic perspective is related to the definition of the investment strategy of AI. For example, future evaluation reports on the economic impact of AI and the company’s AI-related economic performance could help managers determine the timing of investment and budget share of AI adoption. In

other words, it involves planning the allocation of time and resources based on macroeconomic, industry and organizational reports, and forecasts.

In recent years, AI has attracted more and more public attention due to increased media coverage. Governments are also paying increasing attention to AI. For example, China announced plans to become a leader in AI by 2030 (<https://hightech.fm>), and the President of Russia has announced the strategic importance of AI for the near future. Vladimir Putin stressed that,

Artificial intelligence is, of course, the basis for the next leap forward of all mankind in its development. These are so-called end-to-end technologies that ... they permeate and will continue to permeate all spheres of our life: production, social sphere, science, and even culture—all this will be combined with each other. (“Transcript of Putin’s Speech,” 2020)

All of this adds up to a growing need for a deeper understanding of AI and its impact on business research.

Davenport and Ronanki (2018) researched on 152 cognitive projects to assess the impact of AI on business. They divided the AI effect into three parts: process automation, cognitive understanding, and cognitive engagement. Cognitive engagement involves automated communication with customers and employees using AI technologies. The apps include round-the-clock customer service for most requested services, such as changing account information, answering General employee questions, diagnoses of health disorders, and treatment recommendations.

RESULTS

Artificial intelligence as a New Resource in Economic Development

Today, the world is undergoing global changes in the mode of digital transformation with corresponding consequences in the economic, social, and administrative fields. The real world is updated by AI. It is becoming more and more intelligent. The urgency of the problems associated with the introduction of AI and the formation of an innovative digital economy on its basis has attracted the natural interest of politicians and scientists in Russia and around the world. The era of large-scale use of AI is coming. Now we can say that AI is a new resource in the economy of the 21st century, whose value is only increasing every day.

In general, Russian companies have formed an idea of the need to use AI as one of the strategic tasks of their activities in the future. Companies plan to transform the entire operation of the enterprise, rather than any

individual business functions and directions. The main problems in the way of using AI in the business lie in the technical, organizational plane, but especially in the personnel sphere, which lacks specialists with the necessary qualifications in this area. The development of AI reduces the asymmetry of information that leads to market failures (fiasco) (Nosova, 2014).

However, the development of AI has so far had little impact on the lives of most of the world's population. Nevertheless, practice shows that many Russian organizations, especially in the field of finance, public services, healthcare, and tourism, are already using AI in their activities. However, Russia, not having the full volume of AI production, becomes dependent on foreign manufacturers. Therefore, Russian companies have a lot of work to do to reach the global level of robotization of our economy. This is our “intriguing future.”

Currently, business needs to move actively to the development of automated technical systems—robotics. Thus, the financial sector of Russia was the first to use robotics. MTS group of companies and the Russian Direct Investment Fund (RDIF) have signed an agreement to create an Alliance in the field of AI. The signing ceremony took place at the Artificial Intelligence Journey Conference. The tasks of the Alliance will include monitoring the implementation of the national Development of AI strategy. However, as a result of the worldwide pandemic, “some companies will reduce capital spending, while others will delay new projects, or seek to reduce costs in other ways” (Gartner Global Research, 2020).

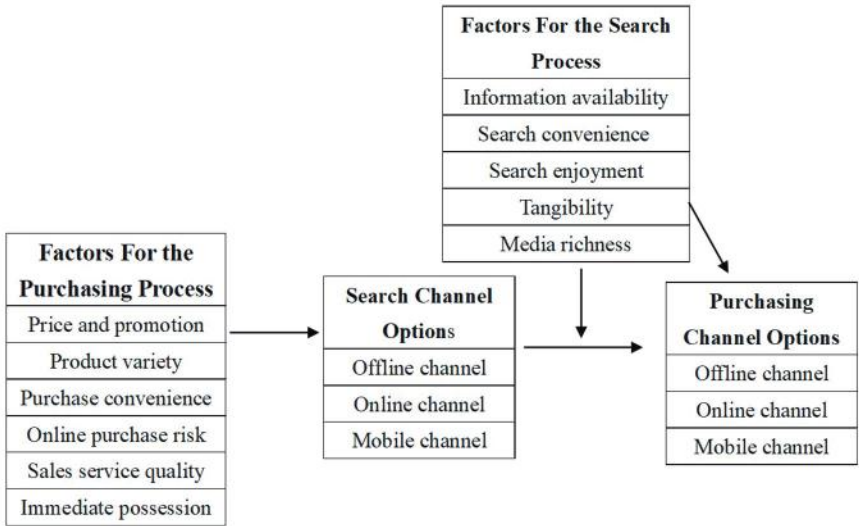
At the same time, businesses have become even more appreciative of digital transformation and its development projects for all employees. Also, the pandemic has helped to improve opportunities for remote work, as well as the development of marketing and business projects via the Internet. The marketing industry as more resilient to the economic downturn, as AI technologies have already become an integral part of its business operations, will reduce its turnover to a lesser extent.

Development of AI and Revolution in the Marketing Industry

AI has the potential to be used in many sectors, such as automotive, energy, mining, finance, agriculture, security, and transportation. But the most significant impact of AI is on marketing. The development of AI leads to a revolution in the marketing industry. To explain better the impact of AI on the development of a particular industry, we suggest considering the use of AI in marketing. Research conducted by PricewaterhouseCoopers shows that AI could increase consumer demand by providing personalized and/or better products or services. The structure of marketing research is shown in Figure 7.1.

Figure 7.1

Structure of the Marketing Research



Note: Compiled by the authors.

This study focuses on consumer decisions about whether to use the Internet and mobile networks to purchase products. The essence of the AI decision-making mechanism depends on data collected from various sources, such as clients, transactions, sensors, devices, and so forth. However, biased data that can lead to undesirable consequences are based on automated solutions. Similarly, in some cases, regulatory standards are needed to materialize an AI-enabled product. If regulatory and reliability issues are not regulated carefully, the reputation of firms will be destroyed due to the adverse impact of the product or service. For example, the Independent High-Level Expert Group on Artificial Intelligence, established by the European Commission, recently published “ethics guidelines for reliable AI” to promote the legitimate, ethical, and reliable implementation of AI (Independent High-Level Expert Group on Artificial Intelligence, 2019).

AI’s growing predictive ability has been paralleled over the years by investments in AI startups. According to the annual AI Report 2019, funding for AI startups increased at an average annual growth rate of more than 48% between 2010 and 2018 (Perrault et al.,2019). An ethical and regulatory perspective is one of the most important elements of a business AI strategy, which can undermine the prestige of a company if it is not handled properly. For example, Google apologized to an African American

man who claimed that Google's photo algorithms classified a photo of his African American friend under the label "gorilla." Therefore, ethical, and regulatory issues should be addressed at the executive level to avoid the wide range of side effects that may occur.

A survey of 3,500 marketing leaders conducted by Salesforce found that at least 60% of marketing leaders worldwide believe that AI will change the way digital marketing is conducted in the next five years (Salesforce Research, 2017). Recommendations systems provide suggestions with the help of AI algorithms based on similar preferences or characteristics of the transaction. This technology is so important that the competitive advantage of Amazon's book or product recommendations, Spotify's ability to discover the musical taste, and the accuracy of Netflix's movie recommendations are the foundation of their success (Portugal et al., 2018).

By offering AI advertising, marketers spend less time on traditional advertising methods. By matching people who are most likely to buy their products using historical data, marketers get a much higher return on investment. Programmatic advertising uses AI to buy ad space offline in real-time based on specific consumer demographics and search behavior. Instead of implementing a marketing search for where and who your customer is, an AI-based bidding system decides which ad should be displayed in a website's advertising space based on the visitor's online behavior, such as search keys and links (Peterson, 2018). By processing customers' online footprints, the AI can assess their loyalty and churn propensity. When an AI system predicts a customer loss trend, the customer support team can act proactively to retain the customer. One recent study on the Economics of AI suggests that AI will have a significant impact on all sectors within 5–10 years.

Development of AI and the Russian Economy

Russia has the task to get into the top five largest economies in the world. There is an opinion that for the Russian industry the problem of the development of AI is quite complex. But we will solve it. The Russian government is focusing on the "digital future" promotion. The idea was constantly voiced that the result of the penetration of the AI into all industries would be the salvation of the country. It is emphasized that the digital economy will penetrate the most remote areas of the country. However, we must not forget that today the Russian economy is not the most fertile ground for thinking about a "bright digital future." Perhaps it will be after the implementation of the national project "Digital Economy of the Russian Federation." Possible, but it is not the first year that the Russian economy is not in the best condition. It depends on the export of raw materials and on sanctions, which cause turbulence in its development.

An example of this is the intention of the presidents of the United States and Poland, Donald Trump and Andrzej Duda, to prevent the construction of the Nord Stream 2 gas pipeline (Sad gas, 2020). This event is an example of a new round of turbulence in economic development. But Russia is looking for and has already found a way out of this situation.

Russian digital business seeks to combine efforts to create technological components that stimulate the development of AI. In particular, the parties will conduct a scientific and expert analysis, analyze industry problems of AI implementation, and look for possible solutions. The Alliance will also be tasked with promoting advanced Russian developments in this area abroad, which will allow them to enter the global market and strengthen the position of Russian companies in one of the most competitive high-tech areas. The new Russian economy will operate on the principles of Public-Private Partnership (PPP). This is a national consensus on the implementation of the National Strategy for the development of AI in Russia. Considering the demographic situation in Russia, IT technologies help to move forward. The jobs that AI currently creates are those jobs that are hard to exploit. For the impact of AI implementation to be significant, it is necessary to increase the production of big data, establish regulation in the interests of business and citizens, and implement a National Strategy for the development of AI based on consensus with partner countries and international associations.

It is difficult but necessary. If you look at the problem of economic growth in Russia from the perspective of a pandemic, it destroys it. Thus, according to official statistics, the GDP growth rate in Russia, with a minus sign in Q2/2020, amounted to 3.2% (“Key Indicators of the Russian Economy,” 2020). What to do? Is there a way out of this state? There is a way out. AI will significantly increase the economic efficiency of Russian companies. In the context of the COVID-19 pandemic, due to restrictions on business activities, as well as the free movement of people, fundamentally new, real-time systems, and methods of rapid response to changes in coordination between countries are required. A new quality of economic globalization is manifested in the desire to digitalize business. In this regard, Russia is trying to develop a new model of economic development that meets the interests of its citizens and all of humanity. “Due to the increased interaction with AI, and existing modernization efforts, the delivery of public services to citizens may soon reflect the ways they interact with technology in their personal lives” (Mehr, 2017).

However, today only 4% of Russian companies use AI in their work. If a company is outside of AI, then it lives in the past. Our “childhood without AI” is over. All our current and future solutions should be transferred to the “cloud,” or AI. “The Russian markets for AI and neurotechnologies can grow 80 times by 2024 and reach 160.1 billion rubles and 8.2 billion

rubles, respectively. This is stated in the roadmap ‘neurotechnologies and AI’, developed by Sberbank and published on the website of the Ministry of communications of the Russian Federation” (RIA Novosti, 2020). The purpose of this study was not to identify different aspects of AI impact in different sectors of the economy but to create a correct strategy for its development. The AI strategy should be well-coordinated between the AI technology and the concepts of each business function, including data selection, determining the relationship between task concepts and technology, and fine-tuning the development of AI system. Russia aims to create a strong AI.

CONCLUSION

The authors believe that the successful development of AI requires a collaborative approach of technical and management skills. In this aspect, it is important to identify the prospects for the development of AI, namely its capabilities and limitations, regulatory, economic, business functions, and so forth. Therefore, a conceptual review of the development of AI from the point of view of managerial science can help to define the strategy of the development of AI in companies better and correctly assess the impact of the development of AI on the growth of the economy as a whole. Because The development of AI is not yet associated with a range of certain cognitive capabilities of a person, so initially it can be used in routine, voluminous, and non-intuitive tasks.

It is argued that AI technologies should be implemented in certain areas of activity with the careful study since automated solutions can destroy the reputation of a company if ethical and regulatory cases do not work well.

It is emphasized that AI technologies can be used in many sectors, such as healthcare, automotive, energy, mining, finance, agriculture, security, IT, transportation, retail and e-commerce, education, and insurance. For better explanation of the development of AI importance from an industry perspective, the impact of the development of AI in the marketing industry providing a personalized approach to customers was briefly explained.

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CHAPTER 8

RETHINKING THE IMPLEMENTATION OF THE ACTIVITY BASED COSTING METHOD IN THE PRACTICE OF COST MANAGEMENT IN RUSSIA

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ABSTRACT

This chapter deals with the problem of the lack of clearly developed recommendations and measures for implementing the method of cost allocation that is activity-based costing. Therefore, the authors develop recommendations for its implementation, based on a preliminary determination of the conditions for its effective application. The authors use the following methods to solve the problem: analysis, synthesis, generalization, thought experiment, tabular method, and graphical presentation. The article has an introduction, a presentation of research methods, the results obtained, their discussion, and conclusions. The results of the study are practical recommendations in the form of a set of measures necessary and sufficient to ensure the conditions for an adequate and effective application of the activity based costing method. The authors determine the conditions for the application of the method, studying its essence. A set of measures, in fact, is a system of

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management decisions that must be made and implemented. These solutions relate to the field of accounting management. The results obtained can be used in the accounting practice of any enterprise, where there is a need to distribute indirect costs in the calculation.

In the theory and practice of cost accounting, there is a problem of distribution of indirect costs. It is solved by choosing a distribution method. One of the most advanced and progressive methods, is the activity-based costing (ABC) method.

The use of this method in the practice of accounting and cost management requires some preliminary decisions. These decisions are aimed to change the cost accounting process in the organization, which make the use of the ABC method possible. However, scientific works do not consider such decisions and measures.

That is, a problem is that the use of the ABC method is impossible without the implementation of a set of preparatory measures, but scientific articles and other sources of information do not have data on these actions. In practice, each subject, introducing the ABC method, independently develops measures for its implementation. At the same time, mistakes are inevitable. This problem makes this study relevant and practically significant. Therefore, the purpose of the study is to develop a set of actions that must be taken to implement and apply the ABC method.

Achievement of the set goal requires solving the following tasks:

1. Determine the conditions, which will allow the use of the ABC method.
2. To develop a set of measures aimed at compliance with the conditions for applying the ABC method, performed during its implementation.
3. Justify the need for the implementation of this complex.

METHOD

The authors used the following methods: analysis, synthesis, generalization, thought experiment, tabular method, and graphical presentation.

The analysis method was used to identify the essence of the ABC method and determine the conditions for its application. The synthesis method made it possible to determine the set of measures necessary for the implementation of the method. The use of the generalization method made it possible to generalize the results obtained. Thought experiments were carried out to identify and describe the negative aspects of refusal to implement the developed set of measures, to identify and describe

the principles for choosing cost drivers. The tabular method was used to present and summarize the measures and conditions for the implementation of the ABC method. The graphical presentation made it possible to demonstrate the result obtained in the form of a graphical image.

The authors used the following sources of information. First, the scientific works of R. S. Kaplan (Bruns & Kaplan, 1987), the developer of this method, were used.

Since this method is used in accounting practice, it is described in textbooks on cost accounting by the following authors: Drury (2008), Horn-gren et al. (2006), Rainborn and Kinney (2013), VanDerbeck and Mitchel (2015), Banerjee (2014), Boyd (2013), Agrawal (2018), Collis (2015), Seal and Rohde (2014), Arora (2012), Gill (2015), Mehta (2015), Pandey (2016), Singh (2016). The development of this method is disclosed in the works of Norreklit (2017), Malina (2017), McWatters and Zimmerman (2015), Tascher and Charifzadeh (2016).

Also, scientific articles of the following authors were studied: Al-Halabi and Shaqqour (2018), Lin et al. (2016), Almeida and Cunha (2017), Antić and Sekulić (2016), Carli et al. (2014), Chakraborty and Dwivedi (2016), Khandakar et al. (2018), Sembiring (2018), Ríos-Manriqueza et al. (2018), Kocakulah et al. (2017), Kannaiah (2015), Namazi (2016), Neto et al. (2018), Quinn et al. (2018), Stefano and Filho (2013), Kabinlapat and Sutthachai (2017).

In general, the following publications draw attention to the need to introduce efficient foreign technologies and cost optimization methods in small and medium-sized businesses: Dyakova et al. (2017), Karanina et al. (2017), Karanina et al. (2018), Shibaeva et al. (2019), Sozinova (2018).

RESULTS

The authors obtained the following results while solving the problems.

First, the conditions for applying the ABC method are:

1. Management understanding of the need to apply the method.
2. Ensuring the required level of competence of the accounting personnel.
3. Organization of cost accounting, ensuring the grouping of costs by type of activity (function, work) of the unit.
4. Correct identification of cost drivers.
5. Organization of accounting for the actual values of drivers.
6. Amendments to local acts and regulations, securing the changes made to the accounting system.

The composition of conditions is illustrated by the diagram shown in Figure 8.1.

Second, the authors developed a set of measures to ensure compliance with the conditions for each of them. The list of measures for each condition is presented in Table 8.1.

Moreover, Figure 8.2 shows the principles of selecting cost drivers to determine or select a cost driver.

The system of measures determined to organize the accounting of the actual values of cost drivers are illustrated by the diagram shown in Figure 8.3.

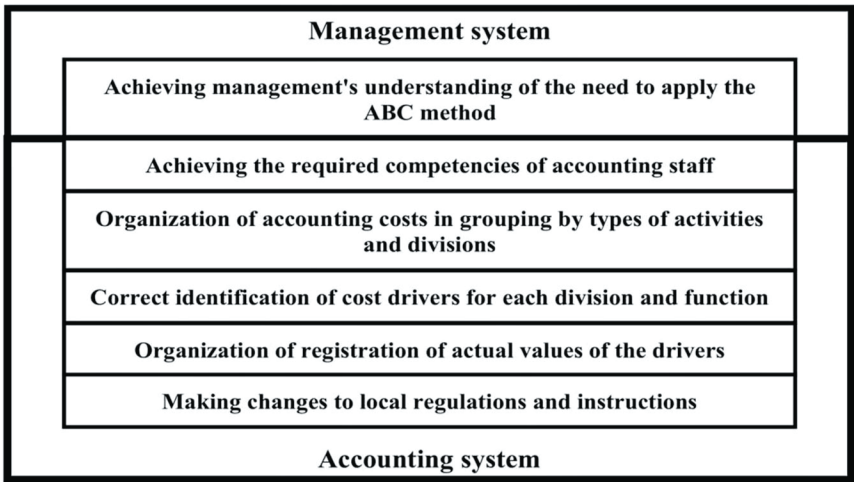
Third, the need to implement the developed set of solutions was substantiated through a description of the negative consequences of refusing to implement measures. Table 8.2 shows the identified negative consequences.

DISCUSSION

The conducted research of sources revealed that educational and scientific works do not cover the set of measures for the implementation of the ABC method.

Figure 8.1

Conditions for Applying the ABC Method



Source: Compiled by the authors.

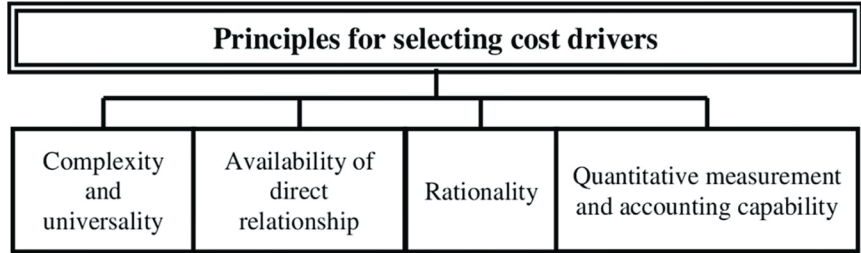
Table 8.1

Composition of Measures for the Implementation of the ABC Method

Condition	Measure
1. Management understanding	1.1. Explaining to management the benefits of using the method
	1.2. Warning about the possible incompatibility of information in the reporting, or bringing the reporting into a comparable form
2. Ensuring competencies	2.1. Accounting staff training
	2.2. Development of clear and specific regulations and instructions
3. Organization of cost accounting by type of activity	3.1. Defining a specific target list of functions
	3.2. Detailing of cost accounts of departments
	3.3. Codification of functions and divisions
	3.4. Making changes to the forms of documents and registers
4. Definition of drivers	Strict adherence to established principles of driver selection
5. Organization of accounting of actual values of drivers	5.1. Identifying sources of information about cost drivers
	5.2. Development of forms of documents, registers and reports
	5.3. Development of document flow, determination of the procedure for filling in registers and reports
6. Changes to local acts and regulations	6.1. Fixation and codification of the functions performed
	6.2. Legalization of changes in terms of detailing invoices, changes in document forms, registers and reporting
	6.3. Pinning the selected drivers
	6.4. Legalization of the developed forms of registration of drivers
	6.5. Clear definition of staff actions

Figure 8.2

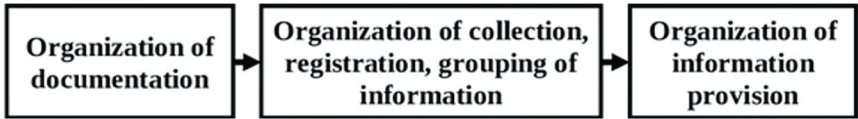
Principles for Choosing a Cost Driver



Source: Compiled by the authors.

Figure 8.3

System of Measures for Organizing Accounting of Driver Values



Source: Compiled by the authors.

Table 8.2

Identified Negative Consequences

Condition	Identified possible negative consequences
1. Management understanding	1. Impossibility of comparison with the past 2. Impossibility (errors) in assessments and decisions
2. Ensuring competencies	1. Failure to perform operations by personnel 2. High risk of errors
3. Organization of cost accounting	Distortion of the cost of a specific type of product
4. Determination of cost drivers	Cost distortion due to misallocation of indirect costs
5. Organization of accounting of driver values	Inability to apply the ABC method
6. Changes to local acts and regulations	1. Lack or dilution of responsibility 2. Uncertainty of personnel actions 3. Increased risk of erroneous actions
In general for the economic entity	The occurrence of distortions in the cost of a specific product, an increased risk of making the wrong decision

It was found that articles either describe the implementation of the method in various industries, countries, small enterprises or cover the development of the method and its applications, without measures necessary for the implementation of the ABC method and conditions for its application.

The study of the essence of the ABC method revealed conditions, nonobservance of which leads to the impossibility of its application. The authors identified measures to ensure compliance with each condition.

Thus, management’s understanding of the need to apply and implement the ABC method is achieved by explaining the benefits of its use and preventing possible incompatibility of information.

Meetings with management clarify the process. During such meetings, an example illustrating this method reveals its essence and the fact that the distribution of costs will be carried out more accurately and objectively. The prevention of incompatibility is carried out in the form of a recommendation for refusal to compare with past periods, or by bringing the reporting data for the past in a comparable form.

The implementation of the second condition—ensuring the required level of the accounting personnel competence—is achieved through training and instructions. Organization of cost accounting, ensuring the grouping of costs by department functions is carried out by:

- Definition of a specific final list of functions of each unit.
- Detailing of accounts for accounting of division expenses by introducing account expenses by function.
- Codification of functions and divisions.
- Making changes to the forms of primary documents and registers.

The list of functions is determined based on the results of the analysis of the local act regulating the activities of the unit and by interviewing employees. Detailing of accounts provides the opening of a separate account for collecting, grouping, and summarizing information about the costs of a unit to perform the function assigned to it. Codification of functions and divisions is carried out by assigning digital or letter designations (codes) for divisions and functions. Changes in the forms of documents and registers are associated with the emergence of a new cost accounting object—the function of the department and the opening of additional cost accounts.

The implementation of the fourth condition—the definition of cost drivers—should be made for each department and function. For this, a list of possible cost drivers is compiled for each department and function. Then, one driver is selected by function, based on the principles:

1. Comprehensiveness and universality: the driver must be defined for each function of each division.
2. Direct link: the driver is selected as a factor that determines the costs of the function and associated with the volume of production of a particular product.
3. Rationality: the cost of obtaining information about the actual value of the driver should not be high.
4. Quantitative measurement and accountability: the driver must be measured in quantitative terms and reflected in specific sources of information.

Ensuring the fulfillment of the fifth condition—the organization of accounting for the actual values of drivers—is achieved through the implementation of actions carried out within the framework of the accounting system for the work of the unit:

1. Identification of information sources for each cost driver.
2. Development of document forms for the primary fixation of driver values, registering and reporting forms.
3. Development of workflow for the entered documents, determination of the procedure for filling and processing registers, drawing up and submitting reports.

As a reporting form, it is recommended to draw up a table containing the actual values of drivers in the context of departments, functions, and calculation objects. The frequency of its submission is determined based on the frequency of the reporting calculations. The addressee should be a department (employee) performing the function of calculation.

The sixth condition is a measure that ensures and fixes previously committed actions and includes:

1. Fixing a specific and closed list of functions in the operating regulations of each department and their codification.
2. Legalization of the changes made to the cost accounting registers, to the forms of primary accounting documents, internal reporting.
3. Fixing all selected drivers in internal regulations.
4. Legalization of the developed forms of primary documents and registers, reporting within the framework of the accounting system for driver values.
5. Clear definition of personnel actions in instructions.

Refusal to carry out the above set of measures when introducing the ABC method can lead to the following negative consequences:

1. Lack of understanding will lead to the inability to conduct retrospective analysis and to errors in decisions.
2. Lack of relevant competencies among the personnel will lead to the impossibility of performing the assigned work by the personnel, and an increase in the risk of errors.
3. The lack of grouping of costs by the function will lead to the distribution of costs in general across the division and distortions in the cost of the type of product.
4. The wrong choice of cost drivers will lead to cost distortions due to the wrong allocation of indirect costs.

5. The absence of a system for accounting for driver values will lead to the impossibility of obtaining driver values, which makes it impossible to apply the ABC method.
6. The absence of changes in instructions introduces uncertainty in the actions of personnel.

In general, the refusal to implement the entire set of measures can lead to distortions in the cost of objects of calculation, which will lead to an increase in the risk of making wrong decisions in management.

CONCLUSION

This article has outlined a possible solution to the problem arising while implementing the ABC method, due to the lack of a developed set of measures for proper training, based on compliance with the conditions for using this method.

The conditions for the application of the method are the following:

1. Management understanding of the need to apply the method.
2. Ensuring the required level of competence of the accounting personnel.
3. Organization of cost accounting in a grouping by function
4. Correct identification of cost drivers.
5. Organization of accounting for the actual values of drivers.
6. Changes to local acts and instructions.

The authors have developed a set of actions for each condition, carried out by the management of the enterprise and the head of the accounting service. The necessity of introducing a set of measures was substantiated through the description of possible negative consequences in case of refusal from the recommended actions.

The research results can be used by any organization, regardless of industry affiliation and place of business.

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CHAPTER 9

INNOVATIVE DEVELOPMENT AND REPRODUCTION OF THE INNOVATION POTENTIAL OF UNIVERSITIES IN RUSSIA

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ABSTRACT

The presented work contains the study results on the properties of innovative development of the Russian higher education system. The chapter aims to examine the main features of the universities' innovative activities and determine the trend and prospects for innovative development of the higher education system in Russia. The research was conducted using the developed methodology on determining the type of reproduction of the aggregate innovation potential of higher educational institutions. This methodology is based on assessing aggregate resource flows arising during innovation activities of universities and affecting the resource component of their innovation potential. Based on the official statistics, we evaluated the aggregate resource flows and determined the type of reproduction of the aggregate innovation potential of Russian universities in 2015–2019. As a result, we established a narrowed type of reproduction of aggregate innovation potential in 2016–2018, which shows problems in the sphere of innovation and research activities of Russian higher educational institutions.

In particular, we revealed a significant decrease in the innovative activity of universities in Russia, which is manifested in the reduced R&D spending, revenues from scientific research, the output of R&D-related goods and services, and capital investments of universities.

Higher education is a system ensuring the preservation, growth, and dissemination of knowledge in society. A. Smith, J. B. Say, K. Marx, and others noted the role of knowledge and technology in economic development. Currently, there are several models of economic growth models considering the development of human capital and technology. These are the models of Romer (1986), Aghion and Howitt (1992), Mankiw et al. (1992), and others. There is a scientific consensus on the role of knowledge and innovation as key factors in developing socioeconomic systems. Thus, developing an economy based on knowledge, scientific, and technological progress requires a modern and effective higher education system.

The educational activities of Russian universities are regulated and standardized. There is a system of state control—licensing and accreditation of universities. In addition to training, universities conduct research and participate in the creation and implementation of innovations. The educational, scientific, and innovative activities of universities must be balanced. The presence of problems in the field of innovation and research activities of universities limits the prospects for developing the higher education system. Moreover, it negatively impacts long-term economic growth. Thus, it is necessary to preventively identify problems in universities' scientific and innovative activities and their negative consequences.

During this study, we developed appropriate tools that allow assessing the nature and trends of innovative development of the higher education system. The developed tools are based on assessing the type of reproduction of the aggregate innovation potential of the country's universities.

The formation of the concept of innovation capacity is associated with studying the factors determining the emergence of innovation. This concept has been developing since the 1960s. In the studies of the 1960s, the ability of socioeconomic systems to create and implement innovation is considered in the context of various economic processes and phenomena. In 1963, E. Mansfield (1963) published the results of a study on the relationship between the rate of innovation and market structure. The earliest work using the term “innovative capacity” was published in 1965 (Thompson, 1965). One of the first conceptual schemes of innovation potential was developed by L. Balcerowicz (1980). In 1990, L. Suarez-Villa first used the concept of innovation potential as the basis for applied research (Suarez-Villa, 1990). He assessed the innovation potential of the U.S. from 1880–1986. In the late 1990s, M. Porter (Furman et al., 2002) formulated and further popularized the concept of national innovation potential.

This study examines the innovation potential of universities. The innovation potential of a university is the ability of a university as a socioeconomic system to generate the flow of innovations that ensure its economic development.

The results of a university's innovative activity depend on its innovation potential. During innovation activities, the state of the university's innovation potential is changing. Thus, the innovation potential of a higher educational institution is cyclical. The cyclical development of any system is reproduction.

Reproductive processes can be classified according to their impact on the system's state. Such classification of reproductive processes was introduced by Karl Marx (1992). He developed models of simple and expanded reproduction of the total social product. As for the innovation potential of universities, we should distinguish between expanded and narrowed reproduction. The expanded reproduction of the university's innovation potential leads to its growth and development, which manifests itself in an increase in the university's ability to carry out innovative activities. Narrowed reproduction leads to a reduction in the university's innovative ability. This is true not only of particular universities but of the higher education system as a whole. The feature that distinguishes expanded reproduction from narrowed reproduction is the impact of reproduction on the university's innovation potential. To determine the type of reproduction of the university's innovation potential, it is necessary to compare the innovation potential at the beginning and the end of the reproduction cycle.

Several factors determine the ability of a university to carry out innovative activities. The key factor is the availability of appropriate resources, their balance, and interaction. The university's innovation potential includes four main groups of resources: human, material, information, and financial resources. Human resources are university employees and students, their knowledge, skills, and creativity that can be used to implement innovative projects. Material resources are assets that can be used in implementing an innovative project. Information resources are the accumulated and recorded knowledge, experience, and results of previous innovation and research. Financial resources are cash and liquid assets that the university can use in innovative activities.

The innovation potential of higher education institutions can be estimated as the total value of all resources suitable for use in innovative activities, considering their systemic interaction (Formula 1).

$$CAP = k \times (L + M + I + F) \quad (1)$$

where:

CAP – assessment of the university's innovation potential;

k – multiplier;

L – cost estimate of human resources;

M – cost estimate of material resources;

I – cost estimate of information resources;

F – financial resources.

Consideration of balance and interaction between resource elements of innovation potential is carried out by introducing the multiplier into model k. The multiplicative account of systematicity is since systemic links cover all elements of innovation capacity. Changes in these connections affect the whole system. If the systemic interrelationships are destroyed, the university's innovative ability will be reduced to zero, even if resources are preserved.

The change in the innovation potential of the university as a result of the reproduction cycle can be written as follows (Formula 2).

$$\Delta \text{CAP} = \text{CAP}_1 - \text{CAP}_2 \quad (2)$$

where:

CAP_0 – state of innovation potential at the beginning of the reproduction cycle;

CAP_1 – state of innovation potential at the end of the reproduction cycle.

Reproduction is extended when $\Delta \text{CAP} > 0$ and narrowed when $\Delta \text{CAP} < 0$.

Let us denote the absolute change in the multiplier k, human, material, information, and financial resources during the reproduction cycle as Δk , ΔL , ΔM , ΔI , and ΔF . Then the change in the university's innovation potential will take the following form (Formula 3):

$$\Delta \text{CAP} = \Delta k \times (L_1 + M_1 + I_1 + F_1) + k_0 \times (\Delta L + \Delta M + \Delta I + \Delta F) \quad (3)$$

Since the values of k_0 , L_1 , M_1 , I_1 , and F_1 are always positive, the reproduction type depends on changes in the volume of resources included in the innovation potential and changes in the multiplier characterizing

the relationship of resources. Narrowed reproduction occurs if there is a significant reduction in resources at the end of the reproductive cycle compared to the beginning or if there is a violation of the systemic relationships uniting and organizing these resources.

The approach to assessing innovation potential and the model for determining the type of reproduction of innovation potential based on it are applicable to particular universities and the whole system of higher education. The expanded reproduction of the universities' total innovation potential results from the relatively effective functioning of the system of higher education and university science. The source of additional opportunities is the results of previous research and innovation activities. On the contrary, the narrowed reproduction of the total innovation potential of universities may indicate the low economic efficiency of their innovative activity. The results obtained from such activities are not sufficient to recover the resources spent. Thus, prolonged narrow reproduction of aggregate innovation capacity leads to a gradual reduction in research and innovation capabilities of universities and degradation of university science.

METHODS

The use of the developed model to determine the type of reproduction of aggregate innovation potential of universities requires solving several problems. First, it is impossible to assess all resources making up innovation potential. Secondly, determining the value of multiplier k requires a time-consuming assessment of the impact of interaction and balance of resources on innovation potential. Third, it is impossible to unambiguously determine the beginning and end of the reproduction cycle of innovation potential. Since the university's innovation potential is a system marked with stability (Gazitdinov, 2019), we can assume the following to simplify the model. At the scale of the higher education system, the multiplier k changes insignificantly in the short term. Consequently, the type of reproduction of the total innovation potential of universities is determined by the change in its resource component. Such changes are due to the corresponding resource flows. Thus, the results of the reproduction cycle can be assessed by studying the resource flows arising when universities carry out innovation activities.

We can distinguish incoming, outgoing, and internal resource flows. Outgoing flows are the costs of research and innovation activities (remuneration of labor, purchase of inventories, etc.) and depreciation of fixed assets used in such activities. The main incoming resource flows are the increase in nonfinancial assets and income from the commercialization of the results of innovation and research activities. Internal resource flows

imply a reduction or increase of innovation potential due to the redistribution of university resources between different spheres of its activities. Internal flows include investments in the development of the resource component of innovation potential and the withdrawal of resources from the innovative activities of universities. Aggregated outgoing resource flows constitute the aggregate costs of the country's universities for innovation activities. Aggregated incoming resource flows are the aggregate revenues of universities from innovation activities. The difference between total revenues and total costs can be called the total profit (loss) of universities from innovative activities. The difference between the aggregate amount of resource withdrawal and the aggregate investments in the development of innovation potential is proposed to be called the aggregate net investments in the development of universities' innovation potential.

Aggregate profit (loss) of universities from innovation activities and aggregate net investment in the development of innovation potential increase or decrease the resource component of the aggregate innovation potential. Consequently, the change in the total innovation potential of universities (ΔCAP) can be represented as the sum of the total profit (loss) of universities from innovation activities and net investment in the development of innovation potential.

RESULTS

This study assessed the aggregate resource flows and determined the reproduction type of the aggregate innovation potential of Russian universities. The reproduction cycle duration is one year. The assessment was based on data from federal statistical observations in Forms No. VPO-2 and No. 2-Nauka. The results (summary tables) of observations according to Form No. VPO-2 are published on the website of the Ministry of Science and Higher Education of Russia (Ministry of Science and Higher Education, 2020). The results of federal statistical observation according to form No. 2-Nauka are published on the website of the Federal State Statistics Service of the Russian Federation (Rosstat) (Rosstat, 2020b).

The study of the adopted statistical methodology allowed us to determine indicators for assessing the aggregate resource flows from the innovative activities of Russian universities. Aggregate costs of innovation activities are calculated as the sum of current internal costs, external R&D costs, and depreciation charges on fixed assets used in innovative activities of universities. These indicators are included in Form No. 2-Nauka. The cumulative income from innovative activities of universities is estimated as the value of revenues from R&D. This indicator is included in the form of statistical observation No. VPO-2. The universities' capital expenditures

assess aggregate investments in the development of the universities' innovation potential. This indicator is included in Form No. 2-Nauka.

Following Russian law, some data is not published for reasons of confidentiality. The results of statistical observation according to Form No. 2-Nauka does not contain aggregated data on higher educational institutions. To determine the value of indicators for universities, it is necessary to consistently subtract the values of indicators for research institutes, design offices, technological organizations, experimental enterprises, and other organizations related to the higher education sector from the value of indicators for the higher education.

The resulting values contain data on universities and experimental enterprises. Data for 2017–2018 also includes data on the sector's design, engineering, and technology organizations. Design, engineering, and technological organizations, as well as experimental enterprises, occupy an insignificant share in the higher education sector. In 2017, the share of such organizations in the total number of organizations was 0.1%, in the total number of research personnel—0.71%, in the volume of domestic spending on scientific research—1.7% (Diachenko et al., 2019). Thus, the indicated error is insignificant. The cost values of the indicators were recalculated in comparable prices of 2015. For this purpose, we used the deflator index for the economic activity “Research and development” (Rosstat, 2020a). Table 9.1 presents the results of the calculations.

Table 9.1

Assessment of Aggregate Resource Flows From Innovation Activities and Determining the Type of Reproduction of Aggregate Innovation Potential of Russian Universities

Indicator	2015	2016	2017	2018	2019
Proceeds from R&D, bln. RUB	96.2	78.08	80.87	85.96	86.18
Internal current expenses on R&D, bln. RUB	80.23	67.04	69.63	71.52	63.88
External expenditures on R&D, bln. RUB	9.43	6.85	5.69	5.03	7.32
Depreciation charges, bln. RUB	8.16	6.8	16.31	17.8	6.99
Capital costs, bln. RUB	2.74	1.63	1.94	1.47	1.53
Aggregate costs of universities to implement innovative activities, bln. RUB	97.82	80.69	91.63	94.35	78.19

Aggregate profit (loss)					
from innovative activities of universities, bln. RUB	-1.62	-2.61	-10.76	-8.39	7.99
ΔCAP	1.11	-0.98	-8.82	-6.91	9.51
Reproduction type	Extended	Narrowed	Narrowed	Narrowed	Extended

Source: Compiled by the author based on (Diachenko et al., 2019; Ministry of Science and Higher Education, 2020; Rosstat, 2020a)

In 2016–2018, the reproduction of the aggregate innovation potential of universities in Russia had a narrowed nature. In total, from 2015 to 2019, the aggregate innovation potential of Russian universities in comparable prices of 2015 decreased by 6.09 billion rubles.

In 2015–2018, the total costs of university innovation activities exceeded the total revenues from such activities. Thus, the main factor determining the narrowed reproduction of the aggregate innovation potential of higher education institutions in Russia is the low economic efficiency of innovation activity in the system of higher education. The results of the universities' innovative activity did not ensure the reimbursement and development of their aggregate innovation potential.

The change in the type of reproduction of aggregate innovation capacity of universities from narrowed to expanded in 2019 is due to the influence of several factors. On the one hand, the total costs of universities for innovation activities decreased by more than 20% by 2019 compared to 2015. On the other hand, total university revenues from innovation decreased by 10.4% in 2019 compared to 2015. In absolute terms, the reduction in total revenues amounted to about 10.2 billion rubles, and total costs—19.6 billion rubles. Thus, the expanded reproduction of the aggregate innovation potential of Russian universities is caused by the outstripping reduction in aggregate costs compared to the reduction in aggregate revenues from innovation activities.

In 2019, the recovery of the expanded reproduction of aggregate innovation potential in Russia was accompanied by the following negative trends. For five years, there has been a significant reduction in the output of goods, works, and services, as well as revenues from innovative activities of universities. Internal spending on university R&D has decreased. There has been a significant reduction in investment in fixed assets used in research and innovation activities. In 2015–2019, the value of capital expenditures of higher education institutions in comparable prices of 2015 decreased by 44%. Thus, the recovery of the expanded reproduction of aggregate innovation capacity in 2019 occurred against the background of a marked decline in the economic and innovation activity of universities compared to 2015.

Based on the above, we can make the following conclusions. As of 2019, Russia had no significant growth in the innovative activity of universities.

Therefore, the current state of the Russian higher education system in terms of innovative activities of universities and commercialization of R&D results can be characterized as stagnation. Due to the long-term narrowed reproduction of aggregate innovation potential and the consistent reduction of capital expenditures, the probability of activation and significant expansion of innovation, research, and implementation activities of universities using capabilities and resources of the higher education system can be assessed as low.

The current situation in the Russian system of higher education is due to several problems. First, Russian universities are insufficiently active in the commercialization of R&D results. This is partly because most Russian higher education institutions are state educational organizations with limited property and financial autonomy. Russian universities have insufficient incentives to conduct proactive research and promote their results on the market. Moreover, Russian universities do not actively interact with existing enterprises. Thus, university administrators and research and teaching staff often lack insight into the real needs of businesses for specific products, research, and technology. In general, the identified properties and negative trends in the sphere of innovative development of Russian universities require the revision and improvement of state management of the higher education system.

CONCLUSION

The results of our research showed that the innovative activities of Russian universities in 2016–2018 did not ensure the recovery and development of aggregate innovation potential in the higher education system. The outstripping reduction of costs caused the increase in the efficiency of innovation activities of Russian universities, which led to the transition to the expanded reproduction of the total innovation potential. Nevertheless, the reduction in the volume of produced goods, works, and services, a slight increase in R&D revenues, and a significant reduction in capital investment of universities indicate stagnation in innovation activity of higher education institutions.

The reproduction of innovation potential and innovative activity of higher education institutions is a promising and relevant topic for further research. The research results can be expanded and refined by assessing the impact of university R&D on the overall development of science and technology. Additionally, it is interesting to study the reproduction of innovation potential in other sectors and the whole economy. This will allow determining the properties and prospects of innovative development of

Russia and assessing the contribution of the higher education system in such development.

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CHAPTER 10

IMPACT OF INDUSTRIAL PARKS ON DEVELOPMENT OF NETWORK FORMS OF BUSINESS ORGANIZATION

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ABSTRACT

The main purpose of this chapter is to develop a methodology for assessing the impact of industrial parks on the development of network forms of business organization.

The main form of networking is related to the distribution of individual stages of the value chain among participants. The opposite is the vertical integration strategy, in which different stages of the value chain are combined into one enterprise. Therefore, if the activities of the industrial park contribute to the development of network forms of business organization, the level of vertical diversification of enterprises—residents of the industrial park should be lower than that of enterprises—competitors working in the same sphere of activity, but not residents of the park. To ensure the possibility

of universal application of the methodology, the assessment of the level of vertical diversification of the enterprise should be based on open data.

The application of the proposed methodology is illustrated by the example of the Russian industrial park Oka-Polymer (2021). The analysis shows that the level of vertical diversification of enterprises—residents of the park is significantly lower than the level of diversification of competitors, which confirms the conclusion that the industrial park may have a positive impact on the development of network interactions between its residents.

The application of the proposed methodology will allow assessing the efficiency of industrial parks in terms of creating opportunities for the development of network forms of business.

INTRODUCTION

It is now widely felt that traditional autonomous enterprises are gradually being replaced by networks. Thus, Milan Jelena, a leading researcher on the development of modern economics, identified four stages of the development of management systems from the second half of the 20th century to the present. These are the stages defined by the orientation to the final product of production, the orientation to the individual stages of business processes, the orientation to the business processes as a whole, and, finally, the orientation to intercompany networking (Zeleny, 2005). A key advantage of a network business organization is the ability to solve many problems that arise in autonomous multidisciplinary enterprises, such as the lack of knowledge and experience necessary to organize activities in new markets, the complexity of managing various types of activities, and the high cost of restructuring production chains within the enterprise. If the principles of the network organization are implemented, these problems cease to play a significant role. Since the network organization is a dynamic structure, the main components of which can be “installed” or “uninstalled” depending on the requirements of the interaction participants (Milner et al., 2005), there is no problem of insufficient flexibility for it, as well as the problem of high cost of reorganization of value chains. Each member of the network interaction is responsible for the efficiency of company. Therefore, there is no problem of organizing centralized management. The relevance of the problem of experience and knowledge lack when entering new markets is also reduced; network organizations use effective mechanisms of knowledge exchange, because the organization’s network paradigm in most cases is focused on knowledge, as the basis of competitive advantage (Milner et al., 2005).

However, there are also obstacles that limit the development of network forms of business. So, in the work (Trifonov & Vizgunov, 2014) we identified the main factors that determine the choice of Russian entrepreneurs

in favor of traditional multidisciplinary enterprises, and not in favor of network structures. These factors include:

1. High transaction expenses associated with finding potential partners.
2. Lack of opportunities to apply modern approaches to assessing the quality of enterprise management and interaction with counterparties. For example, the company's compliance certificate ISO 9001 should be evidence of the company's implementation of an effective quality management system. However, in practice, many enterprises approach the implementation of this standard formally, limiting themselves to the development of documents necessary for certification, which do not fully reflect the real situation.
3. Insufficient culture of cooperation, and so forth.

At the same time, it should be noted that in Russia, state bodies are currently making certain efforts to create infrastructure for the development of network organizations—this is, in particular, the active development of technology parks and industrial parks. Measures are being implemented to subsidize management companies to reimburse part of the costs of servicing loans for the creation of industrial parks and technology parks, to reimburse regions from the federal budget for the creation of industrial infrastructure of parks; The National Geographic Information System of Industrial Parks and Technology Parks of Russia (GISIP) has been created, which allows you to obtain sufficiently detailed information about these structures, etc. The important role of industrial parks in the development of network forms of interaction is due to the fact that the general rules for using the infrastructure of an industrial park, locating residents on a common territory, the possibility of obtaining information about the activities of potential partners not only from themselves, but also from the management company allows residents to effectively organize joint projects. For companies engaged in innovative activities, similar advantages are provided in the framework of technology parks.

It can be assumed those opportunities for organizing joint work that are provided to companies within the framework of industrial and technology parks contribute to the development of network forms of organizing the business of these companies. However, it is difficult to verify the validity of this assumption—after all, to obtain accurate results, it is necessary to collect and analyze specific cases of network interaction between park residents, and such information is often confidential. Within the framework of this article, we propose a methodology for assessing the impact of indus-

trial parks on the development of network forms of business, based on indirect signs, information about which can be obtained from open sources.

Many works of modern authors have been published on the problem under study, including the work of Ginevicius (2009).

The authors also used the data from website Rusprofile (2021) and database Kontragent (2021) in this article.

METHODOLOGY

Our proposed methodology is based on the following provisions. The main form of networking is related to the distribution of individual stages of the value chain (according to Porter [1985]) between participants, that is, one company carries out production operations, another is engaged in marketing and sales, the third is in improving product design, and so forth. In turn, different stages of the value chain in a vertical diversification strategy are combined within one enterprise (Aaker, 2009) and opposite to the strategy for developing network interaction. For each enterprise, the level of vertical diversification can be estimated (that is, how much vertical diversification is characteristic of a given enterprise). If the average level of vertical diversification of industrial park resident enterprises is significantly lower than the average level of vertical diversification of enterprises operating in the same industry, but not residents of the park, one can conclude that the assumption of the positive impact of industrial parks on the development of network forms of business is justified.

A key challenge in developing this methodology is to identify indicators that reflect the level of vertical diversification of enterprises. A large number of works by various authors are devoted to the development of indicators for assessing diversification (see, for example, works by Fan & Land, 2000; and Ginevicius, 2009). Basically, the authors of these works focus attention on the development of indicators reflecting both the distribution of activities in various areas of the economy and the impact of each type of activity on the financial result. An example of such an indicator is the entropy index, which describes the order of production corresponding to various activities, and proposed in the work (Jacquemin, 1979). The entropy index is calculated as follows:

$$E = \sum_{i=1}^n p_i \ln \left(\frac{1}{p_i} \right),$$

where E is the entropy index; n – number of activities; p_i is the share of products corresponding to the i – type of activity ($i = 1 \dots n$) in the total volume of the enterprise's products sold.

Another widely used indicator that characterizes the level of diversification is the Herfindal-Hirschmann index, based on the same baseline data and calculated as follows:

$$H = \sum_{i=1}^n p_i^2,$$

where H is the Herfindal-Hirschmann index; n – number of activities; p_i is the share of products corresponding to the i – type of activity ($i = 1 \dots n$) in the total volume of the enterprise's products sold.

The following deficiencies can be identified:

1. The calculation of the indicators is possible only if information on the distribution of profits/resources for the various activities of the enterprise is publicly available. In some countries, in particular, in Russia, it is impossible to get it from individual enterprises from publicly available sources.
2. The indicators under consideration determine only the general nature of the distribution of activities across different sectors (that is, show how wide the range of activities of the enterprise is and how homogeneous their contribution to the overall results), but do not allow identifying the characteristics of diversification—that is, whether the enterprise is horizontal or, on the contrary, vertical form of diversification.

These disadvantages can be overcome as follows. In Russian practice, the only publicly available data describing the diversification of the enterprise are data on activities determined by the enterprise in accordance with the Russian Classification of Types of Economic Activity, which is an analogue of the classification “Statistical Classification of Economic Activities in the European Community” used in the European Union. Thus, indicators of diversification should be based on these data.

Due to Russian Classification of Types of Economic Activity, the following sections are provided: A. “Agriculture, forestry, hunting, fishing and fish farming” (code range 01 – 03.22.9); B. Mining (05 – 09.90); C. “Manufacturing” (10 – 33.20); D. Provision of electric power, gas, and steam; air conditioning (35 – 35.30.6), and so forth. We compare the level of vertical diversification of the enterprise among the sections of Russian Classification of Types of Economic Activity, which include its activities (we denote this indicator as JS1). In the case where all the activities of the manufacturing enterprise belong to one section (section “C”), this enterprise corresponds to a low level of vertical diversification. It is quite likely that such an enterprise does not expand production either up the value chain (otherwise the activities of sections A, B, D would appear in the list

of its activities) or down (otherwise the activities of sections G. “Wholesale and retail trade” or H. “Transportation and storage” would appear in the list of its activities). Accordingly, the classification of the enterprise’s activities in several sections of Russian Classification of Types of Economic Activity shows a higher level of vertical diversification. For example, an enterprise whose main activity is woodworking may include logging units (this activity refers to section A). The food industry can also grow plants used as raw materials for production (this activity also refers to section “A”). Many enterprises are also characterized by the inclusion in the scope of activities of transactions related to the sale of manufactured products and their after-sales services (such activities belong, respectively, to section “G”).

Taking into account the above provisions, our proposed methodology for assessing the impact of industrial parks on the development of network forms of business should include the following stages:

1. Calculation of the average value of Sv_1 for industrial park resident enterprises.
2. Calculation of the average value of indicator Cv_1 in relation to enterprises—competitors of residents of the industrial park—that is, companies comparable in scale of business from the same production area, but not related to the industrial park, are considered.
3. Evaluation of results:
 - a. If the values of indicator Cv_1 calculated for industrial park resident enterprises significantly exceed the values of indicator calculated for competitors, a preliminary conclusion can be made about the positive impact of industrial park activities on the development of network forms of business. In this case, it is advisable to continue the analysis by examining specific examples of network interaction.
 - b. If the values of indicator Cv_1 calculated for industrial park resident enterprises do not exceed the values of indicator calculated for competitors, we can make a preliminary conclusion that there is no impact of industrial park activities on the development of network forms of business. In this case, it is advisable to analyze the characteristics of the industrial park, which can prevent the development of network interactions.

RESULTS

Consider the proposed methodology on the example of Oka-Polymer (2021) industrial park, a specialized site created on the basis of one of the

leaders in the chemical industry of the USSR—the Kaprolaktam (2021) plant and designed to accommodate chemical industries (chemistry and petrochemicals, the production of automotive components). Given the specifics of the park, it can be assumed that the bulk of the residents of this park carry out production activities belonging to the class of Russian Classification of Types of Economic Activity 20 “Production of chemicals and chemical products.” Also, based on the fact that the general territory of accommodation creates conditions for the organization of effective interaction of enterprises, it can be assumed that the low level of vertical diversification is characteristic of resident production enterprises—after all, such enterprises should have the opportunity to transfer non-core activities related to trade, transportation and storage of products, research and development to specialized companies located on the same production site. Information on the characteristics of park resident enterprises is provided in Table 10.1. Information on the number of employees of enterprises, types of activities of enterprises and their belonging to small or medium-sized enterprises (SMEs) is obtained on the basis of sources (Rusprofile.ru, 2021), (Counterparty, 2021). The list of residents of OKA-Polymer industrial park is taken from the corresponding section of the site of this organization (Oka-Polymer, 2021).

Table 10.1***Characteristics of OKA-Polymer Industrial Park Resident Enterprises***

No	Name and Individual Tax Number of company	Main activity type	Personnel number	small or medium-sized enterprises' agent	Cv1
1	JSC “Research Institute of Polymers” scientific and production enterprise ITN 5249164736	72.19 Scientific research and development in the sphere of natural and technical sciences	585	–	2
2	“Boryshev Plastic Rus” LLC ITN 5222070456	29.3 Production of components and accessories for motor vehicles	147	–	2
3	LLC Clarity ITN 5262282320	22.21 Production of Plastic boards, strips, pipes, and profiles	123	Medium-sized	2

(Table continues on next page)

Table 10.1 (Continued)***Characteristics of OKA-Polymer Industrial Park Resident Enterprises***

No	Name and Individual Tax Number of company	Main activity type	Personnel number	small or medium-sized enterprises' agent	Cv1
4	LLC "Caprolactam" TS ITN 5249124973	20.59.4 Production of lubricants, lubricants additives, and antifreezes	110	Medium-sized	3
5	LLC scientific and production enterprise "Uniplast" ITN 5249004154	22.29 Production of other plastic products	60	Small	2
6	"Track – LV" ITN 5263037190	17.21 Production of corrugated paper and paperboard	60	Small	2
7	LV "Intelligent Systems" LLC ITN 5249106861	33.2 Installation of industrial machinery and equipment	45	Small	4
8	"Paper-Trade" LLC ITN 5249105709	33.12 Repair of machinery and equipment	19	Small	2
9	"Partner Elektro NN" LLC ITN 5249145388	27.32 Production of other wires and cables for electronic and electrical equipment	15	Micro	3
10	"Russian gas industry" LLC ITN 5257105910	46.9 Wholesale nonspecialized trade	14	Small	3
11	"Mashneftekhim" scientific and production enterprise LLC ITN 5260341379	25.99 Production of other finished metal products not included in other groupings	1	Micro	3

Source: Compiled by the authors.

The average value of Cv_1 calculated for the specified group of enterprises is 2.55. Thus, most enterprises resident in the industrial park correspond to the level of vertical diversification, characterized by the classification of activities into 2–3 sections of the Russian Classification of Types of Economic

Activity. Then we calculated the average level of vertical diversification for 20 enterprises of the same region working in the chemical industry, but not residents of the industrial park (moreover, since among the residents of the park more than 80% are small and medium-sized businesses, competitor companies were also selected from this segment). For them, the value of indicator Cv_1 was 3.3. Thus, the value of indicator Cv_1 calculated for residents of the park is significantly lower than the value of the indicator calculated for competitors, from which we can conclude that the industrial park may have a positive effect on the development of network interactions between its residents. It should be noted that the production activities of the park companies are quite diverse, and are not concentrated exclusively on the production of chemicals and chemical products, which creates certain opportunities for establishing production links. For the further development of network forms of business, it is advisable to more actively involve companies specializing in trade, marketing, research and development in the industrial park. Indeed, at present, among the residents of the park, only one company (JSC “Research Institute of Polymers”) specializes in scientific research and development, and only one company (LLC “Russian Gas Industry”) has trade as its main activity.

CONCLUSION

The application of the proposed methodology will make it possible to evaluate the effectiveness of industrial parks in creating opportunities for the development of network forms of business. Identification and automation of inter-firm business processes that can be built within a single production site is an urgent task for the resident companies of the industrial park. More broadly, this task can be considered as the construction of a single system of information and technological interaction within the industrial park. This task will simplify the transfer of non-core activities to specialized companies operating on the same production site, which is especially relevant for small and microenterprises.

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CHAPTER 11

INNOVATION AND MARKETING MECHANISM OF CHANGE MANAGEMENT IN THE REGION

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ABSTRACT

The environmental transformation has led to the necessity to address the issue of change management in the region. This condition is implemented through mechanisms that have different algorithms and directions of action. In this study, the aspect of change management in the region is focused on the application of innovation and marketing mechanisms. Innovation and marketing mechanism is considered as an integral part of change management in the region. The chapter aims to present the innovation and marketing mechanism of the management of changes in the region from the position of cyclicity, rule-setting, planning, and equilibrium management.

The methodological basis of the research focuses on applying methods of graphical representation, formalization of the studied data, classification, theoretical reasoning, and delineation of problems. This study has theoretical and practical significance. Theoretical significance is related to the lack of understanding of the innovation and marketing mechanism of the management of changes in the region in Russian practice. The practical importance of this topic is due to the importance of finding new tools to consider the system of regional management from a different perspective.

INTRODUCTION

The region is an integral system of managing objects, subjects, and elements of the internal and external environment. The management system is regulated by a mechanism determining the effectiveness of the formation and implementation of processes that form the regional features of development. The internal and external environment of the region is subject to changes, which make the management chaotic (Zhuravlev, 2020). In accordance with this condition, it is necessary to select a mechanism for change management in the region, which would correspond to the priorities in implementing an effective strategic plan for territorial development.

The topic of innovation and marketing mechanism of change management in the region is relevant from the theoretical and practical standpoint. In terms of theoretical significance, this condition is associated with the lack of representation of innovation and marketing mechanism of change management in the region in Russian practice. Nowadays, the studies of Russian authors have not formed an algorithm or conceptual representation of the innovation and marketing mechanism of change management in the region. The practical importance of this topic is due to the importance of finding new tools to consider the system of regional management from a different perspective. In accordance with these conclusions, the chapter aims to form an innovative marketing mechanism of change management in the region. To achieve the indicated goal, it is necessary to present the innovation and marketing mechanism of change management in the region from the perspective of cyclicity, norms and rules setting, planning, and equilibrium management. In accordance with these objectives, the research topic is disclosed through:

- Formation of an innovative and marketing mechanism of cyclic management of changes in the region;
- Proposal of an innovation and marketing mechanism for the establishment of rules in the management of changes in the region;

- Implication of the innovation and marketing mechanism of planning changes in the region.

MATERIALS AND METHODS

The research toolkit focuses on elaborating tasks through author proposals. Within the framework of this research, it is proposed to apply methods of graphic representation, formalization of the studied data (Wright et al., 2000), classification, theoretical justification (Urakova & Katok, 2012), and delimitation of problems (Kupova, 2010).

RESULTS

The current mechanisms of change management are universal, which indicates their application in the context of the development of territorial and local management objects. The essence of the territorial object of management is disclosed in the scientific article of T. N. Yakovleva (2007). The object of territorial management is a generalized term for a device or dynamic management process, limited to a complex structural representation and reflecting several levels of administrative and economic organization. This definition is supplemented by the typology of Yu. V. Gusev and T. A. Polovova (2020), who studied the territorial object in the context of the following types of change management:

1. According to the territorial administration: the federal level, the level of the subject of the Russian Federation, and the municipal level (Bolshakova et al., 2020);
2. According to the division of economic systems: the economic system of the Russian Federation, regional economic system, and municipal economic system (Dugarzhapova & Zhalsaraeva, 2020);
3. According to the level of socioeconomic development of the territories: territories with the developed economic system, territories with average economic potential, and territories with low economic potential;
4. According to the problem characteristics of the territorial development: backward (underdeveloped) territory, depressed territory, and crisis territory (Gusev & Polovova, 2020).

The highlighted classifications allow us to conclude that the mechanism of change management in the region from the position of the territorial

object is based on the aspects of strengthening the role of the internal component by means of highlighting the features of the administrative and economic unit. The local feature of the change management cannot be attributed to the study of the region. In this case, the formed mechanism allows providing a system of organizational development rather than a territorial object. According to the criterion of innovation and marketing component, the mechanism of change management in the region should manifest itself through multifunctionality and diversity of application (Bashminov, 2013; Chepik & Gracheva, 2020; Meyer et al., 2010). In accordance with this statement, the innovation and marketing mechanism of change management in the region should reflect the following:

- Completeness of the content and consistency of the application of species classification (Fedko, 2021);
- Elements of planning, organization, and control of the change management (Shirinkina, 2020);
- Availability of standard problems to be solved through a comprehensive algorithm of actions (Poberey & Ermolaeva, 2020);
- Content of the rules and principles that correspond to the internal content of the region and reflect the peculiarities of the development of the external environment (Filushina, 2020).

The presented characteristics regulate the innovation and marketing mechanism of change management in the region through systematic and comprehensive manifestations. The establishment of differentiation of innovation and marketing mechanism of change management in the region within the definition of tasks will allow considering this tool from different positions. Thus, let us form the innovation and marketing mechanism of change management in the region from the position of cyclicity, rule setting, change planning, and equilibrium management.

Figure 11.1 shows the schematic reflection of the innovation and marketing mechanism of cyclic change management in the region. The essential components of the innovation and marketing mechanism of cyclic change management in the region are as follows:

- Potential – a set of opportunities and actions manifested through innovation and marketing tools and approximated in the context of existing contradictions;
- Contradiction – a formal representation of the problem situation denying the presence of provisions for the existence of a negative situation but requiring the implementation of changes through the innovation and marketing component;

- Internal environment—a set of structural elements that reflect the structure of the management object through the innovation factor;
- External environment—a set of factors and attributes within which the region develops and deforms under the influence of marketing tools.

The highlighted components of the innovation and marketing mechanism of cyclic change management in the region are antipodes (potential-contradiction, internal environment-external environment). This oppositeness creates a process of cyclical variation in the problems

Figure 11.1

Innovation and Marketing Mechanism of Cyclic Change Management in the Region

	Potential	External Environment
	Internal problems (affecting innovation)	External problems
Growth	Optimization of the innovative criteria of the internal environment. Changes come from the internal and external environment. Over the long term, the management system remains stable through innovation. The dynamics are within the innovation management system.	Use of marketing tools: conducting diversification and engineering of the management system; making radical decisions; adapting to internal and external changes. The emergence of a systemic problem situation.
Stagnation	Adapted changes are the main source of transformation of the management system. Unstable development of the management system of innovation. Transition to sustainable development through change. The policy of potential increase in innovation.	Use of marketing tools: crisis management. Change management is forced. There are significant contradictions between the internal and external environment.
	Internal environment	Contradictions

Source: Compiled by the authors.

within which innovation and marketing changes are carried out. For example, contradictions require change, and capacity contributes to the solution of these contradictions. The internal environment adapts to innovative changes. The external environment creates innovative changes through marketing tools.

The external form of the innovation and marketing mechanism of cyclic change management in the region is based on a matrix that accumulates the quadrants of class change. Comparing the innovation and marketing mechanism of cyclic change management in the region with a comprehensive one, it is worth noting its situational and process orientation. The structural elements of the innovation and marketing mechanism of cyclic change management in the region are functions, processes, and connections. These elements allow us to distinguish the cyclical characteristics into the following groups:

- Growth with internal problems;
- Growth with external problems;
- Stagnation projected through internal problems;
- Stagnation projected through external problems.

The focus of these quadrants of class change is reflected quite clearly.

The first quadrant is growth with the presence of internal problems. The highlighted quadrant of changes is formed in the conditions of sustainable development of the region and a favorable environment of external changes. Sustainable development of the region is conditioned by the dynamics of innovation potential, reflecting the priority areas of implementing external activities. The implementation of changes within this quadrant is necessary to coordinate and solve the internal problems of the region.

Changes can come from internal and external environments. The variation of the selection of changes for solving existing problems is carried out purposefully and in a balanced manner. This aspect is due to the fact that the management system maintains its stability over the long term. The preference in solving problems is given to the internal capabilities of the region. The region must adjust to the changes being implemented on its own.

The second quadrant is growth with the presence of external problems. There is no stability of the management system in this quadrant. The emerging problematic situation is systemic. The systemic nature is due to the negative reflection of the conditions of development of the external environment. The dynamics of the region's potential produces solutions to systemic problems through the following innovation and marketing tools:

- Diversification of the problem—expanding the methods of solving the problem by changing the goal and the benefits of the result;
- Reengineering of the problem situation—rethinking and reformatting the approaches to solving the stated problem based on a variety of internal and external potentials;
- Integration of positive changes—combining important structural parts of the changes that contribute to the solution of the stated problems.

One of the features of innovation and marketing tools is the ability to adapt the region to change. The systemic nature of the problems is comparable with the need to apply radical solutions during the emergence of internal and external problems.

The third quadrant is stagnation projected through internal problems. Compared to previous quadrants, the region is stagnating, which is provoked by internal problems (above all, a lack of innovation). Stagnation is the state of an object marked with stagnant processes of a depressive nature. Change management is adaptive. The adaptability of change management is associated with the transformation of the management system in a period of an unstable and depressed state.

The goal of change management in the third quadrant is to move into the sustainability sector. Accordingly, a policy of potential buildup is used. This policy consists of identifying the region's weaknesses and strengths. The highlighted features are substituted. A change management plan is formed in the context of the weaknesses identified. The third quadrant does not completely transform the region's weaknesses but only minimizes their effects by introducing changes.

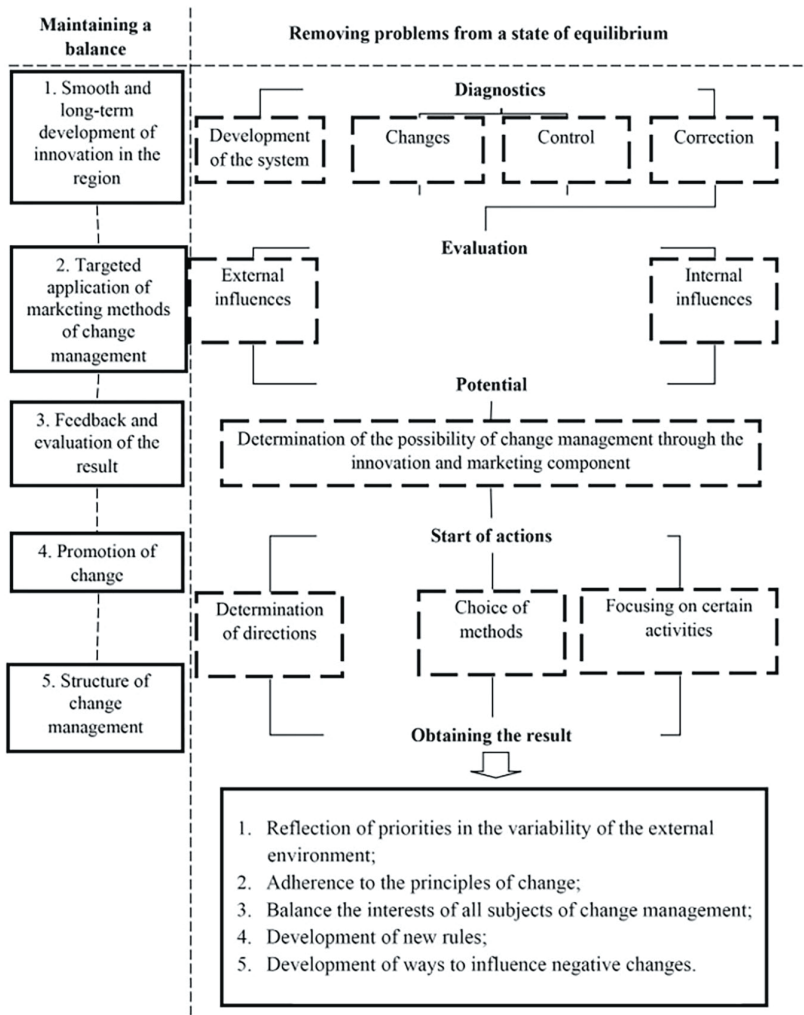
The fourth quadrant is stagnation projected through external problems. This quadrant reflects the fatalistic direction of stagnation in the region. In the context of this quadrant, the region is subject to serious systemic problems that affect innovation and stop the application of marketing tools. The use of innovation and marketing mechanisms of cyclic change management in the region is forced. The management situation formed in the fourth quadrant expresses an anti-crisis nature. This thesis is related to the fact that the presence of internal and external problems entails the deformation of the region and the possibility of fatalistic changes.

In this aspect, change management is related to the implementation of two conditions: the introduction of innovation in the structure of the internal elements of the management system of the region and consolidation of marketing tools to identify volatile factors of the negative impact of the external environment. The tool for implementing these conditions is the anti-crisis plan.

Innovation and marketing mechanism of equilibrium management of changes in the region is associated with the establishment of equilibrium between the stable state of the object of management and the changes carried out in it (Figure 11.2).

Figure 11.2

Innovation and Marketing Mechanism of Equilibrium Change Management in the Region



Source: Compiled by the authors.

In accordance with this setting, the developed innovation, and marketing mechanism of equilibrium change management in the region is divided into two constituent parts: the observance of balance and the removal of problems from a state of equilibrium. The presented setting was used to form the model algorithm, projecting the action to create conditions for change and solve problems based on the innovation and marketing component. Let us consider these constituent parts separately.

The aspect of balance in the innovation and marketing mechanism of equilibrium change management in the region includes five stages. These stages reflect the structural elements of the region, which should remain invariant in the face of changes in the problematic aspects. These elements are as follows:

1. Smooth and long-term development of innovation in the region. It is assumed to reflect the aspect of declaring innovation in the strategic plans and concepts of the guaranteed level of regional development;
2. Targeted application of marketing management methods. It is assumed to use the most adapted marketing methods of change management allowing to obtain the planned result in the region's activities;
3. Feedback and evaluation of the result. It is assumed to form a system of effective feedback regulating a reliable representation of the final result of the activities in the region;
4. Encouragement of changes. This element involves the creation of motivational conditions for a proactive approach to change on the part of the subjects of management of the region;
5. Structure of change management. It is assumed to form a separate structure for transforming problem situations and creating changes within the region.

Prerequisites of the above elements on the balance in the innovation and marketing mechanism of equilibrium change management in the region are formed based on elements of the internal environment, which are in a state of stable equilibrium. These elements include the management system, management structure, methods and motivational tools, and feedback between the subjects of management of the region.

The second part of the innovation and marketing mechanism of equilibrium change management in the region is removing problems from the state of equilibrium. This part reflects the structural features of the complex management mechanism, including resources, processes (actions), and results. Removing problems from a state of equilibrium occurs based on the diagnostics of the system of management of the region, changes,

control, and corrective measures. Diagnosis of the presented elements forms information that later serves as analytical data to solve the stated problem. The key feature of the innovation and marketing mechanism of equilibrium change management in the region is that the use of tools aims to identify the conditions and factors contributing to the development of the problem.

Identification of the factors and conditions for the development of the problem initiates several priority activities solving these problems. The implementation of measures to eliminate the problems requires resources. The launch of actions in the innovation and marketing mechanism of equilibrium change management in the region involves identifying problem areas, which will attract the attention of the subjects of the territory's management. Methodology for the introduction of changes is determined by the subjects of management depending on the degree and scope of the problem. After implementing changes, the result of innovation and marketing mechanism of equilibrium change management in the region is formed. The result is the development of rules of conduct. This group of rules can include the following:

- Reflection of the priorities of the variability of the external environment;
- Compliance with the principles of change;
- Establishing a balance of interests of all subjects of change management;
- Development of rules for the development of the object of management and ways to influence negative changes.

Innovation and marketing mechanisms of equilibrium change management in the region cannot be attributed to the complex one. Resources and processes (manifested in the form of actions) are replaced by the lack of criteria, methods, means, and factors. Despite the available result, the equilibrium change management mechanism does not reflect the patterns of process control between internal elements.

DISCUSSION

Thus, the highlighted types of innovation and marketing mechanisms of change management in the region allowed to formulate a universal approach in different areas of development of the Russian subjects. The innovation and marketing mechanism of cyclic change management in the region aims to solve internal problems based on the allocation of criteria

for the development of the territory. The innovation and marketing mechanism with the establishment of rules in managing regional changes highlights norms and requirements as critical tools for the development of territories. Innovation and marketing mechanism for planning changes in the region establishes the importance of applying the aspect of planning based on compliance with clear regulations of the algorithm. Innovation and marketing mechanism of equilibrium change management in the region determines the focus on activities to identify priorities in the development of the external environment, principles of change, and the balance of interests of subjects of change management and development of new rules. Applying a set of innovation and marketing mechanisms of change management in the region will lead to a more comprehensive elaboration of the issues related to modern tools in the context of regional management. On the other hand, it will create a pool of activities aimed at elaborating innovation and marketing postulates in environmental transformation.

CONCLUSION

Our research on the topic of innovation and marketing mechanism of change management in the region has formulated the following conclusions:

1. Innovation and marketing mechanism of change management in the region is a toolkit that allows one to revise the idea of the elements contributing to territorial development. Innovation and marketing mechanism of change management considers the region as a system consisting of internal and external environments. The internal environment is subject to changes caused by innovation processes. The external environment is regenerated based on marketing tools contributing to the solution of management problems in the region.
2. Formed types of innovation and marketing mechanism of change management in the region are focused on compliance with the conditions of territorial development associated with cyclicity, rule-setting, planning, and equilibrium management. The combined use of this toolkit allows, on the one hand, to determine the importance of the innovative component in the aspect of regional development and, on the other hand, to focus attention on the importance of change management. This condition produces a theoretical and practical perception of the study of innovation and marketing mechanisms of change management in the region.

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CHAPTER 12

SYSTEM OF RESPONSES TO THE INNOVATION-MARKETING COMPONENT OF THE REGION DEPENDING ON THE LEVEL OF REGIONAL DEVELOPMENT

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ABSTRACT

The lack of a system of reactions within regional studies diminishes the significance of the existing tools and, as a result, causes imperfections in the strategic plans for regional development. On the one hand, the innovation-

marketing component allows ensuring the proper level of regional development, and, on the other, it allows focusing on the priority measures of the strategic plan at each of its stages. Studying the level of regional development requires prioritizing the innovation-marketing component, which allows generating proposals for solving current and long-term regional problems. This task is facilitated by a system of reactions to the innovation-marketing component of the region that depends on the level of regional development. This study aims to create such a system. The research methods include: (1) forming our conclusions; (2) accumulating information; (3) classifying and grouping data; and (4) graphical representation. We achieved the following: (1) identified the levels of regional development based on the socioeconomic status of the region; (2) created a system of reactions to the innovation-marketing component of the region that depends on the level of regional development; (3) concluded that marketing subcomponent is vital for the under-developed regions (depressive, problematic) and the innovative subcomponent—for the developed regions (average, affluent).

INTRODUCTION

The increasing role of transformation processes at the regional level creates the conditions for implementing the innovation-marketing component. The innovative component of the region is determined by the application of science and technology in various branches of the regional economy. On the one hand, the innovative subcomponent serves as a foundation for innovative industries (Lado et al., 2004) and, on the other, promotes the digital development of the region. The marketing component is declarative; it determines the place and role of the region on the markets of goods and services (Blalock, 1993). Therefore, the innovative subcomponent models the internal environment of the region, while the marketing subcomponent acts as a stand-in of the region in the external environment.

To date, no system allows for the development of the innovation-marketing component of the region depending on the level of development of the territory. This fact is caused by the following factors:

1. Weakened role of the innovation-marketing component compared to the conceptual principles of regional digitalization (Sheikhova & Efa, 2020);
2. Narrow differentiation of the regional development level: depressive or stable (Bogdanova, 2018; Volkova & Tinyakova, 2013);
3. Regional authorities that fail to understand the principles of the innovation environment, and in some cases, ignore the intermediate stages of development of regional development

- (modernization, knowledge economy, innovation policy, etc.) (Chechelashvili et al., 2004);
4. Addressing only the brand parts of the marketing subcomponent (Tychinskaya et al., 2015).
 5. Lack of approaches to forming the innovation-marketing component adapted to the conditions of regional development (Bocharova, 2010).

The abovementioned factors determine the relevance of this study, which focuses on applying the system of reactions to the innovation-marketing component of the region, depending on the level of regional development. The identified fact allows us to examine the innovation-marketing component as a tool that contributes to regional development.

In this study, we aim to form a system of reactions to the innovation-marketing component of the region, depending on the level of regional development. The objectives of the study are based on the following:

- Identifying levels of regional development;
- Creating a system of reactions to the innovation-marketing component of the region depending on the level of regional development.

MATERIALS AND METHODS

The methodological basis of the study is based on the use of the method of systematic development. Its essence lies in the formation of our own conclusions (Grigoryeva, 2018) on the topic. In addition, we used other research methods: accumulating information, classifying, and categorizing data, and graphical representation (Davidov & Chekalina, 2009).

RESULTS

Gradations of regional development, represented in scholarly studies, are fairly diverse. The levels of regional development have fairly diverse differentiation associated with the author's studies of territorial issues. For example, the most general classification can be found in the article by M. V. Shendo and E. V. Sviridova—they divide regions by financial affluence into deficit, unbalanced, and balanced ones (Shendo & Sviridova, 2020). Other common classifications are based on investment inflows (critical, low, sufficient) (Pavlov et al., 2020); economic branches and specializations

(Lyashko et al., 2020); stages of regional growth (growing, mature, or declining region) (Shapovalova, 2020), and so forth.

However, in this study, we used the classification by N. N. Yashalova, N. P. Krylova, E. N. Levashov, which is based on the socioeconomic status of a region. This classification divides regions into depressive, problematic, average, and affluent ones (Yashalova et al., 2020).

The system of reactions is a mechanism of action that allows specifying measures of regional development through given influence elements. In this case, the influence element is the innovation-marketing component. The specific features of a system of reactions are the following:

1. Proposals in the system of reactions reflect the measures used for the development of a studied object. Applying this feature to the system of reactions, we note that a type of region embodies the directions that focus on change management and the improvement of the socioeconomic situation.
2. The system of reactions has a general character, differentiated based on decomposition measures, formed depending on the level of regional development. Therefore, the system of reactions includes all measures used for the development of a studied object.
3. The level of regional development differentiates the system of reactions. The level of regional development allows reflecting the result of changes, which depends on the innovation-marketing component.

Consequently, these criteria are based on categorizing a region into the following types: depressive, problematic, average, and affluent. In addition, one should consider the period of the regional development—the system of reactions is effective only for a certain period and in present regional conditions.

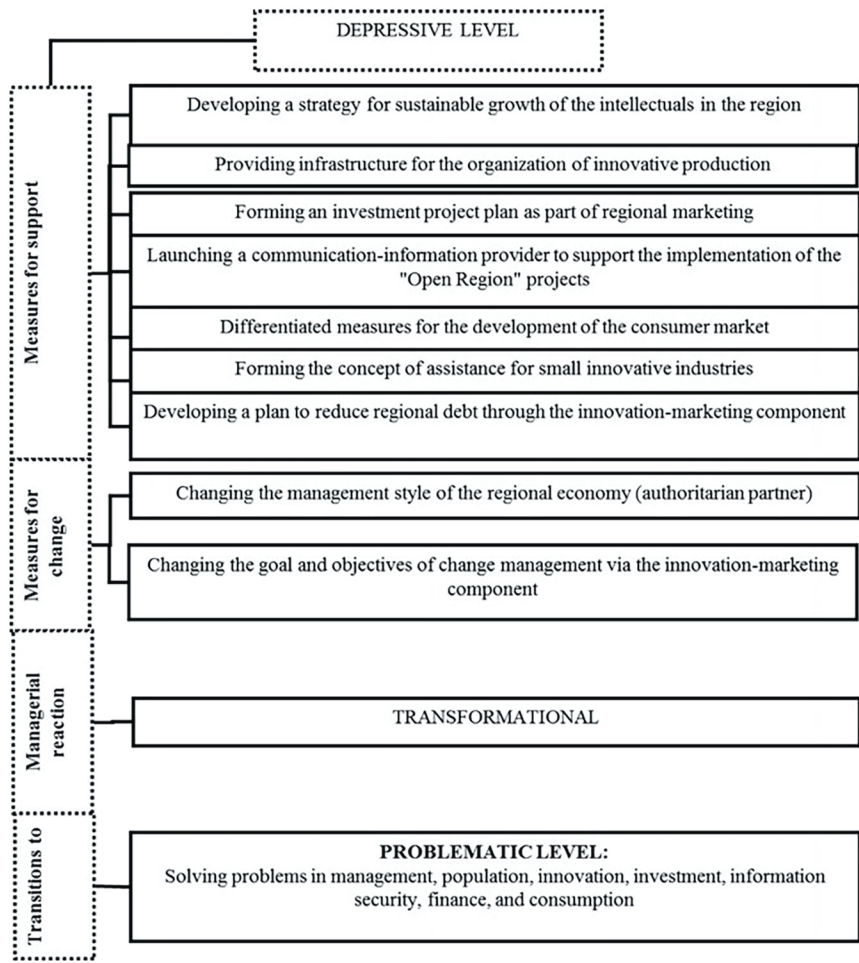
Below we will examine the measures and the implementation algorithm of the reactions for each level of the regional development. The transformational reaction is typical for regions with a depressive level of development (Figure 12.1).

According to Figure 12.1, the suggestions of transformational responses for a region with a depressed level of development are reflected in the following:

- Supporting measures modeled based on the change management in the region;

Figure 12.1

Measures Within the System of Transformational Responses to Changes in the Regional Environment



Source: Compiled by the authors.

- Measures that reflect the management style, internal structure, and parameters contributing to the transformation of the innovation-marketing component;
- Managerial reaction to the classification of the region;
- The level that the region must aim to transition to.

Transformational reaction implies the transition of the region to the problematic level of development. The primary condition of transitions is the progressive change of the situation in the regional development. Consequently, a region with a depressed level of development cannot use measures aimed at transitioning to the average level of development. The emphasis of the transformational response is on solving problems in the areas of governance, population demographics, innovation, investment, information security, finance, and consumption. These problems are solved with the help of measures for support (MFS).

MFS in the region of a depressed level are based on:

- Developing a strategy for sustainable growth of the intellectuals in the region,
- Providing infrastructure for the organization of innovative production,
- Forming an investment project plan as part of regional marketing,
- Launching a communication-information provider to ensure the implementation of “Open Region” projects,
- Differentiating measures for the development of the consumer market;
- Forming the concept of assistance to small innovative industries;
- Developing a plan to reduce the regional debt through the innovation-marketing component.

MFS are aimed at adjusting the current condition of the region. The transition to the next level of regional development is based on measures connected with changes in the environment. These measures are supported by changes in the management style and goals of the region via the innovation-marketing component. Transformational reaction provokes the “authoritarian partner” management style. It includes a clear separation of tasks and control over fulfilling a set goal, prioritizing territorial interests over other benefits. Additionally, this style indicates that regional authorities are not only strict controllers but can also serve as partners in priority projects. This kind of partnership is transparent and based on mutual assistance on the part of all actors involved in the innovation-marketing component of the region.

The measures within the problematic level of development are slightly different (Figure 12.2). The system of corrective response focuses on positioning the region to the average level of development.

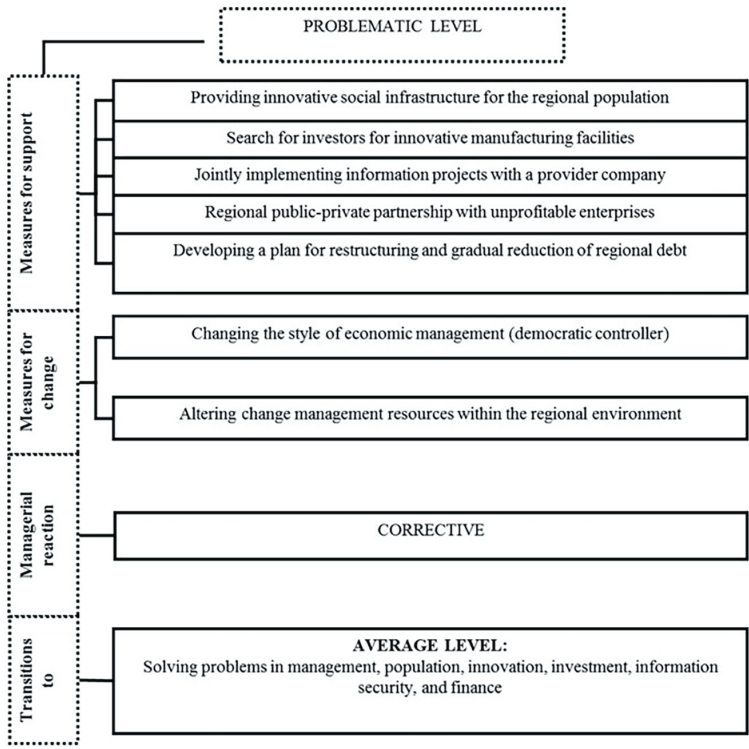
The highlighted MFS aim to balance the current state of the regional economy. In this case, an essential component is the changes associated

with a new management style and connected to resources required for regional needs.

The change in resources is related to the strengthened role of the marketing subcomponent. Therefore, the authorities form a system of tools that view the region as a territory of change. The toolkit allows forming a pool of regional agents that can develop the priority areas of a region in various ways. This, however, is not limited to simply finding financial resources—it also includes accumulating different resources and means within the region. We propose using the “democratic controller” management style in this case. The style reflects the proactive participation of regional agents in solving problem situations. The regional authorities act as overseers and supervisors, ensuring the achievement of objectives.

Figure 12.2

Measures Within the System of Corrective Responses to Changes in the Regional Environment



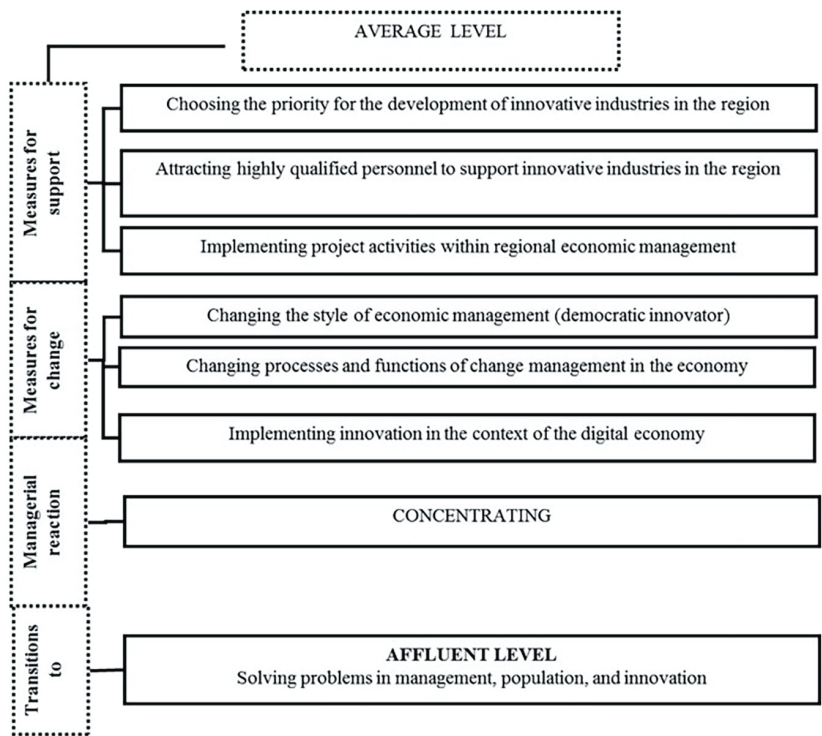
Source: Compiled by the authors.

The measures used for regions with an average level of development are presented in Figure 12.3. This level mainly focuses on the concentrating reaction. Problems that hinder the development of the region and its innovation-marketing component are eliminated by improving the areas of management systems, population demographics, and innovations. Solving these problems mainly presupposes the following:

- Choosing the priority for the development of innovative industries;
- Attracting highly qualified personnel to support innovative industries in the region;
- Implementing project activities within the region.

Figure 12.3

Measures Within the System of Concentrating Responses to Changes in the Regional Environment



Source: Compiled by the authors.

The number of measures in the concentrating reaction system is lower compared to other levels of regional development. These measures rely heavily on the innovation component due to a sufficiently high level of regional development. In addition to the highlighted MFS, accounting for changes is important for the region of an average level of development. The changes taking place in the regional environment are based on transformative measures: a new style of economic management (democratic innovator), and the processes and functions of change management. The “democratic innovator” style aims to implement the project function, forming the prerequisites for the digital economy. This management style can be based on the concept of a Smart City, adapted to the level of regional development.

According to this concept, the management style of the region emphasizes the unification of political and innovative elements within a single governing body. Despite the democratic nature of the style, compared to the corrective system of reactions (for problematic regions), it rejects many external and internal agents. This aspect allows paying closer attention to identifying the problematic areas of the innovation component, minimizing the external interference through the marketing component, and strengthening the role of the regional economy via digital developments. The system of stimulating responses is the most suitable for regions with an affluent level of development (Figure 12.4).

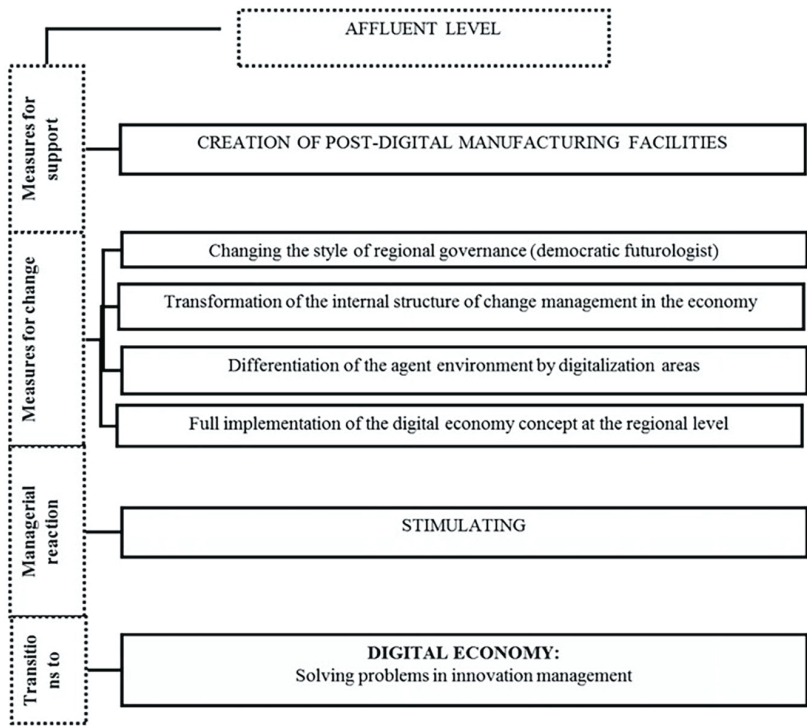
The transition to the next level of development in the context of this system is conditional and accompanied by solving problems in innovation management. The stimulating response partially projects the marketing strategy on the innovation area. The more stable the regional development, the stronger the role of the innovative subcomponent is. This removes the marketing subcomponent from the strategic agenda of the long-term functioning of the region. This feature is associated with strengthening the role of the national paradigm, which currently involves creating a common digital environment.

Measures in the system of stimulating response reject innovative actors, replacing them with post-digital production. This requires the following:

- Changing the style of regional governance to the “democratic futurologist” type, which will focus not on solving current problems but on creating the prerequisites for the long-term regional development;
- Transforming of the internal structure of change management in the economy towards reshaping each element of the regional environment;

Figure 12.4

Measures Within the System of Stimulating Responses to Changes in the Regional Environment



Source: Compiled by the authors.

- Differentiation of the agent environment by digitalization areas and rejecting “old school” type agents;
- Full implementation of the digital economy concept at the regional level.

DISCUSSION

The system of reactions to the innovation-marketing component of the region is quite diverse and depends on the level of regional development. First, regional development requires establishing the dominant role of the innovation or marketing component at different time stages. The levels

of regional development replace the marketing subcomponent with the innovative one in ascending order. This means that a region with an affluent level of development will not be economically efficient if the marketing subcomponent takes precedence over the innovative one. The presented systems of reactions allowed us to form a structure of measures that simplify the regional transition according to the implementation of proposals in the innovation-marketing component. The structure should be viewed as a differentiated one.

CONCLUSION

In this study, we came to several conclusions. First, the aspect of studying the levels of regional development features a rather large number of scholarly classifications that are based on the regional system of governance. In these studies, the level of regional development is differentiated by the financial component, inflows of investments, industrial specification, and theory of growth stage. However, the most comprehensive classification is based on the socioeconomic status of a region: depressive, problematic, average, or affluent.

Second, we created a system of reactions to the innovation-marketing component of the region depending on the level of regional development. This allowed us to form a set of measures that would improve the region's role in the external environment. We concluded that the innovation-marketing component should be highly differentiated. In the regions with a low level of development (depressive and problematic ones), the marketing subcomponent should be dominant, in the regions with a higher level of development—the innovative subcomponent. This feature stems from the fact that the penultimate goal of regional development is the transition to the highest level—digital society and digital economy.

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CHAPTER 13

NONSTANDARD FORMS OF EMPLOYMENT IN TERMS OF DIGITALIZATION

Russian Specifics

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ABSTRACT

The purpose of the work is to study the specifics of nonstandard forms of employment that arise as a result of the intensification of digitalization processes, as well as to analyze their development in Russia. The authors identified the impact of digitalization on the labor market and employment, as well as systematized nonstandard forms of employment. The authors found that new forms of nonstandard employment are characterized by an

increase in the share of part-time work, temporary work, self-employment, as well as the predominance of remote work and models of joint use of labor. The authors analyzed the development of nonstandard forms of employment in Russia and found that ICT-based mobile work and crowd employment (remote employment) are the most widespread in the country. The authors analyzed the impact of the COVID-19 pandemic on the demand for professions, changes in the forms and nature of relations between employees and employers. It is determined that the COVID-19 pandemic has created conditions for many employers to reconsider their approaches to organizing flexible employment, as well as to expand the sector of remote work and outsourcing. The article contains recommendations on the organization of effective work of the remote labor market in Russia.

Digitalization transforms the usual manner of public life, technological processes, and the nature of the organization of business activities. They are becoming more dynamic, technologically advanced, and flexible.

Radical transformations do not leave aside the labor market and the employment sector. Demand and supply in the labor market, organizational and content bases of work are changing.

There are completely new areas of labor activity against the background of the disappearance of some professions; the conditions of competition are becoming tougher. There is a need for more adaptive employees who can adjust to rapidly changing conditions. Access to the internet allows specialists to perform many types of work at a territorial distance from the employer and in a flexible time mode, which corresponds to modern technological needs and the economic interest of companies.

In addition, the intensive development of information and communication technologies creates technical prerequisites for the development of small, flexible industries, in-depth specialization, and outsourcing.

Thus, the study of the ongoing changes in the labor market and employment concerning the conditions of Russian reality is becoming increasingly relevant.

LITERATURE REVIEW

Digitalization processes have a significant impact on the labor market. This is shown in the works of researchers such as Frey and Osborne (2013), Sizova and Husyainov (2017), Sagina et al. (2020). Some authors point to the creation of a high-tech network environment that opens up new opportunities for organizing work and differentiating employment patterns (Frey & Osborne, 2013; Kenney & Zysman, 2016). Some jobs are not tied to one place and time, as well as new atypical forms of remote work, outsourcing, and self-employment on the internet, which increase the degree of social mobility of a person (Bracci, 1988; Pravkina, 2012; Sorokina,

2012; Strebkov & Shevchuk, 2009). Sorokina (2012) points to changes in the institutional framework of employment, namely, the emergence of temporary employment, part-time employment, and multi-party labor relations. This provokes structural shifts in professions and competencies (Sagina et al., 2020), as well as division of jobs into high- and low-skilled groups (Autor & Dorn, 2013; Goos et al., 2009). Kergroach (2017) also emphasizes that digital technologies allow fragmenting work tasks and simplifying the workflow, dividing it into smaller operations within a global digital production.

However, new job formats create a demand for a higher-skilled workforce that extends to all professional groups. In the new conditions, the employee is required not only professional competencies, but also systemic and creative skills, as well as abilities to work with large amounts of information, and digital literacy. There is a new phenomenon of “technological change based on skills” (Sizova & Khusyainov, 2017; Spitz, 2004).

Another effect of the impact of digitalization is an increase in labor productivity both at individual enterprises and at the macroeconomic level (Kergroach, 2017), however, the other side of this process is the opposition of human labor and automation/robotization, the likelihood of displacing a person by a machine (Brynjolfsson & McAfee, 2011)

METHODOLOGY

The purpose of the study is to determine the prerequisites for the emergence of nonstandard forms of employment as a result of digitalization, as well as to analyze their state and development in Russia.

Research objectives: (1) to reveal the impact of digitalization on the labor market and employment; (2) to identify the specifics of nonstandard forms of employment as a result of the intensification of digital processes; (3) to analyze the development of nonstandard forms of employment in Russia; (4) to investigate the impact of the COVID-19 pandemic on the development of nonstandard forms of employment in Russia.

Research methods: methods of logical and theoretical research (analysis, synthesis, comparison, generalization), methods of systematization, system method.

RESULTS

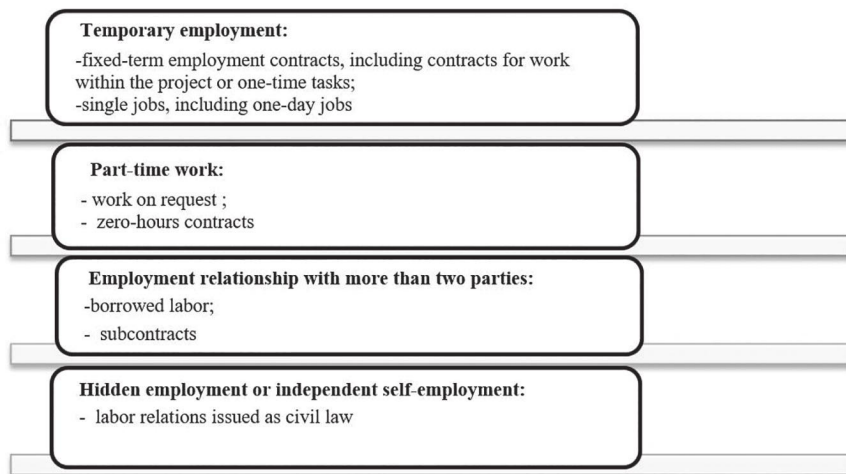
The Impact of Digitalization on the Labor Market and Employment

Fitzgerald et al. (2013), McDonald and Rowsell-Jones (2012), Collin et al. (2015) Gimpel and Röglinger (2015), Kane et al. (2015) point out that

the process of digitalization is associated not only with the transformation of analog information into digital information, but also has an impact on production processes, the nature of labor activity, and the social sphere. The researchers emphasize the stages of digitalization. The first stage is the digital economy emergence and the formation of separate segments of activities related to the use of digital technologies. The second stage, due to the global spread of the Internet to all spheres of public life, increases the requirement for the formation of skills for the widespread use of digital technologies and derivative changes in the labor market and employment. At the third stage, an effective institutional framework is formed for the developing digital economy and, in particular, for the transforming forms of employment and labor relations regulation (Alekseenko & Ilyin, 2018; Kulikova, 2018; Shmelev, 2018). Digitalization transforms the classical labor relationship and promotes the development of nonstandard (new, atypical) forms of employment—temporary employment, part-time work, labor relations with more than two parties, as well as hidden employment (Figure 13.1).

This understanding of nonstandard forms of employment is provided by the ILO (International Labour Organization, 2016). However, the Eurofund expands this view, pointing to the following forms of employment, which are rapidly developing in the context of digitalization (Eurofound, 2015):

1. Employee labor sharing, when several employers simultaneously hire employees and assume the relevant obligations. This form has two directions of labor sharing: strategic and one-time (temporary provision of labor to an employee who will later return to the employer (secondment) (Golovina, 2015).
2. Joint employment (job sharing, work-sharing)—a form of the employment relationship when an employer hires several employees to jointly perform one labor function for full-time work (Messenger & Ghosheh, 2013).
3. Interim management is a special form of employment when an employer “leases” its employees to other employers for a certain period to achieve a certain goal (solving specific managerial or technical tasks, providing qualified assistance in times of crisis).
4. One-time work (casual work)—a form of unstable and short-term work activity of a person when the employer does not provide regular work and resorts to the services of the employee as needed. One-time employment manifests itself in the form of intermittent work, on-demand work (on-call work), or zero-hours contracts (Eurofound, 2015; International Labour Organization, 2016).

Figure 13.1*Nonstandard Forms of Employment*

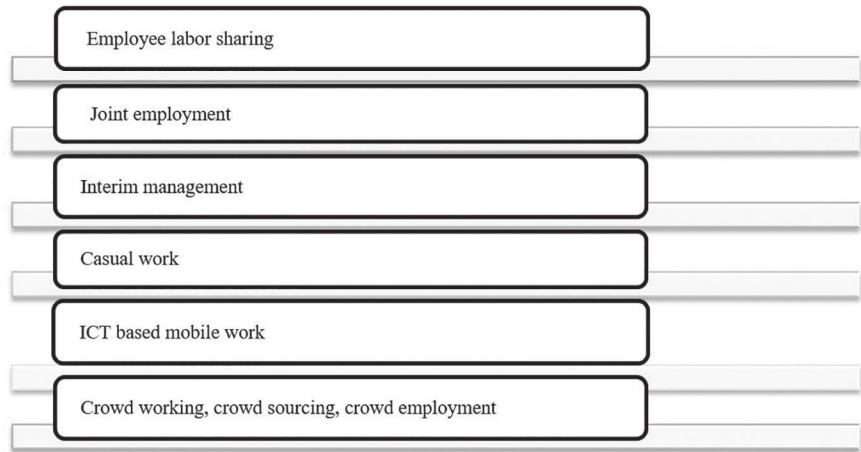
Source: Compiled by the authors based on International Labour Organization (2016).

5. Mobile work based on the use of information and communication technologies (ICT based mobile work) is a form of labor relations that involves the use of digital technologies to perform production tasks without being tied to the employer's office and is remote (Gerasimova et al. 2017; Vasilyeva & Shuraleva, 2016; Vasilyeva et al. 2016).
6. Crowdfunding, crowdsourcing, crowd employment—a form of labor relations implemented between an employee and an employer through a special online platform (Chesalina, 2017, 2018; Green & Barnes, 2013).

Both approaches to the systematization of nonstandard forms of employment reflect changes in the labor market, but the second approach is more in line with the conditions of digitalization. Indeed, the growth of nonstandard employment is one of the characteristic features of the flexibility of the modern labor market, since the patterns of structural changes, the requirements of employers, and in some cases, employees, contributes to an increase in the share of part-time work, temporary work, and self-employment (Merkusheva, 2020).

Figure 13.2

Nonstandard Forms of Employment in Terms of Digitalization



Source: Compiled by the authors based on Eurofound (2015)

Development of Nonstandard Forms of Employment in Russia

Research on new nonstandard types of employment is complicated by the lack or incompleteness of official statistics on nonpermanent, part-time, remote work, and other groups. Nevertheless, new trends in changing the nature of labor employment in Russia are already noticeable.

1. Employee sharing is a form of labor relations involving the creation of a network of customers who enter into civil contracts with service providers or contractors (Faduilhe, 2012). In Russia, this form of employment is not legalized, and if it is detected in court, the employer is subject to administrative responsibility (Labor Code of the Russian Federation No.197-FZ, 2001; The Code of the Russian Federation on Administrative Offenses No. 195-FZ, 2001). In practice, the manipulation of the corporate plurality of the employer is widespread: a group of legal entities and/or individual entrepreneurs, united in a single corporate group, enters into employment contracts from one or more persons belonging to this structure (Lyutov, 2016). One-time labor sharing involves the employer temporarily being unable to provide work to its employees and sending them to work in

another company while maintaining the employment contract between the original employer and the employee. In Russian reality, such schemes are often used for abuse by entrepreneurs in relation to taxes and mandatory payments, when employees are registered in one legal entity of a group of companies, and work is performed for another legal entity. Thus, the profit of one of the legal entities is “lost” when paying for the services of another company (Lyutov, 2018).

2. Joint employment is a form of employment that involves the division of the position and the corresponding job responsibilities between two or more employees; this is one of the flexible working practices. This trend is typical for the United States and European countries (Laba, 2019). The most common forms of joint employment are job splitting (allocation of different areas of work within the same position between colleagues); job pairing (ensuring full interchangeability of employees while maintaining the range of responsibilities within the position). The advantages of joint employment for employees are access to responsible positions while maintaining part-time work; exchange of experience and ideas between people holding the same position; expanded professional networking due to the joint work of two or more people; optimal balance of personal and professional life. Companies benefit from implementing joint employment schemes, as they provide higher productivity and better solutions through communication between employees; economic benefits when paying one full salary to two employees; reducing the risk of employee burnout; the attractiveness of the company in the labor market, and promoting the employer’s brand. Currently, in Russia, only 12% of employers practice the organization of the work process based on joint employment, 53% of employees welcome this form of employment, as it creates opportunities for devoting the free time to personal and professional development, combining with other work (47%), devoting more time to family (37%) and hobbies (21%) (HR-TV, 2020).
3. In Russia, more and more companies are discovering the potential of interim management and attracting highly qualified experts with knowledge in various industries and many years of experience in solving the most difficult tasks in a limited time (Russland, 2021). The involvement of interim managers provides the company with flexibility and independence, optimizing the use of resources. The most common situations for attracting highly qualified managers with many years of experience in

managing companies and projects are launching new high-tech business lines; ambitious projects to optimize the business; implementation of business digitalization projects; managing business projects (time-limited tasks) and certain complex business processes.

4. Casual work is a type of employment under an oral or written contract that does not involve a long-term relationship in the future but is designed for a short period. In the Russian context, this type of employment includes employment under a fixed-term contract, work under a contract with leasing companies for the provision of temporary staff, contracts for the performance of a certain amount of work, replacement work and work on probation (Gimpelson & Kapelyushnikov, 2006).
5. As for ICT-based mobile work and crowd employment, in Russian conditions there is some confusion of these categories of employment, and equating them with remote work carried out in a remote format using the Internet and online platforms.

Despite the presence of certain obstacles in the development of remote work in the Russian Federation, this type of employment has firmly occupied a niche in the labor market. This is evidenced by the study of remote (geographically independent) employment in the Russian Federation conducted in 2015 by Bitrix24 and J'son&PartnersConsulting. According to the report, digital technologies allow 45% of employees in the small and medium-sized business segment and 29% of employees in large companies to work remotely. They work remotely, mainly highly qualified employees with higher education, age category 26–42 years. The total economic effect of remote work across the country is estimated at 94 billion rubles per year. Businesses save on travel time, access to the workplace even during sick leave, maintaining an office space, and reducing labor costs by expanding the geography of hiring (Bitrix24, J'son&PartnersConsulting, 2015). A survey of managers of medium-sized, small, and large businesses in 15 regions of Russia that use a remote form of employee labor organization showed that today about 40% of employees work remotely from time to time, half of them work remotely permanently. At the same time, the amount of remuneration for remote workers corresponds to the remuneration of employees of traditional employment.

Previously, these forms of nonstandard employment showed a relatively low value in the total share of employment. However, the COVID-19 pandemic has contributed to the transition of organizations to more flexible forms of employment. For example, at the beginning of 2021, there was

a clear imbalance of supply and demand in the labor market in the IT industry. Developers, data analysts, and Internet marketers have become much more popular as a result of the pandemic, when businesses began to migrate massively online (Forbes, 2021). In addition, most technology companies have increased the salary of IT specialists in 2021, for example, Mail.ru Group, Kaspersky Lab, Megaplan, Samokat, Joom, and SkyEng. The increase in wages affected system analysts, SRE engineers, information security specialists, and data scientists. The COVID-19 pandemic has led to the rapid growth of the outsourcing and outstaffing market. In the context of the pandemic, growth was observed in such areas as accounting, information technology, and logistics. So, in particular, according to Global Finance, the demand for accounting services from March to April 2020 increased by 2.5 times (Buybrand, 2020).

The main categories of nonstandard employment in Russia are related to self-employment (Merkusheva, 2020). The share of self-employment in nonstandard employment is one of the indicators of the flexibility of the labor market, which corresponds to the growing processes of digitalization. So, according to official statistics in the Russian Federation in 2019, for 72,500 thousand people employed, 4.6 thousand people were self-employed. The results of a study by the Center for Socio-Political Monitoring of the Russian Academy of Sciences (RANEPA) in 2019 showed that the share of the self-employed in the total number of employed people in Russia was 22% (for main work—10% and additional work—12%). In numerical terms, this is about 16–17 million people (Pokida & Zybunovskaya, 2019). The self-employed are also at risk of negative impacts during the economic downturn, particularly the COVID-19 pandemic, as they, like workers employed in nonstandard conditions, are less likely to gain access to social protection systems due to the low degree of legalization in the labor market.

Thus, digitalization makes remote work the most common form of nonstandard employment in Russia. For the effective operation of the remote labor market, it is necessary to develop a better institutional framework, adopt laws that define and regulate the existence and development of the remote employment market, as well as mechanisms for its control. It is necessary to carry out the final formation of the remote employment market in Russia.

Thus, the formation of effective employment will be facilitated by taking into account the specifics and level of digitalization of the regions and sectors of the Russian economy while borrowing the advantages of foreign experience.

CONCLUSION

The authors investigated the forms of nonstandard employment that are associated with structural changes that occur as a result of digitalization, as well as new requirements of employers and employees. New forms of nonstandard employment are characterized, first, by an increase in the share of part-time work, temporary work, self-employment, as well as the predominance of remote work and models of joint use of labor. The authors analyzed the development of nonstandard forms of employment in Russian conditions. Among the forms of nonstandard employment in Russia, the most common is ICT-based mobile work and crowd employment, which is determined by the remote nature of work. The authors found that the COVID-19 pandemic has led to drastic changes in the Russian labor market: there have been significant changes in the demand for professions, working conditions, forms of relations between employees and employers, and the strengthening of the remote work sector. Recommendations on the organization of effective work of the remote labor market in Russia are formulated.

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TECHNOPARKS AS AN INTEGRATION ELEMENT OF INNOVATIVE INTERACTION

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ABSTRACT

The purpose of the study is to substantiate the prospects for enhancing the institutional innovative interaction of science, business, and the state through integration with the participation of technoparks.

Design/methodology/approach: To achieve this goal, the analysis of institutional barriers to enhancing innovative interaction and ways of overcoming them and a study of the relationship between the growth rate of R&D expenditures and the dynamics of export of high-tech products were carried out, the necessity of accelerating innovation activity with the help of technoparks was substantiated and the socioeconomic effects of this interaction were assessed. The methodological basis of the research is formed by deductive and inductive methods, structural and comparative analysis, systemic and interdisciplinary approaches, methods of statistical evaluation. The empirical basis of the study is the official statistics of the OECD and the EU.

Findings: The study showed that the main factors constraining innovation processes include lack of funding, high cost of innovation and insufficient level of integration of business entities and institutional structures. The

authors substantiated the receipt of positive effects from integration interaction on the basis of technoparks. It was revealed that intensive financial support of innovative projects by the state could lead to their “freezing” due to the appearance of the effect of “relaxation in achieving the goal.” According to the results of the study, it was found that close integration on the basis of a technopark, the necessary infrastructure, and a combination of various sources of financing contribute to the rapid commercialization of technologies.

The current stage of economic development is characterized by the increasing role of knowledge-intensive industries. In developed countries, innovations are becoming a factor that determines trends in social development, creating the prerequisites for the formation of “Industry 5.0,” predetermining the directions of digital transformation, which become the basis of the best management practices.

In this regard, the issues of innovative interaction of institutional structures become especially relevant. In the context of this issue, special attention should be paid to the issues of technological, legal, economic, and social mechanisms of the integration interaction of economic entities. The listed mechanisms are actively implemented within the framework of technoparks, which act as an integrating element of innovative interaction.

The purpose of the study is to substantiate the possibility and prospects of enhancing the innovative interaction of institutional structures, such as science, business, and the state through integration with the participation of technoparks.

METHODOLOGY

Achieving this goal is associated with the need to solve a number of tasks: analysis of institutional barriers to the acceleration of innovative activity of enterprises and organizations and ways to overcome them; study of the relationship between the growth rate of R&D expenditures and the dynamics of exports of high-tech products; conducting cross-country comparisons of indicators of the effectiveness of public and private investments in R&D based on an assessment of the impact of the growth rate of the share of public funding for R&D on the growth of exports of high-tech products; substantiation of the need to activate institutional interaction with the help of technoparks and an assessment of the economic effects of this interaction.

The empirical base of the study was statistical data from the OECD, EU, World Bank. The authors’ calculations to determine the above dependencies and determine the degree of influence of integration ties on the change in the share of enterprises introducing innovations were carried

out using correlation-regression analysis. The study used such scientific methods as deductive and inductive, structural, and comparative analysis, systemic and interdisciplinary approaches, the principle of ascent from the abstract to the concrete, methods of statistical evaluation.

The theoretical and methodological basis of the study is formed by the works of foreign authors, the most important place among which is occupied by the theory of innovative and evolutionary economic development and the concept of national systems.

Monograph by K. A. Bagrinovsky, M. A. Benediktova, E.Yu. Khrustalev “Mechanisms of Technological Development of The Russian Economy” on the formation and improvement of the mechanisms of scientific and technological development of the economy has a special theoretical and methodological significance for the research carried out among the works of Russian authors (Bagrinovsky et al., 2003). This chapter analyzes the system of relations between states, the scientific and technical sphere, and market forces on the basis of fundamental theoretical approaches and world experience.

The works of some foreign and Russian authors devoted to the development of technoparks deserve attention. In this context, it is advisable to highlight the article by Mammadov et al. (2018) on the tools for expert assessment of the effectiveness of innovative projects implemented in scientific technoparks, as well as the work of Pavel et al. (2019) on the development of the ecosystem of Russian technoparks. Various aspects of the transformation of the structure of technoparks abroad are analyzed by Al-Mubarak and Basler (2017).

The work of Nikolaidis et al. (2013) is devoted to the assessment of the role of technoparks as an accelerator of the region’s innovative development. Recommendations for the development of technoparks in Russia are substantiated in the article by Romanovich (2015), taking into account the best world practices.

The presented work is a continuation of a series of publications by the authors on this issue (Bylinskaya, 2020; Loginova, 2019; Lyadova, 2014; Polushkina, 2012; Zolotov, 2014) and is included in a series of articles on strategic planning of the innovative component of global economic development.

RESULTS

The authors analyzed scientific publications and statistical information within the framework of this study. In accordance with this, the following factors are identified as the main factors hindering technological innovation:

1. Lack of funds. The problem of insufficient funding was noted by 17.5% of organizations engaged in innovative activities in Russia and from 11.6% (Belgium) to 40.1% (Slovenia) of organizations operating in the EU in 2017.
2. The high cost of innovation. This factor was named as an obstacle to innovation activity by 16.5% of Russian organizations and from 9.9% (Italy, Norway) to 31.1% (Croatia) of firms in the European Union.
3. Underdeveloped cooperation ties. The problems of integration interaction concern on average 7.7% of innovative enterprises in the EU countries; this problem is significant only for 1.8% of innovation firms in Russia.

In this regard, the problem of financing innovative activities is considered the most important and does not lose its relevance. The calculations carried out by the authors of the study show that the growth rates of expenditures on research activities in 2013–2017 directly affect the growth of innovation activity of national enterprises (correlation coefficient 0.547). The greatest effect from the increase in funding was demonstrated by the Czech Republic (1.58%; 13.10%), Portugal (3.03%; 12.42%), Latvia (4.92%; 16.07%), Iceland (29.94 %, 49.18%), and Republic of Korea (14.68%; 22.04%) (OECD.Stat., 2021; World Bank, 2021)

There are three main agents among the sources of R&D funding—government, business, and charitable organizations. Each financial agent has certain goals and objectives of financing innovative activities; he is guided by his own criteria and priorities when investing capital and, therefore, receives a different effect.

Public funding is mainly directed to R&D related to basic science and strategically important research, which require significant financial investments and imply a long payback period. This is confirmed by the insignificant negative correlation between the growth rates (2013–2017) of the share of government funding and the growth rate of the share of exports of high-tech products (the correlation coefficient is -0.0692) found by the authors. Intensive financial support of innovative projects by the state often leads to their “freezing” at the stage of development and the emergence of the effect of “relaxation in achieving the goal.”

Business directs financing to those innovative projects that can be commercialized, which is demonstrated by a direct and closer relationship between the growth rate of the share of private financing and the growth rate of exports of high-tech products (correlation coefficient is 0.385) than with public financing. The highest efficiency of private spending on research and development, according to the author’s calculations, is demonstrated by such countries as the Republic of Korea (1%; 22.4%),

Latvia (2%; 16.07%), Iceland (9%; 49.18%) and Russia (5%; 6.69%) (OECD, 2021; World Bank, 2021)

The problem of stimulating innovation in the context of the difference in the spheres of interests of the state and business involves the creation of a mechanism for attracting private capital with the support of the state. Technoparks act as such a mechanism, on the site of which the process of optimizing the distribution of the burden of costs for innovation takes place.

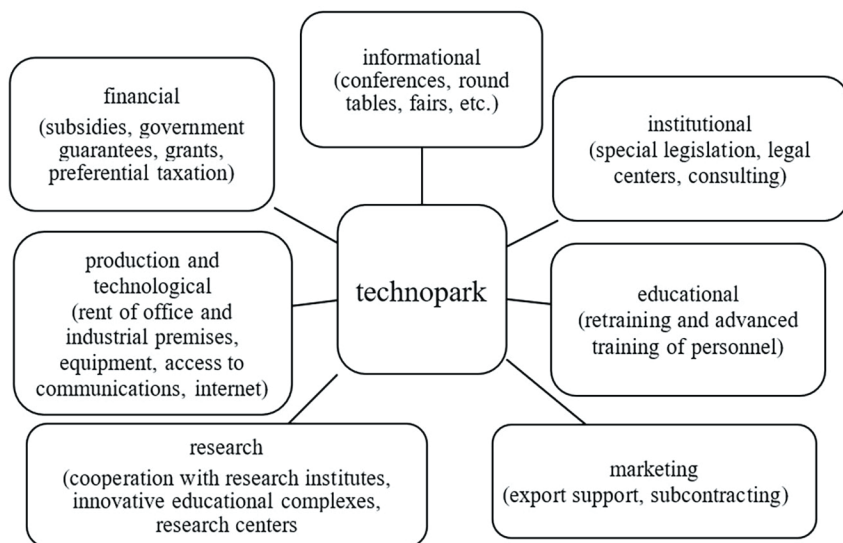
In addition to state financial support for innovative enterprises, technoparks act as a platform for close integration of economic entities with other participants in the innovation process. Expansion of cooperation, cooperative ties, and the development of various forms of partnerships when introducing innovative products to the market has a positive effect on the indicators of innovative activity.

Organizational factors, which are implemented using the infrastructure of the technopark, play a significant role in successful integration (Figure 14.1).

The results of the analysis of statistical data from the EU member states indicate a positive relationship between the share of organizations

Figure 14.1

Types of Support Provided to the Residents of Technopark



Source: Compiled by the authors.

participating in joint innovation projects and the share of innovative products. The correlation coefficient was 0.33 for all EU countries and 0.45 among the most developed countries according to 2018 data. In the world economy, in terms of the share of innovative firms implementing joint innovations, the leaders are the United States (73.2%), Great Britain (69.3%), China (65.1%), Estonia (57.5%), Austria (50, 2%), Greece (49.9%) (OECD, 2021).

Close integration of science, production, business, state support based on the technopark, as well as the availability of the necessary infrastructure of various directions and the combination of various sources of financing contributes to the release of innovative enterprises from non-core activities, the rapid commercialization of technologies and the transfer of innovative goods to mass production in a short time.

Small and medium-sized businesses are actively involved in integration forms based on technology parks related to the implementation of innovations. Development of a new product, its commercialization, and launching to the market is often beyond the power of a small business alone; interaction within technopark structures promotes the exchange of experience and knowledge, generation of innovations. In Russia, for example, 92.7% of technopark residents are small and medium-sized enterprises (Bukharova et al., 2020).

The share of small and medium-sized enterprises innovating at their own expense decreased by 11.3% in the EU between 2012 and 2019. The number of small and medium innovation organizations partnering with other companies increased by 38.4%. To a greater extent, this is typical for Norway (+148%), Greece (+125.2%), Lithuania (+97.3%), Iceland (+66.1%), Finland (+59.1%), Estonia (+53.3%) (European Commission, 2021).

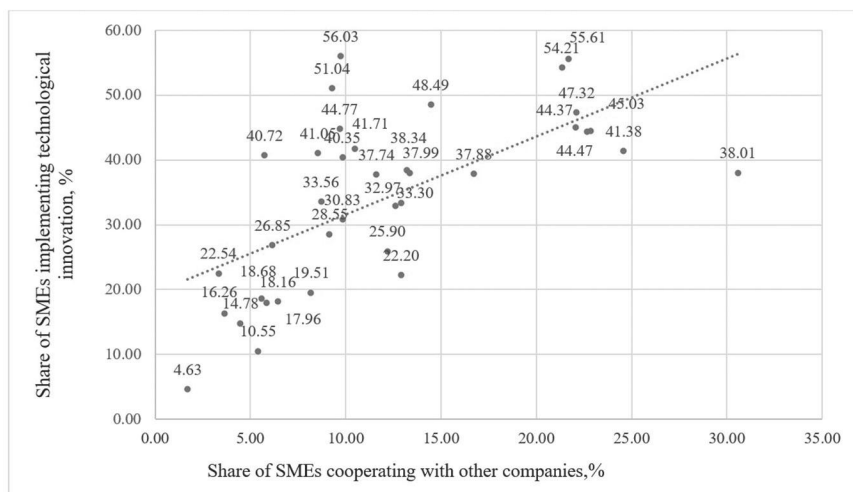
The effectiveness of technoparks has been proven by world experience, because modern infrastructure ensures the interaction of all types of capital (real, human, financial), and the combination of production, technological, scientific, organizational processes become the key to innovative development.

The relationship between the share of innovative SMEs collaborating with other companies and the share of SMEs introducing product or technological innovations (in % of the number of SMEs) is quite strong (Figure 14.2)—the correlation coefficient is 0.65. Further regression analysis showed that cooperation between enterprises is not the only factor that stimulates innovation, but nevertheless the influence of integration interaction on stimulating innovation activity is significant.

The number of technoparks is growing every year in all countries of the world. There were 179 technoparks in Russia in 2019. Among industrial

Figure 14.2

Impact of the Share of SMEs Cooperating With Other Companies on the Share of SMEs Implementing Technological Innovation



Source: Compiled by the authors based on the European Commission (2021).

technology parks, 29% are entirely state-owned projects, 61% are privately owned and 9% are mixed ownership [14]. It should be noted that the infrastructure of technoparks that are in a mixed form of ownership is used to the greatest extent—the occupancy rate is 84.93%, private technoparks are 70.35% full, state-owned—only 58.58%.

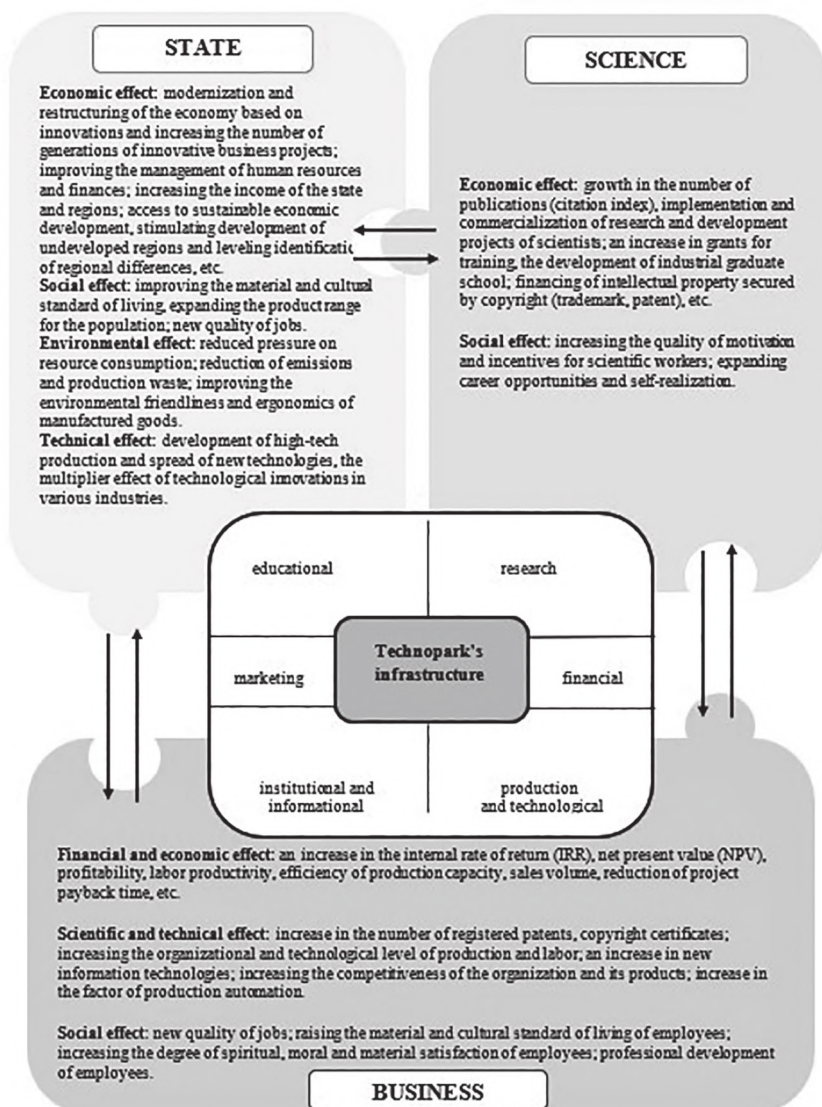
Socio-economic effects of integration within technoparks for the state, science, and business are presented in Figure 14.3.

CONCLUSION

It was possible to obtain a number of theoretical and practical results and conclusions based on the results of the study.

1. The possibility of enhancing the innovative interaction of science, the state and business has been substantiated, the mechanisms have been disclosed and the prospects for expanding the innovative interaction of science, the state and business through integration with the participation of technoparks are outlined.

Figure 14.3

Socioeconomic Effects of Integration Interaction Within Technoparks

Source: Compiled by the authors.

2. The analysis of institutional barriers to the acceleration of innovative activity of enterprises and organizations and ways to overcome them, carried out in this work, revealed that the key factor that hinders the growth of innovative activity in the countries under consideration is the high cost of innovations and the insufficient development of integration ties between economic entities.
3. The cross-country comparisons of indicators of the effectiveness of public and private investments in R&D carried out by the authors have confirmed that private investments have a more obvious and strong effect, manifested, among other things, as an increase in the export of high-tech products.
4. It has been substantiated that the key problem of enhancing innovation in the countries under consideration is the need to stimulate innovation activity by creating an effective mechanism for attracting private capital into the innovation sphere with the support of the state. Technoparks are the most promising elements of this mechanism.

The study of the relationship between the proportion of subjects participating in joint projects and the proportion of innovative products made it possible to substantiate the receipt of positive effects from integration interaction.

The conclusions that technoparks are an effective integrator of innovative interaction and stimulation of innovative activity were made on the basis of an assessment of the economic effects of innovative interaction between science, government, and business with the participation of technoparks.

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PART II

ACTUAL DIRECTIONS OF SUSTAINABLE SOCIOECONOMIC DEVELOPMENT OF RUSSIA AND ITS REGIONS

CHAPTER 15

REGIONAL E-COMMERCE IN THE PANDEMIC

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ABSTRACT

The COVID 19 pandemic has made a significant impact on the regular activities of retail enterprises and the consumer behavior of Russians. The changed economic conditions put many market participants in a state of deep shock; many of them cannot overcome the consequences up to the present. The article describes the results of a study of e-commerce trends for small and medium-sized businesses at the regional level (Kirov Region case study). The main goal of the study is to analyze the conditions and constraints the regional retailers had to face during the 2020 lockdown. The research methods used by the authors involved the statistical analysis, analysis of economic instruments, and data analysis. The study identifies the problems faced by the trade enterprises operating in the regional market, which are associated with the restrictions introduced during the first wave of the COVID-19 pandemic. It also determines the new economic tools used by the enterprises during the period in question. To describe the prospects for regional e-commerce, the article includes a forecast of development trends made based on of the expert

assessment. The marketing trends, which will dominate in the coming years both at the regional and national level, are identified.

According to Yandex-market (2020), Russia now ranks one of the World's Top-10 e-commerce markets in terms of size and growth rate. Interestingly, the market is growing not thanks to, but despite the generally unstable economic situation in the country (VAT rate increase, anti-Russian sanctions, projected tightening of the Central Bank monetary policy, a further increase in the key rate, etc.). However, it is still significantly smaller than that of the Western markets, accounting for about 4–5% of the Russian retail market. E-commerce growth in Russia can be attributed to solely an increase in the number of online shoppers, but not the number of their purchases.

Many types of trading activities today move to the internet. You can buy online almost anything, from household electric appliances to a handkerchief. Today, there is hardly any person who can imagine living without electronic gadgets or the internet. The online industry is developing at a tremendous speed causing a considerable impact on commerce. As a result, there is a new trend of electronic commerce developing all over the world. It refers to buying and selling goods and services wholesale and retail using the internet.

At the same time trading enterprises have to operate in conditions of an unstable market which is associated with a high level of competition, the lower income of the population, shifts in the demand and supply for goods and services, changes in consumer preferences, and restrictions on trade and trade-related businesses during COVID-19 pandemic. In this context, there is an urgent need for more research on consumer behavior trends.

MATERIALS AND METHODS

Studies by Bozhuk et al. (2019), Bozhuk and Pletneva (2018), Kataeva et al. (2017), Lysova et al. (2020), Savelyeva et al. (2019), Sozinova, Nabokikh, et al. (2019), Sozinova, Burtseva, et al. (2019), Sozinova (2018, 2019), Sozinova et al. (2017, 2018, 2019) are devoted to the issues of regional marketing.

Due to a difficult economic situation aggravated by the COVID-19 pandemic, studies on risk management including Karanina et al. (2017), Karanina, Loginov, et al. (2017), Karanina, Ilysheva, et al. (2017), Karanina, Sapozhnikova, et al. (2017), Loginov and Karanina (2017), Loginov, Karanina, et al. (2017) have become of great relevance.

There is a lot of academic research on the economic consequences of the coronavirus pandemic, namely Ataguba and Ataguba (2020), Dente and Hashimoto (2020), Sozinova et al. (2021).

In order to study the changes in consumer behavior in the context of the coronavirus pandemic, an analysis of the consumers' attitude to online and offline shopping was carried out. Online shopping is the process of buying goods using the internet (via an online store, a mobile application, social networks, etc.); offline shopping is a way of purchasing goods by visiting physical retail stores. The study was carried out during 2020. The information collection method used in the research is an online survey. In order to obtain reliable results, sampling quotas were calculated for the survey according to the statistical information about the Kirov Region ("Territorial Body of the Federal State Statistics Service in the Kirov Region," 2020), taking gender and age into account; the sample size was 431 people. To make comparisons, the authors used the data of the national survey conducted by the Organizing Committee of the conference for online retailers IDRF'2020 and Data Insight (2020).

The second stage was monitoring the trading enterprises of the region (Kirov Region) the main purpose of which was to evaluate the development of electronic commerce in general and to assess and compare the use of particular internet marketing tools before and after the pandemic. An online survey was conducted. The sample size was 100 trade sector enterprises with respect to their size and sector specifics.

RESULTS

The study results and the analysis of the attitude of consumers to online and offline sales have allowed identifying the following characteristics of the regional consumers and their buying behavior.

The Kirov Region residents, like most Russians, usually buy online such goods like clothes and shoes, electronics, and household appliances. Compared to the Russian consumer in general, the region residents buy online more cosmetics and perfume products, home repair products, children's goods, gifts, jewelry, and sporting goods. At the same time, they do online shopping for food, medicine, health products, and goods for animals to a lesser extent.

During the coronavirus pandemic, the regional online shoppers bought mainly clothes and shoes, cosmetics and perfume products, electronics, and household appliances. The following categories of goods were least purchased: gifts and jewelry, sporting goods, goods for animals.

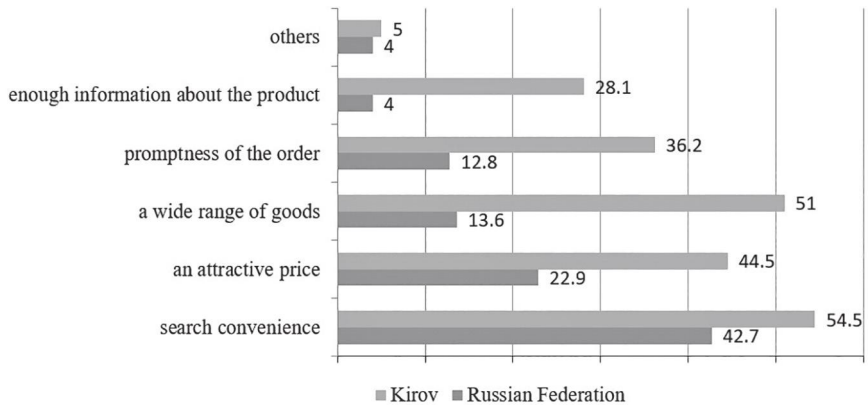
The study results suggest that food products, clothing and footwear, medicines, and health products were most in-demand during the pandemic at the country level. The online shoppers showed the least interest in purchasing the following categories of goods on the internet: home repair and improvement goods, gifts and jewelry, as well as sporting goods.

It is also possible to identify the changes that took place in online purchases during the coronavirus pandemic concerning gender and age. Overall, the number of goods purchased over the internet decreased, which is associated with a decrease in the purchasing power of the region residents during the pandemic caused by job cuts, salary reductions, and so forth. In terms of age, the situation concerning preferred product categories remained almost unchanged; as for gender factor, women did less online shopping for household goods, while men shopped more for food products.

The results of the study showed that more than 80% of both Russians and the Kirov residents make purchases over the internet. In this respect, it was important for our analysis to determine the advantages of online shopping, which were relevant for the respondents (Figure 15.1).

Figure 15.1

Respondents' Answers to the Question: What Is the Main Advantage of Shopping Online? / Russian Federation and Kirov, %



Source: Compiled by the authors.

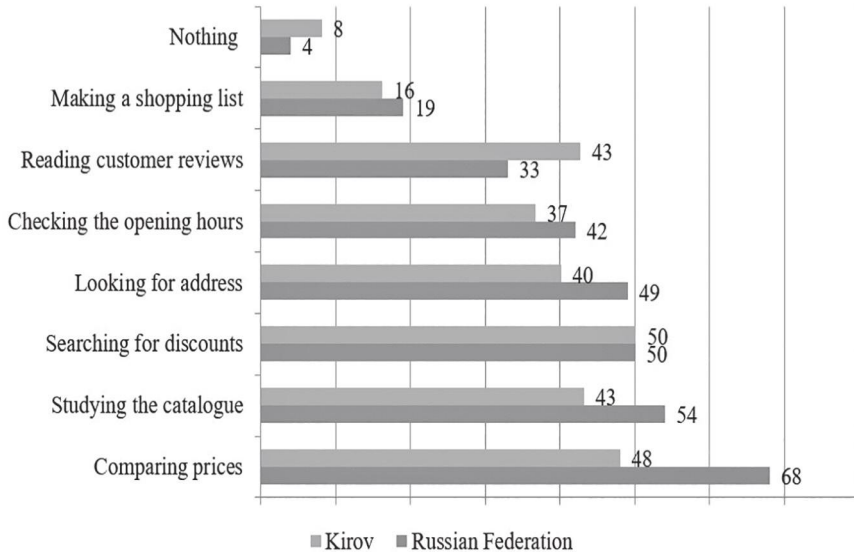
Fifteen percent of the Kirov Region residents experienced problems buying goods online, compared with 7% of online shoppers in Russia.

During the pandemic, some shopping was still carried out offline, not just online. Offline shoppers also use the internet, and they usually use the internet when making purchases in traditional stores for the following reasons, which are relevant to both offline shoppers in Russia and the region under study: checking prices (relevant to 68% of respondents in Russia and 48% in Kirov), looking through the catalog (54%—in Russia and 43%—in Kirov), searching for discounts (50% in both samples), looking for the store address (49% and 40% in Russia and Kirov respectively), and checking the opening hours (42% and 37% respectively). It should be noted that Kirov

residents, compared to Russians, use the internet less frequently when shopping offline (Figure 15.2).

Figure 15.2

Respondents' Answers to the Question: What Do You Use the Internet for When You Do Offline Shopping?, %



Source: Compiled by the authors.

According to expert opinions from different sources, Russian consumers take both the virus itself and its impact on their lives less seriously compared to other developing countries. However, 75% of respondents are pessimistic about the future of the Russian economy and fear a possible recession; 40% of them are not confident in their financial stability. Consumers in different regions of Russia are as well aware of the COVID-19 hazards as Moscow residents and feel even more anxiety despite the fact that the epidemic has affected them to a much lesser extent compared to the capital city. However, most respondents believe that the risk factor for being infected is higher among those attending entertainment events or traveling rather than buying food online or making other online purchases.

To analyze the regional trends in electronic commerce, a survey of enterprises was conducted; the profile of enterprises participating in the survey is presented in Figures 15.3–15.8.

Figure 15.3

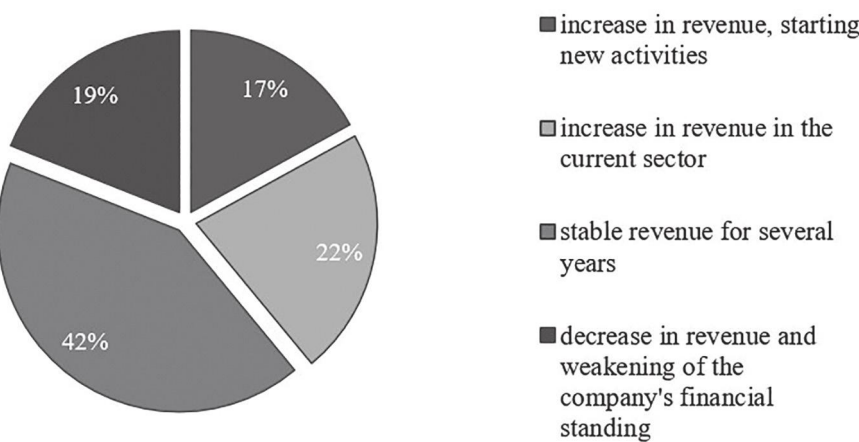
The Profile of Enterprises Participating in the Survey



Source: Compiled by the authors.

Figure 15.4

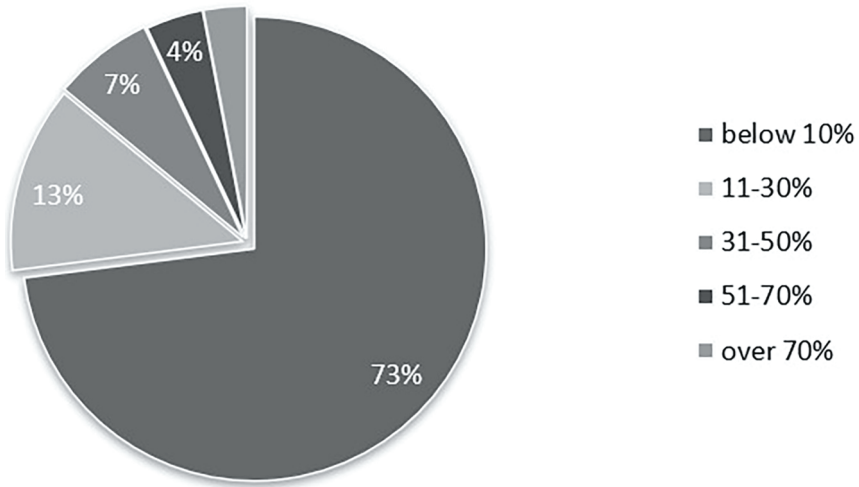
Enterprise Development Rates Before the Pandemic (Kirov Region)



Source: Compiled by the authors.

Figure 15.5

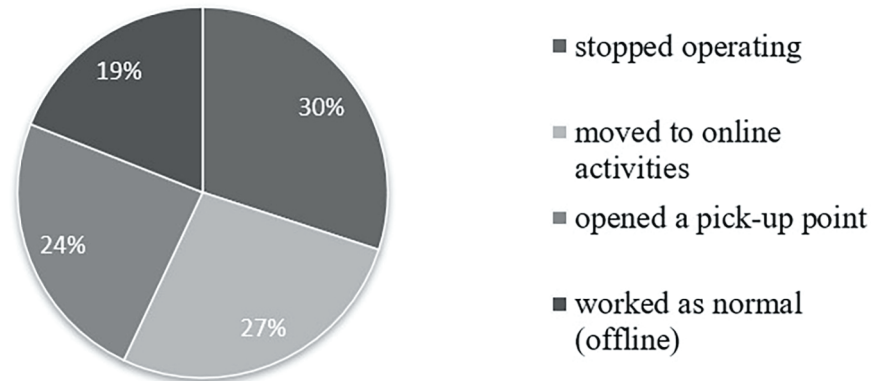
Internet Sales as a Percentage of Total Retail Sales



Source: Compiled by the authors.

Figure 15.6

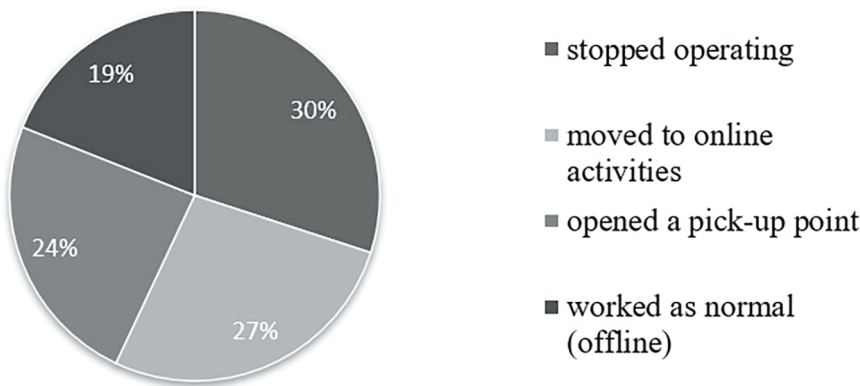
Impact of the Pandemic on the Operating Mode of the Enterprises



Source: Compiled by the authors.

Figure 15.7

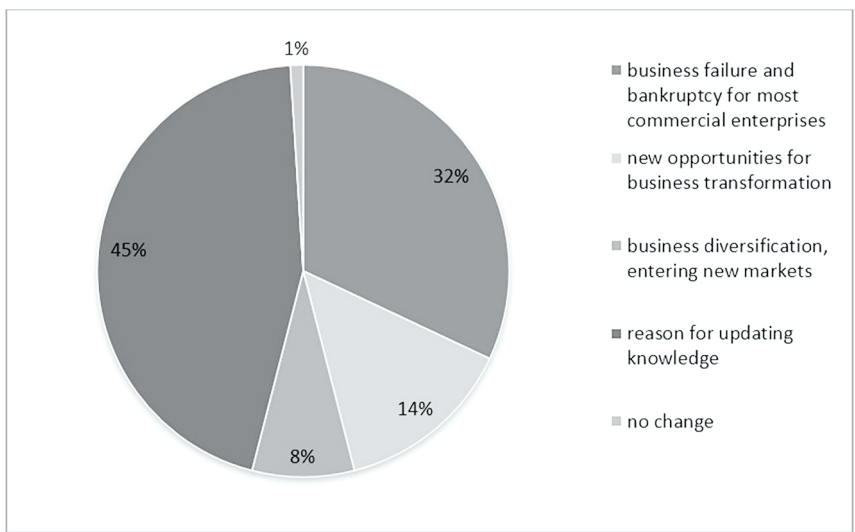
Evaluation of Revenue Changes During the CoronaVirus Pandemic



Source: Compiled by the authors.

Figure 15.8

Opinion About the Pandemic and Its Influence on the Development of the Enterprise



Source: Compiled by the authors.

Most of the Kirov Region enterprises that were surveyed had demonstrated quite steady performance before the pandemic started. In fact, until March 3, 2020, 42% of the enterprises had demonstrated stable development rates and gained steady revenues for several years; 22% of the enterprises showed an increase in revenue in their sector; 17% of them showed an increase in revenue and also started new activities; 19% had a decrease in revenue and weakening of their financial standing.

At the same time, the revenue growth was recorded for 77% of enterprises belonging to small businesses, 18% of medium-sized enterprises, and 5% of large enterprises.

On average, internet sales accounted for a small share in the total retail sales of small and middle-sized enterprises before the pandemic, which suggests their insufficient development and underutilization of modern online tools in marketing goods and services.

Before the pandemic, 79% of the companies had less than five offline retail outlets, which were mainly located in the shopping, and recreation centers.

The survey shows that the coronavirus pandemic had a great impact on the trading offline activities carried out in Kirov, practically paralyzing them.

Almost half of the companies (44%) reported a significant drop in revenues; only 6% of them managed to strengthen their competitive position.

It should be noted, however, that the range of goods and services remained practically unchanged, which indicates the lack of flexibility in the policy of most small and middle-sized companies.

Companies had to improve the existing tools for promoting their goods and services and to master new ones as traditional distribution channels did not function anymore, and multiple barriers and restrictions were imposed during the period from April to September 2020. Low-budget marketing was the most popular tactics; in particular, companies developed SMM and SMO services to communicate with clients (67% of the respondents), improved the website and introduced business intelligence tools (49% of respondents), opened an online store (31%), implemented chatbots (8%), developed a mobile application (8%), got access to marketplaces (6%). 11% of the region's small and medium-sized businesses did not make any additional effort hoping for the short duration of the introduced measures and restrictions.

The factors hindering the achievement of high-performance indicators in selling goods and services include the following:

1. The presence of large federal retail networks in the company's sector, and as a result, the ineffectiveness of the marketing tools used.

2. Lack of resources for business development.
3. Employees are not qualified enough to do online marketing, they do not have enough knowledge and experience in applying modern sales and marketing tools and strategies.
4. Consumers' insecurity about the future.
5. The continued drop in demand for many categories of commodities.
6. Fierce price competition in the online retail industry.
7. A product cannot be sold and promoted online (it is not inappropriate).

In order to solve the problems arising in 2019–2020 at the regional level, the government carried out a campaign to provide state assistance for small and medium-sized enterprises to help minimize the losses caused by the large-scale restrictions associated with the coronavirus pandemic in 2020. Thirty-eight percent of the enterprises surveyed participated in this program; however, the majority of them acknowledged that the measures lacked effectiveness. The average evaluation score of effectiveness given by the companies was 3.82 out of 5.

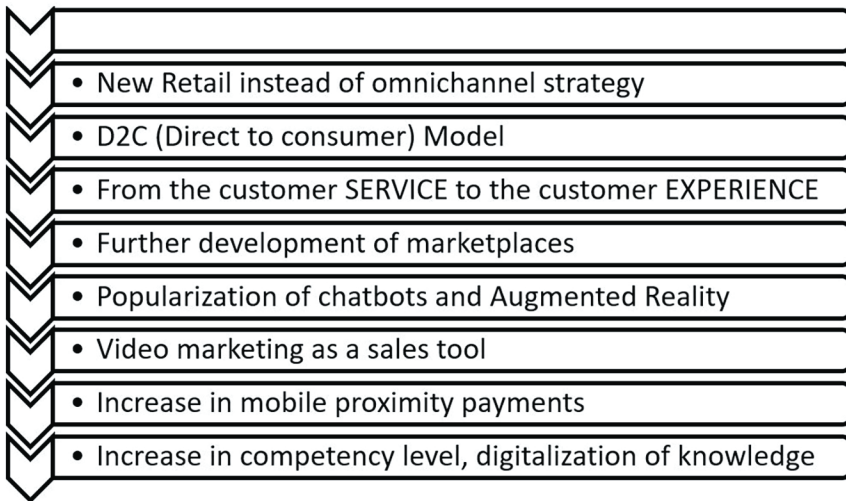
Trade enterprise managers assess the consequences of the changed economic conditions in the region very differently. Thirty-two percent of them admit that the pandemic means an economic collapse, 14% consider it a challenge and a trigger for business transformation representing a new stage in the company development, 8% see it as a reason for business diversification, and 45% consider it an incentive to acquire new knowledge.

To analyze the development prospects for e-commerce, an expert assessment of the opinion of managers of specialized enterprises and an analysis of economic forecasts in open data sources were carried out. The main e-commerce trends for the near future are presented in Figure 15.9.

DISCUSSION

The pandemic and lockdown gave a huge impetus to the development of electronic commerce in the Russian Federation, the Kirov Region, and other regions of the country.

The purchasing pattern of online shopping, before and after the introduction of restrictive measures, remains practically unchanged. The leading sectors are clothing, footwear, cosmetics, and electronics companies, as they received and still receive most online orders. The sales volume has changed; it has grown significantly, which is reported by both local stores and large marketplaces.

Figure 15.9*E-commerce Development: Forecasts and Trends**Source:* Compiled by the authors.

The sales of food and drugs also increased significantly after the introduction of the restrictive measures; these products rank the fourth and the fifth, although before that they were the fifth and sixth respectively. Although no sales restrictions were imposed on these products, it seems that consumers chose not to go to stores due to the fear of becoming infected.

Even those consumers who had not to buy anything on the internet before the pandemic began to purchase goods online and those who had had such experience before started to buy online more frequently.

However, the omnichannel infrastructure of the region's online stores is insufficient. Some companies use only social networks or an additional site, which does not always meet current requirements: they have no mobile version, a complicated and confusing user interface, and poor logistics services. SEO tools are often ignored due to the lack of understanding of how they work.

The coronavirus pandemic is likely to last for another two years, but it does not mean that no new threat may arise afterward. Therefore, it is a logical solution for a business of any size to go online to stay competitive. This solution is probably the only one.

A new Z generation is growing up. They make purchases only online and will soon become solvent consumers. Therefore, electronic commerce is to enter the mainstream, which means it is necessary to develop appropriate infrastructure.

CONCLUSION

The study findings suggest the following:

- Consumer behavior underwent qualitative and quantitative changes throughout the pandemic.
- The main advantage of online shopping is its convenience: it is easy to find and choose the necessary product.
- Most purchases are made with a smartphone, some preference is given to mobile applications.
- Product reviews and photos of goods exert the most influence on online shopping decisions.
- Behavior of the Kirov Region residents does not differ significantly from that of the Russian consumer in general, but it has certain specificity.

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CHAPTER 16

MARKETING RESEARCHES

The Russian Carbon Dioxide Market

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ABSTRACT

Under the influence of current development trends, the Russian carbon dioxide market is showing signs of growth. The innovative potential of the market is being actively used. In the context of formation of the digital economy and transition to Industry 4.0, each industry is developing digital segments (Alpidovskaya & Popkova, 2019; Belik et al., 2020; Bogoviz et al., 2021; Haabazoka et al., 2019; Popkova, 2019; Popkova & Gulzat, 2020; Popkova & Sergi, 2020; Popkova et al., 2019; Popkova et al., 2021a, 2021b; Ragulina, 2019; Ragulina et al., 2019; Saveleva et al., 2019; Sergi, 2019; Sergi et al., 2019; Sozinova, 2018; Sozinova, 2020; Sozinova, Burtseva et al., 2019; Sozinova, Nabokikh, et al., 2019; Sozinova, Fokina, & Shchinova, 2017), that is why it is important to track trends of the carbon dioxide market in order to make the most of the opportunities of the new fourth technological order. The transformational processes of the market are described in the works of Sozinova et al., 2017a, 2017b and Sozinova et al., 2019.

*Reimagining Socioeconomic Development of Russia:
New Directions, Theory, and Practice*, pp. 181–195
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Despite the fact that the solid carbon dioxide market in Russia has existed since the Soviet period, it has been most actively developed since the second decade of the 21st century. The steadily growing production volume caused almost complete coverage of domestic needs, which contributed to development of export supplies. The pace of the market development is determined by a number of factors: on the one hand, the market saturation and sharpening of competition cause a decrease in the increase in the volume of “dry ice,” on the other hand, an increase in the production of gaseous carbon dioxide, which is the main raw material for its production, further development of the spheres of consumption of the product contributes to the sustainable growth of the market. The pandemic also had a certain impact. Solid carbon dioxide prices directly depend on the level of raw materials prices and transportation costs, which, along with rising production costs and high tax burden, cause a decrease in profits of many producers. The level of producer prices fluctuates in a wide range depending on the amount of costs, the forms of sale used, volumes and other factors.

We discuss these findings in order to predict development of the solid carbon dioxide market in Russia in order to determine the degree of its attractiveness for business operations.

INTRODUCTION

Carbon dioxide, also known as “dry ice,” is solid carbon dioxide (“Dry Ice Application,” 2020). At atmospheric pressure and room temperature, it turns into a gaseous state. In appearance, “dry ice” resembles ordinary ice or a mass that looks like snow but has the temperature of minus 78.5 ° C. Solid carbon dioxide is compressed into granules or larger blocks; it is not toxic and explosive.

For the first time “dry ice” was found in 1835 by K. Tidorier, France, but its active commercial use began only in 1925 in the United States for storing food for railroad transportation. By 1932, the volume of dry ice production in the United States had reached 55 thousand tons. Since then, all over the world, the consumption of “dry ice” [Primeneniye sukhogo l'da] has been continuously increasing.

- In industry solid carbon dioxide is produced by cooling carbon dioxide at high pressure. The raw material is carbon dioxide, for which there are the following sources:
- natural carbon dioxide, which comes to the surface of the earth in the form of mineral springs;
- carbon dioxide found as a result of alcoholic fermentation in brewing and distilling plants;

- carbon dioxide as a result of methane fermentation formed at waste-water treatment plants;
- carbon dioxide released during burning of marble, limestone, chalk, and so forth ;
- carbon dioxide found in flue gases during a special mode of fuel combustion at boiler houses of food enterprises.

Cooled carbon dioxide is converted into solid dioxide after processing at the low temperature, about -56°C . The main production volumes of carbon dioxide, which is the raw material for the production of dry ice, are located in the Central and Volga Federal Districts (see Table 15.1).

Table 16.1

Production of Carbon Dioxide in the Russian Federation by Federal Districts

Federal district	2017		2018	
	ton	%	ton	%
The Russian Federation	448,834.7	100.0	504,860.2	100.0
Central Federal District	127,633.9	28.4	138,936.4	27.5
Northwestern Federal District	41,032	9.1	51,710.1	10.2
Southern Federal District (from 29.07.2016)	8,956.2	2.0	10,254.8	2.0
North Caucasian Federal District	7,754.1	1.7	9,158.9	1.8
Volga Federal District	197,260.9	43.9	231,033.6	45.8
Ural federal district	14,818.5	3.3	16,167.7	3.2
Siberian Federal District	45,021.1	10.0	38,760.8	7.7
Far Eastern Federal District	6,358	1.4	8,837.9	1.8

Source: FSGS RF. Available at: <https://www.fedstat.ru/indicator/57783>

In 2019 the global market of dry ice amounted to \$170 million, which is 6.5% more than in 2018 (“Dry Ice Market: Global Industry Analysis,” 2020). Europe’s share of the dry ice production market is about 46%, followed by the United States with about 33% and the Asia-Pacific region, which has about 14% (industrial sector, transportation, food processing, healthcare, commercial, entertainment industry, and others); By machine type (production machine and cleaning machine)—(“Dry Ice Market by End Use Industry Type,” 2020). Dry ice market is expected to exceed \$270

million by 2025 and Region (North America, Europe, Asia-Pacific and Rest of the World)—(“Global Dry Ice,” 2020).

METHOD

The information for the study was the databases of the Federal State Statistics Service of the Russian Federation, internet resources, business and specialized publications, analytical reviews, the results of expert surveys, materials from participants in the domestic solid carbon dioxide market.

The main methods of data collection were the qualitative content analysis of documents, the survey, and the method of expert assessments. The main methods of data analysis were statistical methods of processing quantitative data, comparison, grouping, generalization.

RESULTS

The Market Analysis

In Russia the “dry ice” market has existed since the Soviet period, but despite this, even in the first decade of this century, this niche was poorly occupied, since carbon dioxide plants produced mainly liquid carbon dioxide and production of “dry ice” was deficit. The available number of factories/workshops was not enough, and additional equipment was required, production of which was poor in the country. Today the “dry ice” market is expanding due to “dry ice” increasing use. Moreover, production is recognized as profitable: for example, it has been established that for a manufacturer working on its own raw materials, the profitability reaches 100% or more.

In 2011 about 12,000 tons of “dry ice” were sold in Russia for about \$12 million, which is 3–5% more than in 2010. At the same time about 3,000 tons of ice were imported (“Production of Dry Ice,” 2020). One of the main problems of the market development was the problem of high costs in implementation of investment projects for production of “dry ice,” but even so, in 2012–2013 an increase in demand by 5–7% per year was expected (“Dry Ice Import Export,” 2020). For the period of 2015 the Russian market for solid carbon dioxide was still unsaturated since most of the producers were located in Moscow and the Moscow region (“Carbon Dioxide Market in Russia,” 2020). In 2015, the capacity of the Moscow market was about 1,000 tons per year, or \$ 1–1.5 million.

More active development of the Russian market began in 2016. According to the calculations of DISCOVERY Research Group analysts, the volume

of the solid carbon dioxide market in Russia in 2017 amounted to 32,255.2 tons, where the share of production accounted for 99%. In value terms the market in 2017 amounted to \$ 17,706.9 thousand. The volume of the solid carbon dioxide production in Russia in 2017 amounted to 32,252.8 tons (“Analysis of the Market for Solid Carbon Dioxide,” 2020a, 2020b).

From 2016 to 2019 there was a positive trend in the production of both the main raw material—carbon dioxide in Russia, and “dry ice,” with the exception of 2015, in which, according to various experts there was a decrease from 2.5% to 10%. The share of “dry ice” in the total volume of carbon dioxide ranges from 7% to 8%. The steadily growing volume of production in Russia caused almost 100% coverage of domestic needs. As a result, supplies of solid carbonic acid to the foreign market increased. The largest volume of supplies was recorded in 2017–2018. The dynamics of the “dry ice” market in Russia is presented in Table 16.2.

Table 16.2

Market Volume of Solid Carbon Dioxide in Russia

Value	Years							
	2012	2013	2014	2015	2016	2017	2018	2019
Market volume, tons	12,720	13,485	18,178	20,660	24,998	32,255	37,863	41,128
Growth, %	–	106.0	134.8	113.7	121.0	129.0	117.4	108.6

Source: made by the authors based on materials Alto Consulting Group. Available at: <https://alto-group.ru/>

Since 2017 there has been a decrease in the rate of market growth, which is primarily due to its gradual saturation. In 2019, the market volume amounted to more than 41 thousand tons, or about 1.9 billion rubles. In the first half of 2020 there was also a decrease in the production and consumption of “dry ice,” which is associated with a decrease in the production of raw materials—carbon dioxide, where the decrease in April 2020 was 14.5% compared to April 2019, and a general decline in the Russian economy.

Spheres of Consumption

In the USSR “dry ice” was used everywhere under conditions of a shortage of refrigeration capacity, but then the Russian industry stopped using

production technologies for a long time. Only a few years ago, supplies of imported equipment for the production of solid carbon dioxide began to Russia, which ensured the interest of almost all sectors of the economy. Currently, “dry ice” is in great demand in various industries due to its ability to effectively cool and evaporate, passing the liquid state. In addition to cooling, the purpose of preserving materials and products is facilitated by the ability of carbon dioxide to displace oxygen, including by increasing the volume by 800 times. The use of “dry ice” in different segments, sectors of the national economy, can be seen in Table 16.3.

Table 16.3

Dry Ice Uses

Segment	Use
Food industry	Contact freezing of food products of animal and vegetable origin
	Refrigeration of food products during transportation and storage
	Slow down the growth of yeast bacteria
	Protecting food from insects and pests
	Carbonation of drinks.
Mechanical engineering	Pressurizing tanks
	Cold fit of machine parts
	Dismantling of tanks with flammable substances
	Calcium carbide pressure
	Rapid cooling of molds.
Mining engineering	Cooling of mine production.
Agriculture	Prevention of the reproduction of microorganisms, mold, fungi
	Disinfestation
	Top dressing of plants
	Branding of cattle and horses.
Petroleum industry	Fast freezing of oil spills
Construction engineering	Foaming of porous plastic materials
	Brick processing for increased strength.
Scientific research	Slow down chemical reactions
	Obtaining low temperatures without the use of water
	Freezing laboratory samples
	Use as an inert medium.

(Table continued on next page)

Table 16.3 (Continued)***Dry Ice Uses***

Segment	Use
Biology, cosmetology, medicine	Reducing pain
	Preservation of the flowering process
	Removal of inflammation, edema
	Top dressing of greenhouse plants
	Transportation of biological materials
	Cryotherapy
	Improving blood flow
	Control of bleeding
Entertainment industry	Stimulating respiration (coupled with oxygen).
	Creation of stage effects in shows, photo and video shooting
	Ice sculpture production
Meteorology	Firefighting.
	Creation of favorable weather conditions.
Food services	Emergency replacement of faulty refrigerators and freezers
	Sale of soft drinks, ice cream
	Catering.

Source: Made by the authors.

Certain spheres of use of “dry ice”—industrial production, medical, and research, logistics activities—are off-season, which ensures its consumption throughout the year. In the sphere of public catering business has a seasonal character, when the high season is the hot period of the year: at this time 60% of the product produced per year is sold. It is noted that it is the seasonal consumption of “dry ice” that brings about 70% of the profit. The largest volume of consumption is in the second and third quarters; the fourth quarter also demonstrates good results due to the New Year holidays. The attractiveness of the catering segment is due to the fact that only a few enterprises and catering companies have their own “dry ice” granulating mills and, accordingly, do not need external supplies. The rest of the companies are forced to purchase solid carbon dioxide from third-party producers.

One of the determining factors in choosing a supplier of solid carbon dioxide is the price and delivery terms. Mainly producers sell goods on a self-pickup basis, offering delivery at the request of the client. When delivered outside the area indicated in the terms of the agreement, the cost

risks from 30 to 50%; when transporting over long distances, a negotiated price is set.

One of the important additional options for the consumer is the container for transporting the product, because due to the temperature difference sublimation of “dry ice” proceeds very quickly: even in an isothermal container the average evaporation rate is about 10% per day. The percentage of evaporation depends on the quality of the container and the amount of ice: the less free space, the less evaporation. Thermocontainers are made of durable HDPE (high strength low pressure polyethylene) or usual PE plastic (high strength) with an integrated insulator inside the walls and in the lid of the thermocontainer, which provides thermal insulation and rigidity to the structure. Insulation materials are polystyrene, expanded polystyrene, rigid polyurethane filling foam, and so forth. A prerequisite is the presence of a gas bleeding system.

Consumers are mainly interested in the price. The quality of the product does not directly affect the choice of the consumer, but it does matter for the producer, since the equipment is quite sensitive to impurities that can contain carbon dioxide if not thoroughly cleaned. As a result, the units fail earlier, require repair, frequent maintenance, which leads to an increase in the cost price and, accordingly, the price for the consumer.

Prices and Competitors

In Soviet Russia, the ICE-FILI plant and its subsidiary Extract-Fili were the monopoly on the “dry ice” market, which ceased production due to reconstruction (“Dry Ice Producers From Russia,” 2020). As a result, two producers were left on the market—Sedmoy Khladokombinat and Frozeks. Other companies, for example, the cleaning company Demetra, made products for their own needs. In 2017, the largest producer of solid carbon dioxide in Russia was SHCHEKINOAZOT—5,395 tons, followed by Nevinno-missky Azot—4,186 tons, the third place was taken by Akron—3,937 tons.

Currently, there are about 20 producers of solid carbon dioxide operating in Moscow, the Moscow Region, bordering regions, the Central Black Earth Economic Region and the Volga Federal District. The oldest of them is Shchekinoazot with a wide range of industrial chemistry. The largest and successfully developing companies include Bovenit, Crio-Genservice, Amarco-Service, Toaz-Dioxid. The young and successful companies are Polyus Kholoda and Yamos.

The highest level of competition in the “dry ice” market is in Moscow and the Moscow Region. The market of the Volga Federal District is also saturated. Competition is carried out mainly on a price basis and at the expense of the offered assortment. Many companies also emphasize high

quality of their products, which is confirmed by the presence of ISO certificates, or compliance with the requirements of GOSTs, or by production on imported equipment, and so forth.

Over the period 2017–2019, the cost of the main raw material for the production of solid carbon dioxide (9.06% in 2019) and its delivery increased several times, which affected the level of producer prices. 2019 is also characterized by a drop in revenues and profits of many producers-market participants. The reasons are low purchase prices for products, an increase in production costs, and a high tax burden.

Solid carbon dioxide producer prices in 2020 fluctuate widely. The price is determined by the cost of production, the form of sale—wholesale or retail, the volume of the released products, and also whether the production of this product is the main or additional type of activity. The production technology is also an important factor in price formation. In the process of crystallization of liquid carbon dioxide, part of it (up to 50–80%) turns into a gaseous state and evaporates, which also affects the cost of production. The highest prices are set by Cryo Tech enterprise, where for small batches of goods the cost of delivery weighing from 2 to 5 kg is 400 rubles/kg. Toaz-Dioxid, on the other hand, sells batches of 100 kg and more at the price of 22–27 rubles / kg.

The price level is also determined by the saturation of regional markets. Enterprises in Moscow and the Moscow region for batches over 100 kg maintain prices from 50 to 60 rubles/ kg. In the regions, the price can reach 120 rubles. (see Figure 16.1).

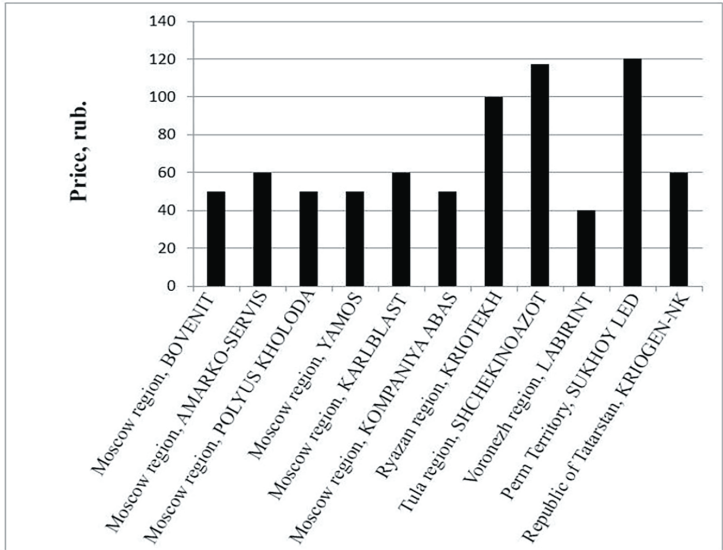
Import and Export

In 2017, the volume of the “dry ice” import to Russia did not exceed 0.04% of the import of carbon dioxide in all forms. In 2017, 2.4 tons of solid carbon dioxide were imported. The largest volume of the import was carried out by the company Han Sung, South Korea, with volumes of 1.63 tons. In general, supplies from South Korea amounted to 2.3 tons or 94.3% of the total import of “dry ice” (“Analysis of the Market for Solid Carbon Dioxide,” 2020a, 2020b). Deliveries from South Korea were made to the Sakhalin Region (62.4%), the Kamchatka Territory (34.9%) and the Primorsky Territory (2.7%). The rest of the import belonged to Poland, Germany, Italy, and so forth. Later, the steadily growing volume of domestic production caused almost complete coverage of domestic needs, and in the period from 2018 to 2020, Korean supplies are carried out mainly to the Sakhalin region.

Nevertheless, many foreign companies offer services for the supply of “dry ice” to the Russian market on open internet sites (“Main Product Manufacturers in Physical Terms Since 2017,” 2020):

Figure 16.1

Producer Prices for Dry Ice in Regions of the Russian Federation, for a Batch From 100 KG



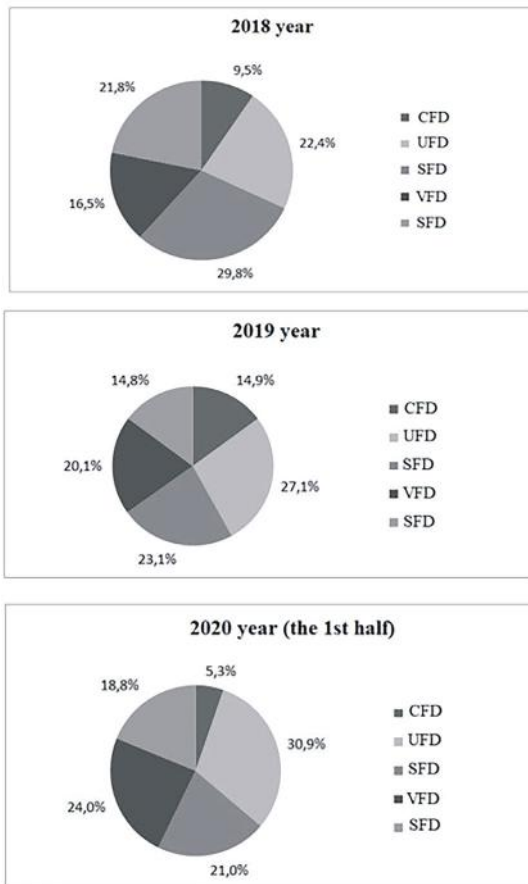
Source: Made by the authors based on data from the websites of enterprises.

- White Lion Dry Ice & Laser Cleaning Technology GmbH (Germany);
- Dry Ice Zone (Poland);
- Südstrahl GmbH & Co. KG (Germany);
- Hielo de Manantial, S.L. (Spain);
- Pepe Gerardo (Italy)
- Fabbrica Ghiaccio Eredi Pansini (Italy)
- 9 Mares—Importação E Exportação de Peixes e Mariscos, LDA (Portugal)
- Cryo'tech - La Technologie Cryogenique (France)
- Rolf Gerhards GmbH (Germany)
- Elme Messer Gaas, AS (Latvia);
- Gaschema, UAB (Latvia) (Proizvoditeli l'da sukhoy iz Rossii);
- Dry-Ice-Tec GmbH (Germany);
- BUSE KSW GmbH & C. KG (Germany);
- Storopack Hans Reichenecker GmbH (Germany);
- ACP Company (Air Products Company) (Belgium);
- Carlblast Industry (Sukhoy led. Import-Eksport).

The export of solid carbon dioxide in solid form has not been carried out since 2014, when it amounted to 0.005 tons. In recent years, supplies to the external market have resumed, but in minimal volumes. In 2018–2020, supplies were mainly carried out to the markets of Kazakhstan and Ukraine. The global situation in 2020 most strongly affected the exporters of the Central Federal District, whose share in the first half of 2020 fell to 5.3% (see Figure 16.2). The price of exported “dry ice” ranges from \$ 0.71 to \$ 1.14.

Figure 16.2

The Share of Federal Districts in the Carbon Dioxide Export Market in the Period From 2018 to the 1st Half of 2020



Source: Made by the authors based on materials of the company Eksport V. Available at: <https://eksportv.ru/zavod/led-suhoy-ot-proizvoditelya.html>

DISCUSSION

It is expected that in the post-crisis period, the volume of the Russian market for solid carbon dioxide will steadily grow, in particular, due to the further development of its application spheres: rapid growth in demand for frozen foods, growing use as a refrigerant in the food and shipping industries, development of cryoblasting technologies, and so forth. A significant growth in the transport industry will facilitate the delivery of “dry ice,” thereby preserving the possibility of market growth. The limitation on consumption is the high rate of sublimation, which determines the inability of the product for long-term storage.

A stable rise in prices for solid carbon dioxide is also expected, where the main factors are a rise in prices for raw materials, taxes, as well as an increase in consumption. The export of “dry ice” will develop, and, first of all, to neighboring countries. The concentration of the majority of producers in Moscow and the Moscow Region and in the Volga Federal District will remain, which will cause the preservation and strengthening of competitive tension in these regions.

CONCLUSION

The Russian market for the production of solid carbon dioxide is considered a fairly attractive business, characterized by good profitability and high consumer interest. According to the optimistic scenario of the end of 2019, the growth by 6–7% annually of the Russian market in the period up to 2025 was planned; under the pessimistic scenario the planned growth is 2–3% per year. But the situation with the pandemic left its mark on the development of the market. As it is noted by experts, the chemical industry, along with others, was one of the most affected industries. According to the results of the first half of 2020, experts predicted a market decline only in 2020 and its recovery in 2021. But now it is becoming clear that the crisis may leave its imprint for more than one year.

At the same time, it should be understood that it is rather difficult to make economic forecasts for such events, which cannot be foreseen and the consequences cannot be calculated. The recovery of the dry ice market will be facilitated by the revival of the sectors of the economy—from the entertainment industry to the food and mechanical engineering industries, where the main driver of market development will be the growth in consumption.

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CHAPTER 17

SOCIOECONOMIC INEQUALITY

Historical and Logical Analysis of Causal Relationships

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ABSTRACT

Socioeconomic inequality has plagued humanity throughout history, growing worse in times of crisis and conflict. By applying the historical analysis method to studies on inequality, conducted by renowned scholars in humanities, we summarized the specific features of this issue, its causes, and ways to overcome it. Modern scientific approaches allowed us to study inequality as a multifaceted and systemic process as well as to identify its factors, forms, and long-term consequences. We proposed the broadest typology of inequality, accounting for its levels, scale, and forms. Modern political economy views are unequivocal about the problem of inequality and its negative impact on social and economic development. The Sustainable Development concept features 17 goals, most of which are tied to solving inequality. We conducted a systemic analysis of the typology of inequality and the 17 Sustainable Development Goals. As a result, we concluded that the economic methods of the market economy are unable to offer an effective algorithm for eliminating inequality. Furthermore, it cannot even minimize the negative impact of inequality on the main areas of economic life at micro- and macro-levels.

INTRODUCTION

The issue of inequality still persists in the modern world. Publicly available international statistics show that inequality is growing rather than decreasing. An analysis of World Bank data on the top 10 economies of the world revealed global economic inequality between countries.

Seven countries out of 10 (Japan, Germany, Russia, Indonesia, United Kingdom, Indonesia, France, and Brazil) with relatively uniform economic strength (GDP PPP, bln. USD) differ significantly in per capita income. This points to the different patterns of socioeconomic structure in these countries, which manifests itself in the management of income distribution. The worse the income distribution, the bigger the wealth gap (Gini index). This means that inequality can manifest itself both at an international level and at the level of social groups within a country. In general terms, inequality is a conflict of interest between different groups, caused by limited resources.

These facts point to the need for methodical interpretation and clarifying of the notion of “inequality.” This study aims to find ways of solving the problem of socioeconomic inequality. In this study, we tried to establish whether it is possible to solve inequality in the existing socioeconomic development paradigm.

MATERIALS AND METHODS

The theoretical-methodological foundation of this research is formed by:

- Historical, dialectic, abstract-logical methods;
- Methods of categorization and classification;
- Systemic principle;
- Comparative analysis method;
- Theoretical generalization;
- Visualization via graphs, matrices, and tables;
- Other general and specific methods.

The information basis was formed by global statistics of the World Bank, the UN data on Sustainable Development Goals (SDGs), and relevant scholarly studies.

In this study, we conducted a historical analysis of theories on inequality and analyzed Russian and foreign terminologies and methodologies relevant to socioeconomic inequality. Additionally, we analyzed public statistical data on economic and social inequality, grouped inequality

types, and generalized its manifestations. Moreover, we analyzed systemic measures taken to mitigate inequality (in the framework of SDGs) and evaluated the efficiency of modern methods of solving inequality in the market economy paradigm.

The combined use of materials and methods allowed us to conclude that the main causes of inequality cannot be negated in the conditions of a market economy—they require other solutions.

RESULTS

Historical Analysis of Studies on Socioeconomic Inequality

Inequality is an inherent feature of social and economic relations, and it has been present throughout the history of humankind. Many thinkers, philosophers, and scientists have studied this phenomenon, its causes, forms, and consequences. To date, there is a fairly wide range of scientific interpretations defining the essence and meaning of socioeconomic inequality. Applied political economy defines it as “the difference in economic well-being between individuals in a group, between population groups, or between countries.”

Since ancient times, representatives of various philosophical schools have recognized inequality as a feature of social stratification but have not addressed its underlying causes.

Plato (fifth century BC), an ancient Greek philosopher, pointed to the formation of an underlying rift (i.e., socioeconomic inequality) in society that divides a state from within.

The work “Politics” by Aristotle (fourth century BC) divided society into classes (poor, middle class, and rich). The philosopher underlined that this division stems not from the wealth gap but from sociopolitical inequality.

Arthaśāstra, an ancient Indian treatise (fourth–third century BC), stated that inequality is a natural distinction between castes and a foundation of social structure.

Renaissance thinkers stressed the inevitability of inequality, provided its root causes, and, for the first time, offered a solution to the problem.

Thomas Aquinas (13th century AD), being a renowned religious philosopher, still pointed to the economic aspect of inequality. However, he believed that the estates system and the wealth gap that it causes were created by God, meaning that inequality is an objective and indisputable truth.

Niccolò Machiavelli (1467–1527) first suggested that inequality, as a manifestation of socioeconomic processes, is a consequence of government policies.

Jean Bodin (1529–1596)—a French politician, economist, and jurist—also believed that social conflicts are caused by unequal distribution of wealth, political struggles, and religious intolerance. However, he advocated strengthening the monarch’s power and private property of citizens (i.e., he supported stronger inequality).

Tommaso Campanella (1568–1639) proposed a qualitatively different social development model, in which socioeconomic inequality was to be solved by abolishing private property.

The Enlightenment saw the birth of the classical school of economics; since then, inequality has been viewed not as a social problem but as the driver of the economy.

Adam Smith (1723–1790)—Scottish economist, the founder of economic theory—argued that the “invisible hand” of the market allows using limited economic resources optimally, increasing economic efficiency. In this theory, social inequality is a secondary manifestation of market competition (Besshaposhny & Dzhancharova, 2019).

David Ricardo (1772–1832) was the first economic theorist to address the problem of socioeconomic inequality. He argued that income differentiation in society was a consequence of the market mechanism itself, and that the capitalist class must abandon its pursuit of profit in favor of the interests of the rest of society.

Karl Marx (1818–1883), a German philosopher, sociologist, and economist, believed that inequality is one of the main criteria of the class society and the main factor of class struggle.

Economists of the 20th century focused on studying the possible manifestations and consequences of socioeconomic inequality in two formulated paradigms: as a natural manifestation of market relations and as a form of class conflict.

For example, Paul Krugman (an American economic geographer) recognized that the modern economic development model is efficient but stated that different groups of people tend to have a different risk tolerance, meaning that income inequality should be seen as a reward for risk.

Joseph Stiglitz (an American Keynesian economist) explains the worsening of income inequality as a consequence of cyclical economic development. In this case, the acceleration of the “bull and bear” cycle causes the price of labor (i.e., wages) to fall and reduces social obligations on the part of the business.

In contrast, Thomas Piketty (2013) (a French economist) notes the sharp confrontation (concerning capital) between economic efficiency of production and social justice. In his work *Capital in the Twenty-First Century*, he examines the concentration and distribution of wealth over the past 250 years. Piketty argues that the rate at which capital increases in developed countries is consistently greater than the rate of economic growth. This

leads to property inequality that only increases over time. He suggests solving this problem by a progressive worldwide property tax (Besshaposhny, 2019).

Our Classification of Inequality Types

Inequality in its various interpretations can be regarded as a quality indicator of the social development model. On the one hand, inequality is an obvious sign of the imperfection of the socioeconomic system at a given stage of development. On the other hand, it is a factor of its further evolution.

Since inequality in the modern world is systemic and multifaceted, we propose the following classification of inequality:

1. **At the global level**, inequality between countries is caused by differences in the potential of socioeconomic development models and political structures. Moreover, an objective prerequisite for international inequality is the spatial development of countries, manifested in such territorial differences as the features of geographical location, natural resource potential, the capacity of transport systems, and cultural differences. The main types of inequality in this group are:
 - *Scientific-technological inequality* is determined by the technological potential, the level of economic development, the potential of the population, and the educational system of the country. It manifests itself as a scientific-technological specialization in the global division of labor. Moreover, it is interpreted as knowledge-based inequality, expressed in incomparable terms of access to sources of information, technological capabilities of scientific research, and contributions to science and technology development. The consequences of these disparities have a long-term character and are apparent in the economic, social, and environmental disparities in global economic development;
 - *Economic inequality* is determined by the type of economic development of the country. It manifests itself as the specialization of countries in the international division of labor, as well as the difference in the sectoral structures of economies. According to the market economy laws, countries with an economy of diminishing returns (i.e., countries with resource-based economies) are in the most unfavorable position. Despite various international trade agreements, such nations face fiercer competition and are more exposed to price fluctuations in world resource markets;

- On the one hand, *environmental inequality* is seen as unequal access to natural resources, and on the other hand, as the quality of the living environment. Developing countries with resource-based economies face the greatest environmental risks. Meanwhile, economically developed countries are more concerned about creating a comfortable ecological environment. Due to the natural processes of the international division of labor, the most “dirty” types of production are relocated to “poor” countries. This harms the global ecology. Therefore, the problem of ecological inequality cannot be solved by local measures.
- 2. **At the regional level**, inequality arises between constituent entities (regions) of the same country. The main reason for the growing inter-regional inequality is the short-sighted public policy of regional governance, as well as the historical, cultural, national, and geographical specifics of regional development. The main types of inequality in this group are:
 - *Socioeconomic inequality* is caused by the dynamics and quality of socioeconomic development of the country. It manifests itself as an imbalance in socioeconomic development of regions, resulting from differences in economic potentials, development of social infrastructure, and differences between the central and peripheral regions or urban and rural areas;
 - *Environmental inequality of regions* is caused by the territorial peculiarities in the distribution of capital and population in the country. Environmental conditions in the regions, on the one hand, are an objective fact caused by their specialization, which was formed over many decades. On the other hand, solving environmental problems is a systemic task of governmental regulation and control (via legal provisions, taxes, tariffs, investment policy, etc.).
- 3. **At the social group level**, inequality is a feature of accumulated disproportions in socioeconomic system. It serves as a quality indicator of the economic development model of the country, as well as the result of the system of wealth distribution. Methodologies that analyze this type of inequality are based on indicators of standards of living. The main types of inequality of social groups include the following:
 - *Economic inequality* is measured by the degree of material security: the difference in income, assets, capital; the level and type of employment;

- *Social inequality* assesses the differences in terms of social status and access to social infrastructure services: education, health, sports, culture, justice, security, and social protection;
- *Cultural inequality* manifests itself as discrimination on the basis of group identities: gender, age, ethnicity, race, religion, disability, and so forth; *political inequality* is the difference in the ability of individuals and groups to influence and benefit from political decision-making processes and to engage in political action.

DISCUSSION

We suggest treating the increasing inequality as an indicator of unsustainable social development. The UN proposed a model of civilizational development based on a systems approach. The concept of Sustainable Development, formulated in 1987, is based on the need to maintain a balance between addressing socioeconomic problems and protecting the environment. Since then, a great deal of work has been done to formulate the principles, goals, and objectives of Sustainable Development, as well as a system of indicators for assessing the various criteria of sustainability.

In 2015, all 193 UN member states adopted the 2030 Agenda for Sustainable Development, with 17 global goals, 169 relevant targets, and 230 indicators. SDGs are universal and are to be used in all countries. The Agenda contains conceptual goals and specific methodologies: quantitative indicators and a list of measures that allow countries to plan long-term actions for achieving the goals and targets.

We analyzed all 17 SDGs from the point of their efficiency in solving inequality and from the position of systemic approach (i.e., their ability to eradicate the causes of inequality and mitigate its consequences).

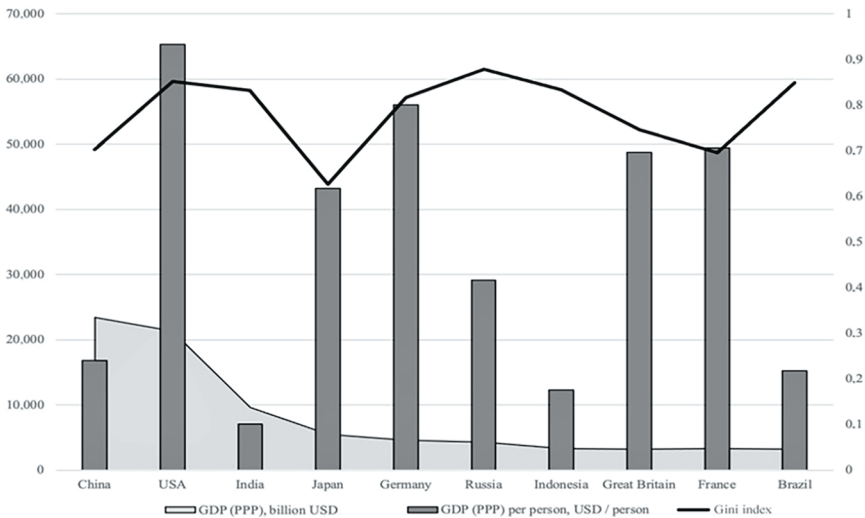
In comparing the 17 SDGs and out inequality classification, we concluded that the 15-year sustainable development plan aims to eradicate the most severe issues of current inequality (Figure 17.1).

To identify the efficiency of the SDGs in solving global and systemic issues of inequality, we grouped them according to the priorities of sustainability (economic, environmental, and social), level, and impact into three groups (Romanyuk, 2010):

1. *Resultative goals* (No. 1, 2, 3, 4, 5, 10) reflect specific indicators of inequality (mainly social group inequality), meaning that the specifics of each country determine their efficiency. These goals are as follows:
 - Goal 1. End poverty in all its forms everywhere;

Figure 17.1

Ten Strongest Economies of the World by GDP (PPP) Per Capita and Gini Index in 2019



Source: Compiled by the authors based on (World Bank, n.d., 2021; Credit Suisse Research Institute, 2019).

- Goal 2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture;
 - Goal 3. Ensure healthy lives and promote well-being for all at all ages;
 - Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all;
 - Goal 5. Achieve gender equality and empower all women and girls;
 - Goal 10. Reduce inequality within and among countries.
2. *Environmental goals* (No. 6, 11, 13, 14, 15) reflect the priorities of the global and macro-regional environment. Achieving these goals is only possible with the efficient cooperation of all countries. These goals are the following:
- Goal 6. Ensure availability and sustainable management of water and sanitation for all;
 - Goal 11. Make cities and human settlements inclusive, safe, resilient, and sustainable;

- Goal 13. Take urgent action to combat climate change and its impacts;
 - Goal 14. Conserve and sustainably use the oceans, seas, and marine resources for sustainable development;
 - Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
3. *Conceptual* goals include “scientific” (No. 7, 9), “economic” (No. 8, 12) and “ideological” goals (No. 16, 17). These goals reflect the directions and quality of global development. Their implementation is ambitious and long-term, affecting all countries.
- o Scientific SDGs:
 - Goal 7. Ensure access to affordable, reliable, sustainable, and modern energy for all;
 - Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation.
 - o Economic SDGs:
 - Goal 8. Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all;
 - Goal 12. Ensure sustainable consumption and production patterns.
 - o Ideological SDGs:
 - Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels;
 - Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.

Conceptual goals are the most efficient for the sustainable development of the entire world. Environmental goals are the most important until 2030. Resultative goals are essential to overcoming the inequalities of social groups in the short term.

The systemic strategic approach in the Sustainable Development Goals is evident, yet there are still questions about the mechanisms and effectiveness of achieving these goals.

CONCLUSION

We concluded that most scholarly approaches to socioeconomic inequality concern themselves mostly with the microlevel impact of inequality.

For this reason, we analyzed inequality in all aspects of its institutional manifestations, both within countries and within the global community.

A systemic approach, used by us in studying inequality, allows bringing scientific discussions on the topic to a conceptually new level, resulting in:

- Multifaceted analysis of the notion “inequality”;
- Examination of all directions and manifestations of inequality, both in the tactical direction of analysis and at the strategic level.

Worsening of inequality demonstrates that the methodology of humanities cannot yet form any algorithms for overcoming it. Therefore, soon the need to develop a realistic mechanism for implementing the concept of sustainable development will increase.

So far, we can identify the following methodological problems of dealing with inequality in a systemic way:

1. Modern models of economic development have exhausted their ability to influence the main aspects of socioeconomic inequality: the parity of national interests in world markets and the equality of economic conditions of production, exchange, and consumption;
2. The problem of global socioeconomic inequality can be solved only by involving all countries;
3. Future development of humanity must be based on the same moral values and the principles of socioeconomic development for all countries.

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THE CONCEPT OF RESILIENCE DIAGNOSTICS OF RISKS AND LEVELS OF ECONOMIC SECURITY OF RUSSIAN REGIONS

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ABSTRACT

Modern problems of instability of socioeconomic systems and processes deepen the development of the theory and methodology for diagnosing the level of stress tolerance (resilience diagnostics) in the context of various subjects both at the international and national, regional, and local levels. The assessment of signals of threatening states is necessary to develop a mechanism for making timely decisions in the public administration system. The tools of resilience diagnostics of stress tolerance allow us to determine the signals of the most significant threats in the socioeconomic system, the possibility of rearranging elements to achieve balance. It applies to various systems and allows assessing the levels of these systems from the point of view of the impact of risk factors. Within the framework of this study, it is proposed to use a system of indicators of economic security and risks of the regional economy from the perspective of grouping in the following areas—projections: general economic, social, production-technological, and financial, which allows carrying out a differentiated analysis of risk factors and threats to the sustainable development of regional economic systems.

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The concept of stress tolerance (resilience) originated in the 1970s in ecology, later penetrating other scientific fields, including psychology, economics, and political science. International organizations of the EEC and other associations accept the concept of stress tolerance as the most important component of foreign and integration policy (Russian Council for International Affairs, 2019).

Resilience diagnostics as a diagnosis of resilience provides a detailed understanding of resilience at all levels of system functioning. Resilience can be considered as the ability of a system to develop and grow in very difficult conditions. In the context of assessing risks and levels of economic security, resilience diagnostics involves assessing the stress tolerance of the regional economic security system to significant disturbances (shock changes) of individual factors (indicators) of the economic system. This study allows us to understand the mechanism of managing the economic security of the region.

Research in the field of diagnostics and rating of risks and threats to the economic security of regions has been actively conducted before, including the authors of this study (Bogoviz et al., 2021; Kataeva et al., 2017; Karanina, Ilysheva, et al., 2017; Karanina & Loginov, 2017; Karanina, Sapozhnikova, et al., 2017; Loginov & Karanina, 2017; Popkova et al., 2021a, 2021b).

Many studies have paid attention to the issues of diagnostics of security indicators, formation of projections taking into account factors and signals of crisis and instability of development (Fufacheva et al., 2017; Karanina & Kartavyh, 2017; Loginov et al., 2017; Lysova et al., 2020; Popkova et al., 2019; Sergi et al., 2019; Sozinova, 2020; Sozinova, Burtseva, et al., 2019; Sozinova, Nabokikh, et al., 2019).

METHOD

To obtain adequate and comparable estimates in the regional and temporal context, it is proposed to use the following approaches:

1. to use, if possible, relative indicators;
2. assessment of indicators of economic development of the region in terms of per capita;
3. assessment of the cost indicators of the regional development in the number of fixed consumer baskets (FCB) of the region, that is, in the form of the ratio of the regional cost indicator to the cost of the FCB.

These transformations of indicators allow us to assess the level of risk and economic security of regions, taking into account their regional

characteristics (in particular, regardless of the size of the region and the current price level). On the other hand, there is a possibility of multi-time comparison.

At the first stage of the study, a system of indicators of the regional economy was formed. It is based on indicators which values can be found in open sources, in particular, in the open analytical data system of the Rosstat, data set (Sozinova, 2019). For this purpose, the appendix to the collection “Regions of Russia”—“Socio-economic indicators” (Rosstat, 2012) was used.

When choosing indicators, attention was paid to the fact that the regional economic security should be considered both from the point of view of the security system itself, that is, the regional economy as a whole and from the point of view of the most important elements of the system—the economic security of producers and the economic security of consumers, in particular, from the point of view of the safety of the regional population.

For economic security, it is proposed to use three levels of security (or risks—stress signals of economic security). These levels of economic security are determined by separate indicators using two thresholds (barrier) values. The formation of threshold values can be different; first of all, it is carried out based on targets established by law or within the framework of various programs of socioeconomic development. Another approach to the formation of threshold values involves the use of real achievable levels of security within the subjects of the Russian Federation, which can be further incorporated into regional development programs for managing economic security. In particular, for this purpose, it is proposed to determine the threshold levels of economic security for some indicators, taking into account the average Russian (or average for the federal district) values. In this case, you can use the following interpretation of the indicator from the point of view of the level of security: according to the studied indicator, a safe economic state is observed if the indicator value is higher than the average Russian value (the average value for the federal district), possibly with some margin.

RESULTS

Tables 18.1–18.4 show these targets and the indicators calculated on their basis in the context of the four projections of economic security. In particular, Table 18.1 presents the targets and indicators of general economic security. The targets and indicators of social security of the region are presented in Table 18.2. Targets and indicators of industrial and technological safety of the region are presented in Table 18.3. Targets and indicators of financial safety of the region are presented in Table 18.4.

Table 18.1***Targets and Indicators of General Economic Security (Based on Rosstat Data)***

Label	Target Used	Label	Indicator of the Model	Indicator Calculation
P1.1	Gross regional product (GRP) per capita (RUB)	I1.1	GRP per capita (FCB units)	P1.1/P1.11
P1.2	GRP physical volume index (in constant prices; % compared to the previous year)	I1.2	GRP physical volume index (in constant prices; % compared to the previous year)	P1.2
P1.3	Industrial production index (% to the previous year)	I1.3	Industrial production index (% compared to the previous year)	P1.3
P1.4	Index of agricultural production (% to the previous year)	I1.4	Index of agricultural production (% compared to the previous year)	P1.4
P1.5	Volume of agricultural production, million rubles	I1.5	Agricultural output per capita (FPC units)	P1.5/P1.11/ P1.10×1000
P1.6	Volume of shipped products of own production million rubles. (manufacturing industries)	I1.6	The volume of shipped products of own production per capita (units of FPC)	P1.6/P1.11/ P1.10×1000
P1.7	Per capita monetary income of the population (per month; rub.)	I1.7	Per capita monetary income of the population (per month; units). FPC)	P1.4/P1.10
P1.8	Dynamics of real incomes of the population (% to the previous year)	I1.8	Dynamics of real incomes of the population (%, compared to the previous year)	P1.5
P1.9	Consumer spending on average per capita (per month; RUB)	I1.9	Consumer spending on average per capita (per month; units FCB)	P1.7/P1.10

Source: Compiled by the authors using www.fedstat.ru

Table 18.2***Targets and Indicators of Social Security (Based on Rosstat Data)***

Label	Target Used	Label	Indicator of the Model	Indicator Calculation
P2.1	Population change (% , annual growth)	I2.1	Population change (% , annual growth)	P2.1
P2.2	Change in the average annual number of employees (% compared to the previous year)	I2.2	Change in the average annual number of employees (% compared to the previous year)	P2.2
P2.3	Demographic load factor (for 1000 people of working age, there are persons of non-working age)	I2.3	Demographic load factor (for 1000 people of working age, there are persons of non-working age)	P2.3
P2.4	Infant mortality rate (number of children who died before the age of 1 year, per 1000 live births)	I2.4	Infant mortality rate (number of children who died before the age of 1 year, per 1000 live births)	P2.4
P2.5	Life expectancy at birth. Men, years	I2.5	Life expectancy at birth. Men, years	P2.5
P2.6	Life expectancy at birth. Women, years	I2.6	Life expectancy at birth. Women, years	P2.3
P2.7	The share of the population with monetary incomes below the subsistence minimum (% of the total population of the subject)	I2.7	The share of the population with monetary incomes below the subsistence minimum (% of the total population of the subject)	P2.7
P2.8	Unemployment rate (%)	I2.8	Unemployment rate (%)	P2.8
P2.9	Share of food products in the structure of monetary income of the population (% of total monetary income)	I2.9	Share of food products in the structure of monetary income of the population (% of total monetary income)	P2.9

Source: Compiled by the authors using www.fedstat.ru

Table 18.3***Targets and Indicators of Industrial and Technological Safety
(Based on Rosstat Data)***

Label	Target used	Label	Indicator of the model	Indicator calculation
P3.1	Investments in fixed capital per capita (in current prices; RUB)	I3.1	The share of investments in fixed capital in the GRP structure (%)	$P3.1/P1.1 \times 100$
P3.2	The degree of depreciation of fixed assets at year-end (%)	I3.2	The degree of depreciation of fixed assets at year-end (%)	P3.2
P3.3	The index of labor productivity (%)	I3.3	The index of labor productivity (%)	P3.1
P3.4	Innovative activity of organizations (the proportion of organizations engaged in technological, organizational and marketing innovations in the total number of the surveyed organizations, %)	I3.4	Innovative activity of organizations (the proportion of organizations engaged in technological, organisational and marketing innovations in the total number of the surveyed organizations, %)	P3.4
P3.5	The volume of innovative goods, works, services, mln. RUB.	I3.5	The share of innovative goods, works, services in the GRP structure (%)	$P3.5/P1.10/P1.1 \times 100$
P3.6	The share of products from high-tech and science-intensive industries (%)	I3.6	The share of products from high-tech and science-intensive industries (%)	P3.6
P3.7	Organizations that implement innovations that improve environmental safety in the production of goods, works, and services (% of the total number of organizations that implement environmental innovations)	I3.7	Organizations that implement innovations that improve environmental safety in the production of goods, works, and services (% of the total number of organizations that implement environmental innovations)	P3.7

Source: Compiled by the authors using www.fedstat.ru

Table 18.3 (Continued)**Targets and Indicators of Industrial and Technological Safety
(Based on Rosstat Data)**

Label	Target used	Label	Indicator of the model	Indicator calculation
P3.8	Emissions of pollutants into the atmosphere from stationary sources (thousands of tons)	I3.8	Emissions of pollutants into the atmosphere from stationary sources in GRP production of 1000 FCB (tons)	$P3.8/P1.1/P1.11 \times P1.10 \times 1000$
P3.9	Discharge of polluted wastewater into surface water bodies (million cubic meters)	I3.9	Discharge of polluted wastewater into surface water bodies in GRP production of 1000 FCB (thousand cubic meters)	$P3.9/P1.1/P1.11 \times P1.10 \times 1000$

Source: Compiled by the authors using www.fedstat.ru

Table 18.4**Targets and Indicators of Financial Safety (Based on Rosstat Data)**

Label	Target Used	Label	Indicator of the Model	Indicator Calculation
P4.1	Net financial result (profit minus loss) of the organizations' activities, mln. RUB.	I4.1	The ratio of the net financial result (profit minus loss) of the organizations' activities and GRP (%)	$P4.1/P1.1/P1.11 \times 1000 \times 100$
P4.2	The share of unprofitable organizations (% of the total number of organizations)	I4.2	The share of unprofitable organizations (% of the total number of organizations)	P4.2
P4.3	Expenses of the consolidated budget of the subject, million rubles.	I4.3	The level of consolidated budget expenditures in the GRP structure, %	$P4.3/P1.1/P1.11 \times 1000 \times 100$
P4.4	Income and expenses (balance) of the consolidated budget of the subject, million rubles.	I4.4	The ratio of the balance of the consolidated budget of the subject and the GRP, %	$P4.4/P1.1/P1.11 \times 1000 \times 100$
P4.5	–	I4.5	The ratio of investments and the net financial result of organizations' activities, %	$P3.1 \times P1.11/P4.1/1000 \times 100$
P4.6	Investments from the budget funds for the development of industry in the region (% of the total investment)	I4.6	Investments from the budget funds for the development of industry in the region (% of the total investment)	P4.6

(Table continued on next page)

Table 18.4 (Continued)**Targets and Indicators of Financial Safety (Based on Rosstat Data)**

Label	Target Used	Label	Indicator of the Model	Indicator Calculation
P4.7	Debt on loans in rubles provided by credit organizations to individuals per capita, thousand rubles	I4.7	Debt on loans in rubles provided by credit organizations to individuals per capita, FCB units.	P4.7/P1.10 × 1000
P4.8	Debt on loans in rubles provided by credit organizations to legal entities per capita, thousand rubles	I4.8	Debt on loans in rubles provided by credit organizations to legal entities per capita, FCB units	P4.8/P1.10 × 1000
P4.9	Consumer Price Index (%)	I4.9	Inflation rate (%)	P1.9–100

Table 18.5**Average Values of Indicators for the Russian Federation and the Volga Federal District for 2010–2017, Their Variation (Variation Coefficient V) and Threshold Levels of Safety (Based on Rosstat Data)**

Indicators	RF		Threshold levels from RF		VFD		m fraction of RF	Threshold	
	m, average	V = s/m	Lower	Upper	m, average	V = s/m		Lower	Upper
General economic									
1. GRP per capita	33.8	4.7%	-20.0%	5.0%	28.0	5.9%	0.8	27.0	35.5
2. Index of phys. GRP	102.3	1.9%	Expert		102.6	2.7%	1.0	100.0	103.0
3. The industrial production index	102.7	2.5%	Expert		104.1	3.4%	1.0	102.0	105.0
4. The agricultural production index	103.3	9.5%	-3.0%	3.0%	103.3	17.6%	1.0	100.2	106.4
5. The agricultural production volume	2.4	6.5%	0.0%	25.0%	3.1	7.9%	1.3	2.4	3.0
6. Own production	17.1	5.0%	0.0%	25.0%	19.8	6.2%	1.2	17.1	21.3

(Table continued on next page)

Table 18.5 (Continued)

Average Values of Indicators for the Russian Federation and the Volga Federal District for 2010–2017, Their Variation (Variation Coefficient V) and Threshold Levels of Safety (Based on Rosstat Data)

Indicators	RF		Threshold levels from RF		VFD		m fraction of RF	Threshold	
	m, average	V = s/m	Lower	Upper	m, average	V = s/m		Lower	Upper
7. Average monetary income of the population	2.3	4.4%	-5.0%	5.0%	2.1	5.5%	0.9	2.1	2.4
8. Dynamics of real incomes of the population	100.7	4.3%	Expert		100.6	5.4%	1.0	100.0	105.0
9. Consumer spending of the population	1.7	5.6%	-5.0%	5.0%	1.6	6.4%	0.9	1.6	1.7
Social									
1. Population change	0.1	52.8%	Expert		-0.2	-66.6%	0.0	-0.1	0.2
2. Change in the number of employees	99.9	0.3%	-25.0%	10.0%	99.4	0.7%	2.9	99.9	100.5
3. Demographic load factor	702.8	8.2%	Expert		719.3	8.9%	21.3	650.0	750.0
4. Infant mortality rate	7.2	14.6%	National project "Health"		6.6	13.2%	0.2	4.5	5.6
5. Life expectancy at birth. men	65.3	2.1%	-5.0%	5.0%	64.3	2.2%	1.9	62.0	68.5
6. Life expectancy at birth. women	76.3	1.2%	-5.0%	5.0%	76.2	1.2%	2.3	72.5	80.1
7. The population with incomes below the subsistence level	12.2	9.3%	Target 7-10		15.3	22.3%	0.5	10.0	15.0

(Table continued on next page)

Table 18.5 (Continued)

Average Values of Indicators for the Russian Federation and the Volga Federal District for 2010–2017, Their Variation (Variation Coefficient V) and Threshold Levels of Safety (Based on Rosstat Data)

Indicators	RF		Threshold levels from RF		VFD		m fraction of RF	Threshold	
	m, average	V = s/m	Lower	Upper	m, average	V = s/m		Lower	Upper
8. Unemployment rate	5.8	12.7%	Target < 4		5.4	20.2%	0.2	4.0	6.0
9. Share of food products in income	33.2	5.2%	-10.0%	10.0%	33.1	5.5%	1.0	29.8	36.5
Production and technological									
1. Investments in fixed assets	23.2	7.4%	-5.0%	5.0%	24.7	6.6%	0.7	22.1	24.4
2. Depreciation of fixed assets	47.8	4.3%	Expert		53.7	2.7%	1.6	45.0	55.0
3. Labor productivity index	101.8	1.8%	-2.0%	2.0%	103.3	2.0%	3.1	99.8	103.8
4. Innovative activity of organizations	9.6	8.1%	Target		11.1	11.9%	0.3	10.0	20.0
5. Volume of innovative products	5.5	19.0%	Target		12.2	11.1%	0.4	10.0	20.0
6. Share of science-intensive industries' output	19.7	2.6%	Expert		23.6	2.5%	0.7	20.0	30.0
7. Organization and implementation of innovations in the environment	50.8	10.0%	-10.0%	10.0%	50.7	12.5%	1.5	45.8	55.9
8. Emissions of harmful substances into the air	3.7	8.5%	-20.0%	20.0%	3.1	5.9%	0.1	3.0	4.5

(Table continued on next page)

Table 18.5 (Continued)

Average Values of Indicators for the Russian Federation and the Volga Federal District for 2010–2017, Their Variation (Variation Coefficient V) and Threshold Levels of Safety (Based on Rosstat Data)

Indicators	RF		Threshold levels from RF		VFD		m fraction of RF	Threshold	
	m, average	V = s/m	Lower	Upper	m, average	V = s/m		Lower	Upper
9. Discharge of harmful substances into surface waters	3.1	10.6%	-20.0%	20.0%	3.2	11.0%	0.1	2.5	3.7
Financial									
1. Net financial result	13.8	26.0%	-25.0%	5.0%	10.5	31.5%	0.3	10.3	14.4
2. The share of unprofitable organizations	30.9	4.8%	-10.0%	10.0%	28.9	4.9%	0.9	27.8	34.0
3. Consolidated budget expenditures	15.8	8.1%	-10.0%	10.0%	15.8	10.4%	0.5	14.2	17.4
4. Consolidated budget balance	-0.4	-102.4%	Expert		-0.8	-63.6%	0.0	-3.0	4.0
5. Investment/Profit	181.8	33.8%	-10.0%	50.0%	279.6	60.4%	8.3	163.6	272.7
6. Budget investments	16.7	7.3%	-15.0%	5.0%	14.4	17.8%	0.4	14.2	17.5
7. Debt of legal entities	9.5	12.6%	Expert		6.8	7.1%	0.2	5.0	10.0
8. Debt of individuals	7.6	27.1%	Expert		7.4	27.4%	0.2	5.0	10.0
9. CPI	7.5	44.7%	Target		7.2	45.7%	0.2	5.0	10.0

Source: Compiled by the authors using www.fedstat.ru

Thus, to measure the level of economic security of the region, four projections are used with nine indicators in each projection, that is, a total of 36 indicators. Each projection also identifies three subprojections of economic security. Thus, it is possible to assess the economic security of the subjects of the Russian Federation from the position of 12 subprojections of economic security.

DISCUSSION

In contrast to the approaches used to compare the level of security with the average Russian (threshold) value, we suggest converting their values into a safety scale, measured from 1 to 100 points to compare various indicators of economic security with each other. One hundred points mean the full provision of economic security; 1 point is a low level of economic security, a high risk of stress instability for the normal functioning of the region's economy according to the measured indicator.

According to the indicators of each projection, the level of economic security is calculated on a point scale based on the arithmetic mean principle. Then, based on the values of economic security for all projections, the integral (or final) level of economic security of the region is calculated according to the geometric mean principle. The use of simple arithmetic means within a single projection is based on the fact that the indicators of a single projection can be quite strongly interrelated since they have such a relationship by their nature. Since the number of indicators in the group is significant, the use of weight coefficients does not play a significant role. Therefore, the values of the indicators in one group are mutually compensated around the average value. On the contrary, indicators of different projections characterize unrelated aspects of economic security, so the low values of some projections should not be compensated for by the high values of others. In this case, the use of the geometric mean indicator is justified to estimate the integral.

The piecewise linear scaling method is used to convert the indicator values to a point scale. In general, it is assumed that when the indicator values change from the minimum possible values to the maximum possible values, the influence of the estimated factor on the level of economic security can be represented graphically in the form of an S-shaped curve. In particular, with sufficiently small values of the factor (indicator), security is provided to a lesser extent, and with sufficiently large values of the factor, economic security will be provided to the required extent.

This curve can be well approximated by a piecewise linear function (graph), which takes fixed values at the boundaries of the indicator change interval, and changes linearly in the interval between the two threshold values. Thus, the problem arises to identify the threshold values between which the main change in the level of economic security occurs.

In the period under study, the general economic indicators of the subjects as a whole in the Russian Federation and the Volga Federal District change slightly—the variation coefficient is low—under 10%, only the agricultural production index has a moderate variation coefficient—fewer than 25%. More significant fluctuations are observed in changes in social indicators, in particular, a moderate level of variation is recorded in three

indicators, and a high level of variation in the indicator—population change—exceeds 50%. The variation of production and technical indicators is about the same level. The greatest instability is observed in the indicators of the financial projection—most of them have a high coefficient of variation—over 25%.

Using the threshold levels, the values of the indicators are converted to a point scale. Let us assume that the upper threshold level corresponds to a higher security level indicator. Then this threshold level and higher indicators are assigned 100 points. The lower threshold level and lower indicators are assigned 1 point. The intermediate values of the indicator are assigned from 1 to 100 points in proportion to the deviation from the lower threshold level.

In general, based on the score of the indicators, the score values of the security projections (group assessments) and, in general, the final (integral) assessment of the level of economic security is also determined.

These assessments can be used to qualitatively characterize various aspects of safety. To do this, it is proposed to divide the point scale into three safety levels using two threshold levels: 34 points and 67 points:

- 34 or fewer points—a dangerous state, a high risk of a stressful decline in the level of economic security;
- 67 points or more—a safe state, a high level of economic security, a low risk of a stress disorder of stability and a decrease in economic security;
- from 34 points to 67 points—an intermediate (uncertain) state of security: there may be minor risks of reducing the level of economic security.

This interpretation is possible both for individual indicators and for group assessments—projections (subprojections) and the final (integral) assessment of economic security.

CONCLUSION

The results of the assessment of the economic security and risks of the subjects of the Volga Federal District in 2010–2017 from the position of the final (integral) economic security are presented in Table 18.6.

In general, there is an intermediate level of safety from the point of view of stress tolerance in the first half of the study period, and in the next three years, it decreases to a dangerous level for many subjects. The best situation with economic security is in the Republic of Tatarstan, but even there, since 2014, the level of security from the point of view of stress tolerance is intermediate.

Table 18.6***Final (Integral) Assessment of Economic Security of the Subjects of Volga Federal District***

Subjects	2010	2011	2012	2013	2014	2015	2016	2017
VFD	40	48	55	53	44	30	34	37
Republic of Bashkortostan	52	51	53	57	43	33	31	35
Republic of Mari El	40	43	46	44	46	38	21	39
Republic of Mordovia	43	46	47	46	50	43	53	48
Republic of Tatarstan	67	81	77	71	64	59	66	65
Udmurtian Republic	39	47	42	39	40	26	41	31
Chuvash Republic	46	55	52	39	38	37	37	35
Perm Territory	40	47	38	46	38	27	29	36
Kirov Region	35	39	33	23	43	19	28	21
Nizhny Novgorod Region	43	52	60	59	52	39	44	45
Orenburg Region	41	43	41	37	27	22	26	30
Penza Region	34	44	43	49	44	46	39	39
Samara Region	39	50	55	57	50	28	31	35
Saratov Region	37	42	44	42	37	26	34	40
Ulyanovsk Region	45	49	43	40	32	25	36	42

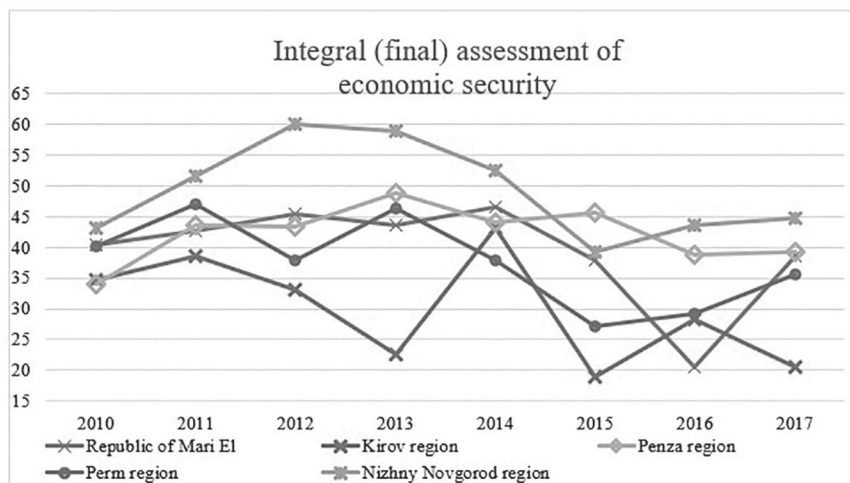
Source: Compiled by the authors.

The dynamics of the integrated assessment of the economic security of the subjects of the Volga Federal District is also shown in Figure 18.1.

The study of economic security from the point of view of comparing different projections also shows a certain level of interrelation and interdependence of indicators within individual projections by the region.

Figure 18.1

Results of Integral (Final) Assessment of Economic Security by VFD Regions



Source: Compiled by the authors.

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CHAPTER 19

MARKETING RESEARCH

Russian Market of Organic Mineral Fertilizers

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ABSTRACT

Agriculture, being the basic branch of the economy, combines biological and economic conditions for the implementation of production activities. Crop production is particularly susceptible to external influences. This feature imposes certain restrictions on using key components when working in crop production. In particular, it is necessary to be careful when applying fertilizers to the soil. In world practice, mineral, organic, and organomineral fertilizers are used. As the studies show, special attention is paid to using organic fertilizers, since these compounds combine the main characteristics of both mineral and organic fertilizers.

INTRODUCTION

In recent years, markets have developed under the influence of several trends. The first trend is the development of Industry 4.0, which is

described in (Alpidovskaya & Popkova, 2019; Belik et al., 2020; Bogoviz et al., 2021; Bozhuk et al., 2019; Haabazoka et al., al., 2019; Karanina, Sapozhnikova, Loginov, Holkin, Sergievskaya, & Zurakhovskii, 2017; Lysova et al., 2020; Popkova, 2019; Popkova & Gulzat, 2020; Popkova & Sergi, 2020; Popkova, Sozinova, & Menshchikova, 2019; Ragulina, 2019; Ragulina et al., 2019; Saveleva et al., 2019; Sergi, 2019; Sergi et al., 2019; Sozinova, 2019; Sozinova et al., 2019; Zavyalova et al., 2018; Popkova et al., 2021a, 2021b). The second trend is associated with the global pandemic COVID-2019 (Ataguba & Ataguba, 2020; Bentata, 2020; Dente & Hashimoto, 2020; Laing, 2020; Sozinova, 2020). It should be noted that the economy still has not recovered from the global financial and economic crisis, which is described in (Sozinova et al., 2017; Sozinova et al., 2019; Fufacheva et al., 2017). The third trend is associated with the development of marketing activities in the markets, which is described in (Kataeva, Marakulina, Sanovich, Sozinova, & Vasilyuk, 2017; Sozinova, Fokina, & Shchinova, 2019). The risks that enterprises face under the influence of the indicated trends are described in (Karanina, Sapozhnikova, et al., 2017; Karanina, Loginov, et al., 2017; Karanina, Ilysheva, et al., 2017; Karanina, Sapozhnikova, et al., 2017), (Loginov & Karanina, 2017; Loginov et al., 2017).

In connection with the above trends, relevant is the development of agriculture as a branch of the economy, which is least affected by the consequences of COVID-19, but at the same time is subject to the influence of risks attributed to the category of force majeure. As a fundamental component, we consider the market of organic fertilizers, since crop production can be considered a connecting link in agriculture—this is the country's food development, the formation of a fodder base for animal husbandry, and a raw material base for a number of light industry sectors. When growing any types of agricultural crops, an invariable technological operation is the use of fertilizers in various doses of application, depending on the type of crop, the initial fertility of agricultural land and the type of fertilizer.

METHODOLOGY

Organomineral fertilizers, combining organic elements and mineral salts, change the physicochemical properties of the soil, which ultimately makes it more fertile, and also enhances the action of various microorganisms.

We should note the main advantages of organomineral fertilizers: due to the presence of humates, minerals are almost completely absorbed by agricultural plants, which makes it possible to reduce the number of seasonal fertilizers or completely abandon them; using organic fertilizers on all types of agricultural land does not lead to an overdose of nutrients in

the soil, since the solid fractions not assimilated by plants will remain in the surface layer of the soil until the next season and will be processed by microorganisms into the fertile layer; a sufficiently high level of digestibility of organic mineral fertilizers makes it possible to reduce the rate of their application by 2.5–3 times in comparison with traditional mineral fertilizers (Garzanov & Dorofeeva, 2018); granular organomineral fertilizer has the ability to absorb soil moisture, and then feed it to plants as needed (Bauatdinov & Tjiev, 2020); fertilizer improves the structure and other properties of the surface soil layer, creating conditions for better oxygen saturation (Kireychева & Yashin, 2015); when using organomineral fertilizers, agricultural plants adapt better to unfavorable environmental conditions, that is, they tolerate spring frosts, lack of light and oxygen with less losses, plants increase their biological resistance to diseases and pests, an improvement in the quality of fruits and vegetables is observed (they have a higher level of starch, sugars, microelements and vitamins, a higher level of gluten and a lower level of nitrates) (Yakovleva & Bakalov, 2012).

Thus, organomineral fertilizers supply agricultural plants with a full range of nutrients and enrich the soil layer without harming its physical properties, having a positive effect on agrochemical, agrophysical and biological characteristics. In this regard, it is necessary to pay attention to studying the market for organic fertilizers in the territory of the Russian Federation.

RESULTS AND DISCUSSION

A Brief Overview of Mineral Fertilization

Using mineral fertilizers in agriculture allowed mankind to make a breakthrough in the process of providing the population with food due to a significant increase in the level of crop yields, gross harvests of grain, vegetables, and as a result, due to the production of feed, to increase the production of meat, milk, and other agricultural products.

The consumption of mineral fertilizers at the world level in 2018 amounted to 188.8 million tons (Table 19.1), which is 1.3 million tons less than in 2017. It should be noted that such fluctuations can be caused by changes in the climatic conditions of growing and the annual crop rotations, when the movement of crops between fields causes a change in acreage, resulting in various levels of using all types of fertilizers. At the same time, the forecast estimates are quite optimistic and indicate an increase in the dynamics of consumption in the near future.

Let us consider the variation in the consumption of mineral fertilizers from the point of view of a geographic approach.

Table 19.1***World Consumption of Mineral Fertilizers, Mln Tons***

Fertilizer type	2016	2017	2018	2019f
Nitrogen	107.1	106.4	106.5	107.1
Phosphoric	45.4	46.3	45.3	4.0
Potash	35.9	37.4	37.0	37.4
Total	188.5	190.1	188.8	190.5

Source: IFA (Short-Term Fertilizer Outlook 2016–2017, 2019–2020).

In terms of geographical distribution, the largest consumers of mineral fertilizers are the countries of Asia and America. It should be noted that about 60% of the global demand for chemicals is in four countries: China, India, the United States, and Brazil, which clearly form the main directions of the dynamics of the world market development.

The reduction in the consumption of mineral fertilizers at the world level is caused by the mutual influence of a number of main factors:

- a low level of prices for a number of agricultural crops has formed on the world market, which has caused the need to reduce production costs, and as a result, a decrease in the volume of purchases of mineral fertilizers, since the specific weight of this particular cost item, according to experts, accounts for up to 20% of the total costs of crop production;
- a number of regions, the main consumers of fertilizers (U.S., EU), have unfavorable weather conditions for agriculture;
- a number of countries importers of mineral fertilizers (Turkey, Argentina), had a devaluation of national currencies;
- the development of a protracted trade conflict between the United States and China;
- the introduction of banning food sanctions against Iran;
- an increase in the level of efficiency of using mineral fertilizers in China and developed countries.

The second half of 2018 was characterized by a relatively low water level in the river system of the EU countries, which directly had a negative impact on the volume of consumption in the mineral fertilizers market towards its decrease. Despite the fact that at the beginning of December 2018 the situation returned to normal, some supplies of mineral fertilizers to the EU market were postponed to the first quarter of 2019. Also, 2018 was marked by the fact that in the United States, due to snowfall earlier than

the average observed time and generally unfavorable weather conditions, the level of consumption of mineral fertilizers turned out to be lower than the traditional one, while the application season was shifted to a later date.

The second and third quarters of 2019 were marked by the beginning and further exacerbation of the trade conflict between countries such as the United States and China. This affected the global economy as a whole, and also affected the mineral fertilizers market. The relatively stable level of demand for potash fertilizers in the first half of 2019 was due to the favorable situation in Brazilian agriculture, as the conflict between the United States and the PRC contributed to an increase in Brazilian soybean exports.

It should be noted that in the U.S. market was the following situation: due to unfavorable weather conditions, there was a low level of demand for potash fertilizers, pre-sowing treatment and plant protection products, that is why stock levels increased. At the same time, a stable demand for potash fertilizers was in the countries of Europe, the Middle East, and Africa.

During 2018, palm oil prices in Southeast Asian countries were fairly low, and the level of trade in key markets formed below traditional sales volumes, which, as a result, consistently caused a decline in the level of demand for potash fertilizers. In the market of China, there was an imbalance between contract volumes of supplies and consumption, and as a result, port stocks were accumulated. Therefore, there were preconditions for a decrease in demand for mineral fertilizers, and manufacturers were informed about a reduction in production volumes.

Let us consider the dynamics of the level of application of mineral fertilizers for agricultural crops in the territory of the Russian Federation (Table 19.2).

Table 19.2

Application of Mineral Fertilizers for Crops in Agricultural Organizations in the Russian Federation

Indicators	2014	2015	2016	2017	2018
Mineral fertilizers applied:					
total, mln ct	19	20	23	25	25
per 1 hectare of the entire sown area, c:	0.40	0.42	0.49	0.55	0.56
among them:					
cereals and legumes (excluding corn)	0.42	0.45	0.51	0.58	0.60
fiber flax	0.28	0.33	0.42	0.32	0.63
sugar beet	2.55	2.74	2.94	3.01	3.05
sunflower	0.28	0.25	0.32	0.37	0.34

(Table continued on next page)

Table 19.2 (Continued)***Application of Mineral Fertilizers for Crops in Agricultural Organizations in the Russian Federation***

Indicators	2014	2015	2016	2017	2018
forage crops	0.13	0.14	0.16	0.19	0.20
vegetable and melon crops	1.72	1.66	1.95	1.98	1.87
potatoes	3.06	3.28	3.26	3.54	3.92
Specific weight of the area fertilized with mineral fertilizers in the total sown area, %	47	48	53	58	59

Source: http://old.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/enterprise/economy/#

In the period from 2014 to 2018, there was an increase in the total amount of mineral fertilizers applied by 0.6 million tons. It should also be noted that for the effective use of agricultural land, it is important to apply fertilizers per unit of sown area. The level of this indicator on the territory of the Russian Federation during the period under review increased from 40 kg per 1 ha in 2014 to 56 kg per 1 ha in 2018.

As for agricultural crops, the following changes took place during the period under review: the greatest increase in the application of fertilizers was for planting potatoes—by 86 kg; the smallest—for sowing sunflower—by 6 kg and for sowing forage crops—by 7 kg, respectively. When considering the dynamics of changes in general, a growth trend was formed for the selected group of agricultural crops.

If we consider the level of supply of mineral fertilizers for all sown areas of the Russian Federation, then the following trend should be noted: during the period under consideration, the share of the area fertilized with mineral fertilizers in the entire sown area increased from 47% in 2014 to 59% in 2018. The formation of such a trend can be regarded as a positive factor in the development of agriculture.

To solve the problem of increasing the level of supplying mineral fertilizers to agricultural enterprises in the regions of the Russian Federation, the Order of the Government of the Russian Federation of March 29, 2018 No. 532-r and the Action Plan (“road map”) for the development of the production of mineral fertilizers for the period until 2025 was approved. According to this order, the total volume of production of mineral fertilizers by 2025 should increase by 7.2 million tons compared to the level of 2016.

The volume of production of nitrogen fertilizers by 2025 should amount to 12.3 million tons compared to 9.5 million tons in 2016, the production of phosphate fertilizers will increase by 0.4 million tons, and an increase in the level of production of potash fertilizers should be 3.9 million tons by 2025.

A Brief Overview of Organic Fertilization

We should note that the constant application of traditional mineral fertilizers is associated with certain agronomic, economic, and environmental restrictions, the influence of which is amplified as a result of how the volumes of their application to the soil increase due to natural reasons.

In a number of European countries, according to a number of experts, the maximum level has already been overcome, exceeding the level when applying mineral fertilizers does not give a traditional increase in the level of crop yields, but significantly reduces the effectiveness in terms of agronomic, environmental, economic, energy components and, accordingly, the quality of the resulting agriculture final products. According to the dynamics of the general development and the state of agriculture, an increase in the doses of mineral fertilizers at this stage of the development period no longer leads to a relevant increase in the yield of agricultural crops. The revealed state indicates that a further increase in doses is devoid of a practical component, but even without the introduction of mineral nutrition for plants, it is impossible to carry out work in crop production.

Let us analyze the dynamics of using organic fertilizers in agriculture (Table 19.3).

Table 19.3

Application of Organic Fertilizers for Crops in Agricultural Organizations in the Russian Federation

Indicators	2014	2015	2016	2017	2018
Mineral fertilizers applied:					
total, mln ct	616	642	652	666	688
per 1 hectare of the entire sown area, c:	0.013	0.013	0.014	0.015	0.015
among them:					
potato	0.054	0.061	0.058	0.064	0.048
cereals and legumes (excluding corn)	0.011	0.012	0.012	0.013	0.012
sugar beet	0.020	0.022	0.025	0.022	0.022
vegetable and melon crops	0.028	0.036	0.028	0.026	0.021
sunflower	0.007	0.009	0.009	0.009	0.010
forage crops	0.014	0.015	0.016	0.017	0.019
Specific weight of the area fertilized with mineral fertilizers in the total sown area, %	8.2	8.4	9.3	9.2	9.4

Source: http://old.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/enterprise/economy/#

In the period from 2014 to 2018, there was an increase in the total amount of organic fertilizers applied by 7.2 million tons—from 61.6 million tons in 2014 to 68.8 million tons in 2018. At the same time, the dose of organic fertilizers applied per hectare increased to 0.015 centners in 2018 compared to 0.013 centners in 2014.

During the observed period, there was an increase in the application of organic fertilizers for such agricultural crops as grain and leguminous crops, sugar beets and forage crops. The fertilizer application rate for forage crops increased by 0.5 kg per hectare by 2018 and amounted to 1.9 kg per hectare of sown areas. However, during this period, there was a decrease in the doses of organic fertilizers for a number of crops, such as vegetables and melons and potatoes: for vegetable and melons, the decrease was 0.7 kg per 1 ha, and for potatoes – 0.6 kg per 1 ha.

If we consider the level of provision with organic fertilizers of all sown areas of the Russian Federation, we can say that the process of the formation of the following trend is under way: over the observed period, the share of the area fertilized with organic fertilizers in the entire sown area increased from 8.2% in 2014 to 9.4% in 2018.

Organic agriculture in the territory of the Russian Federation received a new round due to the fact that on January 1, 2020, the Federal Law “On organic products and on amendments to certain legislative acts of the Russian Federation” came into force.

Article 4 of this law describes the requirements for the production of organic products.

A complete ban is being introduced on using agrochemicals, pesticides, antibiotics, growth and fattening stimulants of farm animals, hormonal preparations, with the exception of those substances and compounds that are permitted for use by the national, interstate and international standards in the field of production of organic agricultural products in the Russian Federation.

Brief Overview of the Market of Organomineral Fertilizers

A rational approach to solving the above problems can be achieved in the case of producing and using complex organomineral fertilizers of prolonged action, since these compounds, possessing the properties of mineral fertilizers, are accordingly capable of quickly and fully supplying plants with nutrients, and at the same time with these properties of organic fertilizers, which leads to a reduction in the consequences with a negative impact from using mineral salts of high concentration in the soil layer, allowing to improve the soil structure, composition and activity of soil microbial communities.

In the Russian Federation, GOST R 50611-93 “Complex organomineral fertilizer (Technical conditions)” is in force.

The composition of organomineral or complex fertilizers includes organic matter and macro- and microelements. The formula for the composition of organomineral fertilizers (OMF) can be different depending on biological characteristics of the culture being grown and its basic need for a variety of nutrients. The assimilation of organomineral fertilizers occurs in a fuller volume and faster than organic (manure, peat, compost, etc.) and mineral fertilizers.

In most cases, extracts from peat, brown coal, silt deposits, shale, sewage sludge, and so forth, are used as an organic basis for the preparation of organomineral fertilizers. At this stage, for the preparation of OMF, materials such as peat, brown coal, soil, lignin, and various wastes are used, activated by nitration, oxidation, sulfonation, ammonization in order to enrich them with active functional groups. As a result of such a solution, an increase in the level of solubility of complex fertilizers is achieved, an active flow of anion—and cation—exchange and complex—forming processes in the soil. They usually contain physiologically active compounds and growth regulators that have a positive effect on the development and growth of crops. The effects of organomineral fertilizers are aimed at complex stimulation of all biological processes of plants.

In modern practice, potassium-sodium humates, which have a stimulating effect on plant growth processes, have been actively used to a greater extent. The negative impact of pesticides and other undesirable environmental factors on agricultural plants is reduced or significantly weakened.

Humates are obtained from brown coal and peat. To increase the effectiveness of the action, macro- and microelements in a chelated form are introduced into their composition.

Also organomineral fertilizers are produced on the basis of seaweed.

Sapropel, a bottom sediment in freshwater reservoirs of the Ice Age, can be used as an organic component. As a result of a thousand-year natural synthesis of plant and animal life, a unique product is formed, including mineral and organic components.

Let us consider the main producers of organic fertilizers by geographical location in Russia (Table 19.4).

When segmenting producers of organic mineral fertilizers by geography, it is necessary to highlight a number of factors affecting the production location:

- availability of a mineral resource base for the implementation of the production process;
- the proximity of the main consumers of this type of product, since agro-climatic conditions play an important role for the location of agricultural enterprises;
- development of an extensive road and transport infrastructure.

Table 19.4***List of Producers of Organomineral Fertilizers***

Federal District	Enterprise	Note
Central	JSC “Buisik Chemical Plant”	peat
	LLC “ECO-NEST-M”	brown algae
	LLC “Agrochemical company SoyuzKhim”	OMF
	FERTIKA CJSC	YARA, FERTIKA
	LLC “ORTON”	OMF
	LLC “ECO-AGRO”	OMF
	LLC “AGROOPTIMA”	OMF
	LLC NPO Sapropel	sapropel
	LLC Biotechnology	manure
	LLC “Sudislavl-Peat”	peat
	Garden Retail Service Company	multibrand
	Bioflores company	chicken droppings
	LLC “Biogran”	chicken droppings
	LLC “Ekorost”	peat
Northwestern	LLC Trade and Production Company “NOV-AGRO”	OMF
	LLC “Scientific and Production Association” Implementation of Environmental Technologies”	TU 2431–007–71452208–05
	LLC “Natural Resources”	sapropel
	LLC “Agrofizprodukt”	TU 2186-016-79850210-2007
Southern	LLC Scientific Center “Nooecosfera-XXI”	OMF
	LLC “Kuban Agrobiokompleks”	OMF
North Caucasian	LLC “AGROECO CONSULTING”	OMF
Ural	LLC “Ural Diatomite Company”	diatomite
	LLC Glauconit	glauconite
	LLC “Gumaty”	OMF

(Table continued on next page)

Table 19.4 (Continued)***List of Producers of Organomineral Fertilizer***

Federal District	Enterprise	Note
Privolzhsky	LLC NVP “BashInkom”	OMF
	LLC “Speckhimagro”	OMF
	LLC “Radonezh”	OMF
	LLC “ETALON-SERVICE”	zeolite, glauconite
	LLC “DIATOM-POVOLZHE”	zeolite
	LLC “Innovative Biotechnologies”	zeolite
		TU 20.15.71- 003-32197553- 2019
	EcoAgroTech BIO LLC	OMF
	LLC “Nizhegorodsky fumigation detachment”	pyrolytic charcoal
Siberian	LLC “Sileks-Agro”	OMF
	LLC “AGROTECH GUMAT” (Irkutsk humates)	OMF
Far Eastern	GC Sakhalin humates	leonardite
	LLC NPK Ecoterra	sapropel

Source: Compiled by the authors.

For example, the Sakhalin Humates Group of Companies uses brown coal in the production process—leonardite from the Solntsevsky deposit (Sakhalin Island). Specialists from the Belarusian Institute of Peat began to study it in 1986. Nowadays the Sakhalin Humates Group of Companies interacts with the Agricultural Institute of Agrochemistry named after V.I. D. N. Pryanishnikov, NIUIF named after Ya. V. Samoilov, All-Union Research Institute of leguminous and cereal crops “Orlovskoe.”

OJSC “Buiskey chemical plant” has developed a peat extraction site in the Buiskey district of the Kostroma region for the production of organomineral fertilizers and nutritious peat soils.

Thus, producers of organic fertilizers are located practically throughout the entire territory of the Russian Federation. Some regions have pronounced features, for example, in the Ulyanovsk region, zeolite is used in the production of organic fertilizers.

Let us consider the main players in the organic fertilizer market in Russia, presenting to the market a fairly wide range of organic fertilizers and a number of similar products that can be used in organic agriculture or for optimal use and increasing the level of farming efficiency.

OJSC “Buisky Chemical Plant,” located in the Kostroma Region, has been on the market since 1994 and is one the largest enterprises in the Russian Federation, which produces specialized types of fertilizers for almost all areas of the plant growing industry. Thanks to the scientific approach, a system of soil nutrition for agricultural crops was obtained through the development of organomineral complexes enriched with favorable soil microflora, humic substances, phytopreparations based on allelopathic plants. Special types of mineral and complex fertilizers are adapted to all technologies that are currently used in agriculture.

LLC Kuban Agrobiokompleks is the largest enterprise in the South of Russia, specializing in the industrial production of bulk and liquid organic products under the EKOSS trademark. Production capacity is up to 20,000 tons / year of compost and vermicompost.

LLC “Sudislavl-peat” is engaged in the extraction of peat and the production of organic humic liquid fertilizers. Production volumes are 20 thousand liters per day.

JSC “FERTIKA” is the exclusive representative for the packaging of YARA fertilizers, the exclusive buyer of YaraMila and Kristalon raw materials for the production of complex mineral fertilizers and packaging under the FERTIKA brand. The production of organic potash fertilizer and organic mineral fertilizer mixtures is also carried out.

CONCLUSION

The new generation of organomineral fertilizers, due to using exceptional properties of various forms of natural organic materials (for example, glauconite, zeolite, sapropel, etc.), have a number of advantages over mineral fertilizers: have a balanced ratio between mineral and organic components, include natural components plant growth and development stimulants in biologically active forms; promote in a short time the formation of useful microbial communities in the root zone of plants; are inherently environmentally compatible, reduce the level of pollution of the soil layer and groundwater with complex chemical compounds; have a minimum level of caking during long-term storage, do not form a dusty cloud during application to the soil, have a lower corrosive effect when interacting with agricultural machinery in comparison with nitrogen, potash and phosphorus fertilizers; are characterized by a prolonged release of nutrients, due to which they provide up to 1.5 times an increase in the utilization of nutrients

in comparison with standard mineral fertilizers. The use of organomineral fertilizers from an economic point of view is effective due to the high effect of prolonged action. They do not contribute to the accumulation of nitrate nitrogen in the production of crop products and increase the quality of the obtained agricultural products for food and fodder purposes.

Thus, the analysis of trends in the development of agriculture has shown that in the 21st century there will certainly be a process of gradual replacement of mineral fertilizers with organomineral fertilizers, and it is more likely that in the second half of the century they will become the predominant form. The review of the organic fertilizers market has confirmed that the plant growing industry in the Russian Federation will potentially be fully provided with the necessary resources for the transition to a new technological level of agriculture.

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CHAPTER 20

FACTORS OF ECONOMIC SUSTAINABILITY OF SOCIAL ENTERPRISES

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ABSTRACT

The goals and objectives of the social enterprise are becoming increasingly multifaceted every year. In the current environment, social entrepreneurs are forced to improve the quality of their core business and ensure a sustainable economic position of the social enterprise. The chapter aims to identify and group factors for ensuring the financial sustainability of the social enterprise. The chapter analyzes the types of financial instruments to support a social enterprise. The author's definition of the concept of "economic sustainability of the social enterprise" is given. Based on the analysis of international and Russian literature, as well as the results of the survey of heads of social enterprises in the Kemerovo Region–Kuzbass, the author develops a system of factors affecting the economic sustainability of social enterprises. As a result of the study, the author draws conclusions and gives practical recommendations for improving the economic sustainability of the social enterprise.

INTRODUCTION

The activity of a modern social enterprise is not just a process of providing social services, it is the functioning of a complex system consisting of many elements and links between them in the internal environment, as well as internal elements with links in the external environment. While there is a common vector of development, each element has its own goal, the effective implementation of which is impossible without high-quality infrastructure and adequate financial support. In contrast to a commercial enterprise, the primary purpose of which is to generate a monetary gain, the finances of a social enterprise have a slightly different purpose. First, the money received from entrepreneurial activities must be fully allocated to social projects (which is possible, among other things, through the competent financial organization of the core activity). Second, the activities of a social enterprise provide a financial benefit to the country with the implementation of social goals. In this regard, the central hypothesis of the study is the assumption that social projects can have high efficiency only if the economic sustainability of the social enterprise is ensured.

The chapter aims to identify and group the factors that ensure the financial sustainability of a social enterprise.

During the research, the author defines the concept of “economic sustainability of the social enterprise,” defines financial instruments for the development of social enterprise and indicates the factors affecting the level of economic sustainability.

The research subject is the factors affecting the economic sustainability of the social enterprise. The research object is the economic component of the social enterprise.

MATERIALS AND METHODS

The methodology of the study includes a set of the following methods:

- Analysis of scientific literature (the author considered publications on the financing of social enterprises);
- System analysis (the author identified a set of factors for the economic sustainability of the social enterprise interrelated with each other);
- Method of cause-effect analysis (the author determined the relationship between the level of economic sustainability of a social enterprise and the content of the factors influencing it);
- General scientific methods of analysis and synthesis.

The empirical basis of the study was the results of a survey of 29 social entrepreneurs in the Kemerovo Region conducted in October–December 2020. The survey was conducted in the form of a questionnaire.

RESULTS

Economic sustainability is a widespread concept that has been long used at various levels of economic management. This concept has been evolving for several centuries. For example, Ivanova (2011) identifies sustainability with equilibrium. She emphasizes that the decisions made by the management team must effectively influence the factors of sustainability in a given range of risks. Zaitsev (2006) discloses the content of the economic stability of the enterprise from a slightly different perspective. In his opinion, one can speak of sustainability only when an enterprise effectively develops at present and has the potential for long-term development under external negative influences. Shulgina and Sova (2009) reveal economic stability from the position of the enterprise's ability to reduce the negative impact of risks and. Reznik (2012) believes that the content of economic stability cannot be considered in isolation from the provision of competitiveness. Economic sustainability combines several elements—industrial, commercial, organizational, innovative, social, and financial sustainability. Nevertheless, speaking about economic sustainability, the authors most often focus on financial sustainability since survival in challenging economic conditions remains the goal of most business entities.

The presence of many scientific papers on the economic sustainability of commercial enterprises allows for forming a relatively complete picture of this phenomenon. However, this cannot be said about the economic sustainability of the social enterprise. The concept of economic sustainability of the social enterprise is practically not used and not considered by Russian scholars and specialists. International researchers use this concept more often. For example, Staicu (2018) points out that the failures of social enterprises are caused by various difficulties related to size, lack of resources, and financial problems. Therefore, according to Staicu, it is crucial to understand what revenue streams ensure the financial sustainability of social enterprises. Let us agree with the author's view that social enterprises must remain stable in fulfilling their social mission of social impact. According to Sally and Driscoll (2015), the mission of the social enterprise is to carry out activities that will benefit the economically marginalized segments of society who cannot change their lives without help. Nevertheless, the efforts on the part of the social enterprise must be financially sustainable. These authors indicate that to achieve sustainability, the costs of the enterprise should decrease as the number of its beneficiaries

increases, which will reduce its dependence on charitable or government support as it grows. In other words, the activity of the social enterprise, on the one hand, is focused on solving the social problems of society, on the other hand, on ensuring the sustainability of financial resources.

Agreeing with the identification of the concepts of economic and financial sustainability, the author identifies the economic sustainability of social enterprise as the ability to maintain and ensure the future high performance of social programs and projects based on the use of a balanced source of financial resources under the influence of multidirectional factors of the external and internal environment.

According to international experts, social enterprises most often look for funding sources from banks and venture capitalists (Bryson & Buttle, 2005). Nevertheless, they continue to rely on government grants (Sunley & Pinch, 2012). The hybrid nature of social enterprises gives them the flexibility to receive funding from commercial and charitable sources. However, in the United Kingdom, social enterprises retain a high share of income from their own activities in the total income (as of early 2016, 73% of surveyed entrepreneurs have a value of this indicator at the level of 76%–100%) (Villeneuve-Smith & Temple, 2015). The U.K. uses a diversified structure of financing social enterprises (grants, donations, patient capital, loans, quasi-capital, social bonds, etc.) (Kulkova & Dadaeva, 2018).

Nonrepayable funding (grants, donations) is most widespread in Russia. Exploring the content of financial support programs for social entrepreneurship, Kostousova (2017) indicates that Russian social entrepreneurs use a mixed model of functioning, simultaneously implementing commercial and noncommercial goals. This allows them to participate in more support programs. The best-known projects are as follows:

- All-Russian contest “Impulse of Kindness” (Our Future Foundation);
- Contest of Socially Important Projects (regional branches of the All-Russian People’s Front);
- Contest for grants for nonprofit organizations and Civil Activity Award “I am a citizen!” (Civic Chamber of the Russian Federation).

Popov et al. (2019) analyzed the data from the SEFORIS research consortium and formed a classification of types of financial support for the development of social entrepreneurship, combining external and internal types. External financial support includes donations, crowdfunding, hybrid capital, mezzanine financing, social impact bonds, impact investing, government contracts, and so forth. The internal group includes sponsorships, income, and membership fees. The incomplete list of instruments

for financial support of social enterprises in Russia forces the heads of social enterprises to turn to international foundations and sponsors, which increases the multitasking activities of the social entrepreneur.

To form the most holistic system of factors affecting the economic sustainability of the social enterprise, the author conducted a questionnaire survey of social entrepreneurs of the Kemerovo Region in October–December 2020. A total of 29 people (2.4% of their total number in the region) were interviewed. All respondents are the heads of social enterprises in the cities of Kemerovo (12 people), Novokuznetsk (8 people), Prokopyevsk (4 people), Leninsk-Kuznetsky (3 people), and Mezhdurechensk (2 people). In the structure of respondents by type of activity, there prevail social enterprises of health care, sports, and social tourism (67%). The rest are enterprises of education (24%), culture (6%), and others (3%). The questionnaire included the following questions with open-ended answers:

1. Has the number and content of the managerial tasks you have to perform changed over the past year?
2. What are the primary sources of income for your social enterprise?
3. Do you search for new sources of income to carry out your activities?
4. Is your business economically sustainable?
5. What problems have a significant negative impact on your business?

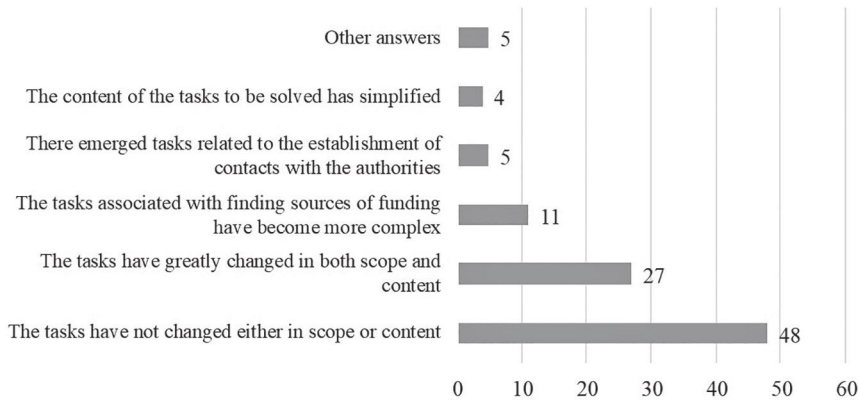
A generalization of the most common answers to the posed questions provided the following results. Over the past year, the vast majority of social entrepreneurs did not see the change in the management tasks either in quantity or in content (51% of respondents). However, the number of respondents who indicated a sharp increase and multidimensional nature of management tasks is also significant (Figure 20.1).

Almost all respondents (82%) indicated that the primary source of income further directed to the implementation of social projects is the financial resources coming from implementing the main activity and donations. Additionally, 9% of the respondents identified grant support from Russian foundations and 5%—grant support from foreign foundations. It is noteworthy that other sources included the own funds of the leaders of social enterprises.

As for the search for new sources of income to carry out their activities, the answers of many respondents were pessimistic. This is mainly connected with the fact that the search for funds is ongoing (61%) but most often does not bring results (Table 20.1).

Figure 20.1

Answers of Respondents to Question No. 1, % of Respondents From the Total Number of Respondents



Source: Compiled by the author.

Table 20.1

Answers of Respondents to Question No. 3, % of the Total Number of Respondents (Several Answers Were Possible)

Answer options	Response rate
We do it constantly; the main task is to monitor possible sources of funding	61
We look for new sources but do not have (or do not know) access to more diverse information	54
We periodically try to find new sources of funding, but the found sources often do not meet the required criteria for obtaining funds	31
We search for new sources of funding on an irregular basis, but there have been several cases where we have received funds	16
Sources of funding are stable; there is no need to look for new ones	14
Sources of funding are stable, and we find new ones several times a year	6

Source: Compiled by the author.

An approximately similar number of respondents who indicated the stability of financial income recognized that their activities could be considered economically sustainable (21%). Other answers included the following:

- No, our social enterprise cannot be considered economically stable; the activities are constantly exposed to adverse factors (33%);
- Our activity can be characterized as constantly changing—we get to the necessary level of sustainability, then we lose it again (24%);
- We are getting closer to calling our operations economically sustainable (18%);
- We find it challenging to characterize economic sustainability in relation to our activities (4%).

During the survey, the leaders of social enterprises noted that economic sustainability could be achieved not so much by having a sufficient financial base but through the activities of a cohesive team of enthusiastic people fully committed to it.

The fifth question was aimed at obtaining information about the negative factors that significantly impact the activities of a social enterprise. The most frequently mentioned factors were the difficulty in obtaining financial resources to develop activities (49%) and the low receptivity of local authorities to the initiatives of social entrepreneurs (41%). It seems important to recognize that some social entrepreneurs are often not active in implementing all managerial tasks and focus only on implementing the main activity (5%). Other factors mentioned by the respondents included: lack of sufficient knowledge on the dissemination of successful experience in social activities, difficulty in finding new consumers of the services provided by a social enterprise, difficulties in selecting a professional team of employees, and others.

Based on the results of theoretical and empirical research, the author presents a system of factors affecting the level of economic sustainability of a social enterprise (Table 20.2).

Thus, ensuring the economic sustainability of the social enterprise is a complex process, which should be based not only on the financial support of the core activity for the long term but also on the competent management of other business processes.

CONCLUSION

The conducted study allowed the author to draw the following conclusions:

1. The content of economic stability of social enterprise can be disclosed as its ability to maintain and ensure the high performance of social programs and projects in the future

Table 20.2

The System of Factors Affecting the Level of Economic Sustainability of a Social Enterprise

Sources of the factors	Name of the factors
Business processes of a social enterprise	Qualitative performance of works (services) on the primary type of activity
	Competent choice of directions for the development of the company
	Effective and continuous monitoring of the implementation of the assigned tasks
Entrepreneurial abilities of a head of a social enterprise	Being proactive and entrepreneurial in seeking funds for a social purpose
	Competent management of financial resources
	Proper disposal of other property
	Effective employee motivation
	Comprehensive information support of activities
Resources of a social enterprise	Committed employees
	Stable financial base
	Accessible information environment
Contacts with the outside environment	Efficiency of interaction with investors and donors
	Quality of interaction with the state budget
	Efficiency of interaction with commercial enterprises implementing projects within the framework of corporate social responsibility

Source: Compiled by the author.

- based on the use of balanced sources of financial resources under the impact of various factors of the external and internal environment.
2. The forms of financing social enterprises abroad have a much more developed structure than in Russia. In Russia, the most widespread forms of nonrepayable funding do not allow to ensure the sustainability of economic development of social enterprises.
 3. Heads of social enterprises in the Kemerovo Region indicate a set of financial, managerial, and communication factors as critical factors negatively affecting economic sustainability. Many social entrepreneurs are aware of the shortcomings in

implementing their activities when, with maximum involvement in social projects, they lose effectiveness in solving other management tasks.

4. One of the mechanisms to improve the economic sustainability of social enterprises can be the organization of networking between business entities of a similar type of activity within one (or more) territory. This interaction should be aimed at expanding the opportunities for obtaining funds for the development of social projects.

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ASSESSMENT OF FINANCIAL AND PRODUCTIVE CAPACITY OF REGIONS TO DETERMINE THE STRATEGY OF SUSTAINABLE INDUSTRIAL GROWTH IN THE REGIONS OF RUSSIA

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ABSTRACT

Purpose: It is important to assess and analyze the financial and productive potential of the territories to identify opportunities for breakthrough industrial growth in the context of internal and external challenges in order to develop a strategy for sustainable industrial growth in the regions of Russia, to increase their investment attractiveness.

Design/methodology/approach: The basis of the methodology for assessing the financial and productive capacity of regions in order to determine the strategy for sustainable industrial growth in the regions of Russia is the formation of a system of indicators and synthesis to determine the conditions for sustainable industrial growth in the regions of Russia. The components of

financial and productive capacity are assessed using appropriate indicators. The integral indicator is calculated by summing up the normalized indicators included in the proposed system of indicators characterizing sustainable industrial growth considering two factors of “money” and “people,” which involves the use of a system of indicators characterizing financial capacity and productive capacity.

Findings: Based on the results of the study, the levels of the financial and productive potential of the Russian regions were established, the rating was compiled with the assignment of high, satisfactory, and unsatisfactory levels to the regions, and the types of strategies for the industrial growth of regions were proposed.

Originality/value: A distinctive feature of the study is the comprehensive nature of the assessment and analysis of financial and productive potential based on budget management and characteristics of the productive forces of the region.

The concept of socioeconomic development of Russia assumes the transition of the Russian economy from the export of raw materials to an innovative type of development. The preserved research and production potential allows implementing the declared strategy of innovative development (Yashin et al., 2018). At the same time, the rates of economic growth should provide up to 12% of GDP growth in the coming years and remain at the level of at least 10% for the entire forecast period.

Currently, the state economic policy of Russia faces two key tasks:

- to launch economic growth;
- to dampen the loss of welfare of the population (Osetrova, 2017).

The efficiency of enterprises in a country directly affects its economic growth. Evaluation of changes in economic indicators both as a whole for the entire economy, and in particular for a particular enterprise, reveals a strong connection between the economic growth of a country and an individual enterprise. Enterprises should be more focused on their internal reserves of growth rather than relying on significant external catalysts for growth, such as those after 1998. It is undeniable that the state should also contribute to the development of production in the country (Gurinovich, 2006).

In order to analyze the possibilities of the country's economic growth, it is important to analyze its economic resources. Financial resources are an integral part of economic resources. Labor resources, labor force are fundamentally different from all other types of economic resources. Productive resource, labor, is a special kind of resource. The labor force, which embodies the importance of human participation in production, is the basis for assessing the productive potential of regions in the study.

The study was tested on the official data of the Federal State Statistics Service of the Russian Federation, the Ministry of Finance of the Russian

Federation for 2015–2019 (Federal State Statistics Service, n.d.; Ministry of Finance of the Russian Federation, n.d.).

METHODOLOGY

The authors proposed relative quantitative indicators (Kireeva, 2017a, 2017b; Pavlova, 2011; Yashina & Grishunina, 2005; Yashina et al., 2018; Yashin et al., 2020) representing a system of indicators of the financial and productive potential of the regions based on the receipts of own incomes of the regions, its use, the increase in high-performance jobs, labor productivity, etc., allowing to make some qualitative conclusions about the financial and productive potential of the regions (Tables 21.1–21.2).

Table 21.1

The System of Indicators of the Financial Potential of the Regions

No	Indicator name	Calculation formula	Interpretation of indicator changes
1	The financial independence coefficient ($K1$) is the share of own budget revenues	$K1 = \frac{SD}{D} = \frac{ND + NND}{D}$	maximization of the indicator
2	Financial stability coefficient ($K2$) characterizes the share of tax revenues in the revenues of the territories	$K2 = \frac{ND}{D}$	maximization of the indicator
3	Coefficient of own income to financial assistance ($K3$)—is calculated as the ratio of tax and non-tax income to gratuitous transfers (BP)	$K3 = \frac{SD}{\frac{BP}{ND + NND}} = \frac{SD \cdot (ND + NND)}{BP}$	maximization of the indicator
4	Coefficient of financing of social spending by own resources of the regions ($K4$)	$K4 = \frac{SD}{\frac{SR}{ND + NND}} = \frac{SD \cdot (ND + NND)}{SR}$	maximization of the indicator
5	Coefficient of financing of the production sector by own resources of the regions ($K5$)	$K5 = \frac{SD}{\frac{NE + ZKH}{ND + NND}} = \frac{SD \cdot (ND + NND)}{NE + ZKH}$	maximization of the indicator
6	Coefficient of financing of management costs ($K6$)	$K6 = \frac{OV}{R}$	maximization of the indicator
7	Human capital investment coefficient ($K7$)	$K7 = \frac{SR}{R}$	maximization of the indicator

Source: Compiled by the authors based on Kireeva, 2017a, 2017b; Pavlova, 2011; Yashina and Grishunina, 2005; Yashina et al., 2018; Yashin et al., 2020.

Table 21.2***The System of Indicators of the Productive Potential of the Regions***

No	Indicator name	Calculation formula	Interpretation of indicator changes
1	Living standards coefficient (K8)	$K8 = \frac{SDD}{PM}$	maximization of the indicator
2	Coefficient of unemployed persons (K9)	$K9 = \frac{B}{RS}$	maximization of the indicator, the ratio of the unemployed to the total labor force
3	Labor productivity coefficient (K10)	$K10 = \frac{VRP}{ZT}$	maximization of the indicator, the coefficient of labor productivity allows assessing the implementation of scientific and technological progress, the level in production
4	Coefficient of growth of highly productive jobs (K11)	-	maximization of the indicator, characterizes the effectiveness of spending budget funds
5	Coefficient of efficiency of preparation of the population for modern requirements (K12)	$K12 = \frac{BZ}{PR}$	minimization of the indicator, the coefficient of efficiency of preparation of the population for modern requirements
6	Coefficient of registered unemployed persons (K13)	$K13 = \frac{BZ}{RS}$	minimization of the indicator that reflects the share of unemployed in the labor market

Source: Compiled by the authors based on Kireeva, 2017a, 2017b; Pavlova, 2011; Yashina and Grishunina, 2005; Yashina et al., 2018; Yashin et al., 2020.

The designations in the table: SDD—average per capita income, P—living wage, SR—social spending: health care, education, social policy, physical education, culture and cinematography, B—number of unemployed, RS—work force, VRP—gross regional product, ZT—total labor costs, BZ—the number of unemployed populations registered with state employment agencies, PR—number of required employees.

Further, the indicators are normalized, that is they are reduced to a single dimension from 0 to 1 according to the transformation formulas (1) and (2).

The first group (improvement (1) of financial and performance indicators with an increase in indicators):

$$K_{ij}^* = \frac{K_{imax} - K_{ij}}{K_{imax} - K_{imin}} \quad (1)$$

The second group (deterioration (2) of financial and productive potential with an increase in the values of indicators):

$$K_{ij}^* = \frac{K_{ij} - K_{i \min}}{K_{i \max} - K_{i \min}}, \quad (2)$$

where K_{ij} is the calculated value of the i -th coefficient of the system of relative coefficients of financial and productive potential in the j -th region, K_{ij}^* is the normalized value of the i -th relative coefficient of the system of relative coefficients of financial and productive potential in the j -th region, $K_{i \max}$ is the highest calculated value of the i -th coefficient in the sample, $K_{i \min}$ is the lowest calculated value of the i -th coefficient in the sample.

The complex normalized coefficient of financial and productive potential is determined according to formula (3).

$$Kfp_j^{norm} = \sum_{i=1}^n K_{ij}^*, \quad (3)$$

where Kfp_j^{norm} – complex normalized coefficient of financial and productive potential.

RESULTS

The rating based on the complex normalized coefficient of financial and productive potential is presented in Table 21.3. To determine the ranks, we assume that the region with the highest value of financial and productive potential gets the first rank.

Determination of the type of strategic development of regions based on the assessment of the financial and productive potential of the regions is based on the calculations shown in Table 21.4.

Figure 21.1 shows the application of the matrix approach for determining the types of strategic development (strategy) of the regions, considering the financial and productive potential for the period 2015–2019. If the region falls into the “F1P1 №3” quadrant it means that the region has a high financial and productive potential, and, therefore, it has the best opportunities for industrial development, and falling into the “F3P3 №7” quadrant indicates the insufficient potential of industrial development, the preconditions for the depressive functioning of the regions (Figure 21.1).

Table 21.3***Rating of Regions based on the Complex Normalized Coefficient of Financial and Productive Potential, 2015–2019***

Regions	Kfp_j^{norm} 2019	Score	Kfp_j^{norm} for 5 years	Score for 5 years	Rank	Place
Yamal-Nenets Autonomous Area	4.986	1	24.596	1	6	1
<i>First Level</i>	5.5	9	27.500	2	25	2
Leningrad Region	5.153	2	27.724	3	29	3
Saint Petersburg	5.188	3	27.996	4	33	4
Khanty-Mansi Autonomous Area—Yugra	5.368	6	28.040	5	37	5
Moscow Region	5.814	23	28.345	6	51	6
...						
Samara Region	5.475	7	30.331	21	153	22
Lipetsk Region	5.908	29	30.643	27	156	23
Novosibirsk Region	6.026	35	30.587	25	160	24
Yaroslavl Region	5.969	34	30.632	26	160	25
Ulyanovsk Region	5.763	21	30.450	24	165	26
...						
Ryazan Region	6.158	43	31.054	36	190	31
Republic of Tatarstan	6.105	41	31.049	35	193	32
Chelyabinsk Region	5.561	13	30.767	30	194	33
Saratov Region	5.944	32	30.859	33	196	34
Udmurtian Republic	6.088	38	31.022	34	198	35
Smolensk Region	5.483	8	30.846	32	203	36
Kursk Region	6.106	42	31.120	39	209	37
Omsk Region	5.891	28	31.091	38	212	38
...						
<i>Second Level</i>	6.5	63	32.500	55	311	54
Nenets Autonomous Area	6.393	58	32.542	56	313	55
Kostroma Region	6.310	56	32.489	54	331	56

Source: Authors' calculations based on data of the Ministry of Finance of the Russian Federation and the Federal State Statistics Service of the Russian Federation.

Table 21.4

Type of Strategic Development of Regions, Considering the Complex Normalized Coefficient of Financial and Productive Potential, 2015–2019

Regions	$F - Kf_j^{norm}$	Rank – F	Ur. FP	$P - Kp_j^{norm}$	Rank – P	Ur. PP	Strategic development type
Leningrad Region	22.131	9	F1	4.543	1	P1	3
Saint Petersburg	21.327	3	F1	4.618	2	P1	3
Yamal-Nenets Autonomous Area	17.059	1	F1	4.923	3	P1	3
Moscow Region	22.292	10	F1	5.102	4	P1	3
...							
Samara Region	23.081	17	F1	6.034	42	P2	2
Chukotka Autonomous Area	29.529	76	F3	6.041	43	P2	8
Perm Territory	22.662	13	F1	6.059	44	P2	2
Yaroslavl Region	23.554	22	F1	6.086	45	P2	2
Orenburg Region	22.456	11	F1	6.087	46	P2	2
Novgorod Region	25.974	51	F2	6.120	47	P2	5
Sverdlovsk Region	21.786	7	F1	6.123	48	P2	1
Vladimir Region	24.765	39	F2	6.140	49	P2	2
Chelyabinsk Region	23.005	16	F1	6.146	50	P2	2
Khanty-Mansi Autonomous Area–Yugra	20.320	2	F1	6.160	51	P2	2
Arkhangelsk Region	25.140	46	F2	6.208	52	P2	5
Ivanovo Region	26.007	52	F2	6.254	55	P2	5
Kirov Region	26.534	56	F3	6.255	56	P2	8
Primorye Territory	24.481	37	F2	6.256	57	P2	5

Source: Authors' calculations based on data of the Ministry of Finance of the Russian Federation and the Federal State Statistics Service of the Russian Federation.

Figure 21.1

Application of the Matrix Approach for Determining the Types of Strategic Development of Regions, Considering Financial and Productive Potential, 2015–2019

Financial potential	High level of financial potential – F1	F1P3 No.1	F1P2 No.2	F1P1 No.3
	Satisfactory level of financial potential – F2	F2P3 No.4	F2P2 No.5	F2P1 No.6
	Low level of financial potential – F3	F3P3 No.7	F3P2 No.8	F3P1 No.9
		Low level of productive potential – P3	Satisfactory level of productive potential – P2	High level of productive potential – P1
		Productive potential		

Source: Developed and compiled by the authors.

Financial potential level—vertical axis Y, horizontal axis X—productive potential level.

Regions with high level of financial and productive potential include Leningrad Region, St. Petersburg, Yamal-Nenets Autonomous Area, Moscow Region, Moscow, Sakhalin Region, Nizhny Novgorod Region, and so forth. These regions account for the majority of oil production and about 90% of natural gas. These regions not only ensure the energy security of the country, but also have high budgetary stability and ensure the fiscal stability of the country as a whole at the expense of foreign exchange revenues.

Regions with low level of financial and productive potential include Republic of Daghestan, Republic of North Ossetia—Alania, Republic of Tuva, Chechen Republic, and Republic of Ingushetia.

Based on the analysis carried out, it can be concluded that sustainable industrial growth is due to a reliable base of financial and productive potential in capital cities that are attractive to investors. Sustainable growth of industrial production depends on tax incentives, labor compensation fund, territorial infrastructure, transport problems, financing of priority and highly profitable sectors of the economy.

CONCLUSION

It is important to direct the reserves of the financial and productive potential of the regions to the provision of highly efficient equipment for

enterprises in highly profitable and priority sectors of the economy; introduction of new technologies and capacities.

Assessment of the financial and productive potential of the regions in order to determine a strategy for sustainable industrial growth in the regions of Russia is important to take into account the unevenness of the scale, production efficiency, and the location of enterprises of related industries.

In general, the use of the developed methodological tools is important for determining the strategy of sustainable growth of the Russian industry.

The methodological toolkit is distinguished by the use of strategic matrix toolkit. The systems of indicators characterizing the financial and productive potential of the regions are the set of criteria that distinguish the proposed methodology.

The presented methodology allows public authorities to improve tax and budget policy, to quickly assess all regions of Russia and develop a certain vector of their development with the aim of sustainable growth of Russian industry based on the proposed strategy options.

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CHAPTER 22

SOCIAL INDICATORS OF THE ECONOMIC DEVELOPMENT OF REGIONS IN THE ASPECT OF ENSURING ECONOMIC SECURITY AT THE PRESENT STAGE

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ABSTRACT

The purpose of this study is to analyze the social indicators of the economic development of regions in the aspect of ensuring economic security at the present stage. The threshold values of social indicators involved in ensuring economic security, as well as information on the costs of payment of benefits,

social assistance, the number of recipients of social protection measures, etc. are considered. The research methodology is based on the analysis of information published in the open press of Rosstat, EGISSO, Maristat. The fundamentals of certain groups of categories that are recipients of social protection measures in the Russian Federation are considered. The chapter provides data on certain issues of social protection of the population, such as: the issue of a significant number of addressees of social protection, the issue of a large proportion of the population with monetary incomes below the subsistence level, an increase in social payments in the income of the population, the issue of poverty of families with children, the issue of poverty of pensioners. The study illustrates measures to improve the problems of social protection of the population of the Russian Federation.

Ensuring economic security is a central function. The issue of economic security is a derivative of the existing tasks of economic growth, taking into account the various stages of development of society. Economic security can be considered as a separate category in which not only a specific individual, society and state are considered, but also the economic entities of the entire economic system (Decree of the President of the Russian Federation, 2018).

We can talk about ensuring economic security when all spheres of the economy, as well as all factors affecting economic security, are in equilibrium. This includes social protection of the population. Its indicators and their threshold values are of particular interest (Table 22.1) (Krivorotov, 2019).

METHODOLOGY

The share of the population with incomes below the subsistence level is one of the most important social indicators of ensuring economic security; a value of 7% indicates a dangerous state (Ibragimova, 2016).

Table 22.1

Threshold Values of Social Indicators in Ensuring Economic Security

Indicators	Threshold Value
The proportion of the population with incomes below the subsistence level	7%
The proportion of the population who are recipients of social protection	12.4%

Source: Developed and compiled by the authors.

The population becomes poor due to the following reasons: economic, for example, problems in the employment system, decline in productivity; social, for example, insufficient level of social guarantees, dependent attitude; demographic, for example, large families, families without one parent; political, for example, forced migration, revolution, reforms; regional-geographic, for example, uneven regional development and distribution of funding (Zolotareva, 2019).

About 37% of the population in Russia is recipients of social protection (Table 22.2).

Table 22.2

Information on Expenditure on Benefits and Social Assistance and the Number of Beneficiaries of Social Protection

	2013	2014	2015	2016	2017	2018	2019
Number of recipients of social protection (support), million people	50.4	50.3	51.7	53.5	54.9	55.5	54.2
Proportion of recipients of social protection (support), %.	35.1	35.0	34.5	36.5	37.4	37.8	37
Threshold value of the proportion of people in the population who are recipients of social protection, %	12.4	12.4	12.4	12.4	12.4	12.4	12.4
Expenses for the payment of benefits and social assistance, billion rubles	2,076.1	2,179.3	2,397.5	2,439.8	2,445.3	2,543.1	2,654.2

Source: Author's calculations based on data from Rosstat (2019), EGISSO (2019).

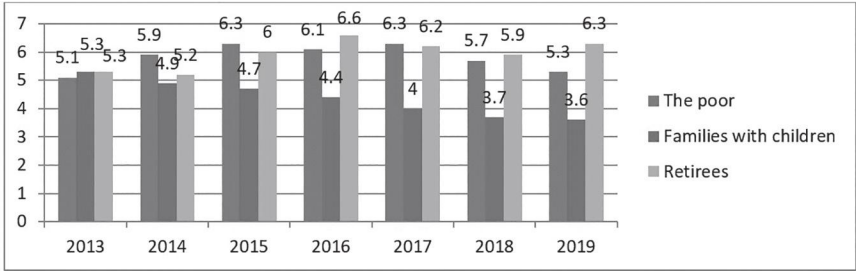
Based on the analysis, it can be concluded that the cost of benefits and social assistance has been increasing every year by 2–3% relative to the previous one. At the same time, the number of recipients of social protection has been proportionally increasing by 2–3%.

Let us consider the individual groups of categories that are recipients of social protection in the Russian Federation (Figure 22.1) (The number of Recipients of Social Services, 2020).

It was found that 9.8% of recipients of social protection measures out of the total number of recipients are low-income, 6.7% are families with children, and 11.7% are pensioners. This situation indicates the economic insecurity of the country (Figure 22.2).

Figure 22.1

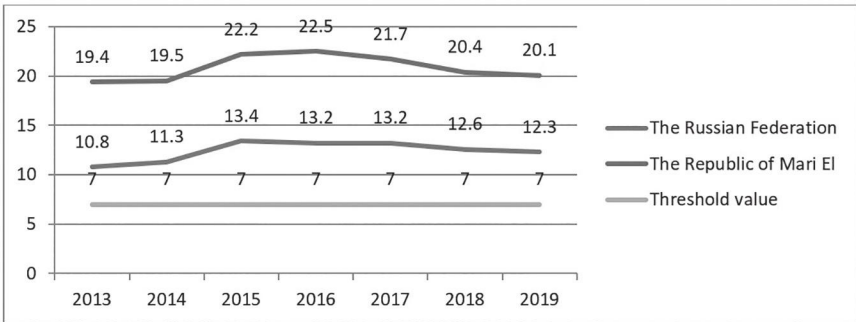
The Number of Recipients of Social Protection for Certain Groups of Categories in the Russian Federation, Million people



Source: Author’s calculations based on data from Rosstat (2019), EGISSO (2019).

Figure 22.2

Population With Monetary Incomes Below the Subsistence Level and the Threshold Value, % of the Total Population



Source: Author’s calculations based on Rosstat (2019) data.

Income from social payments in the Russian Federation is 19.1%, which exceeds the threshold value by 1.5 times, this indicator is 2 times higher than the threshold value for a separate region of the Republic of Mari El (2019), which characterizes the insufficient economic security of this region (Koksharova, 2017). Social payments should not exceed 12.4% (“The Main Socio-Economic Indicators of the Standard of Living of the Population,” 2020).

Working citizens (72.1 million) need social protection, the number of poor employed in the economy is 5.7 million. The number of low-income citizens is 7.9%, which exceeds the threshold of 7% (The number of recipients of social protection (support) measures, 2020).

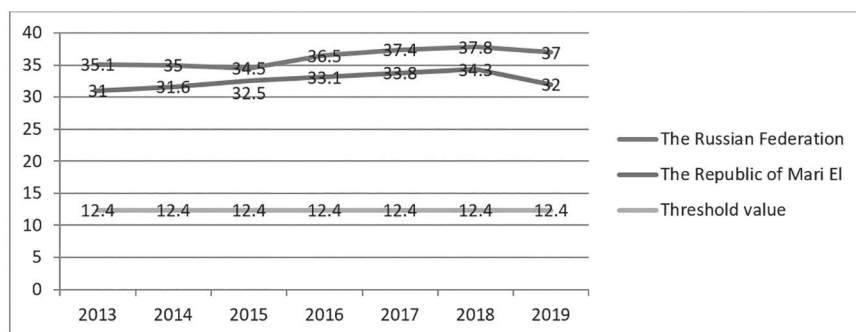
It can be seen that the bulk of the poor is households with children for the entire period under consideration from 2013 to 2019 after analyzing low-income households with and without children. The increase in poverty of families with children leads to decrease in economic security in the country, because it threatens with a decrease in the birth rate.

RESULTS

The first problem of social protection of the population is the problem of a large number of recipients of social protection (Figure 22.3).

Figure 22.3

Number of Recipients of Social Protection, %



Source: Author's calculations based on data from Rosstat (2019), Maristat (2019).

In general, the number of recipients of social protection exceeds the threshold value for the entire period under consideration. The number of recipients of measures is 32%, in Russia it is 37%, while the threshold is 12.4% (Figure 22.4).

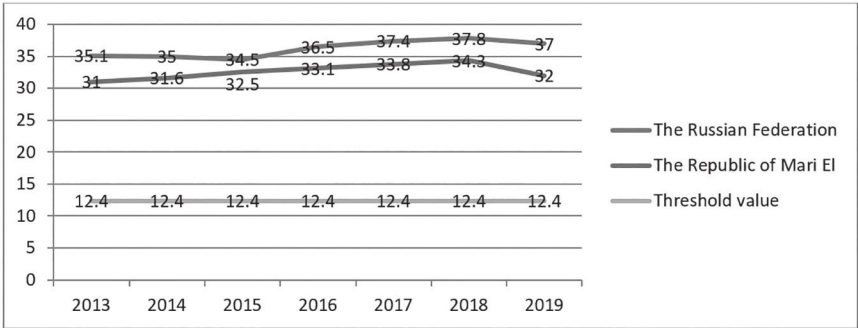
For example, it is 20.1% and almost 3 times higher than the threshold value in the Republic of Mari El (2019). This indicator exceeds the threshold level by almost 4 times and amounts to 27%. And the threshold is 7%. This situation also indicates an uneven distribution of incomes of the population in the Russian Federation, some regions of the country are more prosperous and some are poorer. Therefore, we can talk about the uneven distribution of social protection to the population by region.

The third problem is the excess of social payments in the income of the population (Table 22.3). The threshold for this indicator is 12.4%.

The proportion of social payments in the structure of monetary income is 19.1% and exceeds the threshold value by 1.5 times in the Russian

Figure 22.4

Population With Monetary Incomes Below the Subsistence Level, %



Source: Author’s calculations based on data from Rosstat (2019), Maristat (2019).

Table 22.3

The Share of Social Transfers in the Structure of the Population’s Income by the Main Sources of Their Formation in the Russian Federation and in the Municipal District of Mari El

	2013	2014	2015	2016	2017	2018	2019
The Russian Federation	18.7	18.0	18.2	19.2	21.2	19.1	19.4
Mari El	26.3	26.4	26.0	27.5	27.9	27.6	28.7
Threshold value	12.4	12.4	12.4	12.4	12.4	12.4	12.4

Source: Author’s calculations based on data from Rosstat (2019), Maristat (2019).

Federation as a whole, while it is 28.7% in Mari El (excess by 2 times). This indicates the high material dependence of the people on the authorities.

The fourth problem is the problem of poverty of families with children. About 70–80% of poor families are families with children (Figure 22.5).

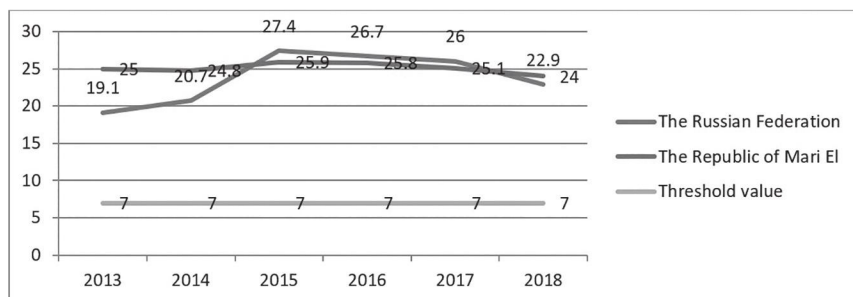
The proportion of children living in poor families exceeds the threshold by three times in the Russian Federation and in municipal districts and amounts to 22.9% in the Russian Federation, and 24% in Mari El. This situation may lead to a further decrease in the birth rate. The fifth problem is the problem of retirement poverty (Figure 22.6).

CONCLUSIONS

In modern conditions, achieving this goal is complicated by a number of problems in the social protection system (Sadykov, 2018). In this regard,

Figure 22.5

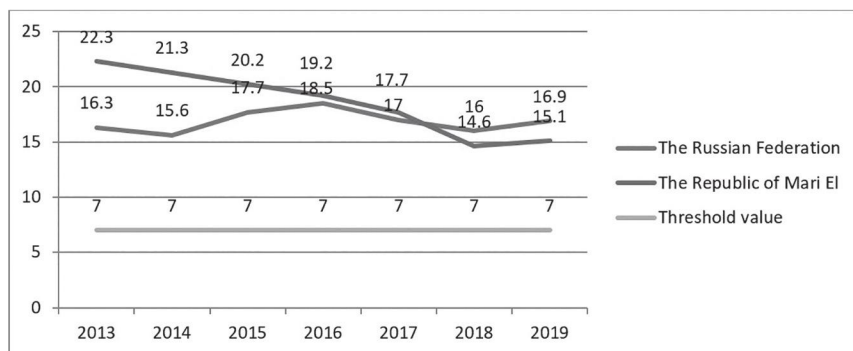
The Share of Children Under 18 Years of Age With an Average per Capita Income Below the Subsistence Level, %



Source: Author's calculations based on data from Rosstat (2019), Maristat (2019).

Figure 22.6

Proportion of Retirees Receiving Social Supplements to Pension in Order to Bring the Level of Material Security of the Retiree to the Level of the Retirement's Subsistence Minimum, %



Source: Author's calculations based on data from Rosstat (2019), Maristat (2019).

let's consider proposals for improving the problems of social protection of the population of the Russian Federation.

1. The number of recipients of social protection exceeds the threshold by 24.6% in the Russian Federation. This indicator is 37%, while the threshold is 12.4%. The existing problem of

exceeding the number of recipients of social support measures of the threshold is largely associated with the fact that the categorical system of social protection prevails in the Russian Federation (Sotnikova, 2017; “Standard of Living,” 2020).

The problem of poverty is fulfilled as a result of the development of the production process, business activity, and stimulation of labor activity and social support.

2. The next problem is the excess of the proportion of social payments in the structure of monetary income by 1.5 times from the threshold value in the Russian Federation. The threshold value for this indicator is 12.4%, and the indicator is about 19.1%. It is proposed to reduce the existing problem of the high proportion of social payments in the structure of the population’s income in the following way.

First, it is necessary to increase the real income of the population by raising wages. It is planned to increase the minimum wage to double the subsistence level. It is also important to increase the income of citizens from entrepreneurial and other production activities. In this case, we are talking about the support of small entrepreneurs from the state.

3. The proportion of children living in poor families is 22.9% and exceeds the threshold by three times in the Russian Federation (the threshold is 7%). The problem of poverty of families with children is still acutely felt despite the available social benefits from the state. It is recommended to provide support to families with children on the basis of need to reduce the severity of this problem.
4. About 16.9% of retirees receive social supplements to their pensions in order for their income level to reach the subsistence level in the Russian Federation. This indicator exceeds the threshold value, which is 7%.

It is necessary to develop a system of non-state pension insurance to reduce the number of poor retirees. This direction will allow ensuring the payment of an additional pension through voluntary pension contributions of citizens (Kholostova, 2018). Such contributions need to be activated with the help of increased confidence in non-state pension funds and other institutions of the country’s pension system. Providing clear guarantees of the safety of accumulated funds and reserves can be the key to solving this problem.

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CHAPTER 23

ON THE ADAPTABILITY OF SYSTEM SOCIOECONOMIC THEORY UNDER CHANGING WORLD

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ABSTRACT

The purpose of the chapter is to research the dynamic aspects of radical technological and organizational changes in the context of the development of system socioeconomic theory.

The interconnections between technological and organizational innovative constituents are researched applied to natural monopolies spheres and regarding dynamics of their system development. Infrastructure/network/natural monopoly component in combination with the appropriate market environment and adequate competitive development is considered as a significant driver of technological transformations. The possibilities for expanding of competition types' spectrum are considered. They are induced by the analysis of dynamics in the spheres of natural monopolies.

The key directions of the basic theoretical elaboration are presented in a generalized form in terms of conceptual models of competition that correspond to the radical technological changes and infrastructure conditions

of industrial development. They are analyzed according to the timeline of the four industrial revolutions' deployment. The dynamic approach to the analysis of competition as a process is particularly emphasized.

The possibilities of adapting technological and organizational changes as well as involving the identified interconnections in the process of natural monopolies structural reforming, which mainly has organizational character, are determined.

The system development of human capital *inter alia* is associated with attempts to form a system socioeconomic theory. The theory more or less directly (or indirectly) is focused on overcoming the possibility of socioeconomic crises and/or mitigating the consequences of their occurrence.

The processes of technological change are accompanied by the assessment, including within the framework of theoretical concepts, adequate types of competitive relations, and their development. Accordingly, one of the relevant directions of the research is a consideration of the issues on the formation of a system socioeconomic assessment with the emphasizing of technological and organizational aspects, tracking their mutual changes.

In Russian management practice, there is a simplified view of competition, including the Federal Law "On Natural Monopolies" (1995); the Law rejects the very possibility of competition in the spheres of natural monopolies—concerning the specifics of the technology, but without specifying its type, without identifying competitive environments that are compatible with natural monopoly.

In connection with the problems of natural monopolies, it is particularly necessary to highlight the research of academician D. S. Lvov, who paid considerable attention to the issues of system transformation in the spheres, "pain points," and the development of adequate managerial measures of a technological and organizational character in various aspects (Glazjev et al., 1992; Lvov, 1998, 2004). Accordingly, this largely determines the relevance of the consideration of the issues in new contexts.

In the chapter, the approaches are researched to the analysis of the radical technological and organizational changes in their interconnections and with an emphasis on the infrastructure/network/natural monopoly component as well as the determination of managerial measures of organizational innovative behavior in terms of the adequate models' development for competitive/contestable markets within the framework of the state regulation system and structure reforming.

METHODOLOGY

The proposed system methodology is presented through a combination of approaches to the analysis and synthesis of technology and organization, the development of new organizational forms of development adapted to

changes in technology (Belousova, 2020a), a combination of unified and specialized approaches in natural monopoly spheres (Belousova, 2019, 2020a, 2020b).

The basis for the formation of the issues defining the interconnections between technological directions of innovative development and organizational changes (applied to network infrastructure subsystems and the corresponding forms of market organization for natural monopolies and types of competition) are the approaches to structuring the main types of innovations and their classification adopted in the expanded third edition of the Oslo Guidelines for Collecting and Interpreting Innovation Data (2005).

This classification covers not only exclusively technological (product and process), but also marketing and organizational innovations. In turn, the impetus for the expansion of ideas about innovations was largely formed by using such an innovative direction as the creation of new organizational forms, market structures in the industry by reorganizing, ensuring, or undermining the monopoly position of another enterprise (Shumpeter, 1982). Accordingly, the expanded view is formed using a dynamic approach, “creative destruction,” fundamentally new market methods in the development of strategies for the market behavior of companies, the analysis of the functions of the entrepreneur, and the emergence of new combinations of production factors.

The processes of technological changes, primarily radical ones, occurring within the framework of industrial revolutions, as a rule, are accompanied by a search, in particular including, within the framework of theoretical concepts, adequate types of competitive relations and their development. Under choosing the types of competition in relation to various industry subsystems (including natural monopoly, infrastructure), it is largely advisable to base on theoretical ideas about the development of competition and use its opportunities to stimulate innovation processes (Belousova, 2020a).

It is proposed to consider the processes of technological and organizational changes that occur under the industrial revolutions, with the inclusion of the infrastructure/network/natural monopoly component as well as assessment of the consistency between technological and organizational changes with an emphasis on conceptual/theoretical ideas about the development of competition, including in the spheres of natural monopolies.

RESULTS

The results of analysis of interconnections between technological and organizational changes according to the time frame of the four industrial revolutions’ deployment, the key directions of the development of socio-

economic theory, the conceptual models of competition, as well as the infrastructure conditions of industrial development can be represented as follows. It's about different aspects of the development of systemic theory, the emergence of new "facets" and their "grinding."

Thus, free trade and competition (the "invisible hand of the market") were considered as a way to countermeasure the corporate spirit and guild laws, which allowed the owners of manufactories to raise the prices of goods within the framework of domestic or international trade (Ricardo, 2016; Smith, 2017). In Sismondi (1937), it is essentially based on the principle of "laissez-faire, laissez-passer," but not limited to it. Accordingly, free trade and competition were considered in the context of the development of manufacturing production as well as the first industrial revolution that took place 1760–1840, based on the periodization presented, for example, in (Schwab, 2016).

At the same time, one of the starting mechanisms for the implementation of the industrial revolution—in terms of transport and infrastructure support—was the construction of a network of inland water channels. By the end of the eighteenth century, England had received excellent internal communication routes in the form of canals, through which the bulkiest goods could be transported cheap and quickly: raw material and fuel for emerging factories, goods (Tugan-Baranovsky, 1998). The invention of the steam engine, the development of railways, which determined the development of mechanical production were further.

Within the framework of neoclassic, (Marshall, 1993) there were postulated issues on free enterprise and economic freedom, access to markets, and the overall impact of economic progress and, at the same time, creative and destructive competition. In Tugan-Baranovsky (1998), the theory of the market is presented in combination with the theory of economic crises (one of the definitions, indeed, is quite "network"—"the market is a node where the threads of modern economic life are intertwined" (Tugan-Baranovsky, 1998, p. 514).

The development of ideas about the market within the neoclassical direction of economic theory in a certain way coincided with the unfolding of the second industrial revolution (late 19th to early 20th centuries), associated with the spread of electricity, the introduction of the conveyor belt, and the development of mass production. At the same time, the most important infrastructure elements (roads, railways, and other types of transport communication), network technologies of electrification, and communication as key components directly determined and, in many respects, continue to form the driving forces of the ongoing radical industrial-technological changes.

In the 1920s and 1930s and beyond, attempts were made to assess the movement of the competitive system towards monopoly from the

standpoint of theory, including assessments of statics and dynamics, as well as the ethics of competition (Knight, 2003, 2009). In Sraffa (1999), the laws of profitability and the factors that destroy the competitive market are researched. The concepts associated with the development of the theory of imperfect competition, including monopolistic competition, developed significantly (Chamberlin, 1996; Robinson, 1986).

The development of the third industrial revolution (the beginning of the 1960s through the end of the 20th century), is identified as a computer or digital and, especially, planned and unfolding in many directions of the fourth industrial revolution, is associated with the synthesis of digital technologies and their interaction in particular, within the framework of network infrastructure subsystems. This period, especially in relation to the spheres of natural monopolies, is characterized by the further development of the dynamic approach and analysis of competition as a process.

Under describing the features of the dynamic/process approach to the analysis of competition, first of all, we are talking about a conceptual model, in which, from the standpoint of the Austrian direction of economic thought, the question is researched: “competition: the situation or the process?” (Kirtzner, 2001). The inclusion of the approach allows us to expand competition types’ spectrum and ensure the adaptation of new types of industry markets, including changing technological conditions—in comparison with the basic their set: perfect competition, imperfect competition (monopolistic competition and oligopoly), and monopoly as a “singular” type of competition.

Within the framework of the dynamic approach, first, we are talking about competitive markets of the contestable type (Baumol et al., 1982), and to a certain extent—about a theoretical model of franchise competition of the Demsetz (1968) type. A common feature of competitive markets, whose characteristics have a process nature, is that competition is mainly not “in the market,” but “for the market” of services (initially infrastructure), providing conditions for potential competition (including for a small number of enterprises).

For the market type contestable, the identity of the industry technology is assumed, which meets the optimal modes of activity and is formed based on the assessment of a total multiproduct cost function (Baumol et al., 1982). Also, it is accepted that the industry structure, expressed in terms of the enterprises’ production characteristics such as physical output and prices, is not to identify a priori, in statics and exogenously as in models of markets of imperfect competition, but is endogenous and is revealed in the process of dynamic interaction in the market.

Competitive market models of the contestable type can potentially take a significant place in the analysis, understanding, and stimulating of the radical technological changes that take place and the organizational

circumstances that confine them, in the assessment of natural monopoly and other industry market structures, techniques of organizational restructuring, and so forth.

Structural transformations in the spheres of Russian natural monopolies, in which segmentation and initiation of competition in these markets (without specifying its type) are considered impractical for technological reasons, have been carried out within the framework of state regulation since the mid-1990s. To a large extent, structural reforms in these spheres are organizational measures for the separation/consolidation of economic activities, accompanied by changes in the ownership forms of infrastructure enterprises. At the same time, expectations from the implementation of structural measures were mainly associated with increased incentives for investment and subsequent innovation in the spheres.

The analysis reveals that, as a rule, decisions on the restructuring of infrastructure subsystems were made without taking into account the natural monopoly specifics, the potential of theoretical and applied foundations in the spheres (Belousova et al., 2015, 2020b). The assessment of dynamic performance indicators, namely, key technological determinants (economy of scope, etc.), types of competition compatible with a natural monopoly are not included in the system of pieces of evidence (Baumol et al., 1982; Belousova & Vasilieva, 2018).

Accordingly, important potentially effective approaches to the assessment of ongoing transformations are not involved, which provide model foundations for the variants of organizational changes that are consistent with the features of the technology in the spheres and determining the possibility and necessity of moving to a new technological level.

Different types of competition, taking into account the prerequisites and features of their appearance, may differ in the necessity and possibilities of state regulation—both in determining the guidelines of the state competition policy and in setting restrictions on the control parameters of competitive/contestable markets, in accordance with the trends of the development of the economy and society.

Taking into account the urgent need for dynamic development, a fundamentally important direction of managerial actions is to provide opportunities for creating general conditions in the state regulation system for the intensification of innovation processes using an expanded spectrum of competitive/contestable market environments. It is necessary to consider the synthesis of the competition models formed to date, their further development, and the use of adequate market models in various market segments, based on the specifics of the industry technology.

At the same time, the role of the infrastructure/network/natural monopoly sphere is very significant as a driving force of industrial-technological transformations. But the significance also appears in terms of expanding

the possibilities of using the conceptual approaches to evidences of organizational measures formed in the spheres (within the framework of accepted hypotheses and established restrictions).

Table 23.1 summarizes, in accordance with the time frame of the four industrial revolutions, the key guidelines of basic theoretical advancements in terms of conceptual models of competition that meet the fundamental technological changes and infrastructure conditions of industrial development.

Table 23.1

Expanding the Theoretical Concepts of Competition Types' Spectrum in Context of Industrial Revolutions Periodization and Infrastructure Conditions of Industrial Development

The sequence of periods of industrial revolutions*	Infrastructure component	The theoretical concept of competition
I –1760–1840	Construction of a network of inland water channels, further —railway networks—one of the starting mechanisms for the implementation of the industrial revolution	• The concept of free trade and competition, “the invisible hand of the market” • The principle “laissez faire, laissez passer”
II – end of the 19th century—beginning of the XX century	Infrastructure elements (roads, railways, etc.), network technologies of electrification and communication as the most important driving forces of cardinal industrial-technological changes	• The concept of free entrepreneurship and economic freedom, market access • The concept of the destruction of free competition market: analysis of factors • The concept of imperfect competition, primarily monopolistic competition • The concept of imperfect competition with the enabling of uncertainty and ethic • The concept of new market techniques and competitive behavior strategies

(Table continued on next page)

Table 23.1 (Continued)

Expanding the Theoretical Concepts of Competition Types' Spectrum in Context of Industrial Revolutions Periodization and Infrastructure Conditions of Industrial Development

The sequence of periods of industrial revolutions*	Infrastructure component	The theoretical concept of competition
III – early 1960s–late 20th century	Development of network technologies	• The concept of dynamic analysis of competition as a process • The concept of competitive markets of the contestable type
IV (origins) – turn of the third millennium - present	Synthesis of digital technologies and their interaction, including in the framework of network infrastructure subsystems	Synthesis of the concepts of competition

*According to (Schwab, 2016).

Source: Developed and compiled by the author.

The identified interconnections determine the possibility and necessity of implementing—within the framework of state regulation—measures to promote competition and create conditions for an adequate market environment. Solving the problems of structure reforming, it is necessary to evaluate a diversified set of competition types from their expanded spectrum—taking into account the specifics of the industry technology and the stage of technological development.

CONCLUSION

In the context of purposeful, but with limited manageability, radical changes in the economy and society, it is necessary to ensure—based on system consideration and developed theoretical concepts—the reduction of the “gap” and mutual adaptation of technological and organizational aspects of transformations, the choice of adequate types of competitive/contestable markets from their possible and permissible spectrum, stimulating innovative development. This can be considered as one of the factors of overcoming the crisis phenomena of the transformation period.

This fully applies to the implementation of structural, mainly organizational changes in the spheres of natural monopolies, which have significant technology specifics.

In general, it is necessary to provide conditions for the progressive, interpenetrating movement of technological changes and the development of competitive relations, the development of acceptable models of competitive behavior, and their interaction. Ideally—for the formation of adequate model system assessments, not only as a background for the unfolding large-scale technological changes but also as a stimulus for their intensification.

ACKNOWLEDGMENTS

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CHAPTER 24

LABOR PRODUCTIVITY IN THE RUSSIAN FEDERATION

Global Trends and Modeling Regional Specifics

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ABSTRACT

Labor productivity is an essential factor ensuring sustainable economic growth and increasing the competitiveness of the national economy of any country. This allows us to consider labor productivity as the basis of a country's economic security. One of the critical problems in the economy is related to the identification of the correlation between the growth rate of labor productivity and the growth rate of wages. The chapter analyzes the disposition of the Russian Federation in the international ratings according to these indicators. The chapter provides the corresponding analysis of the country hierarchy using methods of statistical analysis. The calculations were carried out on the data for 1995–2019. They showed the presence of a stable differentiation of the leading and the outsider countries by the growth rate of labor productivity and the growth rate of wages. Moreover, our calculations confirmed the existing thesis that countries with higher values of labor productivity tend to slow their growth. To study the influence of regional features on labor productivity in Russia and identify factors of its growth, we applied

the approach based on the construction of econometric models using panel data. We obtained quantitative estimates of the individual effects represented in the Russian subjects, which affect labor productivity. These effects reflect the impact of unobserved characteristics. It is shown that the growth of labor productivity in the regions is mainly due to the quantitative reduction of the surplus labor force. At the same time, the low elasticity of labor productivity to real wages is characteristic of the Russian subjects.

The current stage of development of the international community is marked with the transition to multipolarity and, consequently, growing instability and volatility in the world economy. Each country strives to ensure its economic security since it guarantees protection against internal and external economic threats.

In the contemporary environment, the main global challenges are as follows (Presidential Executive Office, 2017):

- Increased structural imbalances in the financial system and the economy, the growth of international debt;
- Increased global competition.

Additional risks for Russia are as follows:

- Insufficient rate of economic growth;
- Declining relevance of the model of economic development based on the export of resources and the low competitiveness of the non-resource sector;
- Qualitative and quantitative lack of labor resources.

In October 2018, Russia started to implement the national project “Labor Productivity” to form a new production culture aimed at ensuring the growth of the enterprises’ efficiency. Its constituent elements are the federal projects “Systemic measures to increase labor productivity” and “Targeted support to increase labor productivity at enterprises.”

The budget of the national project for 2018–2024 is almost 35 billion rubles. In 2019, 200 enterprises involved in the project during the pilot phase showed a 36% increase in output. By the end of 2020, 2100 businesses had already been involved in the project (Ministry of Economic Development of the Russian Federation, n.d.).

Russia is marked with high differentiation in the context of its constituent entities. In this regard, the task of identifying the factors determining the regional differentiation of labor productivity is of particular interest. We used the methods and models of panel data to model labor productivity in the context of the Russian subjects in the dynamics. We selected

the productivity index since the Federal State Statistics Service (Rosstat) publishes data only on it (Federal State Statistics Service of the Russian Federation, n.d.).

MATERIALS AND METHODS FOR GLOBAL TRENDS ANALYZING

Economic security indicators (Presidential Executive Office, 2017) can be grouped into four groups characterizing the following:

- Sustainable economic development;
- Financial stability;
- Social situation;
- Level of activity and balance of foreign economic relations.

One of the most important tasks of ensuring economic security and national security (Presidential Executive Office, 2015) is the improvement of resource efficiency, including labor productivity.

Labor productivity manifests itself in several ways. First, it affects the performance of any organization since it allows increasing the production volume due to the additional consumption of material resources. Second, it leads to increased capacity utilization. Third, productivity growth reduces the need for labor and may cause additional unemployment if additional jobs are not created in alternative areas. Fourth, labor productivity is considered a key factor in determining the number of disabled, unemployed, and pensioners that a single worker can provide.

The increase in labor productivity is the basis of the country's economic development and the welfare of society. It is subject to the competent redistribution of the additional financial results.

Labor productivity is defined as the ratio of output to the number of workers (or time spent). The numerator can be calculated in physical and monetary terms.

The natural measurement of labor productivity is seen as a more adequate reflection of the production process's efficiency without the influence of price and inflationary factors. Such indicators can be used for benchmarking on enterprises with a similar range of products.

Labor productivity in physical terms is a derivative of the following factors:

- Qualification and motivation of employees. These factors can be assessed through the level of wages, the share of employees with

higher, secondary vocational, and other types of education, and work experience (service length);

- Level of a labor organization (including the efficiency of management). In this case, we can distinguish such indicators as working time (downtime), the ratio of production workers (main and auxiliary), and management personnel;
- Efficiency of the equipment and technologies used. In this case, the indicators are the productivity of equipment (usually in physical terms), the rate of depreciation, the renewal rate of fixed assets, the amount of capital investment, and the cost of innovation.

It should be noted that the opinions of researchers regarding the priority of the presented factors differ. Most researchers put the quality of the workforce at the top of the list (European Commission, 2014; Mihi-Ramirez, Melchor-Ferrer & Sobieraj, 2020; Ojeda-Gonzalez et al., 2018). Other researchers consider the increase in investments in innovative development and renewal of equipment and technology to be more significant (Pariboni & Tridico, 2020).

The study conducted by Russian companies (Simachev et al., 2021) found that the leading companies obtain a more significant impact on productivity due to the introduction of innovation. For lagging firms, increasing employee motivation comes to the fore. Other researchers (Vertakova et al., 2019) revealed the dependence of sensitivity to external financial incentives on the company's size. Support is considered to be more effective for small and medium-sized businesses than for large enterprises.

The main direction of the influence of the national project "Labor Productivity," as shown by the results of its implementation by the end of 2020 (Ministry of Economic Development of the Russian Federation, n.d.), concentrates on the growth of qualification of production and management personnel and implementation of lean production tools.

Labor productivity in physical terms undoubtedly reflects the level of qualification of workers, the organization of the enterprise's functioning, and technical and technological support. However, the cost indicators are used for inter-industry and inter-country comparisons. Although, in this case, the cost of production is recalculated not at the official exchange rate but at purchasing power parity (PPP), the structure of the cost, namely, the share attributable to wages, starts having a significant additional impact.

It should be noted that for the whole economy, the level of labor productivity can be estimated as the ratio of GDP to the number of employees (or the number of hours worked). Pogosov and E. Sokolovskaya (2015) argue that the impact of the level of wages provided 63% of GDP growth in 2001–2011.

According to the International Labor Organization (ILOSTAT, n.d.), hourly wages, calculated by PPP in US dollars, are significantly differentiated by country. For example, in countries such as Belgium, Norway, Germany, France, and Luxembourg, it is 2.5–3 times higher than in Russia.

However, according to the labor theory of value, value is labor embodied in goods (Marx, 1951, p. 948). Therefore, an increase in wages leads to increased production costs and, consequently, increased prices of products. As a result, GDP (and hence labor productivity) increases at the expense of the price factor but not at the expense of the technical and organizational level of production. In this context, the study of labor productivity in relation to the level of remuneration is quite logical.

Further analysis will be based on statistical data available on the website of the Organization for Economic Cooperation and Development (OECD) (OECD, n.d.). The first step is the statistical processing of the data on the dynamics of hourly labor productivity with PPP from 1995 to 2019. The sample includes OECD countries, Croatia, Russia, Romania, Bulgaria, South Africa, as well as averages for the OECD, the EU (28 countries), the Euro area (19 countries), and the G7 countries.

The following indicators were calculated:

- Maximum and minimum values, median (by year);
- Average annual growth rate for the whole period and for the last five years (by country).

Figure 24.1 shows the dynamics of labor productivity for some of the countries studied, which most characteristically reflect general trends. The median line divides the entire set of countries (all countries, not just the ones shown in the graph) into two groups. It is noteworthy that during the reviewed period, no country moved from the group of leaders to the group of laggards or vice versa.

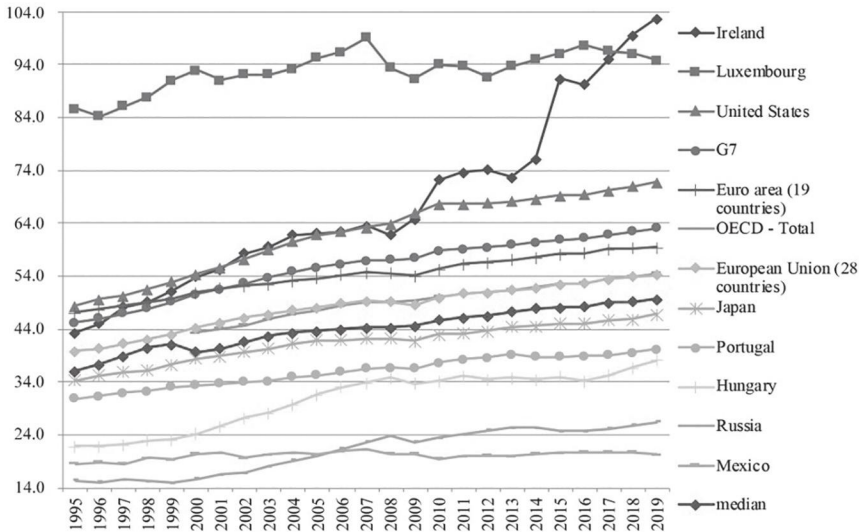
Luxembourg and Ireland are the leaders in labor productivity, with the latter coming out on top with impressive growth since 2009.

In 2019, the median productivity value was \$49.6. From 1995 to 2019, the maximum productivity increased by an average of 0.67% per year, the minimum by 2.36%, and the median by 1.16%. This fact shows that the lagging countries provide more growth than the leaders. The exceptions are Ireland (the rising leader) and Mexico (the non-growing laggard).

Next, we grouped countries by labor productivity and its average annual growth rate (Table 24.1). The analysis of the resulting matrix showed that there are two groups of countries largest in numbers:

Figure 24.1

Dynamics of Labor Productivity (GDP Per Hour Worked, USD, Constant Prices, 2015 PPPs)



Source: Compiled by the authors based on (OECD, n.d.).

- With hourly labor productivity from the median level to \$75 per hour. The median hourly productivity is \$75, and the growth rate is between 1%–2%;
- With hourly labor productivity from the median level to \$25. The rate of increase ranges from 2% to 3%. In general, countries with higher values of labor productivity tend to slow its growth rate, which is recognized as a significant problem of developed economies.

The exception is Ireland, which focuses on developing high-tech industries and reducing the tax burden on companies.

MATERIALS AND METHODS FOR ANALYZING REGIONAL FEATURES

Econometric modeling was carried out using panel data methods based on the specification of Cobb-Douglas type of extended production function:

Table 24.1**Grouping of Countries by Absolute Values and Indicators of the Dynamics of Hourly Labor Productivity**

Hourly labor productivity	Growth rate of labor productivity for 1995–2019				
	up to 1%	from 1% to 2%	from 2% to 3%	from 3% to 4%	over 4%
Over \$100				Ireland	
\$75–100	Luxembourg	Norway, Denmark			
\$49.6 (median) to \$75	Belgium, Netherlands, Euro area, Italy, Spain	Switzerland, United States, Sweden, Austria, France, Germany, G7, Finland, United Kingdom, Australia, OECD (Total), European Union, Canada,	Iceland		
\$25–49.6	New Zealand, Greece	Japan, Israel, Portugal,	Czech Republic, Turkey, Hungary, Slovenia, Croatia, Russia, Chile, Bulgaria	Estonia, Slovak Republic, Poland	Lithuania, Latvia, Korea, Romania
Less than \$25.	Mexico	South Africa	Costa Rica		

Source: Boldface indicates the countries with a higher rate of productivity growth over the past five years than over 1995–2019.

Source: Compiled by the authors.

$$y_{it} = A \cdot \prod_k x_{kit}^{\alpha_k} \cdot e^{\gamma t} \cdot e^{\beta_i} \cdot e^{u_{it}}, \quad (1)$$

where:

y_{it} – dependent variable characterizing the growth of labor productivity of the i^{th} subject of the Russian Federation at the time t ;

x_{kit} – influence factors of the i^{th} subject of the Russian Federation at the time t ;

u_{it} – residuals of the regression equation of the i^{th} subject of the Russian Federation at the time t ;

β_i – fixed individual effects characterizing immeasurable individual differences of the subjects of the Russian Federation;

γ_t – numerical parameters reflecting changes over time characteristic to all Russian subjects.

The numerical multiplier A is a characteristic of the contribution of scientific and technological progress to labor productivity growth.

To determine the required parameters, model (1) was linearized:

$$\ln y_{it} = \ln A + \sum_k \alpha_k \cdot \ln x_{k_{it}} + \beta_i + \gamma_t + u_{it}. \quad (2)$$

Econometric modeling was carried out using official data for 2010–2018 (annual data) for 80 subjects of Russia. The choice of the analysis period from 2010 is due to the availability of data on the selected factors of productivity growth.

The construction and analysis of panel data models of several specifications were carried out During the econometric study for the index of labor productivity. We considered end-to-end regression models, models with individual/temporal, and random/fixed effects. The selection of significant factors for each of the models was made based on t-criterion. The best specification panel model was determined based on the Wald, Hausman, and Breusch-Pagan tests (Verbik, 2006).

RESULTS

According to the simulation results, the best model was the following model with individual and time fixed effects:

$$\begin{aligned} \ln y_{it} = & 5.226 + 0.151 \cdot \ln x_{1_{it}} + 0.095 \cdot \ln x_{2_{it}} + 0.048 \cdot \ln x_{3_{it}} + \\ & + 0.032 \cdot \ln x_{4_{it-1}} - 0.019 \cdot \ln x_{5_{it}} - 0.019 \cdot \ln x_{6_{it}} + \beta_i + \gamma_t + u_{it}. \end{aligned} \quad (3)$$

where:

y_{it} – labor productivity index;

$x_{1_{it}}$ – index of industrial production;

$x_{2_{it}}$ – real accrued wages;

$x_{3_{it}}$ – index of the physical volume of investment in fixed assets;

$x_{4_{it-1}}$ – share of the added value of high-tech and knowledge-intensive industries in the GRP (at a time $t-1$);

x_{5it} – growth rate of the number of unemployed aged 15–72 years;

x_{6it} – growth rate of the average annual number of employees;

i – index corresponding to the subject of the Russian Federation;

t – point in time;

all variables, except $x_{4_{i,t-1}}$, were taken as a percentage of the previous year, the variable $x_{4_{i,t-1}}$ was taken as a percentage of the total.

All calculated coefficients of model (3) represent elasticities. That is, they show the change in the labor productivity index (in %) when the corresponding factor is changed by 1%, provided the other factors remain unchanged. Their statistical significance is ensured at the 5% level. The residuals of the model are uncorrelated with each other and homoscedastic. No multicollinearity of the factors was found.

The results of the panel analysis show that the long-term growth of labor productivity in the Russian regions will be ensured primarily by reducing the number of people employed in the economy and the growth of industrial production. It has been proved empirically that the subjects of the Russian Federation are marked with low elasticity of the index of labor productivity on such indicators as real wages, investment in fixed capital, and the share of value-added of high-tech and knowledge-intensive industries in GRP.

DISCUSSIONS

It should be noted that the model initially included such factors as the growth rate of export changes with non-CIS and CIS countries, the growth rate of the number of highly productive jobs (as a percentage of the previous year), the share of the employed population aged 15–72 years with different levels of education in the total number of employees, and the share of domestic spending on R&D in GRP (as a percentage of the total). However, no statistically significant impact of changes in the structure of the people employed in the economy by the level of education on the growth of labor productivity could be found in the subjects of the Russian Federation, which may indicate the presence of inefficient jobs. The hypothesis that export-oriented regions of the Russian Federation are more economically efficient was not confirmed. It was found that the increase in the number of highly productive jobs correlates with the growth of real accrued wages, which can be explained by the criterion of classifying a job as highly productive only by the level of the average monthly wage. This does not allow

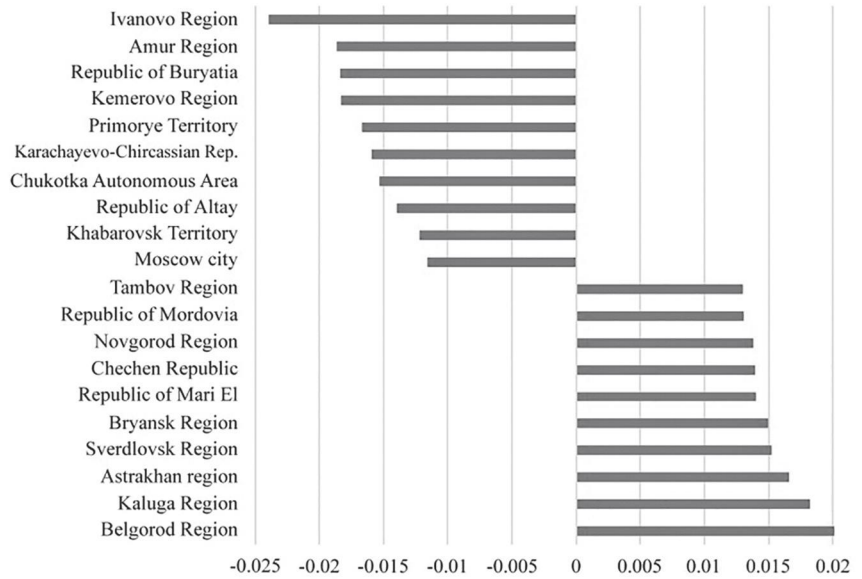
for the simultaneous inclusion of these factors in the model due to the appearance of multicollinearity.

Additionally, the developed panel data model confirms the influence of individual effects on the change in the index of labor productivity in the Russian subjects, which reflect the impact of unobservable characteristics (geographical location, natural resource endowment, provision of subsidies from the federal budget, the quality of government, etc.). The values of individual effects vary between regions and are constant over time. According to modeling results, individual fixed effects are positive in 38 out of 80 subjects of the Russian Federation (Figure 24.2). Thus, with the same values of other factors, the labor productivity index in these subjects will be higher than in other subjects.

Negative estimates of temporarily fixed effects were obtained for 2012–2013 and 2016–2018, which are similar across the subjects of the Russian Federation but differ in the dynamics (Figure 24.3). This indicates a slow-down in the growth rate of labor productivity for all subjects of the Russian

Figure 24.2

Estimates of the 10 Best (Positive) and 10 Worst (Negative) Individual Effects (β_i) in the Model (3)

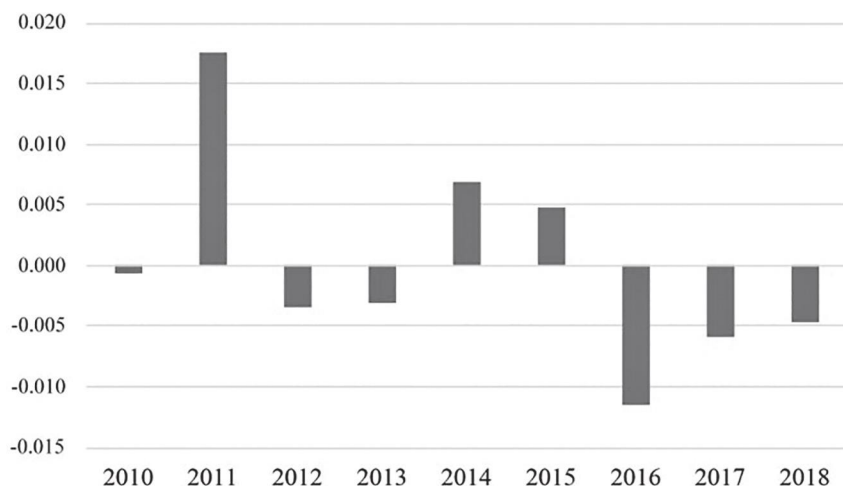


Source: Compiled by the authors.

Federation. The positive values of temporal effects in 2014–2015 can be explained by the effect of the low base of previous years.

Figure 24.3

Estimates of Fixed Effects (γ_i) in the Model (3)



Source: Compiled by the authors.

CONCLUSION

The study results provide quantitative estimates of the impact of selected factors on the index of labor productivity in Russia. In turn, this allows us to interpret their contribution in the context of considering the country's economic security. For example, according to model (3), it was found that the coefficient of elasticity of the labor productivity index on the growth rate of the number of unemployed was -0.019 . Thus, the growth of labor productivity in the Russian regions is mainly due to the quantitative reduction of the surplus labor force. On the one hand, this can be interpreted as a positive trend since the least efficient workers are more likely to be laid off and since layoffs tend to occur in less efficient areas of activity. However, increasing unemployment creates conditions for social tension and directly affects the economic situation in the country (Vanchukhina et al., 2019; Vasileva et al., 2017). Global digitalization and de-synchronization also

significantly contribute to the growth of unemployment (Osipov, 2019). In this context, it is probably necessary to thoroughly investigate the substitution of the social economy with the digital economy. From the standpoint of economic security, it is necessary to analyze labor productivity in the relevant spheres separately. The main difficulties, in this case, will be related to information support for such research.

To some extent, this assumption is confirmed by the above analysis of global trends (Table 24.1). According to it, there is a slowdown in productivity growth in advanced economies, which are the flagships of digitalization.

The research results rejected the hypothesis about the effect of the employed in the economy by levels of education in the total number of employees on the growth of labor productivity, which may also be a consequence of low labor market efficiency.

We revealed a low elasticity of labor productivity to real wages for the Russian subjects. In turn, the low growth of labor productivity due to this factor will not provide further growth of wages. The possible way out of this situation is to create new high-performance jobs and increase labor efficiency without seriously damaging the social economy.

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CHAPTER 25

COMPREHENSIVE ASSESSMENT OF THE QUALITY OF ECONOMIC TRANSFORMATIONS IN THE TERRITORIES OF THE RUSSIAN FEDERATION

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ABSTRACT

Purpose: comprehensive study of the quality of economic processes in the space of the Russian Federation.

The methodological basis of the research was the works of modern scientists, revealing the prospects for balanced territorial development. A series of indicators is proposed in the work for a generalized description of the level and dynamics of the development of their modernization capabilities: the coefficient of extraction of the potential of human resources; cost-effectiveness of patenting activities; volume of unit (average per capita) investments; the percentage of depreciation of fixed production assets; average labor productivity in small business.

The results of the study based on the assessment of indicators for a 10-year time period generally indicate the ongoing protracted crisis of the country's economic system, which is aggravated by a significant stratification of regions in terms of the return on human capital, scientific and investment activities, and entrepreneurial activity. The performed cluster analysis allows to classify the analyzed territories according to a complex of different quantitative characteristics and to single out those that demonstrate dynamics close to the all-Russian ones, as well as the group of federal districts that are unsuccessful in terms of achieving modernization growth.

Practical significance: recommendations on the application of the developed methodology for a comprehensive diagnosis of the quality of the transition of the territories of the Russian Federation to a new technological order are given, possible directions of modification of the proposed evaluative actions are justified.

The quality of the transition of Russian territories to a new technological stage of development is the subject of intense scientific discussions not only among economists, but also among political scientists, sociologists, historians, and statisticians.

Some experts associate the introduction of Western sanctions after 2014 and unconditional complications in the country's economic processes with short-term investment, entrepreneurial and institutional difficulties that will provide impulses for the emergence of the most effective economic relations. On the contrary, other researchers believe that the Russian Federation expects a protracted recession for several decades and a hopeless lag in the standard of living of the population from similar indicators of the most developed countries.

In the light of the emerging controversy, the primary task is the selection of the necessary indicators of the quality of the ongoing transformations and the identification of the further (dynamic or unsatisfactory) trajectory of the functioning of the Russian socioeconomic system.

Therefore, an attempt to solve the problem of a comprehensive assessment of the level of effectiveness of the transition of the territories of the

Russian Federation (federal districts) to a new technological structure is undertaken in this work.

METHODOLOGY

The issues of research and scientific substantiation of indicators and factors that have a priority impact on the socioeconomic and innovative growth of territories are the subject of many works of domestic and foreign experts. At the same time, a particularly important role in the study of the emerging patterns and prospects of expanded reproduction is given to such components as human capital, inventive activity and entrepreneurial potential, innovation, and investment climate, and so forth.

According to the results of Moscow scientists' researches headed by academician of the RAS S. Yu. Glazyev, the key factor of modern economic growth is scientific and technological progress (STP), which accounts for over 90% of GDP growth in developed countries. It provides an increase in the productivity of other factors of production and its efficiency. The transition to a knowledge economy further enhances its importance and determines the competitiveness of the entire economy. In turn, scientific and technological progress is based on a constant increase in the volume and quality of research and development work (R&D), implemented through the creative self-realization of scientists, engineers and entrepreneurs. This reveals the fundamental role of intellectual capital in ensuring the development of modern economy, which is impossible without expanded reproduction of human capital (Glazyev et al., 2020). Naturally, the use of various authors' indicators in the calculations, analysis of unequal time intervals and summing up the results of calculations for specific algorithms cannot provide unambiguous evaluative positions in research circles. From this point of view, the topic of comprehensive monitoring of the situation becomes even more confusing and naturally opens up new avenues for reasoning, which are not always consistent with the previous one.

In the context of the issue under consideration, the remark of A. A. Nikonova, which identifies the prospects for the functioning of the state with the trajectory of high-tech growth, seems to be very valuable. According to her, the importance of obtaining reliable estimates of the innovative development of the national economy is dictated by the tasks of current and strategic planning and management. An analysis of the results of the implementation of economic decisions is required primarily in order to develop a correct understanding of the adopted course in the context of a host of internal problems and external transformations. Therefore, it is necessary to identify and correctly measure the most significant factors and barriers to innovation (Nikonova, 2018).

In the opinion of N. V. Zubarevich, the possibilities of quantitative measurement of many factors are limited, the existing indicators do not quite adequately reflect the situation, the role of the institutional component, which is very difficult to quantify, is great for a number of regions.

On this basis, the researcher has identified a number of barriers to quantitatively measuring the factors of development of Russian territories:

- differences in the level of economic development of regions are noticeable only at the edges (for several of the most developed subjects and a dozen of underdeveloped subjects) against the background of the presence of a vast middle of territories with a different set of factors, which makes it difficult to analyze their influence;
- there are no adequate indicators to identify geographic features, resource availability, infrastructure development;
- distortions in indicators used for quantitative measurements of human capital are significant;
- differences in quantitative values for many indicators are small for most regions;
- an increase in the number of indicators involved in the analysis most often leads to an increase in the problems of interpreting the results due to the multidirectional influence of factors (Zubarevich, 2020).

This work is devoted to a generalized analysis of the quality of the transition of the territories of the Russian Federation to a new technological order based on the use of official statistics and quantitative criteria was undertaken. Thus, the following indicators served as the main performance indicators for the implementation of the author's assessments:

1. The efficiency of using the innovative potential of human resources (thousand rubles/person) in the i -th territory in the period (t), which is proposed to be determined by the formula (1):

$$E_{i,t} = \frac{V_{i,t}}{H_{i,t}}, \quad (1)$$

where V is the volume of innovative (high-tech) products;

H – average annual labor force.

2. Effectiveness of expenditures on patenting activities P (units/million rubles), estimated by calculating the ratio (Fraimovich et al., 2018) (2):

$$P_{i,t} = \frac{M_{i,t}}{C_{i,t}}, \quad (2)$$

where C is the internal costs of research and development carried out in-house by the organizations, including recurrent costs (for wages and insurance premiums; for the purchase (manufacture) of special equipment; the cost of raw materials, stuff, components, semi-finished products, energy, fuel, etc. purchased on the side) and capital expenditures (for the reporting year, regardless of the source of funding), million rubles (Federal State Statistics Service, 2021).

M – number of patents issued for inventions and utility models, total, units.

3. Average per capita investment in fixed assets I (rubles/person).
4. Depreciation rate of fixed assets F (%).
5. Labor productivity in small business L (million rubles/person) is proposed to be calculated using the formula (3):

$$L_{i,t} = \frac{S_{i,t}}{N_{i,t}}, \quad (3)$$

where S is the turnover of small businesses, billion rubles;

N – average number of employees of small enterprises.

It should be noted that this set of characteristics, according to the authors, strongly reflects the level of determination of the country's economy towards modernization and entry into a new technological order. In addition, the selected criteria are relative and demonstrate the specific results of the use of the most important national economic resources, which ensures the correct possibility of their comparison in different spatial perspectives.

Naturally, after covering specific territories that the analyst is interested in, and processing all the data, the task of compactly presenting the results and overcoming information overload arises.

The solution of the existing problem is facilitated by the use of the dynamics criterion ($D_{i,n}$), which incorporates information about the rates

of socioeconomic transformations in the i -th territory according to the efficiency indicator n against the background of the average value for the selected time interval (Fraimovich et al., 2017)

$$D_{in} = \frac{\overline{\delta_{in}}}{\overline{A_{in}}} 100\% , \quad (4a):$$

where $\overline{A_{in}}$ – arithmetic mean for a specific performance indicator n .

The average absolute difference ($\overline{\delta_{in}}$) for the n -th efficiency can be calculated as follows (4b):

$$\overline{\delta_{in}} = \frac{\sum_{t=1}^T (n_{i,t} - n_{i,t-1})}{T - 1} \quad (4b)$$

where $t = 1 \dots T$ – time intervals (years) for which the analysis is carried out.

The most important role of dynamics in the socioeconomic processes of the state is noted, for example, by V. N. Livshits. According to the scientist, the content of economic dynamics acts, on the one hand, as the central object of management, and on the other hand, as an instrument of counteraction to modern crisis processes (Livshits, 2014).

RESULTS

Approbation of the author's methodology is implemented on indicators for the Russian Federation (RF (code in copyright tables – 0)) as a whole, as well as for all its federal districts (Central (CFD, code – 1), Northwestern (NWFD, code – 2), Southern (SFD, code – 3), North Caucasian (NCFD, code – 4), Volga (VFD, code – 5), Ural (UFD, code – 6), Siberian (SBFD, code – 7), Far Eastern (FEFD, code – 8). Data processing for the selected performance indicators was carried out over a 10-year period from 2010 to 2019 based on the official information of Rosstat (Federal State Statistics Service, 2021).

The results of calculating the first indicator (E_i) for the specified territories, as well as the dynamics of D_i (Table 25.1), indicate the most successful transformations in terms of the development of human capital in the UFD (15.2%), the NWFD (14.9%) and the SBFD (14.2%). At the same time, the specific indicators E_i for the VFD in the predominant part of the considered time interval have a significant superiority over the corresponding values of other socioeconomic systems. But the achievement of peak growth rates, and then their loss on the part of the VFD in 2019, led, in fact, to align with the average Russian dynamics and the indicator for the CFD (11.6%).

Table 25.1**Results of Extracting the Innovative Potential of Human Resources (E_i) by Territories of the Russian Federation**

Territory Code	Specific indicators E_i							D_i
	2010	2014	2015	2016	2017	2018	2019	
0	17.4	49.7	53.1	60.6	58.0	63.1	68.4	11.6
1	14.0	51.0	70.4	79.2	52.7	55.7	67.3	11.6
2	16.5	48.3	51.5	46.5	64.1	68.9	83.7	14.9
3	13.4	16.0	20.0	33.3	40.8	27.9	26.5	7.1
4	7.6	7.5	11.1	9.8	9.0	10.4	11.3	4.7
5	37.4	81.6	84.3	100.5	104.3	130.0	127.8	11.6
6	17.0	26.2	33.7	57.3	79.8	82.9	79.3	15.2
7	5.7	22.8	26.9	26.6	25.7	22.4	31.9	14.2
8	4.1	114.2	37.8	17.9	23.2	29.0	35.1	6.9

Source: Compiled by the authors based on (Federal State Statistics Service, 2021).

Really weak transformations in the use of the innovative potential of human resources are demonstrated by the SFD (7.1%), the FEFD (6.9%) and, especially, the NCFD (4.7%). This is due to the fact that the southern regions of the country have limited technological prerequisites for its involvement, having a significant reserve of the working population. As for the Far Eastern territory, a sharp deterioration in indicators has been going on since 2015—a period of active imposition of sanctions, unfavorable changes in the exchange rate, which, apparently, provoked a reduction in the turnover of activities and employment in economic entities that closely cooperate with foreign (mainly Chinese and Japanese) companies.

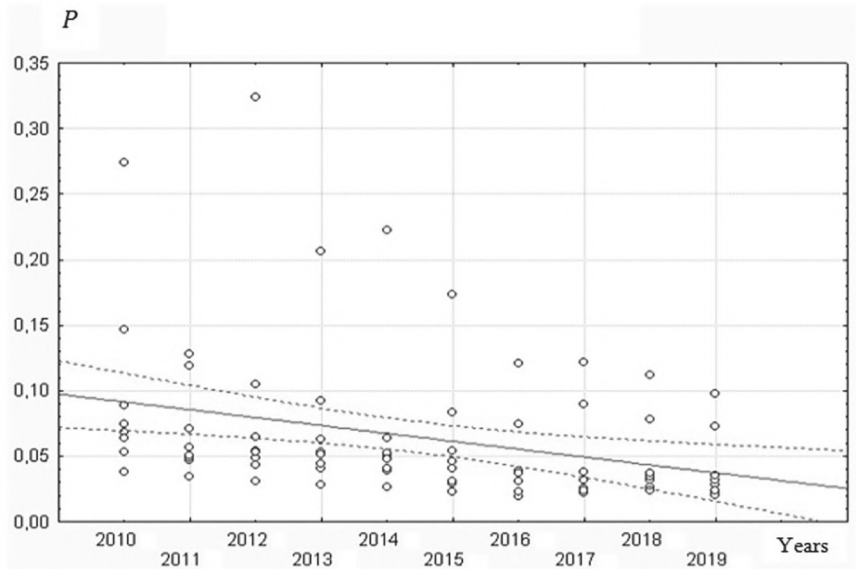
Consideration of the patterns of change in the second indicator (P_i) also in the interval 2010–2019 gives no reason for optimism because negative dynamics was recorded in all analyzed territories without exception. At the same time, the most “severe” drop in results is demonstrated by the UFD (–13%), the SBFD (–11.9%) and the VFD (–11.4%) against the backdrop of the all-Russian stagnation of “–10.1%.” It should be especially emphasized that if 0.061 patents (!!!) were issued for 1 million rubles of research and development costs in Russia on average in 2010, then this value decreased

almost 2.5 times to 0.025 by 2019. And this situation does not correspond to the country’s declared course for innovative growth in any way.

From the scatter diagram of P_i values (Figure 25.1), it can be seen that in reality there is a diminishing return on expenditures on scientific activity in the context of the analyzed eight districts of the Russian Federation and an unfavorable stability of the fall in results is traced according to the regression dependence: $P_i(t) = 0.699 - 0.006 t$. At the same time, the adequacy of the model is confirmed by an acceptable level of significance of Fisher’s statistics ($p = 0.0046$; $p < 0.05$) and indicates the possibility of using the obtained function for monitoring and adjusting the efficiency of spending on research activities in the territories of the Russian Federation.

Figure 25.1

Scatter Plot of EQUATION P_i Values for 2010–2019 by Federal Districts of the Russian Federation



Source: Compiled by the authors based on (Federal State Statistics Service, 2021).

The third indicator is per capita investments (I), which are most active formed in the CFD with a dynamic of $D = 10.5\%$ against the background of the corresponding indicator for the Russian Federation of 7.7% . The most inexpressive trend was noted in the SFD $D = 1.9\%$.

The analysis of indicators of depreciation of fixed assets by districts (F) and their dynamics allows us to assert that absolutely all federal districts

and the Russian Federation as a whole demonstrate an undesirable progressive trend of obsolescence of the production base, as in the case of the second indicator.

At the same time, the most difficult situation with the renewal of funds is in the Far EFD (4.6%), and the most “soft” situation, if it can be described this way, is in the UFD (0.9 %).

As for the last criterion—labor productivity in small business (*L*), the CFD shows the most active dynamics—10%, and the UFD shows the minimum activity—6.5%, which, in principle, means the presence of an entrepreneurial core and an organized business system in the country, due to which a qualitative transition of the state to a modern highly effective framework of economic relations is possible.

The generalized results of calculating the indicators of dynamics (*D_i*), interpreting the quality of the transition of the territories of the Russian Federation to a new technological mode, are shown in Table 25.2.

Table 25.2

Dynamics(*D_i*) of the Quality of the Transition of the Territories of the Russian Federation to a New Technological Order According to the Criteria *E, P, I, F, L* (%)

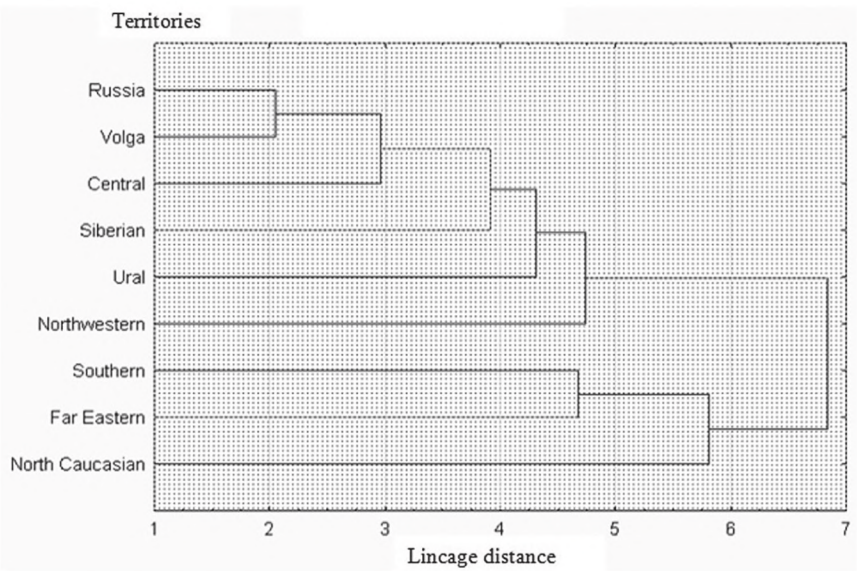
Territory Code	<i>E</i>	<i>P</i>	<i>I</i>	<i>F</i>	<i>L</i>
0	11.6	−10.1	7.7	1.3	9.1
1	11.6	−9.9	10.5	1.0	10.0
2	14.9	−7.3	5.8	1.2	8.8
3	7.1	−8.9	1.9	1.5	8.3
4	4.7	−11.0	6.6	1.7	9.5
5	11.6	−11.4	6.4	1.3	8.2
6	15.2	−13.0	6.5	0.9	6.5
7	14.2	−11.9	7.8	3.5	9.8
8	6.9	−7.0	4.8	4.6	7.9

Source: Compiled by the authors based on (Federal State Statistics Service, 2021)

The processing of the obtained data array to obtain aggregated information about the positions of each territory can be performed using cluster analysis implemented in the “*Statistica*” software package. This tool allows grouping the regions under consideration by a complex of different quantitative characteristics, taking into account the emerging transformations (Figure 25.2).

Figure 25.2

Cluster Dendrogram That Classifies the Territories of the Russian Federation by a Set of Dynamic Development Indicators for 2010-2019 (Observation Grouping Method—Single Link Method Using Euclidean Distance)



Source: Compiled by the authors based on the results of Table 25.2.

The graph shows that the VFD most adheres to the all-Russian dynamics of modernization. CFD, SBFD, UFD, and NWFD duplicate in general the average results for the country, periodically showing insignificant advantages or lagging behind. Against this background, three territories—the SFD, the FEFD, and the NCFD—appear to be clear «outsiders» in achieving high-quality high-tech growth, and by most of the criteria under consideration they are an order of magnitude inferior to the rest of the federal districts. At the same time, a significant gap can be traced not only in the final values, but also in the context of individual particular indicators. It should be noted that the CFD, which is traditionally recognized as the leader of economic and innovative transformations in the Russian Federation, could not unambiguously act as such because of the higher efficiency in the development of some of the most important economic resources in other districts of the country. Nevertheless, the significant level of differentiation of the results of functioning between the “main” and “catching up” groups of regions complicates the reproduction processes, further exacerbates the imbalances, increasing the risks of continuing protracted economic stagnation.

In light of the existing problem, the conviction of I. Rudakova looks quite original and interesting. According to this conviction, the traditional ways of achieving the goals of economic growth, which have proven their effectiveness when moving along the trend, may not be sufficient for the transition of the economic system to a higher level of development. This requires a change in target (Rudakova, 2013).

A well-grounded conclusion on the structural and technological imbalance of the Russian economy, characterized by a disproportionate distribution of factors of production and financial resources, is given by scientists from the Institute of Economic Forecasting of the Russian Academy of Sciences. In their opinion, a specialized structural, and investment policy—a set of measures aimed at smoothing out the disproportions in the sectoral, technological, and spatial nature, which impede interaction between sectors of the economy and are not eliminated by traditional market mechanisms,—is needed to overcome the existing significant differences (Ivanter et al., 2017).

Similar conclusions to the above are formulated by E. M. Buchwald, who believes that federal intervention in the least developed and depressed regions of the country involves the large-scale use of federal budget funds, the capabilities of federal development institutions and state programs of territorial orientation (Buchwald, 2019).

CONCLUSION

It is advisable to note that the quality of transformations of the Russian economy according to the most important development criteria in recent years has been at an unacceptably low level and is causing the next rounds of stagnation. This situation raises special concerns due to the catastrophic reduction in the return on the research sector; the growth of depreciation of fixed assets. The possibilities of correcting an unsatisfactory trajectory are fully within the competence of the federal authorities, which are able to turn economic processes towards a new technological order due to competent, reasonable, and even nonstandard solutions.

In addition, the results of the calculations and the performed graphical analysis are generally consistent with the results of most studies, which note strong socioeconomic differences between the center of the Russian Federation and its periphery with a weak scientific, production and infrastructure base, reducing the efficiency of using human potential.

The proposed evaluative approach can be supplemented with other indicators reflecting the level of development of reproductive resources. It should be noted that in specific modified diagnostic algorithms, in addition to dynamics, the criteria of stability, variability, arithmetic mean will be quite acceptable, which should be combined with the set scientific tasks.

The main provisions of the formed methodology can be applied: by specialized departments of territorial administrations for comprehensive monitoring and adjustment of the efficiency of the development of reproduction reserves; by scientific structures in order to update the toolkit of analytical procedures related to the search for points of regional growth; by educational institutions to improve the skills of students with the data of official statistics; by business incubators as part of substantiating the effectiveness of innovative projects.

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CAUSES OF UNSTABLE DEVELOPMENT OF THE RUSSIAN ECONOMY AND FACTORS AFFECTING THE STABILITY OF THE ECONOMIC SYSTEM

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ABSTRACT

The paper investigates the causes and factors that can influence changes in performance, stability, and volatility of the country's economy. The paper reveals the reasons why Russia is subject to fluctuations and structural changes. The authors note that the recent negative trend of economic growth and the lack of fundamental prerequisites for the possibility of stabilizing production processes are visible. Russia's economy is cyclical and has undergone five economic crises over the past 30 years, which have strongly affected the growth rate of the country's economic system. The problem of economic instability in Russia is urgent and is conditioned by the disclosure of its essence. The authors express the view that the national economy is largely dependent on the global economy. Therefore, there is a need to develop measures to protect and stabilize the Russian domestic market. As a result, the authors determine the structure of factors, the influence of which affects the stable development of the country's economy. The structure of factors includes historical, political, foreign economic, social, institutional, and technological factors. The authors conclude that Russia needs to use tools and develop such protective mechanisms that would reduce risks from the possible negative impact of factors of instability of growth and development of the economy.

Russia is a unique country with enormous territorial, resource, and intellectual opportunities, the effective management of which can help achieve not just high internal economic indicators for the country but also increase the level of importance of the country in the global system of economic relations. Historically, Russia's economy is constantly subject to fluctuations and structural changes expressed in its instability and reduction of the effectiveness of the main indicators of economic growth (Smirnov, 2016). This volatility of systemic economic processes is associated with a volatile system of goals and the setting of priorities by the government. Despite the ongoing reforms in the economy, a negative trend is more visible than the dynamics of growth of economic indicators.

As the main "engine" of the economies of the former Soviet Union countries, Russia started to establish its economic system.

The process of entering the market economy is complex and ambiguous. However, Russia is trying to develop its economic system by developing effective interaction mechanisms between the private sector and the government.

For quite an extended period, Russia has been trying to improve the significant indicators affecting the ranking of the world economies to become one of the five strongest economies. These indicators are influenced by economic and geopolitical factors, the most important of which is the low level of GDP per capita and the fact that Russia is a resource country. The export of resources in large quantities (the share of which is more than

70%) makes it difficult to enter the category of developed countries of the world since this category has been historically used by industrial countries.

MATERIALS AND METHODS

The main indicator of the stability of a country's economy is its economic growth, which is influenced by the cyclical nature of its development and the unequal and progressive nature of its development. The economy of Russia constantly undergoes different phases of the cycle since external economic and political factors strongly influence it. Some of the most important factors are as follows:

- Instability of the national monetary system;
- Dependence on reserve currencies;
- Sanctions, fines, and embargoes from other countries;
- Low competitiveness of industrial goods on the world market;
- Mistrust of investors and low interest in the development of national projects;
- Decrease in the share of industrial production within the country (export of raw materials and import of finished products derived from them);
- Presence of a fairly high level of the shadow economy.

The problem of economic instability in Russia is urgent and is conditioned by the disclosure of its essence. The instability of the country's economic system is an indicator showing the extent to which the country can timely respond to changing social, economic, and political phenomena and apply protective mechanisms that would restrain the growth of factors negatively affecting the development of society.

We understand the instability of the system as such a state of the country's economy, in which there is no proper effective interaction of all economic subjects of market relations and no possibility of achieving stability in production processes. This state is influenced by the following factors:

- Rationality and efficiency of resources and capacities;
- Investment attractiveness of the country;
- Technological progress;
- Social security of citizens;
- Formation of the individual and society as a whole;
- Institutional development.

According to Russian President Vladimir Putin, it is necessary first and foremost to make timely decisions needed by society to solve the problems of instability in the economy. “Under these conditions, it is important to make decisions that will be in demand by businesses and citizens, and will have a real positive effect on businesses, organizations, regions, and the country as a whole, as quickly as possible, promptly” (Presidential Executive Office, 2021).

Given the particular dependence of the Russian economy on the world economy, the country is developing its own internal instruments of stabilization and socioeconomic development. These instruments would allow the country to reduce the risks of the impact of global economic crises and protect it from severe fluctuations. One of these instruments is the Presidential Decree “On the national goals and strategic development goals of the Russian Federation for the period up to 2024” (May 7, 2018, No. 204) (Strategy). The Strategy sets goals aimed at the future development of Russia in the highlighted aspects, such as (Presidential Executive Office, 2018):

1. Demographics;
2. Health care;
3. Education;
4. Ecology;
5. Safe and quality highways;
6. Housing and urban environment;
7. Labor productivity and employment support;
8. Science;
9. Digital Economy;
10. Culture;
11. Small and medium entrepreneurship;
12. International cooperation and export.

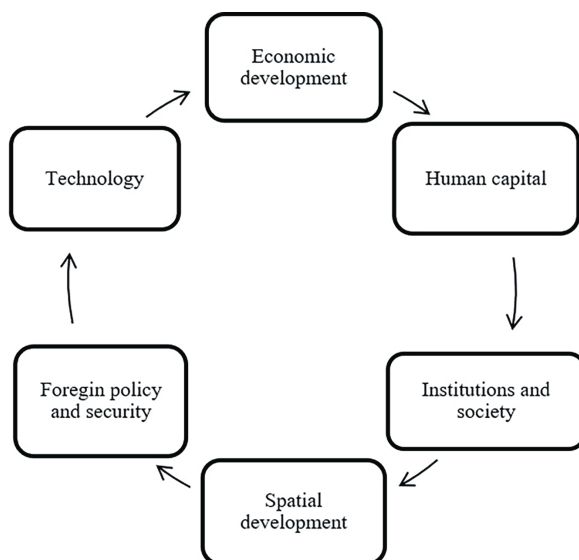
Allocated budget funding for the implementation of national projects should be aimed at the following (Tsypin & Tsypina, 2019):

- Increasing the level of income of the population and reducing poverty by half;
- Reducing unemployment;
- Improving the country’s demographics (population growth and increased life expectancy);
- Entering the top five countries in the world in terms of GDP per capita.

The strategy addresses all important areas of economic development. It aims to create conditions for sustainable economic growth of Russia, exceeding the global average, based on the development of human capital and increasing the country's attractiveness to domestic and foreign investors (Presidential Executive Office, 2018) (Figure 26.1).

Figure 26.1

Elements of the Country's Economic Development Strategy



Source: Compiled by the authors.

Due to the current situation in the world caused by the pandemic, the President of the Russian Federation instructed to revise the planned indicators for the implementation of national projects in order to adjust the program to highlight significant and relevant projects and postpone the implementation of those that are less important in current realia (Tabakh, 2020). The implementation of strategies for national projects will significantly impact the country's budgetary policy and the short-term development of particular sectors of the economy.

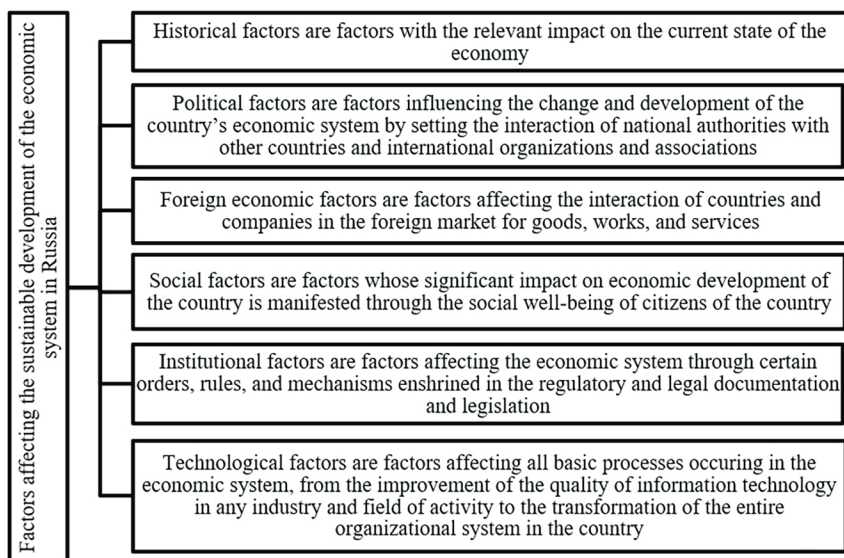
RESULTS

Many factors influence the stable development of a country's economy or, on the contrary, its instability (Figure 26.2):

- Historical;
- Political;
- Foreign economic;
- Social;
- Institutional;
- Technological.

Figure 26.2

Systematization of Factors Affecting the Sustainability of Economic Processes in the Country



Source: Compiled by the authors.

1. Historical factors are factors with a relevant impact on the current state of the economy. Russia has a unique geography, different natural and climatic conditions, and a multinational composition and population. These factors directly affect the organizational structure of the country's economic system, which is constantly subject to fluctuations. In different periods, Russia's economy has undergone attempts to make the following global changes (Kleiner, 2015):

- Transition from an open economy to import substitution;
- Transition from collectivization to privatization;

- Consolidation of economic units—unbundling;
- Natural planning—total monetization;
- Centralization—decentralization.

Such major changes in the country's life require the investment of considerable resources (time, financial, human, production, etc.), which leads to instability of the economic system and the emergence of economic crises, which in the historical aspect tends to impact the current state of indicators negatively.

Historical factors are certainly related to the transition of the Russian economic system from a planned to a market economy. Over the past 30 years, we can distinguish five economic crises that have significantly affected the stability of national economic development (Global Finances Portal, n.d.). They are as follows:

1. 1990–1992—the period of the collapse of the USSR and the formation of the Russian Federation, the so-called crisis caused by the transformation not only in the economy but also in the entire way of life of society. During this period, there was the largest drop in GDP by 14.5%.
2. 1998–2000—the crisis caused by the insolvency of the Russian economy, the emergence of a huge amount of debts to the population, and their inability to pay them, which led to the default and debt crisis with a drop in GDP by 5.3%.
3. 2008–2009—the global financial crisis caused by the decline and overheating of the financial, banking, and stock sectors of the economy, which had a negative impact on the Russian economy and caused a 7.8% decline in GDP.
4. 2014–2015—the currency crisis caused by the ruble's decline against world currencies due to the fall in world oil prices, which led to a decrease in GDP by 2.3%.
5. 2020—the global crisis caused by the COVID-19 pandemic, which paralyzed the entire economic system of countries and caused a 3.8% GDP decrease by the end of 2020.

The cyclicity of the economy and the emergence of crises negatively affect the development of the country's economic system and its growth rate. Nevertheless, there is always a phase of recovery after the crisis, which can positively impact the improvement of the significant indicators for the country in case of quality management and effective development strategy aimed at the following aspects:

- Allocation of funds for the development and support of the affected industries of small and medium-sized businesses;
- Granting tax deferrals and tax vacations to entrepreneurs;
- Development of the OFZ (Federal Loan Obligation) market and increasing its importance in the overall share of investment in the country;
- Balance between budget revenues and expenditures;
- Strengthening of the national currency by adjusting the mechanism of currency sales by the Central Bank of Russia;
- Lowering the key rate to attract borrowers to the banking sector and allowing the population to repay credit obligations to banking institutions.

2. Political factors influence the change and development of the country's economic system by setting the interaction of national authorities with other countries and international organizations and associations. Military and political conflicts influence the establishment of relations between Russia and most of the other countries. On this background, there emerge several factors negatively affecting and provoking the possibility of decreasing the level of Russia in the system of world economic relations. These factors are as follows.

- Ban on imports of some imported products into Russia;
- Embargo on imports of Russian products to foreign countries;
- Penalties from the United States and European Union;
- Withdrawal of a part of foreign investment from Russian business and the stock market;
- Information warfare artificially inflating economic bubbles.

Nowadays, with the whole world affected by the pandemic, countries' economies have sharply shaken, and Russia has an opportunity to demolish political conflicts partially. The virus problem has forced all countries to close their borders. Russia, which has been developing a vaccine for the COVID-19 for almost a year, has been successfully promoting it domestically and trying to prove its effectiveness in every way possible by getting it certified by the World Health Organization. Thus, this factor has a positive effect on the attitude of foreign countries to Russia, changing their world view.

3. Foreign economic factors affect the interaction of companies and companies in the foreign market of goods, works, and services. The country's

foreign economic activity is a necessary element of the entire economic system, which increases the country's position in the world market, the quality of domestic products, and the level of investment in Russian businesses and projects. Moreover, it stimulates economic growth. Foreign trade activities are always subject to certain risks. Therefore, the existing external factors can negatively impact the country's economy:

- Fluctuation of the national currency and its direct dependence on the world's reserve currencies (euro and dollar);
- Restraining the promotion of domestic products in new international markets by prohibitive mechanisms;
- Lack of advanced engineering technologies or the existence of high-cost production methods;
- Low interest of foreign investors in the development of Russian production;
- Low Russian and foreign demand for similar products purchased from foreign companies;
- Lack of a raw material base for some productions or a high price compared to the purchase price of similar resources on foreign markets.

4. Social factors are factors whose significant influence on the development of the economy in the country is manifested through the social well-being of the citizens. Changes related to social factors and directly related to the stability and growth of economic performance include the following:

1. Living standard of the population calculated using the following social indicators:

- Security of the population;
- Quality of medical services;
- Quality of education;
- State of the environment (environmental safety);
- Ensuring the rights and freedoms of citizens.

2. Increase in the level of the population's income:

- Ensuring employment and quality working conditions;
- Unemployment insurance;
- Indexation of wages in commercial organizations;

- Employee training and education;
- Reducing the property inequality of the population;
- Improving the quality of education (secondary and higher).

3. Increasing the level of demographics:

- Social benefits and allowances;
- Support for the economically weaker segments of the population;
- Reforming the pension system (creating a mandatory cumulative system for future pensions through employers).

As a human factor expressed through the qualitative and quantitative indicators of the country's population, the social factor can adversely affect the increase of social tensions in society and directly influence economic instability. Therefore, the government needs to pay special attention to these factors and develop quality measures to improve social stability in the country.

Ensuring social security is a priority for the government, leading to the sustainable development of the country's economy and a steady rise in society's standard of living (Tolstykh, 2020).

4. Institutional factors affect the economic system through specific orders, rules, and mechanisms enshrined in the regulatory and legal documents and legislation. The legislative framework is based on legal regulation, which, in turn, is implemented through certain tools and mechanisms. It should be aimed at supporting and developing economic growth in the country. The mechanisms of the legislative framework are the sustainable forms of economic. The tools of the legislative framework are the methods and means of implementing such relationships (Mishchenko, 2020).

The factors of the institutional environment that can negatively impact the development of the country's economy are as follows:

- Underdeveloped system of legal regulation unable to provide the authorities with the necessary tools to exercise their powers effectively;
- Poor management system, leading to inefficient use of the country's resources;
- Unbalanced development of the country's infrastructure and the centralization of resources and funds only in major cities;
- Low level of information provision of the population on the possibilities of their social security and protection;

- Reduced level of regional competitiveness.

As an incentive, an indicator, an object, and a subject of change, the institutional structure of society is the most crucial element and driver of any reforms. The key tasks of this direction include the simultaneous use of the maximum available possibilities of society under the given institutional structure with gradual evolutionary development, cultivation of an updated, higher-level system of social and state institutions in the following areas (Center for Strategic Developments, 2018):

- Improvement of law enforcement and judicial systems;
- Modernization of public administration;
- Use of nonstandard institutions and consideration of sociocultural factors;
- Strengthening the cohesion of civil society.

5. Technological factors affect all basic processes occurring in the economic system, from the improvement of the quality of information technology in any industry and field of activity to the transformation of the entire organizational system in the country.

A lag in the development of technology and scientific and technological progress can negatively impact the quality of economic processes in the country, among which we can highlight the following:

- Quality of products and services provided;
- Development of new products and services;
- Increase in the time factor;
- Increased production costs;
- Noncompetitiveness of goods and services on foreign markets;
- Quality of interaction of the population with the authorities.

Scientific progress and the development of technology is one of the priority tasks aimed at solving the country's social and economic development. Following the program "Digital Economy of the Russian Federation," the country implements mechanisms aimed at creating high-tech markets and developing advanced scientific competencies. The current directions of scientific and technological progress in Russia are as follows:

- Transformation of the economic system based on the influence of global trends and the development of a strategic model of public policy in the development of digital technology (Grafova, 2020);

- Promotion of domestic developments in the field of science and technology to the international level (Kolin, 2017);
- Development of organizational forms and mechanisms of state management of the scientific and technological sphere;
- Development of promising innovative projects in various areas of the country's economy.

CONCLUSION

We can conclude that the factors systematized in our research directly impact the implementation of economic processes in the country and directly affect the level and quality of economic growth. Nowadays, more than ever, state authorities must use the tools and develop such protective mechanisms that would reduce the risks of possible instability in the growth and development of the economy in Russia. The use of modern information technologies and the harmonization and development of measures aimed at effective interaction between society and the government will allow achieving higher rates of improvement of the country's economic system.

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PART III

**INTERNATIONAL COOPERATION, INTEGRATION,
AND ECONOMIC SECURITY IN THE
SOCIOECONOMIC DEVELOPMENT OF RUSSIA**

CHAPTER 27

THE CURRENCY AND FINANCIAL ASPECTS OF OVERCOMING THE EXPORT AND RESOURCE DEPENDENCE OF RUSSIA

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ABSTRACT

Large importance of the analyzed problem is connected to the Russian economy significant dependence on the situation in resource markets. Here we provide provisions on the negative consequences of specialization in resources, the main of which are deindustrialization and the loss of the possibility of technological development.

The offered theoretical developments reflect the interconnection between the currency, monetary and credit, and structural policies. The system of measures on improvement of the currency and financial system is given.

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It is noted that the best option of ruble exchange rate in the currency policy would be the corrected floating rate with its “connection” to the indicators that are most important for Russia. Such derivate type of currency rate would be able to overcome the drawback of the fixed rate that consists in the impossibility of independent monetary and credit policy. Such option of currency rate would also allow avoiding the main drawbacks of the controlled floating rate—risk and uncertainty, and high probability of erroneous currency rate that is set by the Bank of Russia.

It is supposed that consumer goods trade between countries could be conducted based on a fixed rate with the basic assets for its establishment. Investment products trade should be conducted with a more flexible rate—perhaps, with a higher ruble rate.

We present the model of corrected floating rate with its “connection” to certain indicators, which supposes automatic regulation of currency rate. The use of such scheme allows achieving automatic control of ruble exchange rate for the purpose of the growth of differentiation and independence of Russia’s economy.

INTRODUCTION

Large importance of the analyzed problem is reflected in a range of analytical publications of Russian and foreign economists. The threats to Russia’s economic security include large dependence of the Russian economy on the situation in resource markets. Interregional contradictions grow, “currency wars” arise, and the competition for technological domination increases. We give the provisions on the negative consequences of specialization in resources, the main of which are deindustrialization and the loss of the possibility of technological development.

In the modern economic literature, such aspects of the problem at the interconnection between the currency, monetary and credit, and structural policies have not been fully reflected. It seems that theoretical developments with the distinguished system of measures on improvement of the Russia’s currency and financial system, which are presented here, would allow filling certain theoretical gaps.

METHODOLOGY

The following methods are used: analytical, dialectical, and structural and logical. The theoretical and methodological basis of the research is based primarily on the theory of political economy, which includes the notion of reproduction as reproduction structure of economy and the theory of currency and financial relations. The vector of the goal is connected to a

forming theoretical direction—currency and financial regulation of the economy's structure. Within this direction, a synthesis of political economic and macroeconomic categories, which are based on a complex of post-Keynesian and protectionist theories, is performed.

RESULTS

The excessive resource specialization of Russia in the international division of labor is objectively predetermined by the transnational and external coordination, and, therefore, the global reproduction process. The external coordination of reproduction is a manifestation of the existing world currency and financial system, with the built-on dependence of the “periphery” and “semi-periphery” countries, which include Russia, on countries of the “core,” according to the terminology of Wallerstein (1979).

We suppose that the main problem of the Russian economy is its insufficient structural differentiation and export and resource dependence. This dependence is manifested in the country's vulnerability to movement of capitals, primarily U.S. dollars, and “cheap money” in the global economy. Thus, high volatility of ruble exchange rate is established. As a matter of fact, the Bank of Russia refused to control ruble exchange rate in 2014, creating, according to Kapkanshchikov and Kapkanshchikova (2018), “certain profits for resource exports, financial speculator, and the Ministry of Finance.”

Excessive resource specialization of Russia is the main reproduction factor, which leads to formation of the “deindustrialization trap.” Thus, as a result of instability of ruble exchange rate, investors and potential partners in common payment transactions lose trust in ruble. The risk of internal investing and its replacement by foreign investing, which is built in the external reproduction contour, grows. Thus, there arises the necessity for foreign, U.S. dollar, investing, and the demand for rubles—as an investment currency—reduces, which leads to further depreciation of ruble. The U.S. and other emitters of investment currencies receive more profits from this,

Therefore, in order to provide domestic, ruble investing, it is necessary to strengthen ruble exchange rate and make it an investment currency. Let us consider the real possibilities of such strengthening.

As is known, according to the level of flexibility there are fixed and floating currency rates and derivative formed.

Currency rate could be tied to a certain currency and to a set of currencies of different countries. At present, Russia has a ruble rate that is tied to U.S. dollar; emission of ruble is backed by gold and currency reserves, which volume is even higher than is necessary.

Such regime creates Russia's economic dependence and leads to insufficient monetization of economy, hindering the formation of ruble investment resources. According to the academic Glazyev (2017, 2020), "it is necessary to change the structure of Russian currency assets: give away U.S. dollar tools, using rubles, gold, and currencies of friendly countries—partners of the Greater Eurasian Partnership—instead."

According to Gubanov (2016), ruble must have "solid buying capacity" during several decades at least.

The system of gold standard is a currency system that envisages a rate of national currency that is tied to gold. In 1950s USSR, the USD/ruble exchange rate was determined and fixed based on the buying capacity of ruble and U.S. dollar, and ruble was tied to gold without any "connection" to U.S. dollar. According to Katasonov (2016), this allowed protecting the USSR's financial system from the financial expansion of the United States.

Apart, from fixed rate, there could be floating, or flexible, currency rate. Floating currency rate could be as follows:

- corrected, which changes automatically under the influence of certain economic indicators;
- managed floating with frequent changes by the central bank;
- independently floating, which is established based on demand/offer ratio.

At present, currency rate in Russia is managed flowing, with excessive backing of national currency emission by currency reserves. A derivative, hybrid rate has formed—with the worst features of "currency management" and insufficient level of economy monetization; and floating rate with the large influence of the Bank of Russia.

It has been found out that flowing currency rate fits large relatively closed economies with a high diversification of production. Fixed rate is preferable for small open economies, which depend on foreign trade and are oriented at certain countries. The more open the economy, the more difficult it is to adapt currency rate to various changes of the world state of affairs.

In an open economy, to reduce negative consequences, which are connected to changes of trade conditions (imported/exported goods' prices ratio) it might be necessary to perform frequent change of currency rate.

To conduct a structural policy for the purpose of increase of the share of spheres with high added value, it is necessary to implement changes in the currency policy.

It seems that the optimal currency rate has to be derivative—that is, have the elements of fixation and the elements of flexibility.

The historical experience shows that the basic assets for currency fixation could be different. Thus, it could be various assets—guarantors of stability of ruble exchange rate and export potential. These are as follows:

1. Reserve currencies.
2. Gold. As a matter of fact, the Basel III decision on assigning gold not to the third, but to the first category within gold and currency reserves leads to the tendency of return of the gold standard. This decision leads to overestimation of total balance and creates an opportunity to back the emission of new money, or, to be precise, accounting units, with gold.

At present, gold is “reinstated in its own rights,” and it has become not only a stock metal but also world currency, together with U.S. dollar, euro, and British pound. Besides, in 2019 European central banks refused to extend the CBGA—Central Bank Gold Agreement, which was made in 1999. This decision takes the world gold market out of control of London gold fixing. It is expected that price for gold will grow, which means that this asset could be monetized.

Accounting of other assets could stimulate the flexibility of currency rate, which will allow increasing monetary supply for investment projects in the innovative sector of economy. It is possible to emit monetary or payment assets to back obligations. At present, it is possible to use digital algorithms, similarly to noncash money, commercial money, or bills of exchange; also, it is possible to use crypto currencies, which correlate with American or other securities or reserve currencies through gold parity. Such practice of the use of “gold obligations” (China Intends to “Kill” the Dollar “Digital Yuan,” 2020) is expected in China.

The Central Bank of China offered a perspective scheme. “Bill” was combined with crypto currency, and the movement of the obtained “digital yuan” was separated from the bank system. It is expected that the new financial tool could become a dangerous rival to U.S. dollar as a world reserve currency. The necessity for the wide use of digital technologies for formation of innovative technical conditions for the development of production and increase of competitiveness of the Russian economy is constantly discussed in scientific circles and is reflected, in particular, in the works of Alpidovskaya and Tsikin (2018).

Thus, to regulate the ruble exchange rate, it is possible to use—as the basic asset—conventional units of accounting that are created in macroregional markets (Reshetova, 2017), and payments without currency (clearing). Clearing is good only for companies and countries that import in Russia specially ordered products, for example, equipment (Minchenkov et al., 2017).

Such system allows distinguishing, according to the terminology of Zvonova et al. (2020), “external cost of money (currency rate) from their internal cost (buying capacity) and will allow solving the problem of international liquidity without the necessity to take money from the national economic turnover into the sphere of non-production international reserving” (Vodyanova et al., 2017).

Capital surplus from emission of conventional accounting units could be automatically transferred to the investment sphere with the help of specialized financial institutions, for example, through the Eurasian Development Bank “for financing of the infrastructural objects of the Eurasian economic space” (Delyagin, 2014).

Such measures will allow increasing the internal “replenishment” of ruble with ruble investments, which, firstly, turn into incomes, and, after the creation and export of final product, are replaced by the reserve currency or gold (Gelvanovsky et al., 2017).

The elements of flexibility of currency rate have to be used for the automatic improvement of the structure of the Russian economy.

CONCLUSIONS/RECOMMENDATIONS

Thus, it seems that the best option of the ruble exchange rate might be corrected floating rate with its “connection” to the indicators that are most important for Russia. Such derivate type of currency rate would be able to overcome the drawback of the fixed rate that consists in the impossibility of independent monetary and credit policy. Such option of currency rate would also allow avoiding the main drawbacks of the controlled floating rate—risk and uncertainty and high probability of erroneous currency rate that is set by the Bank of Russia.

In the modern economic literature, there is a similar point of view on the necessity for a double-contoured currency system of Russia (Reshetova, 2018). At present, the suggestion of a range of economists on “creation of a reserve investment contour of the double-contoured national banking and financial system with creation of the commodity and material reserve fund with the use of the commodity prices index” is very important (Delyagin, 2014). Sticking to these offers, it is possible to suggest that consumer goods trade between countries could be conducted based on a fixed rate with previously designated basic assets for fixation. Investment good trade should be conducted based on a more flexible rate—perhaps, based on a higher ruble rate.

The model of corrected floating rate with its “connection” to certain indicators and automatic regulation of currency rate could be presented in the following form.

If the level of economy's differentiation reduces, the regime of currency rate becomes more fixed. For a certain period, ruble exchange rate is "tied" to certain stock basic assets with the given weight coefficients. This will allow keeping ruble exchange rate if the oil and gas priced drop down and stimulating the import of investment goods for the development of hi-tech spheres. Besides, in case of high prices for resources, the inflow of dollar monetary supply within the active trade balance will not increase the ruble money supply, and currency rate will not grow substantially. Currency rate's "connection" to gold could oppose its fluctuation.

If the economy's differentiation grows, currency rate could become more floating and take into account investments (digital accounting assets) as the basic asset. Implementation of investment projects will increase monetization factor; and, therefore, the volume of nonresource production, and will raise the economy's differentiation.

In case of such scheme, the first stage envisages the increase of manufacture of goods for the domestic market, though movement to external markets will be limited by a lot of institutional barriers. In case of reduction of the share of the resource sector of economy, during the initial stages, reduction of export revenues will lead to reduction of the level of fixation of ruble exchange rate.

Reduction of the share of resource export revenues will lead—at the second stage—to reduction of ruble exchange rate. This reduction might be used to promote nonresource goods, which are created at the first stage, in external markets.

At the third stage, the share of export of nonresource goods will increase, economy will become more diversified, and the level of flexibility of ruble exchange rate will grow.

At the fourth stage, when economy becomes predominantly nonresource, currency rate could be managed even better. But the institution of management should be not the monetary body of management (Bank of Russia), but the institution of development—for example, an institution of planning and forecasting, which is formed on the democratic basis.

Thus, the use of such scheme will allow achieving automatic manageability of ruble exchange rate for the purpose of growth of differentiation and independence of Russia's economy.

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CHAPTER 28

ECONOMIC THEORY FEASIBILITY STUDY OF BEHAVIORAL PROSPECT MODEL MOTIVATION BACKGROUND FOR BANKING SECTOR MARKETING IN RUSSIA

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ABSTRACT

Consumer attitudes, perceptions, and preferences in making decisions on purchasing banking and financial products became more complex due to the big data-driven environment, the internet, and the variety of opportunities provided by these technologies. In this regard, the authors aim to justify

the possibility of using the prospect theory in the marketing of the banking and financial sectors of the Russian economy. However, the factors driving consumers to make purchasing decisions are 1—complex and 2—usually country—and industry-specific. Moreover, 3—they go beyond utility maximization and rational choice. The psychological theory of motivation plays a significant role in making these decisions. Therefore, the methodology of our study uses the prospect theory for marketing banking and financial services based on the psychological theory of motivation. As a result of the study, we have identified positive examples of using the prospect theory in marketing financial and banking services on the example of organizations in the Russian banking sector. This study aims to find relationships between personality type and consumer behavior. Particularly, the authors study the influence of personality type on the choice of financial products and services. Our findings can be successfully implemented in financial and credit institutions (banks and other financial institutions) for applying the behavioral perspective model. The originality of this paper lies in the combination of the mentioned components of prospect theory in the marketing of banking and financial services.

ECONOMIC THEORY FEASIBILITY STUDY OF BEHAVIORAL PROSPECT MODEL MOTIVATION BACKGROUND FOR BANKING SECTOR MARKETING IN RUSSIA

In recent decades, economic theory has absorbed the achievements of related social and other sciences, including psychology and neurophysiology. Thus, economic theory saw the creation of new directions, including behavioral economics and neuroeconomics. Current practical research in the marketing of banking and financial services is based on this profound economic and theoretical basis.

Since the World Health Organization declared a global COVID-19 pandemic in early 2020, there emerged an urgent need for contactless banking and financial services and products. According to the research from a financial services provider, *RFi Group*, 71% of consumers worldwide began using digital banking channels weekly in the second half of 2020, which is 3% higher than in 2019. Over the same period, the daily use of these services saw a 6% increase. The United Kingdom, where 73% of consumers use digital banking channels weekly (which is higher than the global average), also saw a dramatic increase in the monthly use of mobile banking from 52% to 57% of people between H2 2019 and H1 2020 (Martin, 2020).

Consumer attitudes, perceptions, and preferences in making decisions on purchasing banking and financial services have also changed and become more complex. This change is caused by the digital environment driven by big data, the internet, which is already a part of most people's daily lives,

as well as the variety of opportunities provided by these technologies. As a result, many banks and financial companies are devoting their resources and time to studying the patterns of consumer behavior and new sales opportunities. Many experts worldwide believe that this change has led to a considerable increase in global competition. There emerged the phenomenon of online banking. It opened a whole new world of possibilities by helping billions of consumers to meet their growing needs and giving them access to a great range of valuable services. Thus, changes in consumer purchasing decisions caused by online banking require regular research to ensure that companies are aware of factors driving consumers to make those decisions.

This justifies the relevance of our research on the application of prospect theory based on the psychological theory of motivation. The study aims to find relationships between personality type and consumer behavior, particularly the influence of personality type on financial products and services. The findings of our study can be successfully implemented in financial and credit institutions (banks and other financial institutions), in particular for applying the behavioral perspective model (BPM).

The research problems and objectives are as follows:

- To identify the following factors considered when using the prospect theory: (1) The influence of utilitarian reinforcements (product attributes); (2) Informational reinforcement (reliability and brand recognition); (3) Negative factors (such as the amount of interest payment) affecting consumer choice in the context of banking services.
- To indicate some features of the influence of personality traits on consumer choice and give information about motivational factors, determining the features of behavior and activities, and prompting the decision-making process as applied to consumers of financial and banking services;
- To find correlations between a personality type of a customer and their consumer behavior.
- To determine the influence of psychological types on the choice of financial products and services.

The theoretical basis of the analysis of consumer behavior is of interest not only to marketers and to analysts but also economists since the use of banking and financial services, as a rule, affects the level of GDP in a country.

In this way, behavioral economics, behavioral analysis, and psychology are being introduced into traditional economic models to explain and predict consumer behavior in such ways that will help organizations

and governments optimize their operations. Since people become more motivated and convinced, the use of behavioral economics is the future of decision making.

METHODOLOGY

To analyze consumer behavior and marketing of banking services, the authors suggest using models of behavioral economics such as (1) the theory of rational choice, (2) prospect theory, and (3) behavioral perspective model (BPM), which incorporates psychological and economic factors in the analysis of complex consumer behavior and notes that such measures would be more accurate in predicting consumer decision-making. However, the factors driving consumers to make purchasing decisions are complex and usually country- and industry-specific. Moreover, they go beyond utility maximization and rational choice. The psychological theory of motivation plays a significant role in making these decisions.

In these studies, the choice of bank brand and type of provided financial service is of interest because the retail banking sector is known for low margins, fierce competition, and, accordingly, a variable operating cycle. Moreover, this sector is affected by factors such as perceived usefulness, product information, price, convenience, product quality, ease-of-use, and so forth (Cho & Sagynov, 2015, p. 24). Sellers of banking services can significantly benefit from knowing the factors driving purchasing behavior, as well as factors influencing consumers' choice of bank brands and types of banking services among a variety of options.

Research further identifies and analyzes the factors determining consumer preferences regarding the selection of banking and financial products at banks and online. Additionally, the authors investigate whether higher informational reinforcement (IR), utilitarian reinforcement (UR), and lower adverse effects will increase the economic value of the brand and financial service, as well as sales to decision-makers. Research hypotheses are tested using relative demand analysis (RDA) with IR and UR consistent with BPM.

The basis for the analysis of consumer behavior is "the application of behavioral economics to consumption choices, especially in the context of developed market-oriented economies" (Oliveira-Castro & Foxall, 2017, p. 457).

The prospect theory (Tversky & Kahneman, 1979, p. 263) is one of the models used in behavioral economics to explain and predict consumer decisions. The theory explains consumer decision-making under conditions

of uncertainty, loss aversion, and isolation effects. It helps to assess the prospects of buying or losing a product. This theory asserts that people are more likely to experience psychological discomfort with losses than with benefits due to their tendency to loss aversion. According to this theory, people base their purchasing decisions on potential gains and losses, which can be of utilitarian and informational nature.

The viral culture of social media has increased the urgency to purchase banking and financial services because of uncertainty about the future availability of the service; consumers will haste to purchase a service before that opportunity is lost forever. This culture includes helpful reinforcements and loss aversion, and informational reinforcements that are not necessarily rational at the end of the decision-making process. This culture includes informational reinforcement, which shows that aspects such as attitudes, social norms, and observation of others can lead to decisions not entirely rational in the traditional economic sense. This shows that customers' attention is allocated selectively based on which reinforcement overrides in a particular product category (Pachur et al., 2018, p. 147).

The BPM of prospective behavior considers the assumptions of prospect theory and extends the concept of consumer behavior in the context of consumer choice. It assumes and recognizes that the impact of consumer behavior does not go beyond the utilitarian and informational reinforcement contained in the consumer situation compiled from the observational history of consumer research and the current environment (Yousafzai & Yani-de-Soriano, 2012, p. 60). This theory correlates behavioral economics with behavioral psychology, which focuses on the contingencies that are divided into a discriminative stimulus (SD), responses (R), and reinforcing or punitive consequences (SR/SA). Thus, reinforcements (SR) are the gains positively affecting the final probability of purchase, while punishments (SA) have the opposite effect (Oliveira-Castro & Marques, 2017, p. 475).

According to the BPM of consumer choice, the consequences of purchasing behavior are divided into various utilitarian, informational, and adverse consequences. In the context of BPM, utilitarian reinforcements (UR) are the tangible aspects in the purchase process related to the use and consumption of a particular physical product that correlates to its attributes that may or may not be beneficial to the use of this product. In making decisions on using a banking product, the consumer subconsciously relies on the informational reinforcements (IR) that are related to (1) the symbols carried by the banking products and services, (2) prestige, (3) reputation, and (4) status (Oliveira-Castro & Marques, 2017, p. 478).

IR plays a considerable role in banking retail. Consumers are not always brand loyal and prefer financial products from banks that they consider better known since they often believe that a well-known banking (financial) product has better reliability and lower cost (risk/reward ratio).

The negative consequences of any factor in the decision-making process (whether it is the poor quality of the website, high-interest rates, or the terms of purchase of a particular banking product) reduce the likelihood that a customer will buy a banking product. Thus, one can monitor these effects using methods of differentiation between banks' interest rates and their reliability (Sigurdsson et al., 2016, p. 338).

The unique nature of banking decision-making lies in the fact that the same attributes and features of the product can function as UR for one and IR for others since every person has a different way of processing the same information based on their personal experience. Nevertheless, there are some common attributes of banking products viewed as UR and IR by most consumers. It is necessary to study them in order to determine individual decision-making strategies. Regardless of the uniqueness of each client's cognition, the only difference lies in the degree of influence of each consequence (Sigurdsson et al., 2016, p. 340).

Consumers are generally influenced by reinforcement and punishment. The influence increases with the amount of reinforcement and decreases with the amount of punishment (the cost of credit or interest rate). Therefore, it is often assumed that consumers seek to maximize UR and IR within the monetary constraints they have (Foxall et al., 2013, p. 74).

Additionally, the BPM is applied to predict consumer behavior (both online and offline) since its structure allows for contingencies such as prompt response, reinforcement or punishment of behavior, and discriminative stimuli (Sigurdsson et al., 2016, p. 341).

The BPM is a good fit for the model of consumer choice because contingencies (e.g., discriminative stimulus and operant responses) shape the consumer's behavior settings and the consumer's learning history that constitute natural consumer behavior (Foxall et al., 2013, p. 77). It shows promising results in the online environment because the discriminative stimulus used in the model helps to take the case of a threefold contingency and use it as a means of predicting more than just a positive reinforcing element in one decision-making element. However, it also acts as a positive or a negative reinforcing initial response and can be applied to the long chain of behaviors that make up online purchases (Fagerstrøm, 2005, p. 6).

An important prerequisite for applying the BPM is to investigate the intrinsic motivation of the consumer to ensure accurate application of the model.

Russian psychological science defines motivation as a factor determining the elements of human life and activity. The highest level of this multifactorial and multilevel regulation is conscious-willed motivational factors. Motivation is understood as the source of the incentive system of any activity of the individual. It is studied in different aspects and, accordingly,

defined by scholars in different ways: 1—as one specific motive, 2—as a system of motives, and 3—as a special sphere of human activity, which includes the needs, goals, and interests in their complex interaction.

In today's post-industrial society, priorities, and motivations are significantly altered; people do not seek goods, but a comfortable life, defined by the level of quality, as well as services available to the individual of post-industrial society. Some authors do not consider motivation to be a prerequisite for acquiring any goods and services since they define the activity of a person as an activity that is not determined by material interests.

Brzezinski (1970) notes changes in social psychology and personality psychology in the age of information technology, in the post-industrial information society: "Culture, psychology, social life, and economy are formed under the influence of technology and electronics, especially computers and communications, the production is no longer the main decisive factor of change, affecting the morals, social order, and values of society" (p. 9). Many researchers, in particular, Baudrillard (1981, p. 58), note the motivational desire for services vs. goods, as well as changing motivation of the consumption structure and nature.

Seeking to consume services more than goods, people prefer convenience and spiritual development more than the possession of goods. In our opinion, this fact explains the change in motivational factors when choosing a job. The intangible factors an employer has to offer are increasingly valued over economic factors (Habermas, 1985, p. 363). The researchers first called such changes in motivation "post-materialist" (Inglehart, 1990, p. 54) and then "post-economic."

RESULTS

In this research, the authors implemented the *Five-Factor Personality Model* (Big Five, BIG 5) developed by McCray and Costa in 1983–1985 (McCrae & Costa, 1985). Subsequently, in 1992, an improved version called the *NEOPI-NEO Personality Inventory* was published (Goldberg, 1999). This development was based on the results of scientific research by leading institutions and psychologists from different countries, such as Eysenck (Pearson, 1991), Guilford (1967), Cattell (1983), Allport and Odbert (1936), Digman (1997) Bernard et al. (2005), and others. The improved model allowed scholars to characterize the structure of human personality. Donald Norman, who worked on cognitive science, design, and user engineering topics, also made considerable contributions to this model (Norman & Rumelhart, 1975).

Among several variants of the NEOPI test, which differ from each other, we selected the variant proposed by Goldberg (1990, University of

Oregon), which is also used in marketing and internet banking (Grabner-Krauter & Faullant, 2008, p. 486).

In Russia, constant research on this topic is conducted by the *Mail.Ru Group*, the international brand *My.com*, and the *Frank RG* team. Their research uses the BIG5 methodology already mentioned above and tries to find the relationship between the psychological type of human personalities and their consumer behavior. The study's basis is the active part of the Russian internet audience (more than 20 million users). The study was conducted in three stages:

- the segmentation of the internet audience by psychological types,
- analysis of each user segment,
- identification of patterns in decision making on the consumption of financial services.

Additionally, the study used the features of conformism, which is a feature of modern society. Thus, the formation of an image, promotion on TV and in social networks, creating trends in fashion, and advertising on T-shirts and paper cups offering a certain service or reporting that the person AA uses several banking products of bank X, creates in members of a particular group an unmotivated desire to buy this product. In practice, it provides a 100% customer guarantee for full service. This method has long been used by advertisers working based on behavioral theory and psychological research.

In this case, one can also pick up a solution to promote a group of banking and financial services, products, or even an entire direction. One of the examples is a VIP service for clients, who may be, to some extent, considered as representatives of another social group.

One cannot ignore the aspect of financial marketing strategies that emerged at the turn of the 20th and 21st centuries. Commercial banks have become supermarkets of banking and financial services. In this case, it seems appropriate to quote Martin Meyer (1984) “the bank is dead—long live the institution of financial services. Commercial banks are becoming institutions of financial services.

Based on marketers' observations on trends in customer behavior, despite the platform and the theory (classical or behavioral) of consumer behavior used, the main directions for the development of modern banking business remain unchanged and classic. They are as follows:

- Development of branch network;
- Diversification of customer base;

- Extension of the range of products (services);
- Effective (expanding and creative) credit policy for individuals and companies.

To date, in retail banking, the most demanded are:

- credit cards with a grace period,
- general-purpose loans,
- simple investment products,
- multicurrency current and saving accounts,
- payroll projects for corporate clients, online banking via the internet and mobile applications,
- 24-hour phone banking online through remote call centers,
- SMS notification system for transactions.

Until recently, the main vector of banking business development was the extensive development and transfer of focus from large cities to regions and small municipal centers. Nowadays, this strategy does not give a strong impetus to the development of the banking business.

The growth of internet services in banks and the growth of the number and volume of online transactions in 2020 are very much due to the global situation. In our opinion, after the COVID-19 restrictions are canceled, there will be a sharp increase in the number of “live” transactions of banking retail.

Against the background of these aforementioned well-established trends, the inevitable densification of the “red ocean” and increased competition for the most popular banking products is increasingly trending upward. It is interesting to watch the development of nonstandard banking services. One of the examples is the experience of *Sberbank*, which began to implement rather unusual practices, for example, grocery services to people. The general public and multimedia space met this attempt with mockery and irony. Someone even released a video on the internet, where customers are given takeout coffee, dry cleaning, hairdressing, and medical consultations.

CONCLUSION

The authors identified an understudied area of research on the role of individual motivation and the choice of motivational factors in decisions regarding consumer behavior in the banking industry.

The findings can be successfully implemented in financial and credit institutions (banks and other financial institutions), particularly for applying the behavioral perspective model.

Based on the study results, the authors identified correlations between personality traits and social decisions about an individual's choice of action.

It was found that the choice of social decisions is influenced by such a type of conscious activity as social communication. This communication includes two distinctive and contradictory needs—the need for a person to belong to a group and the need for isolation. Thus, the more developed persons are, the more they are aware of their uniqueness, feel the need to stay alone in their inner world, and guided only by their opinion, needs, and basic values in making various decisions (including social decisions).

It can be considered proven that motivation provides the premise for the understanding, manifestation, and realization of personal needs. In modern economic language, it is possible to determine behavioral consumer decisions in the era of postmodern society through motivation and need.

The authors found that the modern personality feels the need to unite, a sense of community with other personalities, similarity, and belonging. That is, a typical feature of modern life is conformism—a person's tendency to adapt, develop certain group norms, habits, values, and tolerance, and even imitate other people. Often, we see people resembling each other, dressing in the same style, and behaving the same way.

In our opinion, this aspiration to have common features, merge with the group, and not stand out is born out of a need for security and creating a mechanism of psychological protection. Strange as it may seem, in such a tendency, one can achieve a sense of detachment, privacy, and security. This phenomenon is reflected in the term “social mimicry,” which can be found in contemporary studies.

In our opinion, the future of banking retail is for nonstandard (by banking standards), “live,” and diverse services provided by banks.

It has been established that in the modern society of COVID reality, those orientations that began their manifestation in the 19th and 20th centuries under the influence of the development of modern society, characterized by the escalation of the productive and consumer process, are even more differentiated. These orientations are as follows:

- Humanistic orientation—a person's attitude to himself or herself and society is positive;
- Egoistic orientation—an individual is more important than society;

- Depressive orientation—an individual does not represent any value for himself or herself, and his or her attitude to society can be called conditionally positive.

Considering the contradictory features of a modern personality mentioned above, the authors conclude that individuals behaving similarly will make similar decisions in similar situations. This allows us to study examples of an individual with average psychological traits to show their behavioral preferences for the choice of financial and banking services and get a reasonably close guess at the market demand for types of banking products (e.g., bank deposits or loans for specific purposes).

According to the authors, most customers of these services in the financial and banking retail market are people of average security level with secondary and higher education, working men and women 25–45 years with an average level of mental health and psychological development. The bulk of borrowers are motivated to repay and fulfill their obligations. The authors consider this to be a regular expression of the motivation of a mentally healthy and mature individual.

The authors note that as a result of the struggle, interaction, and fusion of these orientations, there appear stereotypes of a particular individual (in clothing, taste, style of behavior, culture, and behavioral decisions) concerning various social issues, including, consumption and the most important economic categories, which have separate, but, at the same time, closely related economic categories—money and credit. These basic economic categories underlie the complexity of human economic activity and motivate the social decision-making of individuals. Thus, modern banking and financial business is certainly not the most important one. Nevertheless, it is the most publicized, advertised, desirable, and evoking the most acute and profound emotions, which, in turn, most often cause underlying motivational processes.

In turn, this process also has its continuation in establishing motivational decisions, depending on the psychological type of personality, basic values, and some other universal aspirations. In our opinion, considerable attention should be paid not to the motivation of social groups (which we have already discussed) but to a single individual. This is what should guide strategies for selling financial or nonfinancial services to customers in behavioral economics. However, according to the authors, in financial services (which include banking services), the dependence on the psychological type is manifested more clearly and has its group differences.

Motivational features and psychological types directly impact the perception of information, the principles and speed of decision making, communication style, and much more. In particular, they influence the

choice of purchasing behavior strategy and the consumption of financial and banking services.

In the authors' opinion, there are two tendencies in the consumption motives here. The first one lies in the needs becoming more modest due to the increasing availability of goods. Here it seems appropriate to remember the minimalism of Steve Jobs, who became an example for many people, or Europeans' minimalism. On the other hand, trying to resemble famous people and imitate their style, people buy expensive but completely unnecessary things. Modern society, exploiting the need for social mimicry, spins this spiral at full speed, maintains a sense of the need for expensive style, and produces goods and services with recognizable features.

Thus, according to the authors, the choice of preference in banking services is influenced by the so-called consumer preference—the desire to get a banking service along with transactional preferences (i.e., the service must be profitable). This choice is influenced by many personal characteristics (e.g., age, gender, income, the level of expected prices, bank's reputation, the design of promotional materials and website, etc.) and the availability of information for the individual (the degree of computer literacy). The future will show how Russia's financial macro regulator will react to the current situation. The authors would like to believe that experience has given practitioners the knowledge to overcome the current ambiguous situation.

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MODERN TRENDS AND PROSPECTS OF DEVELOPMENT OF RUSSIA'S EXPORT TO CHINA

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ABSTRACT

This study aims to identify opportunities for increasing Russian exports to China. The research methodology is based on a combination of methods of economic and statistical analysis of goods exports. The main methods of research are general scientific methods (abstraction, analysis, synthesis, analogy, comparison) and economic-static methods (methods for studying the dynamics and structure of economic phenomena, grouping, and calculation of average values, index method).

The research process is presented in the form of four stages. At the first stage, the dynamics of export indicators for the period from 2010 to 2019 are analyzed. Based on the results of the analysis, the trends of Russia's export to China are determined, revealing its general orientation, dynamics of the commodity structure, physical volume, and average export prices. At the second stage, these trends are assessed from the point of view of their compliance with the objectives of increasing the volume of non-energy non-resource exports. At the third stage, the target figures for Russia's exports to China in 2024 are calculated, including the target volumes of non-energy exports by

goods groups. At the fourth stage, the capabilities to achieve the calculated targets are determined depending on tariff and non-tariff barriers to enter the Chinese market.

The results of the study made it possible to draw fundamental conclusions about the attainability of the goal—to double the mutual trade turnover by 2024 and significantly outstrip the growth of exports to China in comparison with Russia's total exports of both non-resource non-energy goods and raw energy goods.

While current Western economic sanctions are remaining, Russia continues to develop economic cooperation with China (Nazarov et al., 2019; Simachev et al., 2019; Spartak, 2019). The most dynamic sphere of cooperation between the countries remains mutual trade in goods, the turnover of which in 2019 rose to a record value of \$111.5 billion (UN Comtrade Database, 2020).

Along with the growth of absolute indicators of Russian-Chinese trade increases the importance of the Chinese direction for Russia's foreign trade. Since 2010, when China became the largest trading partner of our country, there has been a steady increase in the share of Chinese direction in Russian exports. In total, between 2010 and 2019, this share increased almost three times: from 5.0 to 13.5% (UN Comtrade Database, 2020).

Thus, at the current stage, Russian-Chinese trade cooperation is strategic and has a wide range of opportunities for further development, which stem from the current trade dynamics.

The leaders of Russia and China have set a goal to increase the trade turnover of mutual trade by 2024 to \$200 billion (Decision of the Board of the FCS of Russia, 2019). With balanced mutual trade, this will require an increase in Russia's exports to China by 2024 to \$100 billion.

This task of increasing exports can be considered achievable due to expectations of a favorable price situation for most Russian exports, good prospects for growth in consumer and investment demand in China, opportunities to improve the competitiveness of domestic products, the implementation of new joint investment projects in energy and infrastructure (Spartak, 2019).

Identification of opportunities to increase Russia's exports to China involves, first, the study of the most important modern trends in export development; secondly, the assessment of the identified trends in terms of their impact on the effectiveness of trade cooperation with China; and thirdly, the definition of target export volumes and opportunities to achieve them in the existing trade relations.

The purpose of this study is to determine the possibilities of increasing Russian exports to China, and the above stages correspond to its main objectives.

METHODOLOGY

Data bank of the research consists of international treaties and agreements of Russia and China (Agreement on Trade-Economic Cooperation, 2018; Treaty on Good-Neighborliness, 2001), strategic documents on the development of foreign economic activities (Decree of the President, 2018; Decision of Board of Federal Customs Service of Russia, 2019; National Project, 2018; State Program of the Russian Federation, 2014), international database of trade statistics (Timeseries, 2020; UN Comtrade Database, 2020), reporting data on the development of foreign economic activity (Results of Foreign Economic Activity, 2019), proceedings of scientists on international trade (Nazarov et al., 2019; Simachev et al., 2019; Spartak, 2019; Spartak et al., 2018; Lipatova et al., 2018).

The research methodology is based on a combination of methods of economic and statistical analysis of goods exports that are adequate to the scientific tasks being solved. The main research methods are:

- a. General scientific methods (abstraction, analysis, synthesis, analogy, and comparison);
- b. Economic and static methods (methods of studying the dynamics and structure of economic phenomena, grouping, calculating average values, and index method).

RESULTS

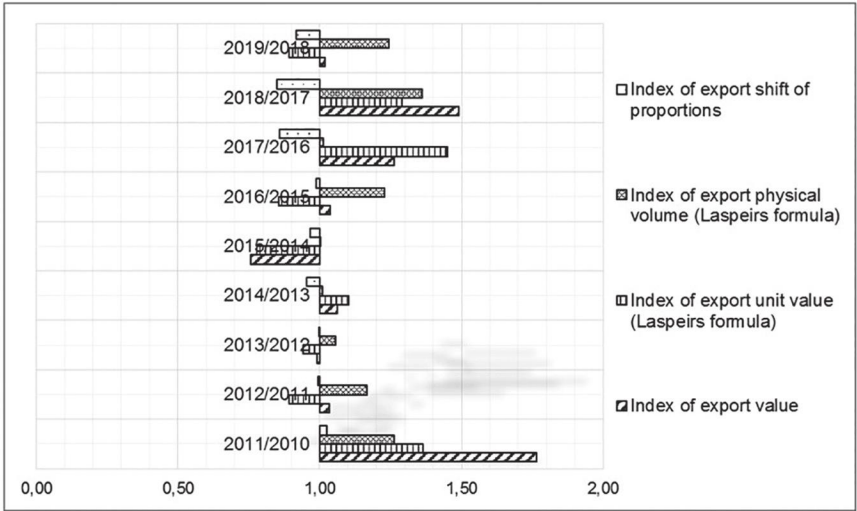
The dynamics analysis of the exports, imports of goods, and trade turnover indicators made it possible to define that the main tendency in the development of Russian-Chinese trade is the trend of the outstripping growth of Russian exports. This analysis was carried out for the period of the most active foreign trade cooperation between Russia and China, covering the period 2010–2019. In general, during the period under review, Russia's exports to China almost tripled: from 19.8 to \$57.3 billion (UN Comtrade Database, 2020).

Decomposition of the Russian value index of exports to China in terms of composite indices of physical volume, average prices, and structure allowed determining that the growth in the value of exports was mainly determined by the growth in the physical volume of supplies (Figure 29.1). This growth either overlapped the negative impact of price declines or coincided with periods of significant growth.

The dynamics of physical volume were characterized by a large number of growth periods and their high amplitude. The only enlarged group of the Commodity Nomenclature of the Foreign Economic Activities (HS),

Figure 29.1

The Indexes of Dynamics of Russia’s Exports to China



Source: Compiled by the authors based on UN Comtrade Database (2020).

in which there was a decisive positive impact of prices, was the group of machinery, equipment, and vehicles (HS codes 84–90). The impact of prices was also decisive in cases of chemical products supply (HS codes 28–40), textiles, textile goods, and footwear (HS codes 50–67), but had a negative direction against the background of physical volume stabilization.

Analysis of the dynamics and structure indicators of mutual trade between Russia and China for the period 2010–2019 (UN Comtrade Database, 2020) allowed us to draw the following conclusion. Despite the overall positive dynamics, the further progressive development of Russian exports to China is hindered by the unfavorable commodity structure, which reflects an increase in supplies of mainly raw materials and energy products. Such export development prospects do not correspond to Russia’s national economic interests in the foreign trade sphere (Decree of the President, 2018), which implies an increase in the volume of non-resource non-energy exports.

The target volume of non-resource non-energy exports in 2024 is \$250.0 billion following the National Project (program) “International cooperation and export” (National Project, 2018). The actual indicators were close to the planned ones (Timeseries, 2020) and contributed to the strengthening of the growth tendency of non-resource non-energy exports of Russia,

which was observed during 2015-2017 (Spartak et al., 2018) since the start of the project in 2018 and the following year.

The interim results of the project allow us to consider achievable the objective of expanding non-energy goods export. Therefore, this objective is taken as the starting point of defining the target level of non-energy goods export from Russia to China in 2024.

Taking into account the goal of doubling the trade turnover between Russia and China as well as maintaining the balance of mutual trade, the target level of export from Russia to China will be \$100 billion by 2024. To determine the ratio of the export target level distribution by non-commodity and non-energy elements in combination with raw material and energy elements, the forecast of Russian export until 2024 is used. The Russian Foreign Trade Academy (RFTA) in cooperation with the Russian Export Center (REC) prepared an export forecast for goods groups and sales partners. The advantage of this forecast is that it is focused and predictive. It is supported by current production potential and necessary increase in the product competitiveness, and the achievable growth rate based on them, as well as bringing these rates in line with the most probable forecast of world commodity markets, demand dynamics, and possible changes in terms of access to importers' internal market.

As the result of applying these proportions to the target level of export to China in 2024, the following numbers were received (Table 29.1): non-energy goods export—\$34.5 billion, energy, and raw material export—\$65.5 billion.

Table 29.1

Target Indicators of Export From Russia to China

Indicator name	Factual value in 2019	Target value in 2024	Relative growth 2024/2019, %
Non-energy goods export to China, bill. USD	16.9	34.5	204.0
China's share in non-energy goods export, %	10.9	13.8	126.6
Raw material energy export to China, bill. USD	40.4	65.5	162.2
China's share in raw material energy export, %	15.0	21.8	145.5
Export to China, bill. USD	57.3	100.0	174.5
China's share in export to Russia, %	13.5	18.2	134.7

Source: Compiled by the authors based on National project (program) "International Cooperation and Export" and Lipatova et al. (2018).

The calculated target indicators demonstrate a significant growth of export to China compared to the total export of Russia. In general, the increase in export to China in the period of 2019–2024 will provide more than ¼ of the growth of non-energy goods and about 5/6 of the growth of raw material energy goods.

Based on the received export target level of the non-energy goods from Russia to China (Table 29.1, line 2) and its allocation ratio between consolidated groups of CN FEA (Commodity Nomenclature of Foreign Economic Activity), the target levels of non-energy commodity export from Russia to China are calculated from the perspective of consolidated groups of CN FEA in 2024 (Table 29.2).

Table 29.2

Target Indicators of Export From Russia to China From the Perspective of Consolidated Groups of Commodities in 2024

CN FEA number	Name of the consolidated group	Factual value in 2019	Target value in 2024	Relative growth 2024/2019, %
01–24	Food and agriculture raw material products	3.3	6.7	207.21
28–40	Chemical products	1.7	5.3	310.20
44–49	Wood, paper, and pulp products	3.7	9.4	256.85
72–83	Metals and their products	1.7	1.6	91.41
84–90	Cars, equipment, and vehicles	3.0	7.5	249.18
25–27, 41–43, 50–67, 68–70, 91–97	Other goods	3.5	3.9	110.72

Source: Compiled by the authors based on Spartak et al. (2018).

The increase in export is expected for all groups of CN FEA except for metals. The highest growth is expected for food and agricultural products (more than doubled), chemical and rubber goods (more than tripled), wood, paper, and pulp products (more than tripled), cars, equipment, and vehicles (by more than 2.5 times).

Based on the results of analysis of the fundamental system trade development factors between Russia and China (Lipatova et al., 2018) we conclude that the feasibility of implementing the potential of Russia’s non-energy goods exports depends on tariff and non-tariff barriers on the way of entering the Chinese market.

Chinese tariff policy seems to have neither a stable tendency in tariff protection of inner market nor liberalization of the regulation (Table 29.3). However, the assessment of base and weighted average rates represents a low tariff barrier to enter the Chinese market.

Table 29.3

Trends in the Application of China's Import Customs Tariff to all Imported Goods and Countries Where Is a Most-Favored-Nation (MFN)

Indicators	2010	2012	2014	2016	2019
Share of MFN duty-free imports, %	7.4	–	7.9	7.0	7.4
Tariff numbers	7,931	–	13,069	13,161	8,548
Base average rate	9.7	–	9.6	9.9	7.6
Weighted average rate, %	4.1	–	4.6	4.4	4.4
Maximum rate, %	65.0	–	65.0	65.0	65.0
Coefficient of variation	79.0	–	72.0	69.0	81.0

Source: Compiled by the authors based on Timeseries Tariff indicators Applied, Non-Tariff Measures Indicators (2020).

The consideration of customs and tariff policy in the field of agricultural and non-agricultural goods confirms the lack of strengthening of their protective function or trade liberalization (Timeseries, 2020), but there is a tendency towards an increase in the degree of differentiation of customs tariffs (an indicator of tariff numbers), which is imposed on the point protection of priority sectors (high maximum rate). Also, there is a lower level of protection for non-agricultural goods compared to agricultural goods.

The highest rates of customs tariff are set for the group of food and agricultural products (weighted average rate—9.9%), the group of hides and skins, furs and goods from them (10.9%), the group of textiles, textile products, and footwear (8.5%), and the group of other goods (17.1%) (Table 29.4).

In general, the comparison of China's customs tariff rates with the profile of Russian exports revealed significant tariff barriers only for the export of food products and agricultural raw materials.

In contrast to customs tariff rates, the number of non-tariff control measures applied by China is constantly increasing (Timeseries, 2020) (Table 29.5). This trend is determined by the trends in the number of applied technical regulations, sanitary and phytosanitary measures, as well as maintaining a high level of anti-dumping measures.

When comparing the number of anti-dumping measures in a country context, it becomes clear that Russia occupies a fairly favorable position in

Table 29.4***Weighted Average Ad-Valorem Rates of China's Import Customs Tariff in Terms of Enlarged Goods Groups, %***

CN FEA code	Name of the enlarged product group	2010	2012	2014	2016	2019
01–24	Food and agricultural products (except textile products)	10.9	11.2	11.5	11.8	9.9
25–27	Mineral products	5.0	5.0	5.2	5.1	4.9
28–40	Chemical industry products, rubber	8.4	8.8	8.6	9.3	8.8
41–43	Hides and skins, furs, and goods from them	16.6	17.0	15.0	11.2	10.9
44–49	Wood, pulp, and paper products	3.1	3.0	3.1	3.0	2.0
50–67	Textile, textile products, and footwear	10.4	11.7	13.3	12.7	8.5
72–83	Metals and their products	5.9	7.0	7.7	8.2	5.4
84–90	Machines, equipment, and transport means	8.2	8.2	7.4	8.3	6.3
68–70, 91–97	Other products	21.2	21.0	22.9	22.8	17.1

Source: Compiled by the authors based on Timeseries Tariff indicators Applied, Non-Tariff Measures Indicators (2020).

Table 29.5***Trends in the Number of Existing Non-Tariff Import Control Measures Applied by China***

Indicators	2010	2012	2014	2016	2018
Number of anti-dumping measures	119	109	104	93	106
Number of compensatory measures	2	4	5	4	4
Number of protective measures	0	0	0	0	1
Number of sanitary and phytosanitary measures	493	684	843	1,193	1,256
Number of technical control measures	760	923	1,050	1,174	1,295
Number of non-tariff control measures	1,374	1,720	2,002	2,464	2,662

Source: Compiled by the authors based on Timeseries Tariff indicators Applied, Non-tariff measures indicators (2020).

the Chinese market compared to the main competing countries. Over the period from 2010 to 2018, the number of anti-dumping measures applied to Russia decreased from 6 to 1.

China's anti-dumping measures applied mainly to chemical products. Their impact on the supply of mineral products and metals, wood, paper, and other similar goods, leather, footwear, and other similar goods is noticeable. This made it possible to conclude the likelihood of an escalation in the use of anti-dumping measures as the range and volumes of Russian exports to China expanded.

CONCLUSIONS

The central modern trend in the development of the Russian-Chinese trade is Russia's outstripping export to China, based on increasing physical volumes of supplies of mainly raw materials and energy products.

The lack of progressive changes in the product structure of Russia's exports to China leads to a consolidation of the export model, vulnerability to external shocks, and limited development potential. In this regard, Russia needs to implement a gradual transition to an innovative model of export to China, which consists of a gradual increase in non-recourse non-energy exports.

The calculations made it possible to draw fundamental conclusions about the prospects for increasing the volume of non-resource non-energy exports of Russia to China. First, the goal of doubling mutual trade by 2024, formulated by the leaders of Russia and China, subject to balanced growth in exports and imports of goods, seems achievable. Second, the calculated targets for the export of non-resource non-energy goods (\$34.5 billion) and the export of energy goods (\$65.5 billion) show significant outstripping growth in exports to China compared to the total volume of Russia's exports. The growth in China's exports from 2019 to 2024 will provide more than 1/4 of the increase in non-resource non-energy exports and about 5/6 of the increase in export of raw material energy.

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CHAPTER 30

ROLE OF EXPORT IN COUNTERING MILITARY PRODUCTS SMUGGLING

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ABSTRACT

The chapter addresses many issues related to international and national export control regimes in terms of countering the smuggling of weapons and military equipment, as well as dual-use goods and technologies. The work also analyzes the judicial practice of criminal prosecution under Article 226.1 of the Criminal Code of the Russian Federation and proposes changes in legislation.

The authors focus on the implementation of customs control measures for military goods. Examples of torts related to the violation of customs rules in

the process of foreign trade turnover of this category of goods are given. The research uses data from special statistics of foreign trade in export control objects, as well as scientific literature on the subject of research.

The work on this chapter involves the use of the universal method of dialectical materialism, the basic methods of scientific research (analysis of regulations, analysis of acts of law enforcement, deduction, and synthesis). Application of private-scientific, formal-legal method allowed formulating and substantiating proposals to improve the criminal legislation. The chosen research methodology made it possible to assess the scale of violations of the procedure and rules of cross-border movement of objects of export control, to give a general criminological characteristic, and to identify the specifics of violations in this area of state regulation. The authors concluded the degree of their public danger and made several proposals to improve the criminal legislation.

ROLE OF EXPORT IN COUNTERING MILITARY PRODUCTS SMUGGLING

The Russian Federation as a state is concerned with the development of international relations in the field of supply or purchase of military or dual-use products to the extent that meets the economic and military and political interests of Russia. State monopoly on military and technical cooperation is justified since the essence and consequences of the arms deal for national defense are very complicated issues.

They require plenty of experience and a careful study to ensure that the exports will not contribute to the arms race, or support international terrorism, or increase the probability of conflict emergence or escalation.

The authors chose the universal method of dialectical materialism as the basic method of research. Such general scientific methods were used as analysis, in which the described phenomenon is decomposed into signs and properties, in order to study it more specifically, and synthesis, designed to connect the individual elements of the studied phenomenon into a single whole for a more detailed study. The method of deduction, which allows us to conclude certain phenomena, based on data on a large number of their private signs, allowed us to conclude that the crimes considered in this chapter have a very high degree of latency and a significant proportion of corruption. Application of the formal-legal method allowed formulating and substantiating proposals for improvement of the criminal legislation. Conceptual bases of export control in counteraction to smuggling of military products in monographic works were investigated rather sporadically. While preparing this study, authors used articles by Stasev (2011), Jabiev (2016), Grave (2009), and Robak (2019), published at different times in the periodical press, as well as available court decisions, statistical data,

and norms of domestic legislation, regulating issues of export control of military products.

RESULTS AND DISCUSSION

Due to a lack of legal transparency, it is sometimes difficult to assess the market value of the arms trade industry. Only by May 2019, Russia had executed \$5.2 billion worth of contracts c/o Rosoboronexport, JSC. In 2018, CAWAT /Centre for Analysis of World Arms Trade/ranked Russia the second in conventional arms exports (\$14.580 billion, 16.4% of global supplies—the maximum figure over four years), with the U.S. taking the first place and France the third.

However, together with growing legal arms supplies, the illegal market segment is growing, too. Armed conflicts and increasing activity of terrorist groups over the past four years have led to a dramatic increase in the grey export of military goods. The experts estimate that an illegal segment of the arms market amounts to about 2–3 billion dollars annually, and starting since 2015, it can exceed 5 billion, that is, more than 5% of the legal market.

The need for effective control of international arms transfers is universally recognized. The world community is legitimately concerned about the growing trend, noted by experts, of transnational illegal deliveries of various kinds of weapons, military equipment, and dual-use goods to terrorist groups, drug cartels, and other organized criminal communities, as well as to countries and regions with unstable political situations where armed conflicts are taking place. The emphasis on forceful methods of struggle, combined with the uncompromising and fanatical nature of terrorist ideology, which morally justifies the use of any violence in the name of a “good” cause, poses a significant threat to both the preservation of world law and order and the existence of humanity as a whole since the use of modern weapons of mass destruction by terrorists could lead to the destruction of human civilization completely.

Efforts of the states concerned led in the second half of the 20th century to signing some international agreements in the field of prohibitions, restrictions, and control over export-import operations with arms and military equipment, as well as goods and technologies of double purpose. Gradually the concept of control international regimes as a complex of measures providing prevention of unauthorized sale of products of military or double purpose, which use can lead to intensification of the current military conflict, promote the process of arms build-up or be used in violations of international humanitarian law, and also promote international terrorism was formed.

Rules of limitation of deliveries of military and dual-use products and mechanisms of their realization are formulated within the framework of international forums. These include the Zangger Committee (ZC) and the Nuclear Suppliers Group (NSG), created in 1971 and 1975 to control the export of materials and technologies used in the creation of nuclear weapons; The 1996 Wassenaar Arrangement export control regimes, which ensure transparency and legality of turnover of conventional weapons and dual-use goods, and the 1987 Missile Technology Control Regime (MTCR), established to limit the spread of unmanned delivery systems for weapons of mass destruction; the Australia Group, established in 1985 to control activities related to the development and proliferation of chemical and biological weapons.

It should be noted that export control regime framework prohibitions and restrictions are extraordinary, conflicting with the basic principle of export freedom. To justify these measures Stasev (2011) points out “their use is necessary if the transaction ... is or may be a threat to international peace, causes significant damage to economic security.”

The principal point of cooperation in the security sphere, as far as international export control regimes are concerned, is the fact that such cooperation is based on a traditionally voluntary union of sovereign states sharing the same values and interests in order to achieve common defense goals. Transfer of goods and technologies from the checklists between the member states does not fall under control rules and is regulated by national legislation, which incorporates resolutions voluntarily made by the member states within control regimes.

Russia is a member of almost all international export control regimes, except for the Australian Group, being actively prevented from the membership therein by the United States and Great Britain.

In 1992, the Russian Federation began a gradual creation of the national export control system, which facilitates Russia's international obligations in non-proliferation of weapons of mass destruction, missile delivery vehicles, and export control. According to Jabiev (2016), “the use of such coercive measures in Russia was dictated by the need to comply with international obligations, the conversion of the defense industry and the entry of a large number of various economic entities to the foreign market.”

At present, the basic documents regulating the legal relations in this sphere are two Federal Laws: “On Military-Technical Cooperation of the Russian Federation with the Foreign States” of July 19, 1998, No 114-FZ (2017) and “On Export Control” of July 18, 1999, No 183-FZ (2015), which normative regulations have served as a basis for the formation of state management bodies in this sphere, development of lists of military and double-purpose materials, equipment and technologies, introduction of

civil legal, administrative, and criminal responsibility for illegal transfer of military and double-purpose items.

Customs control, which is carried out by the Federal Customs Service and its territorial bodies, is specified in the legislation as one of the methods of export control of the transborder movement of military and dual-use products.

Jabiev (2016) points out that “export without a license when declaring nuclear materials; export under a falsified license; non-compliance or incomplete compliance of data indicated in the license with actually exported goods; export without license and declaration (smuggling)” (p. 93.) are the most common types of illegal acts suppressed by customs officials in the implementation of export control of the movement of military goods.

The disposition of Article 226.1 of the Criminal Code of the Russian Federation defines smuggling as illegal transfer through the customs or state border of the Russian Federation of a certain range of items, which can cause damage to public security or are of strategic, cultural, or biological value. The legislator has included in the list of smuggled items firearms and their main parts, nuclear materials, a broad list of military products, including means of delivery of conventional weapons of mass destruction or military equipment.

According to Article 6 of the Federal law “On export control” Decrees of the President of the Russian Federation approved six lists, grouping controlled military goods by analogy with lists of international control regimes. In each specific case, the necessity of export control of specific products is determined by the identification of technical characteristics of an object to the technical description given in the relevant list or using identification opinion issued by a licensed expert organization.

There is an ambiguity (uncertainty) in normative fixation of the list of objects of export control; the exhaustive list of specified objects defined in the normative regulations of the criminal law is not identical to similar provisions of the Federal Law “On Export Control.” Undoubtedly, when resolving the current conflict, priority is given to the special legislation in the field of export control. In addition, the legislator’s use of the term “other military equipment” without specifying the criteria, according to which military products will be regarded as a subject of smuggling for article 226.1 of the Criminal Code of the RF in practical terms leads to the fact that the law enforcement is forced to interpret the provisions of criminal law arbitrarily, and therefore there is a risk of ungrounded bringing persons to criminal responsibility, or vice versa, avoiding the responsibility of guilty. In general and essentially, it should be stated that the provisions of Article 226.1 of the Criminal Code of the RF from the point of view of the requirements of formal legal definitions of criminal law require

significant correction, in particular, the establishment of clear criteria (signs) for classifying military products as “other military equipment” for the purposes of Article 226.1 of the Criminal Code, separation of military and dual-use products, which will promote a unified application of criminal law provisions and ensure real, rather than formal validity of the principle.

Thus, one of the main problems faced by customs officials in countering criminal manifestations in the field of foreign trade turnover of export control objects is the identification of specific goods in terms of classifying them as export-controlled, which in some cases, as rightly noted by Grave (2009), requires complex expensive research.

Analyzing available court reports, we can conclude that one of the most widespread ways of smuggling is a fraudulent confirmation that the imported/exported goods do not match the controlled items. For instance, the verdict dated February 25, 2016, regarding case No.1-30/2016 established that the convicted person illegally moved military equipment across the state border of the Russian Federation with member states of the EurAsEC Customs Union, with the criminal intent of smuggling the following military equipment into the territory of the Republic of Belarus: a brace of the front chassis B24-4202-0—2 pieces, KT-329A wheel—2 pieces, a fuel tank (No.)—2 pieces. In doing so, the convicted person presented a conclusion that these items are components, that is, spare parts, for the MI-8 helicopter, which has both military and civilian purposes. In the course of the investigation, it was found out that these products are spare parts for MI-24 helicopters, which has only military purposes according to the Federal Service for Military and Technical Cooperation of Russia. The court imposed a four-year custodial sentence served in a general penal colony, without the option of a fine and deprivation of liberty.

Smuggled goods also include items that, at first glance, do not seem to be objects of export control: protective and rescue equipment, and other products with a wide range of applications. Therefore, the convicts do not admit guilt, claiming that they were not aware of the military purpose of the smuggling item. For instance, the verdict of February 22, 2019 regarding case No1-19/2019, established that Mr. B., having an intent to smuggle, that is, illegally move armaments, materials and equipment used to create weapons and military equipment, across the customs border of the EurAsEC Customs Union, on 05.01.2018 arrived at the checkpoint of the Taganrog Customs on the border with Ukraine driving an armored car GAS 19521 “KLEN,” which had the following armament: a single 6B45 combined arms bulletproof vest—6 pieces; GSSh-01 headset with active noise cancellation—26 pieces; protection sets of knee and elbow joints 6B51—22 pieces; splinter-proof protective upgraded glasses 6B50—10 pieces; tactical splinter-proof protective glasses—21 pieces; modular transport vest 6SH116 “Senior Shooter” with a patrol bag 6SH116 “Senior

Shooter”—12 pieces, all of which are in the current classifier of weapons and military equipment of the Main Rocket and Artillery Directorate of the Ministry of Defense of the Russian Federation, and belong to the “Artillery Arms” group, category “PPE” (personal protective equipment), having no civilian use. The convict also had materials and equipment that can be used to create weapons and military equipment, such as helmet BPH, type N, with “Paulson DK-6” splinter-proof visor—36 pieces, having declared everything as humanitarian aid. B. was sentenced to three years on probation.

As an example, we can point out problems of qualifying crimes related to illegal cross-border movement of controlled technologies, moved on any physical data carrier, due to the lack of an appropriate disposition in the Russian Criminal Code.

Illegal trade in military products is usually made by criminal groups and, unlike other organized crime activities, is closely linked not only to economic benefits but also to support of certain political regimes. For example, they remotely purchased 33 periscopic prism optical devices from a resident of the Moscow Region. Such items are an integral part of military equipment and are aimed at surveillance from a closed attack-proof armored fighting vehicle (tank, armored personnel carrier BTR, airborne combat vehicle BMD, infantry fighting vehicle BMP, multi-purpose light-armored towing vehicle MT-LB, etc.), they relate to equipment that can be used exclusively for creating military equipment. On 16.05.2017 in Kursk branch of the “Delovye Linii” transport company S.Yu.Semupan received the devices by proxy, while Stotsky placed the devices deep into the luggage compartment of his Ford Transit car, disguising them as spare parts for agricultural machinery; on May 28, 2017 he arrived at the Customs International Automobile Border-Crossing Point MAPP “Nekhoteyevka,” where the items were seized. During the investigation, it was found that the criminal group included several people who performed narrowly specific duties, many of the group members did not know about each other for conspiracy. Both convicts were sentenced to two years and six months imprisonment served in a general penal colony.

Given a great public danger of escalating military conflicts, we believe it advisable that part 3 Article 226.1 of the Criminal Code of the Russian Federation shall be supplemented with a qualifying element: “to transfer military or dual-use products to warring parties during armed conflicts, terrorist organizations or private military companies.”

CONCLUSIONS

It should be noted that the statistics of prosecution for the smuggling of military goods are extremely scarce. According to the data given in the

study of Robak (2019), crimes in the studied sphere are registered in the territory of the Russian Federation in the order of 200 per year (the study period from 1997 to 2017). The lowest number of crimes was registered in 2011—81, the highest in 2015—328. Given the expert assessments of the grey sector of illegal arms deliveries stated at the beginning of the article, we can conclude that these crimes have the highest degree of latency and a significant share of corruption.

Taking into account the significant public danger of escalation of military conflicts, we consider it advisable to introduce a qualifying sign to part 3 of article 226.1 of the Criminal Code: “to transfer military or dual-use products to belligerents during armed conflicts, to terrorist organizations or private military companies.”

It is also necessary to specify the concept of “other military equipment,” legally distinguish the definitions of “military products” and “dual-use products” in the criminal law norm, or specify the normative act defining the content and differentiation of the terms in question, or identify the state body that will have to develop and adopt a relevant normative act. The proposed innovation of criminal law corresponds to the requirements of formal definiteness of criminal law norms and will promote uniform understanding and application of criminal law norms.

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CHAPTER 31

ECONOMICS AND CRIME IN THE POST-COVID PERIOD

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ABSTRACT

COVID-19 pandemic prompted a series of government measures to stabilize the situation in the new challenging environment. Along with measures aimed at preventing the spread of infection, the government implemented measures to provide economic support to businesses and social support to the population. Although these measures were forced, their implementation may bring not only a positive effect but also provide for the emergence of new opportunities for committing economic crimes and laundering illicit proceeds. Adverse effects could result from an increase in digital transactions, increased online sales, simplified procurement of goods needed to fight the pandemic, lower government revenues, higher unemployment, lower personal income, and a general economic downturn. The research relevance is determined by the need to establish a relationship between forced changes in the economic life of the country and new variants of criminal behavior in the economy. The chapter analyzes the functioning of the market in the post-COVID period and the role of the executive and legislative branches in regulating and ensuring the stability of enterprises and the national currency, as well as curbing unemployment and fighting crime. The chapter focuses on the peculiarities of combating money laundering and terrorist financing in a

post-COVID economy. The analysis identifies factors influencing changes in the structure of crime and factors contributing to changes in the behavior of criminals adapting money laundering schemes to new conditions.

INTRODUCTION

During the COVID-19 pandemic, the global community faced unprecedented challenges. New threats related to money laundering and terrorist financing have emerged in national security. The pandemic period was *turbulent* for the Russian and global economies. The occurred changes are so strong that the development of the economy can be conventionally divided into pre-COVID and post-COVID. The profound changes will influence the development of the economy for a long time to come. The post-COVID economy is marked with a drop in income, a change in consumption patterns, and an increase in the use of digital platforms. These circumstances also contribute to changes in the shadow economy. Organized crime is also changing since its goals of finding sources of criminal income and laundering the proceeds of crime remain the same, and the ways of achieving these goals must be adjusted to reflect the changes that have occurred during the COVID-19 pandemic. In this regard, the actual task of the government is the forecasting of possible risks in the sphere of combating money laundering and terrorism financing. Moreover, it is necessary to develop and implement measures adequate to the current situation. The research aims to analyze changes in economic processes that may affect the criminal behavior of money launderers. Intermediate tasks include the tasks of identifying individual factors affecting the structure of crime, as well as possible ways to counteract these processes.

MATERIALS AND METHODS

The article uses general and special methods of research, namely, systemic, logical, description and observation, and formal-legal methods, as well as the method of legal modeling, analysis of documents, and other scientific methods. The theoretical basis of the research includes the works of Russian scholars Kolesnikov (1998), Modenov et al. (2018, 2020), Vlasov et al. (2020), and others. The analysis included normative legal acts, statistical data, information published by authorities, and reports of research centers.

RESULTS

The executive and legislative activities are primarily focused on property relations, which directly impacts the following:

- Public and investor income;
- Meeting the needs of the population for a variety of products and services;
- Social, economic, production, financial, and credit relations arising during the economic activity.

The latter is reflected in the distribution and redistribution of benefits to the final consumers.

The activities of regional and municipal authorities affect economic activities, which necessarily require economic costs. Therefore, it is in the interest of the authorities to make their bureaucratic activities contribute to reducing these costs, which is directly reflected in the transaction costs.

Business support is laid down, first of all, in the tax code. As a rule, system-forming enterprises are capital-intensive, regardless of industry. In the tax code, most of the taxation relates to payroll funds. This allows drawing a line between system-forming and system-serving enterprises.

Additionally, a fine line must be drawn between permitted and prohibited business operations. Prohibited operations must be prosecuted in the manner prescribed by law. In this case, the digitalization of the economy can significantly help the government since it allows for effective monitoring of compliance by the business. The legislation should be differentiated considering business operations (i.e., what is allowed in one industry may be prohibited in another). This applies to labor relations, foreign exchange transactions, the environment, and other aspects that ensure compliance with national interests (Vlasov et al., 2020).

The country's legislation reflects the situation in international markets since it should ensure higher profits for system-forming enterprises in selected areas of the economy based on preserving key competencies.

The development of system-serving enterprises that sell products in their district or region is directly related to the solvency of consumers, regardless of whether it is about every day or durable goods.

The role of system-forming enterprises is to replenish the revenues of budgets at all levels. In turn, the activities of system-serving enterprises help to increase employment. System-serving enterprises are represented mainly in small and medium-sized businesses and are not highly profitable since their products are more labor-intensive and have a relatively higher tax burden compared to system-forming enterprises. Additionally, there is a higher degree of competition in this area of the economy, contributing

to a decrease in their profitability. The operation of the enterprises in question requires lower qualifications. Therefore, it is marked with lower income. Lower revenues due to the limited scope of activities of systemic enterprises and the desire of their owners to increase their profits contribute to an increased degree of criminalization of this sphere of the economy. The income of the owners of such enterprises is commensurate with the income of highly qualified specialists of systemic enterprises. The activities of these enterprises are less transparent and need more attention from the government.

Nevertheless, the activity of a considerable part of the system-serving enterprises is aimed at meeting the direct needs of the population for goods and services. Therefore, executive and legislative authorities must support the operation of these enterprises at the regional and municipal levels. Regional and municipal authorities are marked with the following:

- High dimensionality;
- Considerable number of interconnected subsystems of different types with local goals;
- Multi-circuit control;
- Hierarchical structure;
- Significant lag of coordinating influences with high dynamism of the elements;
- Incomplete certainty of element states.

It should also be noted that the activities of system-serving enterprises aim to maintain and develop infrastructure, often in the interests of systemic enterprises. This allows for taking indirect measures aimed at supporting system-serving enterprises, for example, by lowering rental rates for premises or reducing tax rates on small properties.

Thus, while maintaining the priority of attracting and developing system-forming enterprises, it is necessary to stimulate small and medium-sized enterprises directly involved in meeting the population's needs.

The threat to national security in the post-COVID period is posed not only by the difficult situation in the economy, but also by the changed structure of crime during the pandemic. Organized crime adapts to the new conditions and uses them to legalize the proceeds of crime. We will discuss several factors that must be considered to effectively combat money laundering and maintain an appropriate level of national security.

In our opinion, the pandemic period is marked with the presence of corruptive factors. Presidential Decree "On measures to ensure the sanitary and epidemiological welfare of the population in the Russian Federation due to the spread of a new coronavirus infection (COVID-19)" (April 2,

2020 No. 239) (Presidential Executive Office, 2020) served as the basis for the development and implementation of restrictive measures for businesses in the regions. Organizations whose activities were not included in the list of permitted activities ceased their operation during the pandemic. Amendments to Article 6.3 of the Administrative Offences Code provided fines up to 150 thousand for individual entrepreneurs and 500 thousand rubles for legal entities violating the restrictions (Russian Federation, 2001a). Moreover, the operating activities of such organizations could be suspended for up to 90 days in the case of detected violations. A significant number of business entities found themselves in difficult conditions. The duties of detecting violations of the quarantine were performed by specific officials of the authorized state authorities. Thus, the period of restrictive measures created the ground for the growth of corruption crimes – business entities reached agreements with officials to continue operation activities in the pandemic. However, it is quite difficult to quantify such episodes since corruption is marked with high latency – it is not profitable to report them to law enforcement agencies either for the bribe-giver or the bribe-taker.

Procurement is another area characterized by an increase in corruption during the COVID-19 pandemic. It was allowed to hold tenders with a single supplier to purchase goods, works, and services used for the prevention or elimination of the spread of COVID-19 infection. Thus, the Ministry of Finance, in the letter No. 24-06-06/21324 of March 19, 2020 (Ministry of Finance of the Russian Federation, 2020), explained that the spread of COVID-19 infection is extraordinary and unavoidable, and, therefore, it is a force majeure circumstance. Consequently, procurement could be carried out under paragraph 9 of Art. 1 of Art. 93 44-FZ: “Procurement from a single supplier may be carried out in the case of procurement of goods, works, and services due to force majeure. In this case, the customer can purchase goods, works, and services in the volume necessary due to such force majeure circumstances, if the use of competitive methods of determining the supplier, which require time, is inexpedient” (Russian Federation, 2013). On the one hand, in pandemic conditions, it is essential to simplify the procedures for purchasing personal protective equipment and medical ventilators, because delaying may lead to negative consequences. On the other hand, there arose a corruption factor—law enforcement agencies revealed cases of overpriced purchases or cases of contracting with organizations and individual entrepreneurs with no experience in supplying such goods but affiliated with officials in government bodies.

The coronavirus pandemic stimulated the growth of e-commerce by restricting the activities of caterers and businesses that sell nonessential goods. As of April 2020, online retail orders in the U.S. and Canada increased to 146% compared to the previous year. This growth has been recorded all over the world—even in places with less developed

e-commerce. In Africa, which has the lowest level of e-commerce in the world, the consumer internet sector has recently surged (Moberg & Picard, n.d.). In Russia, the number of online customers grew by almost 10 million during the lockdown period (Data Insight Research Agency, 2020). The rise of the consumer internet sector led to an increase in IT crime. In 2019, the total number of such crimes in Russia was 294.4 thousand, and about 737 thousand in 2020 (Prosecutor General's Office of the Russian Federation, n.d.). The share of these crimes was 25% of the total number of crimes registered in 2020. In fact, every fourth crime was committed using IT.

Coronavirus restrictions have also created fertile ground for the sale of counterfeit goods. This was due, above all, to a sharp decrease in the level of income of the population. Additionally, the breakdown of global supply chains limits the consumers' ability to purchase original products. Moreover, the lack of uniform regulation at the level of the EAEU contributes to the penetration of counterfeit goods on the market. Counterfeit goods allow meeting the population's needs in the face of severe restrictions on business. In Russia, the fight against the sale of counterfeit goods is conducted by introducing mandatory labeling of specific categories of goods and using the state track and trace system "Chestny ZNAK."

CONCLUSION

The coronavirus pandemic caused changes in the structure of crime, creating some corruption triggers and providing a dramatic increase in IT crimes, which has created new sources of income for those engaged in illicit activities. The restrictions imposed by the state have stimulated the search for new forms of illegal activity by criminals seeking to take advantage of the situation. Criminals find new ways to move and hide proceeds using digital technology. Additionally, the implementation of measures to support business and the introduction of tax incentives created opportunities to launder criminal proceeds. These factors require an adequate response from the government.

In a post-COVID economy, the functions of a normal government include (Kolesnikov, 1998):

- Regulation of market relations by laws and other normative acts following the political and legal (ideological) doctrine adopted by the government;
- Compensation for market failures (state subsidies to business entities);

- Social policy (redistribution of the budget in favor of vulnerable social groups);
- Functional interventions to accelerate capital formation in technologically important industries and structural changes in industries supporting economic development.

The implementation of the FATF Recommendations preventing the emergence and use of cash from conducting illegal activities is necessary to ensure legitimate activities. The FATF Recommendations provide for the establishment of standards and the effective application of legal, regulatory, and operational measures to combat money laundering, terrorist financing, proliferation financing, and other related threats to the integrity of the international and national financial system.

Currently, the fight against the financial base of international and Russian crime is becoming more urgent than ever. In our opinion, the problem of bringing the legislation of the Russian Federation and other countries to a consensus is overdue. The legislation must identify the location of the owners of illegal money and the sources of their illicit origin (Russian Federation, 2001b?).

Therefore, creating a unified international information system will establish effective data exchange between all participating countries. However, the proposed information system may affect the national interests of individual countries. For example, it is possible to hide dirty money in Switzerland, since tax and other economic crimes are not criminally punishable in this country. The practice of numbered accounts, which exists in Switzerland, should lose its appeal.

The use of digital technology in the economy will lead to the transparency of transactions and their controllability. Current software products allow tracking and monitoring most transactions between organizations within the country and internationally. The following operations must be monitored and controlled:

- Purchase and sale with a newly established company, which may turn out to be a fictitious or a fly-by-night company;
- Transactions of money out of the country using postal services, transport organizations, and courier services;
- Transfer of funds electronically;
- Currency exchange.

In our opinion, it is necessary to pay more attention to the assessment of the risks of illegally obtained income to prevent and provide more effective work in this area. Currently, there exist the following problems:

- Mechanisms for assessing risks by reporting entities are not defined;
- No clear rules for internal control, risk identification, management, and mitigation at the legislative level;
- There is no mechanism for identifying and assessing risks at the national level;
- It is necessary to change the basic confiscation provisions of the Criminal Code, since they cannot currently be applied to the proceeds of certain significant predicate offenses. Instead, the provisions of the Code of Criminal Procedure are used to confiscate the proceeds of certain crimes, after the issue of compensation for victims has been resolved;
- No clarification in the legislation on the identification of beneficial owners—individuals occupying senior management positions;
- No requirements on data storage despite the extensive list of transactions, information about which must be stored following the law.

The use of digital technologies (software products that can track misreporting and false information or the conclusion of fictitious contracts) will allow timely detection of laundering and legalization of illicit proceeds. To a certain extent, the creation of mathematical models will help prevent this type of crime (Modenov et al., 2020). Digitalization of the economy and the protection of information will help in eliminating emerging threats and reducing costs. To increase the information security of economic activity, it is necessary to develop technologies to protect against various threats (Modenov et al., 2018).

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CHAPTER 32

FEATURES OF THE DEVELOPMENT OF INTERNATIONAL INTEGRATION ASSOCIATIONS OF COUNTRIES IN THE CONTEXT OF THE TRANSFORMATION OF THE WORLD ECONOMIC SYSTEM

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ABSTRACT

The main purpose of this chapter is to analyze of the current state, problems, and promising development of the international integration processes of Russia and Cameroon, development of solutions for economic interaction of countries.

The following methods were used during the research: descriptive, comparative method, statistical data's analysis of indicators of Russia and Cameroon.

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The results of this study present analysis of the state, identifying problems and trends in the development of the integration process in Russian-Cameroon relations and identifying promising areas for enhancing Cameroon's integration potential. The interaction of Russia and Cameroon in the world economy will contribute to the development of integration processes at the present stage. A fundamental aspect is the increasing desire of the State of Cameroon to work with Russia to establish stability and economic well-being.

Today, in the current sanctions environment, Russia increasingly draws attention to the countries of the African continent as a market for goods and seeks to share new solutions and approaches for the development of industry and human resources (Egorova et al., 2019; Egorova et al., 2020; Lavrenteva et al., 2016). African countries, in turn, express confidence in Russian partners and are ready to actively apply in practice the proposed opportunities to overcome the problems facing countries and society in the region.

The strengthening of trade and economic ties is carried out through continental integration associations, through the conclusion of trade agreements (Ivanovich, 2007; Lawrence, 1995). In general, in terms of the development peculiarities of Russian-African, including Russian-Cameroon relations, it can be concluded the participating parties are focused on establishing mutually beneficial cooperation in the long term.

INTRODUCTION

The chapter attempts, on the one hand, to show the causes of the current economic crisis caused by the epidemic on the one hand, and, on the other hand, to consider the state of the world economy and its impact on international integration processes, including on the countries of the African continent.

Today, the world economic system is in a difficult situation than pessimists predicted. The coronavirus epidemic, combined with falling oil prices, sectoral and territorial instability in all economic markets, will undoubtedly be the subject of research for many years. Since the second quarter of 2020, a new global economy has been forming, where old development trends in a new combination will determine the image of the world. Under such conditions, developed economies have advantages, and developing economies try to maintain position in the world market and protect national interests.

The coronavirus pandemic negatively affected economic activity in early 2020, and experts show that in 2021 the forecast is as follows: global growth at 5.4%, GDP—6½ percentage points lower than January 2020, before the start of the disease.

The baseline prediction is based on key assumptions regarding pandemic exposure. In countries with declining levels of infection recovery rates are slower, reflecting continued distancing of society with longer-term

damage greater than expected. There was an impact on business during self-isolation in the first half of 2020 and in the second quarter of 2020, as well as a decrease in productivity due to the need for surviving enterprises to take measures to strengthen the necessary measures to protect health and safety in the workplace. The slow growth of economies in emerging and developing countries, such as Africa, was worrying, as per capita output growth would fall below multiyear averages, all of which would have a direct impact on poverty.

Nevertheless, the attention of the leading world powers is increasingly attracted by the states and associations of the African continent due to the enormous untapped opportunities that are present there. Russia was no exception and pays attention towards African states that gladly responded to its proposals (Mansurova, 2018; Sirozhov, 2019). Moreover, the sanctions policy of the West and Europe towards Russia do not allow building holistic economic interaction. But, it is necessary to note the positive aspects of the anti-Russian sanctions policy: the search for and exits of Russia to new foreign markets, which contributes to the competitiveness of exporters and strengthening interaction with new trading partners (Aksenov, 2019).

In accordance with this, interaction with key African integration associations is of great scientific interest to Russia, as it allows us to track the pace of development of built-up relations, assess their prospects and effectiveness for both sides of the dialogue. Moreover, this topic is becoming extremely relevant due to the ongoing tectonic shifts in the world political and economic systems, which are pushing countries to search for new partners (Timakhov, 2020).

As practical research shows (Aziagba, 2016; Mansur, 2018; Shitov, 2018) African countries today have many achievements, problems, and solutions that affect the promising interaction of countries, and Russia is able to become a leader in the search for these solutions.

The growing interest of the parties in ensuring a systematic and complex nature of relations led to the holding of a historic event in 2019—the Russia—Africa Summit and at the same time the Economic Forum, in which delegations from all countries of the continent took part. In representativeness—the participation of more than 40 heads of state—the Russian forum has become one of the most successful among similar meetings. At the summit, Russian President Vladimir Putin noted the achievements of cooperation in the military-political, trade, economic, and educational spheres: Russian-African trade turnover grew to \$20 billion in 2019, while the share of non-resource supplies is increasing.

At the end of the summit, the Declaration was adopted, it defines fundamental approaches to the development of relations among the parties and establishes priority areas of cooperation, including the deepening of the BRICS-Africa partnership.

Diplomatic and economic relations between Russia and African countries, including Cameroon, were established on February 20, 1964, have a long history of making industrial infrastructure, training national personnel, developing the social sphere, oil and gas production (Bodrunov, 2018; Sharf, 2014). According to economic agreements, Cameroon's National Hydrocarbons Corp (SNH) and "Gazprom" will increase natural gas production.

It can be noted mutually beneficial interaction in all areas of activity of the participating countries has potential. The development and strengthening of the economic cooperation of the Republic of Cameroon with Russia contribute to socioeconomic development, diversification of the national economy, and strengthening of integration potential.

METHODOLOGY

Issues of development of international integration associations of countries in Russian practice were dealt with by: Bodrunov (2018), Mansurova (2018), Sirozhov (2019), Timakhov (2020), Sharf (2014), Shitov (2018), and so forth.

The problems of international integration were considered in the works of foreign authors: Balass (1964), Lawrence (1995), Ivanovich (2007), Babatunde (2011), Mlenga (2012), de Melo (2014), and so forth.

The authors also used the materials from Joint Report of the Russian Council on International Affairs (INF) and the African Business Initiative Union (ADI) (Kortunov et al., 2020). Position of Russia at a new stage of international integration under the editorial part and from Agenda of the African Union–2063 and prospects for Russian-African cooperation: A collection of scientific articles of the IX International Scientific and Practical Conference "Africa in the Context of the Formation of a New System of International Relations" (2019) in this study.

But, despite the sufficient level of the problem elaboration at the theoretical level, it is not sufficiently studied at the empirical level—in particular, due to the fact that until recently the Republic of Cameroon was the most closed country for integration processes.

RESULTS

The authors of the chapter conducted an analysis of the economic development of the Republic of Cameroon to identify the prospects for its integration with the Russian economy.

Earlier studies (Babatunde, 2011; Balassa, 1964; Boudeville, 1966) show Cameroon has small oil reserves, as well as climatic and other conditions favorable for agricultural production, which makes the best domestic supply among West African countries. Due to its geographical location, the country is called “Africa in miniature.” With a population of more than 22 million people in Cameroon, you can find about 230 different languages and dialects.

Cameroon offers average prices compared to other African States. Douala, the country’s economic center, where most of its trade and industry are concentrated, suffers from poor infrastructure, chaotic development and rapid population growth (approximately 3 million people). Cameroon is a state that had every opportunity to become rich and democratic, but in which the ambitions of one person crossed out the chances of development.

What else is needed for happiness except of oil-rich country with excellent natural conditions for agriculture? But unlimited uncontrolled power, even in such conditions, can turn the life of citizens, if not hell, then at least doom to a rather miserable existence (de Melo & Tsikata, 2014; Goto et al., 2006). The country has a high unemployment rate (30%) and a large stratification of society. Almost half of Cameroonians live below the poverty line. According to the World Bank, 24% have less than \$1.9 per day, 45% less than \$3.2 per day. And this is happened despite the fact that the economy is showing steady growth (on average by 5% per year) (Table 32.1).

Table 32.1

Key Economic Indicators of Cameroon

Indicator	Indications	Period
GDP Volume	38.76 USD billions	2019
Annual GDP growth rate	3.8%	4th quarter of 2019
GDP per capita	1523 USD	2019
Inflation rate for the year	2.4%	June 2020
Interest rate	3.25%	August 2020
Unemployment rate	3.3%	2019
Trade balance	−149 XAF billions −0.269 USD billions	2019
Current balance	−730 XAF billions −1.319 USD billions	2018

Source: Macroeconomic statistics. Key indicators of Cameroon (2021).

There are also problems with linguistic discrimination in Cameroon. This applies to the population of the south of the country, where the English-speaking minority lives (the main population speaks French). In 2017, when mass protests of Anglophones began, troops were thrown against them. Loss of human life, hundreds imprisoned, thousands fled the country—the result of that confrontation.

Cameroon is one of the world's leading suppliers of cocoa beans, cotton, palm oil, rubber and sugar. However, Cameroon had many unresolved challenges, such as stagnant per capita income, relatively unfair income distribution, corruption at the highest levels of the public service and climatic conditions, general unfavorable business. Fiscal transparency, privatization of state-owned enterprises and a poverty reduction program were needed.

The development of investment policies to expand infrastructure, create new jobs and improve the economic status of the Republic of Cameroon are the primary issues facing the country. Today, almost 95% of the country's imports and exports pass through the seaport of the capital of Douala. The country is implementing a reinvestment program in the gas sector to increase the production capacity of liquefied natural gas.

The company "CAMRAIL" implements a program for the renewal and construction of railway infrastructure and has permission to operate for a long period of time on 1,100 km of railway track.

Agriculture has great potential for Russian persons, but there is an acute lack of mechanization tools in the country, in accordance with this, it is necessary to implement a policy of simplifying the procurement of these funds.

The country is a member of ECCAS (Economic Community of Central African Countries). According to the requirements of ECCAS, imported groups of goods are divided into four categories with interest rates ranging from 5% to 30% (Mlenga, 2012) (Table 32.2).

The customs value is burdened with special taxes of the Community: ECCAS tax (TCI)—1%, tax on contributions to the integration of ECCAS (CCI) —0.4%. Table 32.3 presents the main institutions of tariff and non-tariff methods of regulation of foreign economic activity.

OHADA is an institution assisting in trade, investment policy, enterprise development and the provision of security guarantees in the judicial and legal sphere.

ANOR is an institution responsible for the implementation of public policies in the sphere of standardization and quality and food security.

When exporting Russian goods to the country, it is necessary to take into account the current Free Trade Agreement between the EU and Cameroon. There are other categories of risks that should be taken into account when Russian companies enter African markets: the presence of bureaucratic delays in certifying goods, registering joint ventures, attracting foreign workers and obtaining permits. In this case, it is necessary to take into

Table 32.2

Categories of Imported Product Groups

Categories	Interest rate, %	Goods
I	0	essential goods
II	10	raw materials and equipment
III	20	intermediary and complex-technical goods
IV	30	consumer goods

Source: Macroeconomic statistics. Key indicators of Cameroon (2021).

Table 32.3

Main Institutions of Tariff and Non-Tariff Methods of Regulation of Foreign Economic Activity

Institutes	Naming
Central African Economic Society	CEEAC
Central African Economic and Monetary Community	CEMAC
Organization for the Harmonization of Commercial Law in Africa	OHADA
Cameroon Cameroon Customs	Customs
Standards and Quality Agency of Cameroon	ANOR

Source: Macroeconomic statistics. Key indicators of Cameroon (2021).

account when developing the supply of meat and dairy products and some other agricultural products in the regions, administrative procedures for admitting certain products to the market are.

Weak state control over the implementation of administrative procedures and their excessive regulation, as well as low wages of the local population, as a result, create corruption risks that impose certain features on the work of Russian companies in the countries of the region.

It is also worth noting the financial risks arising from interaction with Russian companies and countries of the African region. These may include the insolvency of the counterparty, the need to obtain permission from the central bank to make payments and withdraw funds abroad and to buy foreign currency.

West African countries are characterized by a low level of development of energy and engineering networks, transport and logistics systems, which can be defined as infrastructure risks that can arise during the development of the supply route and the organization of assembly industries.

The differences in climate between Russia and Cameroon should be taken into account when working with the agro-industrial complex of the region, in particular, at the stage of determining the availability of equipment and equipment for the region, suitable agricultural products that can and will be used in these climatic conditions. It should be noted that the region's demand for agricultural products depends heavily on climatic conditions, which can vary greatly from year to year and from season to season.

However, the overall trend in terms of trade with West African countries is improving. According to the latest World Bank report, a number of African countries have implemented structural reforms over the past two years, creating favorable conditions for international and in particular Russian business, investment and trade.

CONCLUSION

The movement towards each other of Russia and Africa, in particular the Republic of Cameroon in all areas of industrial integration, is advancing. This is especially true in the conditions of increasing instability of the world economy, trade tensions and the complexity of forecasting global disasters.

The authors show solving the existing problems and establishing Russian-Cameroonian partnership between the countries will be possible only in the conditions of stabilization of the economic situation both in the country and on the African continent as a whole.

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CHAPTER 33

SCIENTIFIC AND TECHNOLOGICAL POTENTIAL OF EAEU COUNTRIES AS A DEVELOPMENT FACTOR OF REGIONAL TRADE AND ECONOMIC INTEGRATION

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ABSTRACT

The main purpose of this chapter is to identify the main problems and prospects for the scientific and technological development of the EAEU, as well as possible promising areas of its scientific and technological integration.

Within the framework of the research, the existing approaches to integration processes in the scientific and technological sphere of the participants of the integration association are analyzed, as well as the main trends in the development of its scientific and technological potential, which is considered as one of the key factors for successful regional trade and

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economic integration. For a comprehensive research of the scientific and technological potential, substantiating the benefits of scientific and technological integration of the EAEU countries and determining possible ways of its further development, SWOT analysis was used, and also an econometric model was built reflecting the dependence of the volume of exports of high-tech products of the EAEU member states on a number of indicators, in particular the domestic costs of research and development, the share of internal research and development costs in GDP, the number of staff engaged in scientific research and development, and so forth.

The feasibility of scientific and technological cooperation as one of the key factors of successful trade and economic integration of the EAEU countries is justified. Indicators have been identified that have the greatest impact on the export of high-tech products of the EAEU member states. Among such indicators, domestic research and development costs are most important. Strategic directions for the development of scientific and technological integration of EAEU participants have been determined.

INTRODUCTION

The intensive development of international economic integration has made it one of the objects of active scientific research. At the same time, despite a significant number of works in the field of international integration processes in general and integration processes of the EAEU countries in particular, certain aspects of these processes, for example, related to the scientific and technological integration of the EAEU member states, remain debatable and insufficiently developed. At the same time, there is no doubt that the main goal of integration is to increase the international competitiveness of national economies, which is largely determined by innovative development, and the latter, in turn, certainly depends on the state and development of scientific and technological potential. Consequently, it is one of the key factors for the successful economic integration of participants, bearing a synergistic effect that can increase the international competitiveness of both individual EAEU member states and the regional integration association as a whole. Understanding the significance of scientific and technological ties between the EAEU member states leads to the fact that these issues are raised by the political leaders of these countries at the highest level. So, for example, in section V of the Main Directions of Economic Development of the EAEU until 2030, approved by the Decision of the Supreme Eurasian Economic Council (Eurasian Economic Union, 2020), it is noted that member states have a low indicator of the share of high-tech exports in GDP and at the same time have significant competitive scientific and production potential in a number of industries, cooperation of member states in this area should help solve

existing problems. Thus, the relevance of the study due to the above circumstances is beyond doubt.

METHODOLOGY

Issues of research on economic integration were first raised in the 30s of the XX century. Since then, two main approaches to the study of integration processes have been used: technological (homogeneous technological processes that underlie integration) and economic (which is also called transactional (the system of relations arising from the formation of large production associations is the basis of integration) (Misko, 2015). In any case, it is emphasized that integration stimulates economic growth in the participating countries, positively affects the speed of NTP, leads to strengthening of competitive positions in the world market and strengthening of innovation of the economy of the integration association as a whole (Borovko & Borbugulov, 2015).

The creation of the EAEU in 2015 became a mechanism that will increase the level of competitiveness of the economies of the countries included in the association, and will also contribute to the development of high-tech industries and stimulate innovative activity. However, all of the above is impossible without the development of scientific and technological potential. Currently, the share of the EAEU in the world market of knowledge-based products is about 2.5%, which is due to a significant decline in science during the crisis of the 90s, while the G-7 countries occupy the market 80% (Gavrilyuk, 2015). To increase this indicator, it is necessary to develop the sphere of scientific research, restore the personnel potential of domestic science, stimulate innovative processes, strengthen the cooperation of scientific organizations with industrial enterprises and create intercountry networks for scientific cooperation (Borovko & Borbugulov, 2015). Within the framework of the EAEU, joint scientific and technical projects are already underway, however, cooperation in the field of science should be strengthened and efforts in the scientific and technical sphere should be consolidated (Gavrilyuk, 2015). It should be noted that the member countries of the union have historical roots of integration in the field of science, which it is advisable to take advantage of at present. Russia is the undisputed leader of the EAEU in the scientific sphere, a number of authors consider it as a locomotive for the growth of the entire integration bloc, thanks to the scientific potential and the state financial resources traditionally invested in science. At the same time, a significant role in the coordination of scientific cooperation is assigned to supranational institutions, in particular the Eurasian Economic Commission, which can contribute to building scientific potential, and contribute to the

establishment of closer scientific relationships between member countries (Shugurova, 2020).

The issue of creating a full legal framework for further integration in the scientific sphere, the implementation of coordinated scientific and technical policies and the effective realization of the scientific potential of countries is very relevant (Shugurov, 2018). There is a lack of a full legal framework, including for scientific cooperation, as well as the need to harmonize and unify legislative acts in each of the countries (World Bank, 2020). Within the framework of the development directions of the EAEU adopted in 2015, one of the main ones is innovative development, which contributes to an increase in the share of high-tech exports of the participating countries (Eurasian Economic Union, 2020). According to the results of the annual monitoring, the above indicator increased by 2.7 percentage points compared to 2015 (Fatykhova, 2019; Eurasian Economic Commission, 2020b). The share of R&D spending in GDP in 2018 was 0.99% in Russia, 0.61% in Belarus, 0.19% in Armenia, 0.12% in Kazakhstan, and 0.11% in Kyrgyzstan. The same indicator in Israel is 4.95%, Korea 4.81, Switzerland and Sweden 3.37% and 3.34%, respectively, in the United States—2.84% (Eurasian Economic Commission, 2020a). A number of authors consider the advantages of the extensive development path of the integration group (inclusion of Tajikistan and Uzbekistan), which can lead to an increase in the synergistic effect (Fatykhova, 2019). The idea of creating science clusters that will more effectively attract investors, use financial resources, as well as increase the scientific and technological competitiveness of the integration association (An & An, 2015; Gavriluk, 2015; Karpenko & Stepannikov, 2018; Shugurova, 2020) is also expressed. A number of authors propose to make changes in the management of macroeconomic processes in order to create a new scientific and technological base based on the strategic breakthrough market-forming innovations available to participating countries, which can bring the integration association to world markets and gain a foothold in leading positions. Under this heading, it is proposed not only to use the cluster mechanism, but also to develop special economic zone, industrial parks and other structures that contribute to the development, introduction and production of innovations, as well as to actively interact with international organizations such as UNIDO (Loginov, 2017).

The methodological basis of the present study is determined by various methods of scientific knowledge. The collected data were analyzed using econometric analysis tools and presented in tabular form with conclusions. The authors also used SWOT analysis to assess the scientific and technological potential of the EAEU. All statistics were collected from scientific articles, reports published by national statistical agencies and international

organizations, as well as from online resources of various governmental and nongovernmental organizations.

RESULTS

For the purpose of a comprehensive study of the scientific and technological potential of the EAEU countries and determining the directions of its further development, we use such a well-known tool as the SWOT model, which includes the assessment of strengths and weaknesses (strengths, weaknesses), as well as opportunities and threats (opportunities, threats) from the external environment (Table 33.1).

Table 33.1

Use of SWOT Model in Research of Scientific and Technological Potential of EAEU Countries

Factors	External	External
	Opportunities	Strengths
F	- EAEU block uses best practices of scientific and technological integration within the framework of European and Asian models taking into account deep structural and historical differences - Growing interest in building mutually beneficial partnerships with the EAEU bloc by third states representing promising markets for knowledge-based products - Relatively low tax burden in EAEU countries - EAEU capacious domestic consumer market	- Relatively high human development rates, driven primarily by a well-developed education system - The presence of powerful technological gaps in such knowledge-intensive industries as nuclear, aerospace, defense, creating opportunities to increase high-tech exports of the EAEU - Deep historical roots of cooperation, legacy of the Soviet period - The language community of the EAEU countries, allowing scientists and entrepreneurs to communicate freely in Russian
A		
V		
O		
R		
A		
B		
L		
E		

(Table continued on next page)

Table 33.1 (Continued)

Use of SWOT Model in Research of Scientific and Technological Potential of EAEU Countries

Factors	External	External
	Threats	Weaknesses
U N F A V O R A B L E	• Policy of Western sanctions applied to Russia—the largest member of the EAEU • Negative consequences of a pandemic of coronavirus of COVID-19 and quarantine measures for her control • Absence of an agreed (ideally—unified) scientific and technological policy of the EAEU countries • Relatively low importance of imports as a factor of technological renewal of EAEU economies • Weak copyright protection in EAEU countries • Unsatisfactory entrepreneurial climate, persisting high level of corruption, bureaucracy in EAEU countries • High competition in the world market of high-tech products • Low efficiency of use of significant income from foreign economic activity for development of scientific and technological potential and modernization of EAEU economies	• Long-term replacement of high-tech and knowledge-intensive industries with labor, energy, and material costs and, as a result, weak diversification of exports of knowledge-intensive products with predominance in exports of products of low conversions and raw materials • Asymmetric nature of interaction of EAEU countries due to dominance of one participant—Russia, different level, and possibility of scientific and technological development • Underdeveloped science infrastructure • Insufficient funding for R&D, inefficient structure of R&D financing by a large margin of government sources, insufficient financial support for research and development by the private sector, whose active participation in research and development is hampered by an unsatisfactory entrepreneurial climate, corruption, and other negative factors • Separation of science from production

Source: Compiled by the authors.

Based on different combinations of factors, it is possible to choose one of the following strategies:

- Strategies aimed at maximizing internal and external capabilities (SO strategies);
- Strategies aimed at maximizing internal capabilities and minimizing threats from the external environment (ST strategies);

- Strategies aimed at overcoming weaknesses and maximizing the potential of the external environment (WO strategies);
- Strategies aimed at neutralizing internal weaknesses and minimizing threats from the external environment (WT strategies).

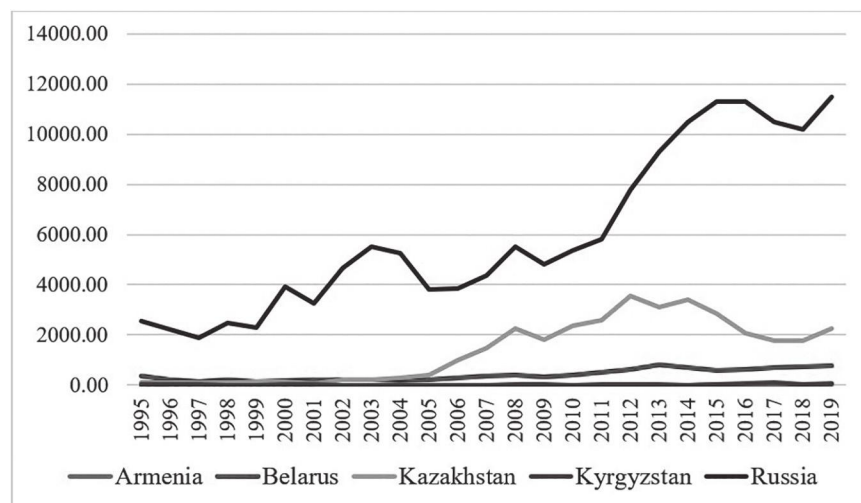
It is important to note that choosing a strategy option does not mean ignoring the rest of the strategies, but only focuses on a combination of factors.

One of the key resulting indicators of the use of scientific and technological potential is the volume of exports of high-tech products, which contains an important characteristic of the state's competitiveness. The high dynamic value of exports of high-tech goods in the EAEU countries (Figure 33.1) was the reason for identifying the factors that most affect this indicator.

To this end, we built an econometric model using statistical data for the EAEU on four indicators over the past 25 years (1995–2019) from sources

Figure 33.1

Dynamics of Exports of High-Tech Goods, Million Dollars



Source: Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, National Statistical Committee of the Kyrgyz Republic, National Statistical Committee of the Republic of Belarus, Statistical yearbooks of the Eurasian Economic Union 2014–2020, Statistical Committee of the Republic of Armenia, 2020, Federal State Statistics Service and HSE.

such as the Bureau of National Statistics of the Republic of Kazakhstan (2020), the National Statistical Committee of the Kyrgyz Republic (2020), the National Statistical Committee of the Republic of Belarus (2020), the Eurasian Economic Union Statistical Yearbooks of the Eurasian Economic Union 2014–2020 (2020), the Statistical Committee of the Republic of Armenia (2020), Rosstat (Federal State Statistics Service, 2020), HSE (HSE, 2020).

The following model parameters were selected: This is clearly the amount of R&D financing, both in absolute terms and in relative terms (in% of GDP).

Also, the number of scientists and relevant organizations, of course, cannot but affect the production of knowledge-based products, since it is highly qualified personnel who are the main source of development both of the production of high-tech goods and of their export. The research also used other factors, such as the number of students in universities who arrived from the EAEU countries, the ratio of labor costs in professional scientific and technical activities to labor costs on average in the country and others (7 variables were studied together), but these indicators did not receive reliable statistical significance, therefore did not affect the result subsequently.

For further analysis, we will use statistics for these five countries of the world and a four-factor linear model:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + \epsilon \quad (1)$$

X_1 – the number of personnel engaged in scientific research and development, people.

X_2 – internal costs of research and development, million dollars.

X_3 – the number of organizations that carried out scientific research and development, units.

X_4 – share of domestic R&D costs in GDP, %.

Y – export of high-tech goods, million dollars.

The results of the econometric analysis are shown in Table 33.2.

The results showed that for the countries with the largest export of high-tech goods (Russia and Kazakhstan), domestic research and development costs are a significant parameter. At the same time, the best statistical significance is shown by the model for Kazakhstan (Table 33.2). Thus, an increase in domestic spending on research by \$1 million leads to an

increase in exports of high-tech goods by 10 times. The magnitude of R&D expenditure relative to GDP is essential.

Table 33.2

Summary of Econometric Analysis

	Armenia	Belarus	Kazakhstan	Kyrgyzstan	Russia	All
b1	0.007**	0.01*	0.029*	0.026***	0.004	0.051*
b2	0.682*	0.23	10.37***	0,526	0.525***	0.462***
b3	0.078	1.82***	1.96**	0,15	6.81***	3.47*
b4	11.6**	358.9*	68.33***	136,92	6092.3*	7678.1***
N	23	23	23	23	25	23
R2	0.63	0.81	0.97	0,72	0.72	0.88
DW	1.12	1.23	2.32	2,16	0.91	0.94

Source: Compiled by the authors.

$$Y = 0,0071X_1 + 0,682X_2 + 0,078X_3 + 1\,1,6X_4 + 60,5 \quad (2)$$

$$Y = 0,01X_1 + 0,23X_2 + 1,82X_3 + 358,9X_4 + 180,81 \quad (3)$$

$$Y = 0,029X_1 + 10,37X_2 + 1,96X_3 + 68,33X_4 + 2048,48 \quad (4)$$

$$Y = 0,026X_1 + 0,526X_2 + 0,15X_3 + 136,92X_4 + 33,46 \quad (5)$$

$$Y = 0,004X_1 + 0,525X_2 + 6,81X_3 + 6092,3X_4 + 29791,3 \quad (6)$$

In general, the calculations show that the integration of the above-mentioned countries allows increasing the efficiency of using the introduced resources and providing the EAEU with an increasing return on the scale of production and export of high-tech goods. So, if the number of personnel in Kazakhstan grows by 1 percentage point (p.p.), then the increase in exports of high-tech goods increases by 3 p.p., while the growth in the number of organizations gives an increase of about 2 p.p. However, if we consider the result of the combined activities of five countries, then with an

increase in the number of personnel by 1 p.p., the increase in exports of high-tech goods will already be about 5 p.p., and the growth in the number of organizations will give an increase of about 3 p.p.

The model of trade and economic integration on the basis of combining the opportunities for the production of knowledge-based products of all five states shows the combined potential and theoretical prospect of developing the export of high-tech goods of the EAEU countries.

$$Y = 0,05X_1 + 0,462X_2 + 3,47X_3 + 7678,1X_4 + 7468,83 \quad (7)$$

The research confirms combined activities enable countries and participants to achieve greater results than their individual operations. So, with an increase in the number of personnel by 1 p.p., the benefit from the joint export of high-tech goods will be at least 3 p.p. for each country, and the growth in the number of organizations in the EAEU gives an unambiguous advantage for Armenia, Belarus, Kyrgyzstan and Kazakhstan (in this parameter, Russia is a clear locomotive). On average, the use of R&D expenditure against the GDP of these countries is 7,5 times more efficient.

CONCLUSION

The SWOT analysis of the scientific and technological potential of the EAEU countries and the econometric apparatus used confirm the feasibility of forming a single scientific and technological space within the EAEU, which would greatly contribute to achieving the goals of the integration association. Combining scientific and technological resources, the EAEU countries will increase the competitiveness of the production of high-tech products and expand the boundaries of export potential.

The built econometric model showed that the largest contribution to the export of knowledge-based products is brought by the amount of R&D financing, which is currently clearly insufficient to achieve the goals of scientific and technological integration of the EAEU member countries, and the structure of R&D financing in the countries under consideration can be described as not corresponding to modern world trends in this area (see Table 33.1). Therefore, strategic solutions need to focus primarily on WO strategies that address weaknesses and take advantage of external opportunities. For example, significant revenues from foreign economic activity can be the sources of growth in R&D spending: many researchers note the low efficiency of using these revenues for innovative renewal and modernization of the economy. At the same time, you can use fiscal policy tools, in particular income tax benefits for enterprises actively engaged in scientific development or introducing the results of scientific activities into produc-

tion. In turn, the use by the EAEU bloc of the best practices of scientific and technological integration within the framework of the European and Asian models, taking into account deep structural and historical differences, as well as the growing interest in building mutually beneficial partnerships with the EAEU bloc by third states representing promising markets for knowledge-based products, open up great external opportunities for the development of scientific and technological potential.

At the same time, the emphasis on WO strategies, as noted earlier, does not preclude the use of elements of others, in particular SO strategies. So, for example, such strengths of the scientific and technological potential of the EAEU states as deep historical roots of cooperation, linguistic community and powerful technological gaps in certain knowledge-intensive industries (Table 33.1) will contribute to a faster exchange of scientific developments within the framework of the Eurasian scientific and technological integration. Effective tools for such an exchange can be the Eurasian technology platforms—platforms for conducting and implementing R&D. Among the already created platforms: “Space and geographic information technologies,” “Technologies for environmental development,” “supercomputers,” “biomedicine,” “photonics,” “Své todiodes,” “Technologies for the extraction of solid minerals,” “Eurasian Bio,” and so forth (World Bank, 2020). Promising key links of the organizational infrastructure of scientific and technological cooperation of the EAEU member states are the territorial integration clusters of science, education and production. Successful examples of such clusters include the innovative cluster of engineering and knowledge-intensive technologies of KazNU named after al-Farabi, the Medical and Biological Cluster of KazNU named after al-Farabi (An & An, 2015), and so forth. It seems the expansion of the list of scientific and technological platforms and territorial integrated clusters will contribute to deepening cooperation.

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CHAPTER 34

ON THE NEED TO DIFFERENTIATE BANKS

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ABSTRACT

Quite a significant part of modern works devoted to banks, the structure and functioning of the national banking system focuses its main attention on the trend prevailing in public life in recent years. This trend is the digitalization of many areas, including the banking system. It should be noted that focusing attention on the technical infrastructural element of the market—“digital” as a modern carrier of financial information, leads scientific work away from the study of the deep foundations of the banking system. The recommendations of economic science, proceeding simply from the outward appearance of current trends, do not bring anything new into the correct definition of ways for the further development of banking. This can only bring a deep analysis of the essence of banks, which the Russian school of economic thought insists on. Some provisions of this school, revealing the contradictory nature of banks are set out in this article. This chapter also examines the current way to overcome this inconsistency, the implementation of which is designed to significantly change the structure and functioning of the national banking system as a whole.

It is obvious that progress in the area of information technology (IT) has had a significant impact on the change in many aspects of public life, including the banking system. New opportunities for accounting and transfer of financial information not only significantly expanded the share of noncash payments and noncash funds but also highly actualized issues related to the essence of the banking system, directions of its development in new conditions. However, as it can be seen from current practice, the differentiation of banks' activities began to be driven mainly by their usual desire to make a profit. Banks serving individuals and legal entities are positioned as commercial companies; and as such, they see the obvious goal of their activities in making a profit, in ensuring its greatest profitability. Moreover, their aspiration is understood by the neoliberal school of economic thought as a matter of course, and most of the recommendations of this school are aimed simply at adapting the activities of banks to the new opportunities of IT from all of this. The Russian school of economic thought, on the other hand, believes that the excessive significance of digitalization ignores issues related to the essence of the banking system, ways of its scientifically grounded development in new conditions. Accordingly, it believes that the practical recommendations of the neoliberal school for the "technological" adaptation of this system to digitalization conditions lead to an exacerbation of the internal inconsistency of the nature of banks, to the development of destructive processes in the functioning of the market as a whole.

METHODOLOGY

While disclosing the questions posed in this chapter, here were used the methods that are characteristic to a greater extent for the Russian school of economic thought. These include, in particular, the deduction method. It is typical for the Russian school to consider and resolve the issue first in a general plan, and then from the standpoint of this general approach, solving it in "concrete terms." Using this method, the chapter examines the relationship between the value of the Central Bank (CB) rate and the level of monetary prices of goods, reveals the essence of inflation, and highlights the issue of the immanence of the CB within the framework of the modern monetary system of the emission function. The flip side of the deduction method is questions of a particular order are somewhat forgotten while using it. This can be partly observed in this chapter.

RESULTS

In general terms, the position of the Russian school, proceeding from the understanding that there is nothing more practical than a good theory, is

that recommendations for the development of banking in the context of digitalization should be based on an understanding of the real essence of banks within the framework of the modern monetary system. Guided by this position, this school draws attention to the fact that banks as institutions of market relations arose during the formation and functioning of the gold-standard monetary system. In the countries of Western Europe, this process began around the middle of the 15th century, that is, at the beginning of the Renaissance, when market relations began to gain a universal character. The wider use in settlements between participants in market relations instead of coins produced by sovereign states, IOUs (bills) issued by goldsmiths, ultimately led in these countries, first, to the abolition of the institution of monarchy and, second, to the appropriation of the monetary function of the state-state by private individuals—these goldsmiths, who deftly transformed their old (jewelry) craft into a new business—banking. Under the new conditions, they have almost ceased to accept coins or simply gold bars for safekeeping and issue IOUs (promissory notes) for them, which are interpersonal, and to replenish stocks of monetary gold and issue receipts for it, which are bearer receipts (bills of exchange—banknotes). The number of monetary units indicated on the banknotes was representative of a certain amount of gold deposited in the vaults of banks. It is interesting to note that the economic science of that time, in particular, the English school of the political economy represented by Smith (2007) noted that

when the population of a country has such confidence in the fortune, honesty, and caution of a banker when they are confident that he will be able to pay at any time on demand those of his credit tickets, which will be presented to him, they acquire the same circulation as gold and silver coins, because there is the confidence that in exchange for these tickets at any time you can get that kind of money. (p. 960)

It is very necessary to add one small but essential detail to the statement of this authoritative scientist. This is the scale of the monetary unit. Debt obligations of the banks that issued their banknotes were, in fact, not these “credit notes” (banknotes) themselves, but the number of monetary units indicated on them. As such, banknotes, like some documents produced by banks, were only carriers of this number. So, the banks did not convert the banknotes, but the number indicated on them. In such conditions, the abovementioned detail was of great importance—the scale of the monetary unit. This scale showed how much monetary gold (silver) was represented by one monetary unit. Gold was in the vaults of banks, and ordinary participants in market relations held banknotes indicating the corresponding number of monetary units. Gold constituted the qualitative definiteness of money, and the number of monetary units indicated on

banknotes constituted the quantitative definiteness of money. These two components of money were held together by the scale of the monetary unit.

As a market phenomenon, the scale of the monetary unit arose under the conditions of the gold-coin monetary system and continued to exist under the conditions of the next variety of the metallic form of the monetary system—the gold standard. During the period of the gold-coin monetary system, the quantitative definiteness of money—the size of their denomination and the qualitative definiteness of money—the weight of the gold contained in the coins were in direct unity. Within the framework of the gold-standard monetary bank system, these two certainties of money were divorced in the market space. Keeping the reserves of monetary gold and issuing an additional number of monetary units for its replenishing volume, they thereby acted as essentially self-increasing aggregate coins of the market. As a result, the objects of market transactions consisted of two opposing parts. The first of these was gold held in banks, and the second was the goods offered for sale. The market transactions were perceived as acts of exchange of a certain amount of gold for goods from this point; although, it should be noted that the prices of goods were no longer expressed in the amount of gold in national monetary units. An important point in such conditions was the understanding of the fact that banknotes used by ordinary participants in market relations were a requirement for banks to convert them into a certain amount of gold; accordingly, they were the obligation of the banks. Let us repeat, in such conditions, banks were essentially aggregate self-growing coins of the market (country). Thus, they should have been positioned as immanent elements of the country's monetary system, which, by definition, has a monopoly character; that is, within which competition and the desire to grow by making a profit are impossible.

Meanwhile, the banks competed with each other and sought to increase not only by replenishing gold reserves but also by making a profit for the provision of financial intermediary services to their clients. As a result, a dualism arose like banks. On the one hand, they were positioned as an immanent element of the country's monetary system, and on the other hand, as participants in economic relations, that is as a structural element of the national economy. The simultaneous belonging to two different and interrelated structural parts of the market-determined the contradictory nature of banks. At the same time, the competition between the banks also had its duality. On the one hand, they competed for their clients, as all private companies in the branches of the national economy do; but on the other hand, the competition between them was conditioned by their belonging to the country's monetary system. In this (second) direction, the competition between banks was carried out by maintaining the declared scale

of the monetary unit unchanged. This direction of interbank competition was invisible to the superficial glance of ordinary participants in market relations. However, it was precisely this that was of key importance.

It was the most burdensome for banks and threatened many of them with the risk of bankruptcy because there were not enough gold reserves for all. Realizing, for the most part, this obvious state of affairs, they at one “fine moment” made a Solomon decision—to abandon the emission function, delegating it to an authority that they created by joint efforts, transferring their reserves of monetary gold to it. The CB became such an authority. It took over the emission function along with the gold reserves. Banknotes in the country have become a single sample. And now they were no longer a requirement for commercial banks, but the CB of the country. In such conditions, the CB began to act as a *national self-growing coin*, which in the market space was represented by the number of monetary units indicated on the entire set of banknotes of a single sample. Under such conditions, banknotes quite clearly acquired a national character. At the same time, commercial banks from the aggregate coins of the market have essentially turned into the *aggregate functioning banknotes of the market*. The difference between banknotes issued by the CB and banks as the aggregate banknotes of the market was that the number of monetary units on banknotes remained unchanged throughout the entire period of their use, while on personal accounts in banks this number was constantly changing; more precisely, it constantly increased due to the profit made by participants in economic relations who have their bank accounts.

Acting as the aggregate banknotes of the market, banks had to position as immanent elements of the country’s monetary system; but acting as a generator of financial intermediary services, they constituted a structural part of the national economy; moreover, such a part that can rightfully be positioned as the initial sphere of market activity, because the turnover of the capital of participants in market relations begins with the fact that the amount of money is directed to the acquisition of the necessary elements of the production process. With the emergence of the two-tier nature of the banking system, the duality (inconsistency) of the nature of banks took on a new form.

This dichotomy was not overcome by the decisions of the Jamaican Monetary Conference. As it has already known, gold was removed from the elements of the monetary system by its decisions. The product-type monetary system, which existed throughout the entire previous history of market relations, ceased to function. Instead, a fundamentally new system arose, which the neoliberal school of economic thought defined as fiduciary, that is, trust system (Friedman, 2002). Such a definition of the monetary system meant that instead of gold, the credibility of the CB’s authority began to act as a qualitative definiteness of money. Authority is undoubtedly a big

deal. However, the questions about how and what it can be measured, how much of it is represented by one monetary unit, are open. To be more precise, they are rhetorical, because the neoliberal school has no answers to them, and in principle cannot exist. Leaving aside these issues, the authors note only the fact that since the replacement of the qualitative certainty of money from gold with the authority of the CB, this monetary authority, like commercial banks, has essentially transformed into a banknote of national order. Moreover, under the new conditions, the entire national banking system from the position of the Russian school of economic thought has been transformed and should be positioned essentially as a *functioning national banknote*, on which the number of monetary units of all participants in market relations is placed.

However, the essential transformation of the banking system with the transition to a fundamentally new monetary system was not accompanied by the transformation of its practical structure. The contradictory nature of banks and the banking system as a whole remained the same under the new conditions. On the one hand, banks are an element of the country's monetary system, which, by definition, has a monopolistic character and therefore, in principle, there can be no competition and striving for profit within its framework, but on the other hand, being in private ownership, they are still acting participants in economic relations which seek to make a profit. Thus, being with one foot in the sphere of monopolistic character and with the other foot in the sphere of competitive economic relations, banks are still an example of internal inconsistency, which carries the potential of great risks for the functioning of the market as a whole.

The new digitalization not only did not contribute to the resolution of this contradiction but exacerbated it. On the one hand, banks, which were at the forefront of the development of information technology, began to act as institutions that mainly carry out settlement operations, and on the other hand, they began to direct their activities towards the provision of services characteristic of purely industrial companies. In other words, on the one hand, they, in cooperation with companies in the IT industry, began to provide a wider range of services that are characteristic exclusively of banks as settlement organizations, and on the other hand, as commercial companies seeking to make a profit, they began to differentiate the directions of their activities in the side of providing such services that were not typical for them in the entire previous history of the development of banking. Such an increasing duality of the directions of their activity is conditioned by the inconsistency of their nature, which they have practically from the very beginning of their existence. This contradictory nature of banks must be correctly understood and competently overcome.

DISCUSSION

As it was noted above, banks in the modern monetary system from the position of the Russian school of economic thought are essentially functioning banknotes of the market; they are part of the country's monetary system. And they *are not* privately owned and have no profit motive. They should be positioned as the national (general) affiliation of the country (market), just as traditional banknotes are in common use. And therefore, they must be under the state "roof." Just as the state provides its services of the same quality and at the same price to all persons in the country, so banks must provide services to all customers of the same quality at the same initial price. In this state of affairs, the guarantee of the safety of deposits will not be 1 million, 400 thousand rubles, and apply to the entire amount of funds placed in the deposits of all clients of banks.

However, if some banks, currently in private ownership, prefer to remain in the same form of ownership, they should be attributed to the participants in economic relations and be fully responsible for the results of their activities, primarily in terms of the safety of their clients' deposits, and not transfer it to the state represented by the state corporation "Deposit Insurance Agency." Such banks should be categorized unambiguously as branch companies operating within the national economy. Banks that are outside the framework of the national economy, that is, constituting an immanent element of the country's monetary system, must be *stated in the form, private in content, national in essence*.

They will be private in content because the funds in personal accounts will be in the private property of market participants, who can freely dispose of and use them at their discretion. They will be national since the transformation of savings into investments will be based on national interests, and not based on the desire to make a profit. The national interest is to create the national gross income, that is, in the fact that the country has more money, and not that the country has more legal carriers of the number of monetary units in the form of traditional banknotes or the form of banks (Kropin, 2020). Banks as functioning banknotes in the modern monetary system are not just an infrastructural administrative and technical elements of the market, but they are a kind of legal successor to the scale of the monetary unit, that is, they also combine the qualitative certainty of money, which appears in the form of the material content of the market in all the variety of its forms now, and their quantitative certainty, which appears in the form of the number of monetary units indicated on all immediate legal carriers. So, they should have no interest in self-expansion through profit; they should contribute to the receipt of such by the participants in economic relations; they should contribute to the creation of the national gross income; they should act as the core of the sectoral structure

of the national economy, without being directly part of it. Such differentiation of banks, according to the indicated structural parts of the market, will make it possible to overcome their contradictory nature, which existed practically from the very beginning of their operation.

CONCLUSION

The digitalization of modern public life did not lead to the resolution of the contradiction like banks and did not change their essence, as the decisions of the Jamaican Monetary Conference led to this. At the same time, the neoliberal school of economic thought, without revealing the existing nature of banks, offers such recommendations for the development of the banking system, which carry the potential for further exacerbating the inconsistency of this nature and destabilizing the equilibrium development of the market as a whole. The Russian school of economic thought reveals this contradiction and shows a scientifically grounded way of overcoming it. It consists in differentiating banks into those that should form a part of the country's monetary system and direct their activities towards providing conditions for the creation of input income tax (IIT) in an increasing volume; and those that will constitute one of the branches of the national economy and direct their activities to obtain their profit.

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CHAPTER 35

EFFICIENCY IMPROVING OF THE TRANSPORT POTENTIAL USAGE OF THE EURASIAN ECONOMIC UNION IN TRANSPORTING ASIA—EUROPE

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ABSTRACT

One of the ways to improve the efficiency of foreign economic activity of the countries of the Eurasian Economic Union (EurAsEC) is the modernization of the transport network. The purpose of the article is to analyze the relevance of the construction of the Eurasia canal, as a result of which new opportunities for the development of the EurAsEC countries will be provided.

The authors of the chapters used such logical research methods as generalization, matching and comparison.

The chapter presents a comparison of possible options for the delivery of goods from Asia to Europe and back, taking into account the share of transport

costs in the final cost of products. The construction of the new Eurasia canal will help reduce transport costs and increase the competitiveness of products of the EurAsEC countries in foreign markets.

The research results have shown that the efficiency of the Eurasia canal is due to the presence of a sufficient cargo base. It is this circumstance that the economic community should pay special attention to when stepping up efforts to create new opportunities in the development of the EurAsEC.

INTRODUCTION

The effective development of the economy of certain states requires world markets access. Ensuring the economic security of the state presupposes diversification of the delivery routes of goods. About 90% of international trade volume is carried out using water transport ("Shipping Industry and World Trade," 2009). In this regard, the EurAsEC countries are in an extremely disadvantageous position, since they do not have direct access to the open seas (Spasova & Rusinov, 2018). The implementation of the Eurasia canal project can solve this problem ("EURASIA Canal Project," 2010; Krivoshey, 2009). The canal will allow the countries of Central Asia to receive a through water communication of the Caspian ports with the regions of Western and Central Europe and provide new connections to European markets. The use of this waterway will help to reduce the transportation cost by reorienting of the part of the traffic from Southeast Asia to Europe to water transport, thereby reducing the energy intensity of products and shortening the delivery time of goods.

METHODOLOGY

Currently, the world is witnessing an intensification of the creation of regional trade blocks, allowing for operational changes in the mechanisms of international integration (Tyagi et al., 2017). At the same time, ensuring the sustainable development of integration entities is largely determined by the efficiency of transport activities (Vilarinho et al., 2019). In the EurAsEC countries, the transport component of international trade is an important part of it (Nailev, 2019; Spasova & Rusinov, 2018). At the same time, the existing state of the EurAsEC transport complex does not allow most of its member countries to have permanent access to world shipping, which provides 90% of all international trade ("Shipping Industry and World Trade," 2009). The existing Volga-Don canal is not able to meet the transport needs of the EurAsEC countries; therefore, at the beginning of the 20s of the previous century, engineer F. P. Morgunenko expressed the idea of connecting the Caspian and Black Seas, by passing the Volga and Don rivers (Krivoshey, 2009). However, for more than 100 years this

issue has been under discussion. The reasons are different, but no systemic studies have been conducted on this issue. The authors of the article made an attempt to take a fresh look at this issue in order to identify the key reason for the lack of intergovernmental decisions, in particular within the EurAsEC framework, on an outwardly attractive project for the new canal construction.

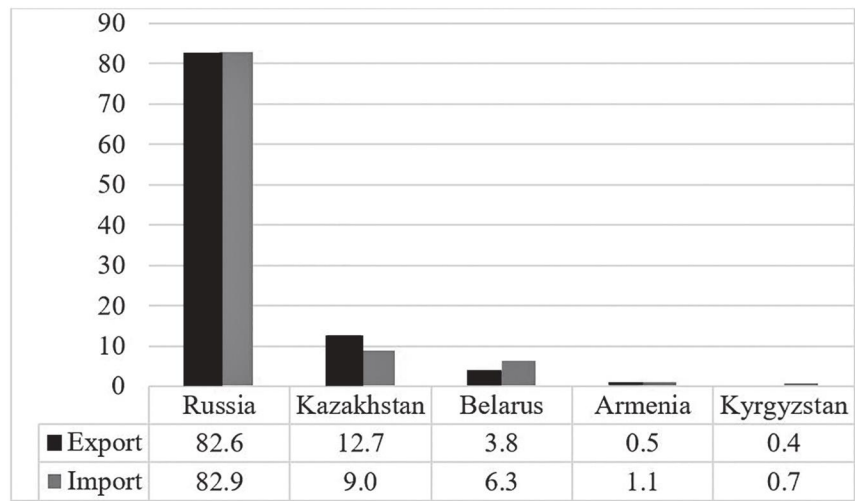
The logical approach used by the authors of the chapter is based on the use of research methods such as generalization, matching and comparison with the effectiveness assessment of the proposed recommendations in relation to the EurAsEC transport system.

RESULTS

In order to ensure the dynamic development based on socioeconomic transformations and the effective use of economic potentials, Russia and a number of neighboring states in October 2000 completed the creation of Eurasian Economic Community (EurAsEC). An important task of its member states is foreign economic activity, the results of which are presented at Figure 35.1.

Figure 35.1

Relative Share of the EurAsEC Member States in Terms of Foreign Trade, %.



Source: Compiled by the authors based on Eurasian Economic Commission statistics department database (2019).

The economic situation of the EurAsEC countries in recent years has been characterized by a decrease in the foreign trade volume from USD 753.8 billion in 2018 to USD 735.8 billion in 2019 (–2.4%). At the same time, the decline in exports by 6.1% could not be compensated for by the growth in imports, which increased by 4.5% in 2019. Export volumes are mainly determined by mineral products (65.7% of the total volume, metals and metal products (8.8%), chemical products (5.8%). Import is associated with the sale of machinery, equipment, and vehicles (44.3%), chemical products (19.1%), food products, including agricultural raw materials (11.1%) (Eurasian Economic Commission Statistics Department Database, 2019).

The World Bank estimates the growth rate of the world economy in 2019 at 2.9%, in Central Asia; this growth is projected at 4.2%. Experts from the Asian Development Bank came to similar results (Eurasian Development Bank, 2019). The positive dynamics of interaction between Central Asia countries and European countries in recent years can have a significant impact of European capital inflow to the countries of Central Asia (Spasova & Rusinov, 2018).

The Caspian region, due to its location between Asia and Europe, can become a short and competitive trade route between Asian countries and European markets. This was first noticed in 1993 at the Brussels conference, where an agreement was signed on the creation of the TRACECA transport corridor Europe—Caucasus—Asia. As part of the implementation of this project, the road, rail and sea transport of the participating countries has been developed. However, completely to date, it has not been possible to realize all the possibilities of the TRACECA project due to the lack of a single tariff for transportation and the presence of unresolved problems in coordinating the work of transport at the border points of the participating countries, as a result of which the business incurs losses due to idle time of vehicles. In addition, in order to create a system for oil and gas transporting from the Caspian region to Western Europe, the INOGATE program was developed.

In 2013, at the initiative of China, the “One Belt, One Road” project was developed. The main idea of the project is to create the Trans-Caspian International Transport Route (TMTM) linking China through Kazakhstan, the Caspian Sea, Azerbaijan, Georgia with Turkey and other European countries. However, since TRACECA and TMTM overlap to a large extent, experts predict the latter the same problems as the former (Acar & Gürol, 2016; Bersenev et al., 2020).

Nevertheless, within the framework of the TMTM project, the countries of Central Asia are actively developing the port infrastructure of the Caspian Sea. A new port of Turkmenbashi was built and put into operation in Turkmenistan, the throughput of which reaches 25–26 million tons of

cargo per year. In 2014, the port of Aktau in Kazakhstan, with the construction of three terminals, increased its throughput to 19 million tons of cargo per year. To the south of Aktau, the construction of a new port of Kuryk is underway. A new port was built in Alat village in Azerbaijan (Tyagi et al., 2017; Yeo et al., 2015).

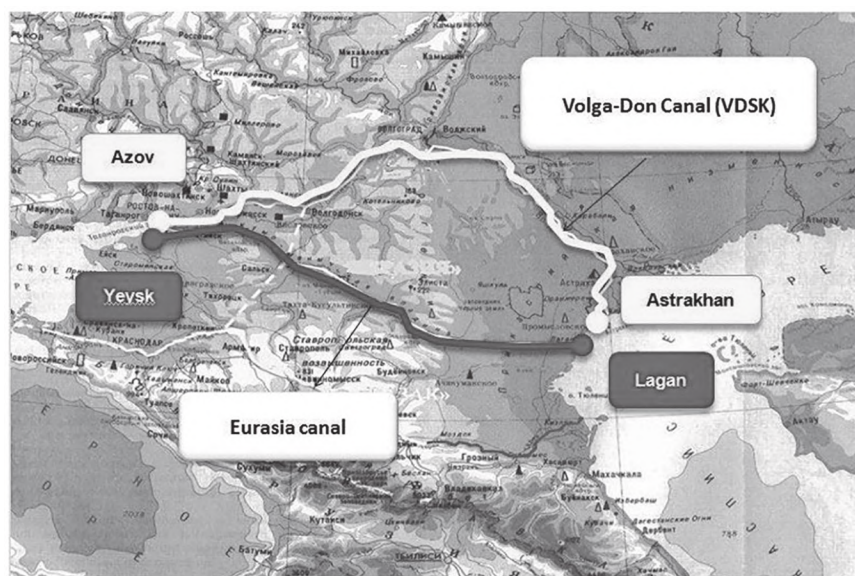
The creation of new port facilities is a consequence of the need of the transit potential efficiency of the EurAsEC countries, primarily through the organization of a new water transit route connecting the Caspian ports and ports of European states. The presence of such a route will facilitate the switching of cargo flows to water transport and, most importantly, non-transshipment communication between the Caspian and European ports (Giusti et al., 2019; He et al., 2021).

The organization of this route is impossible without the creation of a navigable canal between the Caspian and Azov Seas, the construction of which can be carried out by the participating of EurAsEC countries. In this case, in western direction the transportation can be carried out along the Black Sea and further along the Danube through the Main-Danube canal along the Main and Rhine. The eastern branch of the route represents the connection of the Azov-Black Sea basin with the Caspian Sea and will provide access to the ports of Kazakhstan (Atyrau, Aktau), Turkmenistan (Turkmenbashi), Azerbaijan (Baku, Lankaran), Iran (Rasht, Gorgan), and others ("EURASIA Canal Project," 2010).

Building a canal between the Caspian and Black Seas is a rather old idea. Ancient authors wrote about the possibility of building such a canal at the turn of the Christian era. However, this project acquired real outlines in Soviet times. The basis for the connection of the two seas was proposed by the engineer F. P. Morgunenko, expressed by him in the early 20s of the previous century.

One of the options for building a new canal is to use the Kumo-Manych depression. The length of the depression is about 500 km, the width reaches 20–30 km. The narrowest part does not exceed 1–2 km. So, from the point of view of the terrain, this depression is the most acceptable for the construction of the channel (Figure 35.2).

The travel time of vessels on the currently existing route from the Caspian to the Azov Sea through the Volga-Don canal with a length of 1,300 km is about seven days, primarily due to the need to pass 18 locks and shallow areas in the lower Don. The construction of the Eurasia canal with a length of about 700 km and with 6 locks will ensure the delivery of goods from the Caspian to the Azov Sea in 2.5–3.0 days. The dimensions of the canal and locks are designed for the passage of vessels with a carrying capacity of 10,000 tons and more, pushed trains 28 meters wide and a draft of up to 5 meters. It is also important that the navigation period can be 10–11 months a year, instead of 8 months on the Volga-Don canal.

Figure 35.2*Scheme of the Volga-Don Canal Route and the Eurasia Canal*

Source: <https://bakuresearchinstitute.org/wp-content/uploads/2020/07/Caspphoto.jpg>

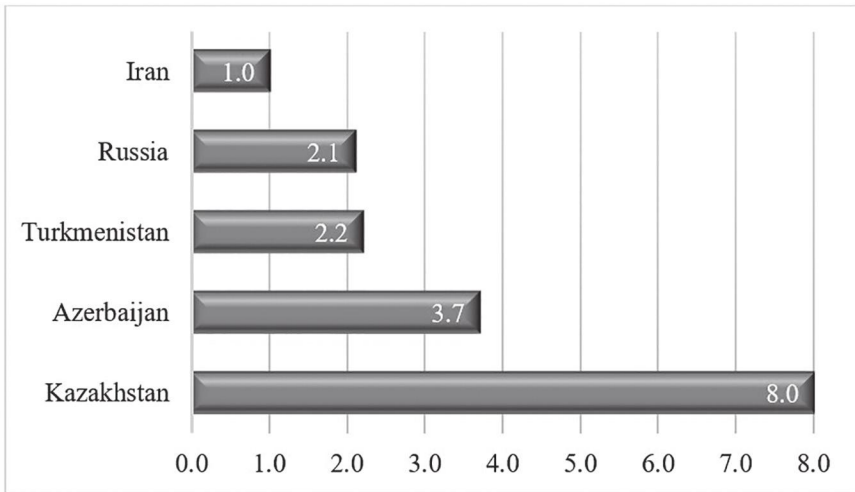
However, in the opinion of the authors, it is incorrect to oppose the Volga-Don and Eurasia canals, since each of them has its own purpose. Thus, the Volga-Don canal is an important component of the Russian transport system, and Eurasia is, first of all, a link in the unified transport system of the EurAsEC countries. In addition, the Eurasia canal in the long term may become the key moment that would provide the Central Asian countries with access to the world ocean with all the ensuing consequences.

According to various estimates, both Russian and foreign, the reserves of hydrocarbons in the Caspian reach about 13–22 billion tons (Figure 35.3). The Eurasia canal could provide non-transshipment transportation of oil and cargo by tankers to refineries on the Black Sea coast and European markets, taking into account that the construction of trunk oil pipelines is associated with huge capital costs, which oil companies cannot yet provide. The supply of raw materials by railway transport can lead to a significant increase in its cost and a decrease in the profitability of sales (Cho & Yang, 2011; Moschouli et al., 2018).

Implementation of the Eurasia Canal Project will create conditions for the development of hydropower in the region and creating new jobs. At the

Figure 35.3

Distribution of Oil Resources Across the Countries of the Caspian Region, Billion Tons



Source: Compiled by the authors based on “Resources and Reserves of Hydrocarbons” (2021).

same time, certain economic, environmental and social risks are associated with the Eurasia channel project.

The main risk, according to the authors, today is the economic risk caused by the condition of the cargo base. To this date, its level sufficient to make a decision on the construction of the canal has not been determined. In Kazakhstan, which is the main stakeholder from the EurAsEC countries in the construction of this canal, they argue that cargo traffic through the canal will exceed 30 million tons per year. According to Russian experts, the traffic volumes are much more modest—10 million tons per year. At the same time, back in 1988, the Commission of the State Planning Committee of the USSR, evaluating Kalmykia’s proposal for the construction of a similar canal, came to the conclusion that a volume of traffic of at least 25 million tons per year is required here to pay off investments.

Expert assessments of foreign and domestic scientists almost coincide with the conclusions of the Commission of the USSR State Planning Committee: 90–95% payback is possible at the earliest in the 14–15th years of operation, but with annual transportations of at least 30 million tons.

The Russian-Kazakh consultative group, created in due time to assess the effectiveness of the Eurasia project, has determined its cost at 4½ billion euros. According to Russian experts, such a canal could cost no less

than \$15 billion. Despite the fact that the channel is a benefit exclusively to Central Asian countries, most likely, Russia will have to invest a significant share of funds in the project, even if jointly built by the EurAsEC countries, since the economic potential of the EurAsEC today is determined mainly by the Russian economy. In 2018, it accounted for 86.8% of the total gross domestic product of the Commonwealth. Following the Russian economy, but with a large lag, is the economy of Kazakhstan, which accounted for 9% of the GDP of the EurAsEC countries (Figure 35.4).

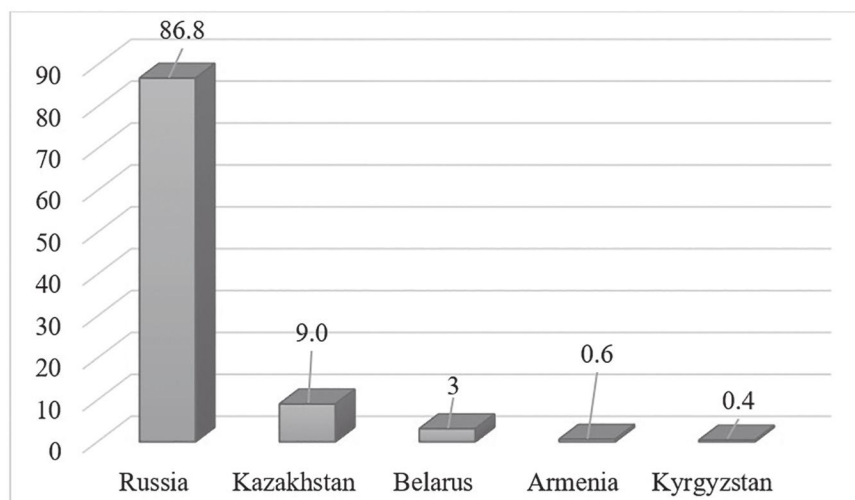
In addition, assessing the relationship between the EurAsEC countries, it should be noted that their level today is far from being able to participate in joint large-scale projects. In a number of EurAsEC countries today, from the point of integration, very ambiguous processes are taking place. Therefore, in these conditions, there are great risks of implementing such a large-scale project as the construction of a new canal. Nevertheless, the economic feasibility of the Eurasia project is quite obvious, but in order to make an informed decision, it is necessary to conduct appropriate systemic studies.

CONCLUSION

The opening of access to the world ocean for the countries of Central Asia will make it possible to fully realize the transit potential of this region. The

Figure 35.4

Aggregate GDP of EURASEC Members, %



Source: Compiled by the authors based on Eurasian Economic Commission statistics department database (2019).

use of the Eurasia canal will ensure non-transshipment transportation of goods from the ports of the Caspian Sea to Europe and vice versa, and subsequently will connect the EurAsEC countries with the world maritime transport system. Switching cargo flows to economical and environmentally friendly water transport will help to reduce the cost of cargo transportation, energy intensity of transport products and reduce the delivery time of goods.

The hydrological conditions and dimensions of the canal locks will allow, along with traditional container transportation, to use Ro-Ro technologies, including lighter transport and technological systems for the delivery of goods, the basis of which are dock-type lighters with a capacity of up to six lighters with a carrying capacity of more than 1,000 tons, and trailers, providing a connection between the EurAsEC countries with main ocean lines.

Another side that benefits from the project is China. Trade between China and Europe is carried out by sea transport, during which ships go around the whole of Eurasia from the south. The construction of the canal will greatly shorten the route from China to Europe. Delivery of goods from Southeast Asia to Europe now takes up to two months, the construction of the Eurasia canal would reduce the delivery time to 10 days. It is obvious that China's trade operations with Europe, carried out in the Caspian region, create conditions for the receipt of income by all interested countries.

At the same time, the decision to start up the project faces the problem of an ambiguous assessment of the cargo base. It is obvious that the interest of investors in this project will largely depend on what volume of cargoes can be offered by shippers for transportation through the canal. There are two directions of research here: the first is to involve China in the project with a clearly substantiated prospect of reducing transport costs by the companies of this country; and second, a real assessment of the cargo base jointly by the EurAsEC member states and the development of measures to increase the volume of traffic, primarily in the Caspian Sea, and, in the long term, with access to the Black Sea.

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CHAPTER 36

MANAGEMENT OF COMMUNICATIONS OF STATE AND MUNICIPAL PROJECTS IN RUSSIA AS A FACTOR OF INFORMATION SECURITY

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ABSTRACT

The chapter studies the information security of project activities in the context of digital transformation. The degree of information security of projects depends on the quality of project communication management. The management of project communications is one of the main processes supporting project activities. The research object is the communication management of state and municipal projects. The research subject is communication management of state and municipal projects in the conditions of digital transformation as a factor of information security. The paper aims to identify problems and trends in managing communications of state and municipal projects and develop recommendations to improve this process to improve information security. The chapter presents international and Russian experience in communication management of state and municipal

projects. The authors indicate the existing problems of project communication management on the example of the project activities of the government of the Perm Territory. The research allowed the authors to develop recommendations for regional and municipal authorities. Moreover, the authors justify the need to implement methodological recommendations for improving the management of project communications and information security under the transition of key management processes to the online mode.

INTRODUCTION

Digitalization and digital transformation have become an objective reality of the global and Russian economy. The digital transformation of management is understood as the change of the industrial model of management to a digital model focused on the maximum use of digital technology throughout the management cycle. It is not just a question of transferring information (digitalization) but also of changing all managerial processes. In this study, it is legitimate to separate the concepts of digitalization and digital transformation. These processes are currently affecting virtually all areas of management. The authorities of the Russian Federation, in accordance with the “Digital Economy” program and the federal project “Digital Public Administration,” are actively implementing and mastering digital services and technologies.

Many practitioners note that project management has turned to risk management and project communications management in the pandemic era. Simultaneously, the introduction of digital ways of communication and digitalization processes leads to an increase in risks in the field of information security of projects. Therefore, in addition to identifying problems and trends in communications management, the current direction of scientific and practical research is to formulate ways to improve the management of communications of state and municipal projects to improve their information security.

The research objectives are as follows:

1. To characterize the process of digital transformation in the field of communications management in project management;
2. To analyze the foreign experience of communication management of public projects;
3. To give an expert assessment of communication management of state and municipal projects on the example of the Perm Territory.
4. To analyze the information security of projects based on the results of a survey of employees of state and municipal authorities of the Perm Territory.

5. To propose recommendations for improving the communication management of state and municipal projects under conditions of digital transformation and increasing the information security of projects.

MATERIALS AND METHODS

In defining the concept of communication, we use the *PMBOK* knowledge database (version 6) (Project Management Institute, 2017). According to it, communication is the purposeful or unintentional exchange of information. The management of project communications is the process of ensuring that project information is planned, collected, created, distributed, stored, retrieved, managed, controlled, monitored, and ultimately archived or disposed of in a timely and appropriate manner. The research assumes that information security will be higher if the communication management is well organized. Information security is the protection of project information from internal and external threats, which ensures its confidentiality, availability, and integrity.

Russian scholars present various studies devoted to information security: Polyakova and Akulova (2015), Timoshkov (2017), and Tsirlov (2013) analyze regulatory legal acts of information security in the public sector. Grosheva and Kupchinskaya (2019), Tikhonov and Sazonov (2020), Sharyan and Mashkova (2019), Yakunina (2019) study current digital communications and their management. Podpovetnaya (2018), Andriyanova (2019), Kuznetsova (2016), and Sarykh (2016) study management of project communications. These works primarily focus on electronic document management and cloud systems. However, the role of messengers, artificial intelligence, and information platforms in the communication process has not been studied sufficiently. The question of information security of projects also remains open.

Digital transformation of management is the change of the industrial model of management to a digital model focused on the maximum use of digital technology throughout the management cycle. Digital transformation in project management implies the use of digital technologies in the main areas of project management: the work of project teams during planning, control, and organization of project communications (Galishcheva, 2020).

The main features of the digital transformation are as follows:

1. Automation of the control system;
2. Optimization of management;
3. Focus on creating innovation;
4. Increasing flexibility of management;
5. Implementation and maximum use of remote management tools;
6. Focus on information protection.

The digital transformation of management implies a change in the requirements for the competencies of the participants of management and their knowledge. Tikhonov and Sazonov (2020) state that the digital transformation of project management will change the system of communication between teams and help redistribute the working time of participants in favor of strategic planning.

Modern technology does not require live presence and communication. Chatbots and artificial intelligence technologies are being created to help manage and optimize project communications. These technologies create conditions for reducing the time required to implement projects.

The research involves several methods for data collection (analysis of normative legal acts, survey, and questionnaire) and methods for interpreting data (comparative analysis and case study).

RESULTS

The worldwide pandemic and the quarantine affected all areas of life. Restrictions on offline communications have led to the increased use of new digital communications technologies. There appeared new platforms and tools for remote communications.

The world practice has already accumulated considerable experience in managing the communications of state and municipal projects. The best practices include the experience of the United Kingdom, Canada, Norway, Singapore, United States, Sweden, and Japan.

The U.K. government uses modern digital communication channels such as *Slack* team channels, *Google Docs*, or *Trello* boards. The use of e-mail is reducing; instead, employees send messages to the *Slack* channel or create proposals in *Google Docs* and share them. Government Digital Service provides the support of information security and development of new digital products.

In Canada, the Project Management Plan necessarily defines a communication strategy when managing government projects. This section

describes the methods, tools, and techniques used to communicate the project. The communication strategy includes communication plans for all stakeholders.

The current prior focus in the management of communication projects in the public sector of the U.S. is to ensure information security. Special *Microsoft* products were developed, and the cyber system *Einstein* was implemented to improve information security.

According to *IPMA* international webinars, the issue of project communications management became a key issue in 2020. The ability to be flexible with changes in communications management and adapt it to real-world conditions is essential for implementing projects.

Vincenzo Testini (PMP), in his webinar on December 11, 2020, highlighted the following changes in communications management:

Increased use of tools for remote project management in general and tools for communication in particular (e.g., *Trello*).

Need to use precise terminology, avoid double meanings, and provide openness to all project stakeholders.

1. Increase in the number of risks in the field of information security of projects.
2. Need to use precise terminology, avoid double meanings, and provide openness to all project stakeholders.
3. Increase in the number of risks in the field of information security of projects.

Currently, the project management system in the sphere of the Russian state and municipal administration is also undergoing changes caused by external conditions and internal transformations as part of the digital transformation.

According to the federal project “Digital Public Administration” (“Presidium of the Government Commission,” 2019), by 2024, there must be considerable changes in the system of electronic document management, the interaction of citizens and commercial organizations with state (municipal) bodies and budgetary bodies, and the system of public services.

Based on these indicators, the system of internal communications and its management is undergoing significant changes.

First, it leads to the need to change the competence requirements for state and municipal employees.

Second, in the emerging situation of high uncertainty, the number of risks in the management of project communications and information security is growing.

At the same time, a considerable methodological problem lies in the lack of a description of the management processes of project communica-

tion in the fundamental normative and legal acts of the civil service. The Decree of the Government of the Russian Federation “On the organization of project activities of the Government of the Russian Federation” (October 31, 2018 No. 1288) (Government of the Russian Federation, 2018) lacks information on the management of project communications. Moreover, there are no methodological recommendations on this topic, which gives rise to certain risks in this area.

According to the results of a survey conducted by the authors of this study on the page “Project management in the public sector” in the social network *Facebook*, more than 90% of the members of project teams in Russia stated a significant change in the way project teams communicate in 2020. *Zoom*, *Miro*, and *JIVA* are the most frequently mentioned. *Slack*, *YouTrack*, and *WhatsApp* were mentioned often enough. E-mail, personal calls, and SMS were mentioned by few respondents (less than 5% of the total number of respondents). The respondents stated that the digital transformation leads to an increase in the management speed by increasing the speed of processing information. Moreover, they stated that it opens up new communication opportunities between management participants, for example, the ability to participate in several projects simultaneously, including at a distance.

To identify trends in the management of project communications and determine the level of information security of projects, the authors conducted an anonymous questionnaire survey among employees of state and municipal authorities of Perm and the Perm Territory. The results of the 2021 survey were compared to a similar survey conducted in 2017. The 2017 survey involved 30 employees at various levels (from departmental specialists to the deputy head of the regional administration). The 2021 study involved 30 employees of similar departments. Employees participated in various regional projects, such as “Safe and quality roads,” “Formation of the modern urban environment,” and others. Table 36.1 presents the results of the survey.

In the 2021 survey, employees were asked the additional question, “How has project communication changed over the past year?” The majority of respondents (40%) said that communication had not changed at all; 20% indicated only the fact that due to remote work, communication has often been carried out in a video conferencing format (e.g., *Zoom*). Meetings in this service have their advantages, such as the ability to participate for a large number of participants and discuss issues in real-time. However, employees point out several disadvantages of this service. First, the free version is given only 30 minutes. Second, there exists a risk of information leakage since unauthorized people can connect to the conference in the free version.

Table 36.1

Survey Results

	2017	2021
Prevailing channel of communication		
Personal contact	53%	39%
E-mail	27%	22%
Meetings	7%	9%*
Telephone conversations	13%	30%
Other	0%	0%
Number of communication participants during the performance of a particular task in one working day		
Less than 5	27%	70%
5–10	53%	20%
10–15	20%	5%
More than 15	0%	5%
Problems arising during the communication		
Long communication chain (many participants in the transmission of information)	24%	23%
Delayed information	44%	13%
Technical vulnerability	16%	16%
Distortion of information	8%	26%
Lack of feedback	8%	29%
Information leakage	0%	3%
Do you care about the project’s information security?		
Yes	20%	27%
No	80%	73%
Percentage of formal and informal communications during decision-making or problem-solving		
50%/50%	73%	80%
Predominantly formal	13%	0%
Predominantly informal	7%	5%
Other (indicate)	7%	15%

Note: *in Zoom.

Source: Compiled by the authors.

Answering the question “Is there any planning of project communication, including the planning of the use of communication channels?”, survey participants indicated that there is no planning of project communications. Similarly, employees responded negatively to the question, “Is there a system to monitor and control project communications?” Thus, the lack of planning and control of project communications can lead to increased risks of leakage and loss of project information, distortion of project information, and, as a result, reduce the quality of project management.

However, the issue of information security bothers only 27% of participants. Technical vulnerability of communication channels as one of the communication problems is noted by 16% of respondents. This indicator has not changed compared to 2017.

As can be seen from the Table 36.1, employees use traditional communication tools in their work. The predominant channels are personal contact, telephone conversations, and e-mail. There are no new communication technologies, and traditional technologies dominate. This fact distinguishes the Perm Territory from other subjects of the Russian Federation (e.g., the Sakhalin Region, Khanty-Mansi Autonomous Area, Sverdlovsk Region, and Belgorod Region), which publicly announced the implementation of new methods of project communication (e.g., *MIRO*, *Trello*, or *Jira*).

There is an evident decrease in the number of participants in the communication during the performance of a particular task in a single workday, according to the results of the questionnaire in 2017 and 2021. This has a positive effect since, with a long chain of communication to perform one specific task, personal responsibility for the improper quality of work is lost, and information can be lost. Another positive aspect is a significant decrease in the number of respondents indicating the problem of time lag.

According to the survey, the main problems encountered in the communication process are the lack of feedback and distortion of information.

CONCLUSION

The conducted research allows the authors to make the following conclusions:

1. Over the past year, there have been significant changes in the management of project communication worldwide. There appeared new tools and ways of implementing communicative interaction, which entails several risks, as well as new opportunities. There is an active process of digital transformation of communication channels; artificial intelligence technologies are being introduced.

2. The management of state and municipal projects in Russia is undergoing a digital transformation, since the “Digital Economy” program and other projects for the digital transformation of the civil service are being implemented. These changes affect project communication management since the latter is a basic group of processes in the project management system.
3. The main challenge in communications for the near future will be the improvement of remote communication and management between project teams. Moreover, there exists the need to build digital competencies.
4. The main problem in the public sector in the world is predicted to be the issue of information security of communication channels.
5. In the Perm Territory, the digital transformation is slower than in other regions. Project management in the authorities is poorly developed. Consequently, communication management and communication tools have not significantly changed, which will lead to an increasing decline in the effectiveness of project management and the work of the authorities.

Our study revealed problems in the digital transformation of the government. The use of traditional forms of communication in the projects allows maintaining the necessary level of information security. However, when intensively implementing digital communication channels in the absence of a planning system, monitoring and control can predict an increase in potential threats in the information sphere.

The following problems of communication management were noted in the state and municipal authorities of the Perm Territory:

1. Lack of purposeful management of this group of processes (no communication planning, monitoring, and control);
2. Preference for traditional communication tools and disregard for modern digital ways of communicating within projects, which reduce time costs and optimize project activities;
3. Lack of feedback in the process of project communications;
4. Low level of awareness on the project’s information security issues;
5. Distortion of information.

We have developed several recommendations to improve the efficiency and effectiveness of the authorities:

1. It is necessary to make amendments to the Resolution “On Organization of Project Activities in the Government of the Russian Federation” (October 31, 2018 No. 1288); including the introduction of the management of project communications in the list of significant management processes;
2. Improving information security in connection with the transition to online mode on the main management processes through monitoring, control, and timely planning of communications;
3. Introduction of modern communication tools (*Miro*, *Jira*, *Trello*, etc.) into the management system of state and municipal projects in the Perm Territory;
4. Development of methodological recommendations on project communications management by the regional project office.

These recommendations can lead to the following positive changes:

1. Improving the information security of state and municipal projects in the Perm Territory;
2. Reducing the number of risks in the management of communications of state and municipal projects;
3. Improving the quality of projects implemented by the authorities in the Perm Territory.

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CHAPTER 37

NATIONAL ECONOMY AND CONCEPTUAL APPROACHES TO ENSURING ECONOMIC SECURITY

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ABSTRACT

The chapter examines the predominant role of the government in the national economy of Russia and substantiates the social order for strengthening the state's influence on current economic processes. The authors analyze the relevant terms of modern economic discourse dominated by the concepts of “state intervention” and “state regulation,” which do not reflect the real place of the government in the relationship with other subjects of the economic system. The authors show the relationship between the concept of “public administration” and the concept of the supreme role of the government in the national economy. In contrast to the above concepts, the concept of “state regulation,” being necessary, cannot be considered sufficient since it has a local unprogrammed nature and does not involve preventive measures that weaken or neutralize the potential economic threat. Using a process approach, the authors consider the management cycle and justify the overriding role of planning in public administration. The authors formulate a problem, the solution of which will allow reaching the level of integral

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national planning and may serve as the key to the successful resolution of specific issues, including the issues of economic security. The authors indicate the need for a broad national discussion on modern tools of state management of the national economy, the development of a system of long-term echelon planning (including the development of medium-term strategies and development scenarios), and traditional five-year national economic plans.

INTRODUCTION

At some point in its development, every science uses the principle of conceptualization to bring its ideas into order. This occurs as views reflecting the real state of a specific field of scientific knowledge mature, generalize, and crystalize due to the need to systematize, accumulate, and increase their theoretical and practical significance. This fully applies to the theory of economic security, which has recently received considerable normative and legal support, primarily at the federal, but also at the educational and research levels. In this regard, the results of the studies addressing the basic foundations of the theory of economic security and its essential side are of the most significant interest.

This topic is discussed by Artemyev et al. (2014), Kim (2013), Moiseev (2002), Ponomarenko (2003), and others. Thus, Artemyev et al. (2014) summarized the concepts of economic security (cameralist-left radical, Keynesian, traditional-institutional, and neo-institutional). The criterion for this typologizing was “the understanding of the main threat to national economic security” with the subsequent dichotomy of the main threat to external and internal (Artemyev et al., 2014, pp. 47–48). Kim (2013) indicates the role played by the concept of economic security, namely, as a response to the emergence of a threat to comprehend it and subsequently “form measures to combat it” (p. 30). Moiseev (2002) indirectly formulates the concept of economic security at the corporate level, the purpose of which is the “prevention of threats of negative influences.” Ponomarenko (2003) based his concept on a system of views about the impropriety of “the dominance of views on the need to reduce the role of the government in the economic life of the country in the adopted programs of social and economic development.” He referred to the facts that “in the economic history of the 20th century, it was active government action that pulled economies to a higher level in the periods of deep crisis. The essence of the problem lies in need to move the issue to change the goals and methods of state intervention in the economy (Ponomarenko, 2003).

MATERIALS AND METHODS

Nowadays, the concept of the predominant role of the government in the economy in general and in the modern national economy of Russia, in particular, is finding strong support. Thus, Novoseltseva (2016) conducts a historical analysis of the scientific schools of Russian researchers on this problem. She reveals the relevance of “the question on the government’s role in the regulation of the economy by the specifics of the current stage of socioeconomic development, which lies in the formed and manifested the need for intensive use of the possibilities of governmental influence on the evolution of economic systems” (p. 48).

From the position of the world-system approach, Osokina and Kalashnikova (2015) refer to the works of Pakhomov and Mendelev and reveal the scheme of the economic dominance of the Western powers:

- For themselves (i.e., the countries of the “center”)—the construction of a market economy is based on a competitive national economy, where an active impact on the state economy is allowed;
- For the “periphery”—the model of a free-market economy in the attractive package developed by W. de Guenez: “Laissez passer, laissez faire.”

The authors give Russia the status of a “semi-peripheral” country. They warn that the continuation of the current economic policy, called by them “the main threat to the economic security of the country,” in conditions of “the current situation associated with the exacerbation of external challenges and threats, only increases the need for a strong governmental influence with active control and management of the development of the national state economic system” (Osokina & Kalashnikov, 2015, p. 23).

Varnavskii (2013) explores the mechanisms of public-private partnership and notes that complex forms of organization and management of the modern economy are impossible without government regulation of the activities of companies, industries, and spheres of the economy. Of the variety of economic functions of the government, its main purpose is to create necessary conditions (political, economic, legal, and organizational) for the subjects of economic activity (pp. 11–12).

At the Gaidar Forum “Russia and the World after the Pandemic” held on January 14 and 15, 2021, Minister of Industry and Trade of the Russian Federation D. V. Manturov pointed to the government as the engine of the national economy, “We think that business drives the economy in many ways. It should be in normal practice and theory. However, the government

sometimes works even faster than business, catches these vibes, and picks up the pace” (Gaidar Forum, 2021).

Nevertheless, the scientific community often estimates the economic functions of the government through the degree of its *intervention* in economic relations, not excluding the area of economic security. In economic discourse, the notion of *intervention*, most often used in everyday life in relation to something reproachable and reprehensible, has become clearly motivated in relation to the organizational and economic decisions of public authorities, which they have either already approved, are developing, or only intend to adopt.

Thus, Myasnikovich et al. (2005) the authors of the collective monograph, believe that “from the position of economic security, it is necessary to determine the degree of state intervention at different levels, in different areas of economic activity, methods and techniques of influence (legislative regulation, administrative, or other), and its time limits” (pp. 8, 17). Nikitenko and Bulavko (2009), in their scientific work devoted to the theory, methodology, and practice of economic security, write, “State regulation of reproductive processes in a planned and contractual economy can be accomplished through state intervention in the system” (p. 60). The term “state intervention” is found in both encyclopedic articles (Yarotsky, 1983) and in media headlines (“State Intervention in the Economy Was Called Normal and Necessary,” Regnum, 2021).

However, is it possible that the government, as the backbone of the political organization of society, acting as the second party to the “social contract” and assuming high constitutional obligations to the people’s livelihood, would stand aside from the solution of economic problems undermining its economic security?

Is it possible that the government does not direct, manage, organize the work of the national-economic complex, or develop and coordinate its enterprises, institutions, and corporations?

Is it possible that the state, being the largest owner in the country, owning real estate, land, and movable property with a total value of 9.346 trillion rubles (Accounts Chamber of the Russian Federation, 2020), would voluntarily assume the role of an aloof observer, a “night watchdog of the market,” an indifferent witness to the impending disaster, since socioeconomic processes left without supervision have a persistent tendency to develop in the direction from bad to worse?

The rhetorical questions posed above are centered on the concepts of interference. This concept is understood as “unsolicited or forced participation in another’s affairs and relations; actions contrary to the autonomy or independence of another” (Ushakov, 1935, p. 196). Following the interpretation of the concept of interference, the economy is an alien domain for the government; the participation of the government in the economy

is recognized as uninvited, even violent, and its actions are at odds with its independence and autonomy.

Evidently, there can be no government interference in the economy since the economy is an organic part of the country, forming a single whole with it. National history testifies to the close relationship between the government and the economy—a strong country generates a strong economy, while a weak country generates a weak economy. It should be recognized that the government is not just a participant in economic relations, but their main subject. Thus, the government plays a directing role in the economy. It has the natural authority of the organizer and manager of the entire economic life of the country. These provisions can be considered the core of one of the most relevant concepts—the concept recognizing the supreme role of the government in the economy.

Another approach to assessing the role of the government in the economy is associated with the term state regulation. State regulation is “a set of measures implemented by the government in relation to the subjects of the economy to stabilize and adapt the existing social and economic system to changing conditions” (Varnavskii, 2013). This concept goes back to one of the management functions, which was discovered and justified in the early 20th century by A. Fayol, the representative of a classic school of administrative management. This concept is activated when the controlled phenomenon goes beyond the established norms. However, the very wording of the concept contains a limiting potential: as the order is restored in the management system, the need for this function is objectively eliminated, and the function passes into standby mode. This function is currently being implemented in the form of “multilateral mutually-binding agreements for sugar and sunflower oil from December 20, 2020 to April 1, 2021” (Interfax, 2020).

As can be seen from the above example, the regulation is used in the case of exit from the so-called “market failures.” It allows solving specific crisis problems. However, even within the framework of the situational paradigm, the function of state regulation, while necessary, cannot be considered sufficient since it has a local unprogrammed nature and does not involve preventive measures weakening or neutralizing a potential economic threat. This is explained by the fact that, from a systemic position, the function of state regulation is part of a higher-order hierarchy, which can be called public administration. Consequently, as a function, state regulation cannot fully ensure the economic security of the national economy since, unlike public administration, it solves important but limited tasks. The predominant role of the government in the national economy can be revealed through the concept of public administration and its content.

The management cycle is a directed process of three fundamental functions: planning, organization, and control. Planning covers the preparatory

part of the management process, where the key role is to set the objective, work out the algorithm of action, and develop resource allocation. The organization takes over everything that concerns the direct implementation of the developed tasks, including management, regulation. Control acts as an instrument of critical analysis of the achieved results with subsequent correction and dialectical return to the starting point.

The planning function (also known as design, programming, budgeting, or roadmap) occupies a special place in this sequence. This peculiarity lies in the “need for precisely defined ideals or goals” (Emerson, 1912), which set the course to follow and include a list of activities and the expected results. From the old times to the present, the same idea, succinctly expressed by Seneca (1977), is repeated in different variations: “Our plans miscarry because they have no aim. When a man does not know what harbor he is making for, no wind is the right wind.” International management laid the foundations of scientific planning, the importance of which was accurately expressed by Ford (1989). He said that the present system does not yield the highest measure of productivity since it promotes waste in all its forms; it robs a multitude of people of the product of their labor. He indicated that this system lacks a plan, and everything depends on the degree of planning and expediency.

RESULTS

Indeed, “a great deal depends on the degree of planning and expediency.” The Soviet period, especially in its initial stage, convincingly proved this. Thus, only in terms of national income, in 1940 in relation to 1928 (the first year of the First Five-Year Plan), its value increased by more than five times, and 10 years after the war, by the end of the Fifth Five-Year Plan—more than 14 times (Table 37.1).

Similar rates of national income growth are now shown by other dynamically growing Asian countries that adhere to the principle of five-year planning—China (since 1952) and Vietnam (since 1958).

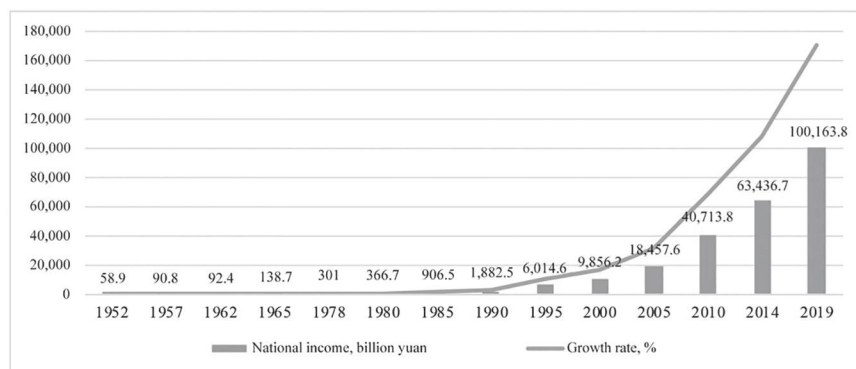
In China, despite the uneven change in the relative magnitude of the dynamics of the macro-indicator, the growth rate of national income increased almost 1,700 times over 70 years of the planned economy from the 1st to the 13th five-year plan (Figure 37.1).

Vietnam, along with China, flexibly applies the methods of state planning in practice. The country has achieved significant economic success and demonstrates high GDP growth rates in the second decade of the 21st century (2010–2019), except for 2020. Even with the adverse effects of the COVID-19 pandemic, the annual GDP of Vietnam, one of the few countries in the world (including China and Myanmar) to remain in the positive zone, was 2.91% year-on-year in 2020 (Figure 37.2).

Table 37.1***The Main Indicators of the Development of the National Economy of the USSR for 1913–1955 (in % to 1913) (Sample)***

	1928	1940	1950	1954	1955
Fixed production assets in all branches of the national economy	136	603	806	1,189	1,320
National income	119	611	1,003	1,533	1,686
Growth rate, %	100	513.4	842.9	1,288.2	1,416.8
Gross output of the entire industry	132	852	1,476	2,428	2,723
Cargo turnover of all transport modes	104	426	623	894	1,017
Total capital investment (1928 = 100)	100	847	1,780	2,749	2,967

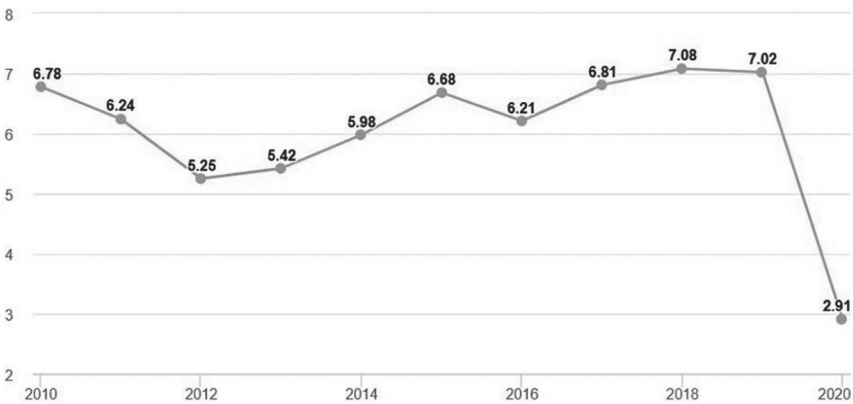
Source: Central Statistical Administration under the USSR Council of Ministers (1956).

Figure 37.1***National Income in China for 1952–2019***

Source: Compiled by the authors based on Lebedeva (2015, p. 126).

Figure 37.2

GDP Growth in Vietnam in 2010–2020, %

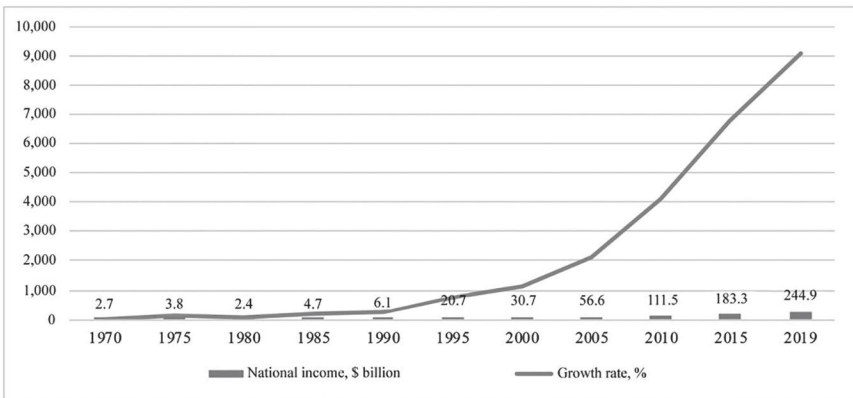


Source: Vietnews (2021).

Another argument for the effectiveness of state planning can be seen in Vietnam’s national income indicator, which grew by more than 90 times in 10 five-year periods (Figure 37.3).

Figure 37.3

Vietnam’s National Income for 1970–2019



Source: Compiled by the authors based on (Ivan Kushnir Institute of Economics and Law, n.d.).

In Russia, there is a need to recognize the planning function at the national level as a tool for solving serious problems, which requires a concentration of efforts and resources.

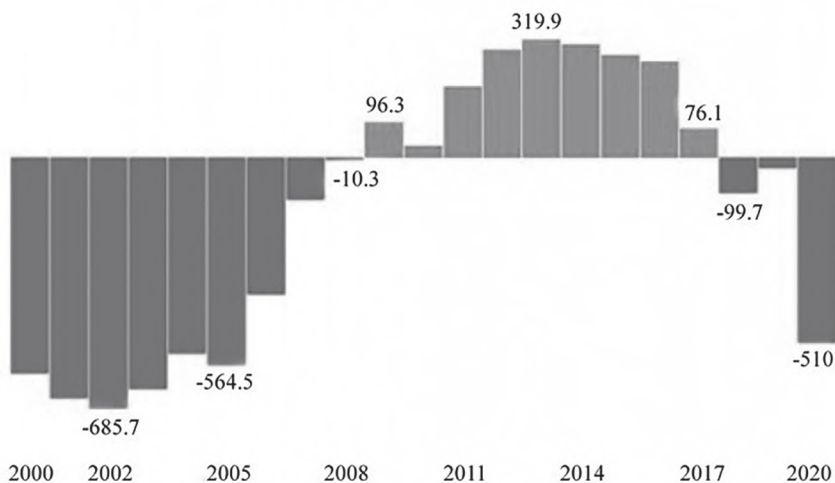
The problem lies not in the lack of understanding of this need or the willingness or unwillingness of particular officials to extensively apply the established planning models in practice. The problem lies in overcoming the barrier in consciousness associated with a fundamental change in values, the notion of the providential role of Russia, and the absence of an officially proclaimed guiding national idea.

This general formulation of the problem will allow reaching the level of integral national planning and may serve as the key to the successful resolution of particular issues. Thus, despite the Federal law “On strategic planning” (June 28, 2014, No. 172-FZ) (Russian Federation, 2014, 2019) adopted in 2014 and implemented by executive authorities at all levels, there was no breakthrough in the socioeconomic development of the country (Figure 37.4). The national economy needs further strengthening “through overcoming differences and contradictions in economic interests and achieving a balance of interests” (Myasnikov et al., 2005).

Figure 37.4

Total Increase/Decrease in Russia’s Population.

Thousand people



Source: Federal State Statistics Service of the Russian Federation (RBC, 2021).

CONCLUSION

Thus, we can trace a certain connection between the lack of positive economic development of Russia and the ineffective management of the country's economy, which is confirmed in practice. The conditions and moment for testing the concept of the dominant role of the government in the economy have arrived.

In our opinion, it would be purely pragmatic to take the following steps:

- Broad national discussion on modern tools of state management of the national economy;
- Introduction of strategic and indicative planning implemented through contractual mechanisms of public-private partnership (Glazyev, 2020);
- Development of the state system of long-term echelon planning, including strategies and development scenarios, as well as the technology for the development of a five-year planning horizon.

The combination of democratic centralism in planning and local initiative under flexible guidance can shift and launch national economic development and ensure the country's economic security.

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IMPORT SUBSTITUTION AND REINDUSTRIALIZATION

World Experience and Russia's Economic Security Policy

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ABSTRACT

The purpose of the chapter is to assess the world experience of import substitution and reindustrialization policies, and innovations in the economies of different development level countries. The importance of applying this experience in the process of import substitution and the unfolding reindustrialization in Russia is indicated. The author analyzes the prerequisites and causes of import substitution and reindustrialization in the world economy. The analysis of the world experience of import substitution and reindustrialization of the economy, its macro-regional features are carried out in the context of maintaining and developing Russia's economic security, accelerating its progress towards sustainable development based on innovation. The author's understanding of the problems and prospects of development processes of the import substitution, investments, and, consequently, reindustrialization in the world is offered. The positive and negative aspects of the policy pursued by a few countries are noted. It is proposed to build recommendations for improving the import substitution policy. This, in the author's opinion, will accelerate the movement towards sustainable development.

According to Sukharev (2014), the important characteristic features of the deindustrialization of the economic system are a decrease in the complexity of operations, the quality of equipment and technologies, in other words, the loss of a properly organized production base. As a natural consequence (and not just a deindustrialization), a country that is in the process of deindustrialization does not have its manufacturing base for the main components of domestically produced machines. Constant import of high-tech products is required.

In the 90s, the Russian economy experienced all the “charms” of deindustrialization, and in its most negative form. When working national industries, and sometimes the most perfect ones, were destroyed for the sake of the selfish interests of the “effective new owners” of these industries, and not even because of ideas of their optimization or overall efficiency.

In connection with the recently greatly changed guidelines of Russia’s foreign economic activity, the Russian economy has sharply aggravated the need to choose a course for import substitution, which can ensure and significantly strengthen Russia’s economic security, facilitate the transition of its economy to the sustainable type of development (Semenychev et al., 2021).

The Russian economy is still characterized by high import dependence. The highest volumes of import are present in mechanical engineering, agriculture, metalworking, chemical industry, oil, and gas processing (Official website of the Federal Customs Service, 2021). Consequently, these industries need import substitution more than others need. At the same time, the specified list includes industries whose products are used by large state-owned corporations in aerospace, mechanical engineering, chemical and other fields. A country needs import substitution when an ever-increasing share of import poses a threat to its economic security. Russia’s dependence on import has been repeatedly used by our Western “partners” for their political purposes.

METHODS

The authors’ argument is based on the methodological principles of the duality of the economic nature of economic entities. Methods of comparative, system and institutional analysis, economic and statistical method are used. Sustainable economic development is not an independent problem, but a dependent part of the modern model of economic formation. On this basis, the analysis of the current state of the world experience of the policy of import substitution and reindustrialization of the economy, and their macro-regional features, is carried out. The analysis is carried out in the context of maintaining and developing Russia’s economic security.

RESULTS

Currently, it is recognized at the state level that the vector of import substitution in industrial sectors is of key importance for the development of the Russian economy to ensure the long-term economic and political sovereignty of the country. In turn, effective import substitution is impossible without an active policy of reindustrialization of the Russian economy based on investments on a new technological basis and based on the widespread use of qualitatively new human capital (Butakova et al., 2021; Guzhavina, 2021; Izmailova et al., 2021; Sukhovey & Golova, 2012). The issue of state participation in industrial import substitution was considered by many scientists. In foreign practice, this strategy has been repeatedly implemented in practice and has been called “Import Substitution Industrialization” (ISI). The most striking precedent of the ISI, the experience of which can be useful for Russia, both for its positive and negative experience, is the Latin American one, which was held in the countries of Latin America (LA) until the 1970s.

In the LA countries, the following ISI measures were applied: increased duties on the import of finished equipment, incentives and subsidies for both domestic and foreign enterprises that supply the means of production for “young immature” industries, a favorable exchange rate for the import of industrial raw materials, fuel and intermediate goods, cheap loans from government development banks for priority industries, direct government participation in certain industries, especially heavy industry, for example, steel, in which neither domestic nor foreign investors invested.

In some LA countries, the ISI operated for a considerable time only in the consumer sector, in industries with relatively primitive technologies and minimal capital expenditures per worker and unit of production. This was especially true for Argentina, Venezuela, and Chile. Most of the industrial products produced in the region had such a high price that it was not possible to export them (Baer, 1970; Baranson, 1970).

The ISI strategy was implemented not only in the LA countries. For example, a significant part of the export of industrial products from India today is based on manufacturing industries that were previously developed as import-substituting.

Having traced the features of the world experience of import-substituting industrialization on the example of LA countries, we see that it certainly has an initial positive effect, but in the future, especially without adjusting the import substitution course, its negative results appear. Let us consider the feasibility of such a policy in the Russian Federation.

The industrial base, which has been at the stage of deindustrialization for more than two decades, is not able to quickly provide import-substituting production that is competitive in price and quality. In addition,

the introduction of protectionist measures at this stage will lead to the monopolization of the market and an even greater technological lag of the country, hindering the development of competitive industries—the locomotives of non-commodity exports. Thus, it is more practical for Russia not to focus on protectionism as an import substitution strategy at this stage.

Let us consider the import dynamics of machinery and equipment for 2017–2019 (Table 38.1). Analysis of these data suggests that the share of equipment in the structure of Russian import has not changed fundamentally in recent years, but there has been a sharp reduction in its value, which is not due to the results of import substitution, but to the fact that in the conditions of devaluation and uncertainty, Russian enterprises freeze projects that involve the purchase of imported equipment. The primary reason for the lack of competitiveness of Russian industrial products is the weak production base, as well as the high raw material orientation of the economy and the devaluation of the national currency.

Table 38.1
Dynamics of Import of Machinery and Equipment for 2017–2019

Year	Share of import	Cost volume, growth rate
2017	50.5%	–
2018	48.0%	– 39.4% by 2017
2019	50.2%	+5.4% by 2018

Source: Author based on Official website of the Federal Customs Service (2021).

The policy of effective import substitution in Russia, in our opinion, should begin with a strategy of reindustrialization.

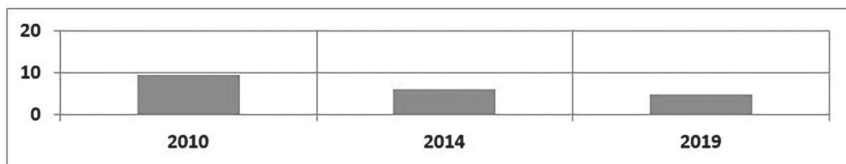
The technical and economic content of the reindustrialization process is industrial reformation because artificial intelligence and environmentally friendly technologies became new drivers for the growth of the manufacturing industry. Reindustrialization in recent years, especially under the presidency of Donald Trump, is also being carried out in the United States of America. The initial stage of this process was the stimulating of deoffshorization (the transfer of manufacturing enterprises from East and Southeast Asian countries back to the country), and the expansion of access to affordable energy sources. In this regard, the United States began to spread the special term “reshor” (from the English word “reshore”)—in contrast to the previously existing offshore process. The country has a specialized nonprofit organization, the Reshoring Initiative, which encourages offshore companies to organize the transfer of jobs back to the United States.

A characteristic feature of the reindustrialization of the United States is the focus on “intelligent production” (Tolkachev, 2021). As an example of intelligent production in action, we call the Albany NanoTech Complex, which is estimated at \$14 billion. The complex receives annual financial support from the state of New York of \$1 billion and employs 3,000 scientific and technical employees. The complex is known for the fact that on its basis, the world-famous IBM, Intel, in cooperation with Samsung and Toshiba, organized a new production of semiconducting products.

In addition, the unemployment rate has significantly decreased since 2010 (Figure 38.1), but the trade balance is still increasing its negative values.

Figure 38.1

U.S. Unemployment Rate, According to the ILO (% of the Working-Age Population)



Source: Author based on World Bank Data (2021).

Speaking about the complexity and revolutionary nature of the beginning reindustrialization of the Russian economy, it is worth referring, for example, to the experience of the USSR.

The examples of Japan and Germany in the 1950s, China in the 1980s and 1990s, as well as the experience of the so-called “new industrial countries” (NIC), which largely followed the Japanese path of development, are also demonstrative. The most important factor contributing to the accelerated modernization of the NIC of Asia was the active state participation and national cultural traditions that support the state authority—obedience to authority, respect for hierarchy, hard work, commitment to sustainable social norms, and the desire to smooth out conflicts.

The catch-up modernization of the EA/SA countries is associated in the economic literature with the “flying geese” model, as is the path of the new industrialization of Japan (Akamatsu, 1962). Industries developed new technological structures, “obsolete” production was transferred first from Japan to the NIC, and then from the NIC to other Asian countries, forming a kind of “goose wedge”, in which there are technological “leaders,” and there are led countries.

The main characteristics of the development of East Asian/Southeast Asian NIC were mainly export orientation, in contrast to the LA countries.

Import substitution was carried out only in one or two countries in the first decade after the beginning of industrialization, after which it was curtailed and gave way to export promotion. The main engine of the industrial and economic development of the Asian NIC was industrial policy. Less attention was paid to foreign trade policy, tariff barriers, currency regulation, and so forth.

In South Korea, as in the LA countries, import-substituting industrialization was carried out, but only until the early 1960s. Then, the country began to implement the export orientation of its industrial policy, while maintaining currency control. The South Korean government was developing five-year economic development plans.

A similar practice existed in some developed countries (Japan, Italy, France, etc.). Pricing control, research and development (R&D), and mechanisms for promoting manufactured goods to international markets were developed (Chang, 1993). The first goods produced for export were standard light industry goods, and then machine tool construction and mechanical engineering, as well as the chemical industry (the 1970s) became priority industries (Suslina, 1997).

The industrialization of the Southeast Asian and East Asian countries was based on increasing capital accumulation, as in Japan, whose example served as a guide for these countries (Table 38.2), and in the 1990s they exceeded similar indicators in Western countries.

Table 38.2

The Share of Capital Investment in GDP in Southeast Asia and East Asia Countries, %

Country	1950–1970	1990–2000
South Korea	10	37.1
Malaysia	15.3	36.1
Singapore	14.5	36.3

Source: Author based on United Nations Conference on Trade and Development: UNCTAD. Trade and Development Report 1996.

About the development and application of human capital in these countries, the increase in R&D spending and the number of students in technical specialties alone was not enough. Thus, the share of these expenditures in the GDP of Japan and South Korea was about 3%, that is, more than that of developed Western countries. However, the effective use of these investments requires that studies and research and production activities be organized in a certain way. This organization means a more free, creative, changeable nature of work, the possibility of try-and-error,

while these countries are characterized by clear regulations and a rigid hierarchy of work activities. In addition, a significant role was played by the historical factor: the lack of traditions of scientific schools and experience in the implementation of scientific research and development.

CONCLUSION

Having considered the main features of reindustrialization and import substitution in foreign countries (Table 38.3), we suggest continuing building the improvement of the policy of import substitution and reindustrialization of the Russian economy, based on the following fundamental provisions:

Table 38.3

The World Experience of Reindustrialization Import Substitution and Innovations in the Economy and Its Significance for the Sustainable Development of Russia

Countries	Positive experience	Negative experience
Latin American countries (Brazil, Argentina, Mexico, Chile, Peru, etc.)	Stable exchange rate of the national currency (to attract domestic and foreign investors, increase sales on the domestic market and for export), cheap loans, subsidies to foreign investors in the amount of 89% of investments—Brazil, 50–60%—Mexico (which contributed to the arrival of foreign MNCs in the automotive industry) state support for unattractive industries for investment (heavy engineering)	The overall state participation without control, for example, by representatives of industry associations or competing enterprises, led to the misuse of funds (“import substitution is not for industry, but a certain number of industrialists”)
United States	The close connection between science and production, the prestige of engineering and working professions, low energy tariffs, reshoring with the creation of new jobs	Negative balance of payments due to steadily increasing import, including equipment and technologies
East and Southeast Asian countries	A large share of investments in R&D, an increase of human resources in the industry, a gradual focus on priority industries, a gradual transition to more high-tech (we started with light industry, then developed machine tool, construction, mechanical engineering, chemical industry)	Lack of experience in scientific developments and scientific schools

Source: Compiled by the author.

1. In developed European countries, as in the United States, there was “positive” deindustrialization, as production was transferred to third countries while maintaining the management, control, and development of high-tech services related to production. In Russia, deindustrialization had a “negative character,” because of which there was the destruction or degradation of most industries, with the loss of scientific, technical, and stock potential, the growth of the share of services was not associated with industrial production. There was not post-industrialization, but “servicization” of the domestic economy.
2. Due to the high import dependence of the Russian economy on such an important commodity segment as machinery and equipment, which is used in many industries that are important for the country’s economic security, as well as in connection with the recent political and foreign economic situation, the country needs a policy of import substitution in the field of industrial production. However, the choice of an import substitution strategy becomes more important.
3. Due to the weakness of the Russian production base, the low competitiveness of the Russian machine-building industry, and the orientation of the raw materials of the economy, import substitution in Russia should begin with a reindustrialization strategy, using the positive experience of the United States, Latin America, and the NIC of Asia.
4. For the reindustrialization of the Russian economy, the reindustrialization of the machine tool construction is of priority importance since its technical condition largely determines both the level of machine-building and the level of technological independence of the country. The paradox of the current trend of Russian import substitution in mechanical engineering is that the “import-substituting” products of machine-building enterprises undergo the so-called finishing on imported machines, most often from Germany, Japan, and South Korea.
5. The government should create conditions for active cooperation between business and science, the largest universities in Russia, and an increase of the share of investments in R&D by introducing appropriate tax incentives. It is necessary to strengthen the connection between science and production, to increase the prestige of engineering and highly qualified working professions.

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PART IV

SOCIAL AND LEGAL ASPECTS OF THE ECONOMIC DEVELOPMENT OF RUSSIA

CHAPTER 39

PUBLIC PROCUREMENT PLANNING AS A FACTOR OF SOCIOECONOMIC DEVELOPMENT OF THE STATE

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ABSTRACT

The authors have presented the research into the essence of procurement planning as an imperative of financial activities of the State in conjunction with the budget process. The goal is to present procurement planning as the basis for strategic relationship with the budget process, the symbiosis of which is able to minimize any financial, economic, and sociopolitical adverse effect, including the impact of crises such as the pandemic.

Using the methodology that is represented by the analysis of main works from the perspective of the budget process and public procurement planning, the following conclusions have been presented: (1) crisis, identifying the most pressing issues of financial activities of the State, obliges the government to promptly analyze and reorganize the regulatory framework for the purposes of efficient financial and economic and sociopolitical management; (2) the

budget process in Russia has retained significant bureaucratic costs, which preclude from ensuring the quick delivery of public funds to each customer; (3) public procurement planning as a constituent part of budget expenditures is not in fact related to its revenue, then it is necessary to carry out such planning judging from the needs of the customer for a more extended period (for example, 5–10 years), that will allow to approach the issue of the efficient expenditure of public funds in a more reasonable and responsible manner; (4) digital technology in public procurement planning minimizes the risks of duplication (unreasonable repeat) of procurement.

The originality of the research consists in the focus on creation of the mandatory relationship between procurement planning and the budget process, as well as the need for the introduction of strategic (advanced) public procurement planning.

INTRODUCTION

In the present context of development, crisis obliges the government of any country to promptly analyze and restructure government regulation for the purposes of efficient financial-economic and sociopolitical management of a particular territory. The pressing need for the timely redistribution of public funds to additional and preferred procurement has shown the shortcomings of statutory regulation of public procurement planning, which should be reorganized, since it is necessary to enhance relationship between procurement planning and the budget process.

Another critical situation that emerged in early 2020 in many countries across the world including Russia was due to the introduction of the “high alert regime” with a view to preventing the advance of the new coronaviral infection COVID-19. The situation dramatically splintered economic and financial and economic ties, which had been well established for many years, both on national and international markets, having affected public procurement.

In our opinion, restrictions and prohibitions that were introduced by the government of Russia and are aimed at minimizing the crisis and its consequences, did not address the top-priority issues of planning of public needs, but also demonstrated the inadequacy of legal standards which are aimed at ensuring the efficient expenditure of public funds.

Any crisis can be treated as a result of critical deviations from the rule of law in the economy of the State that is implemented in the form of ineffective law-making and law-enforcement practices due to the lack of professionalism of individual public servants. The key problem of such deviations lies in the fact that they are the basis behind the deformation of rights and liabilities of the subjects of legal relations, but also determine the essence of the State, as well as its pecuniary institutions.

Thus, the crisis once again served as a basis for the efficient, yet fairly isolated “manual regulation”. The spring of 2020 showed Russian society the way things are in terms of issues related to legal regulation and financial support of public procurement:

1. *phantom competition*—weak competition or lack of any competition, development of which is erroneously positioned as the goal of legal regulation of Russian procurement;
2. *restrictions and prohibitions*—the concept “import substitution” that has been used by public servants since 2014 is not legally formalized in normative legal acts; its essence and content are not defined; however, the crisis pointed at the issue of reasonable regulation of any restrictions and prohibitions as a factor of efficient utilization of public funds;
3. *bureaucracy and reforms*—in the existing field of procurement, the adopted collection of regulatory legal acts does not contribute to the minimization of corrupt practices and the actual budget savings due to the lack of relationship between the budget process and procurement planning;
4. *“planning time”*—current limits of the procurement planning period are unable to ensure real efficiency and effectiveness of budget expenditures, since there is no relationship to fiscal revenues providing not only payment of a particular purchase, but the use of the obtained result in the future;
5. *the lack of “standards of consumption”*—public servants do not decrease legally established limits of budget expenditures for the maintenance of public servants (purchase of office equipment, furniture or cars, payment for communication services, etc.) even during the crisis; they do not distinguish priorities, they do not waive additional procurements that could be cancelled or postponed for a later period.

The problems referred to above are directly related to public procurement planning, which, being the foundation of the efficient expenditure of public funds, forms the imperative of financial activities of the State.

METHODOLOGY

Any research is conducted with the help of various methods of scientific cognition. Research methodology is highly important in the consideration of any issue, in this particular case, economic or legal issue. Traditionally, general scientific and specific scientific methods are the most important methods, which are used in the research of both domestic and foreign

authors. Statistical method, which allows analyzing the dynamics of the financing of public procurement in Russia, as well as the analysis and synthesis method, contributing to the use of logical techniques of theoretic breakdown and subsequent connection of diverse elements of the public procurement system, turned out to be the most in-demand method from among general scientific methods in the research. The most important specific scientific methods were as follows: comparative legal method that made it possible to carry out the analysis of the financing of public procurement in the context of the pandemic in Russia and abroad, and the content analysis of legal acts regulating the financing of procurement. In particular, consideration to public procurement planning was given in the following papers: Carvallo et al. (2019), Barboza et al. (2016), Kikavets and Tsaregradskaya (2020); emergency procurement was considered by Buor (2019), Sadiq and Kessa (2020); the use of fiscal measures for the support of the economy in the context of the pandemic was studied by such authors as Freier and Geißler (2020), Ahmad et al. (2020), Williams and Kayaoglu (2020).

RESULTS

Budget Expenditures for the Financing of Public Procurement

Planning is based on the principle of planned nature, the essence of which lies in the fact that financial plans that are developed in accordance with the state plan and programs of socioeconomic development of a respective territory, serve as the basis for financial activities of the State. Planning of any activities are a prerequisite for the development of any economic relations, including the planned economy and the market economy, since it serves as an essential element in the regulation of socioeconomic development and financial management, although it has its own specifics. The positive effect of planning on financial activities is confirmed by the experience of budgetary relations, existing in the European Union (EU), since all EU member countries are obliged to submit their draft budgets to the special committee; therefore, in the course of their preparation they must be aware of their liabilities under the legislation of the European Union, and also take into account the economic partnership programs applicable to member states (Seyad, 2015, p. 253).

In general, budget planning includes the definition of the total volume and sources of budget revenues on the basis of a uniform methodology for calculating the minimum fiscal capacity; financial expenditure standards for the provision of public services; establishing the areas of the use of public funds etc. In Russia, budget planning is medium-term, since

budgets are passed for the current fiscal year and for the two years under planning. In our opinion, this factor is not efficient in the financing of public procurement, since any economic entity needs more long-term forecasting of its activities.

Within the framework of this research, it seems to be expedient to analyze planned and implemented federal budget expenditures on public procurement over the recent years. The principle of planned nature of the budget process is manifested in the budget drafting for the next fiscal year formalized in a relevant legal act. The assessment of efficiency of this principle is verified by the budget implementation and the correspondence of planned expenditures to actual expenditures.

At year-end 2017–2018, we can see the procurement volume equal to the amount of 7.03 trillion rubles and 7.9 trillion rubles respectively (Federal Law No. 415-FZ of 19.12.2016, 2016; Monitoring of the development of the system of public and corporate procurement in the Russian Federation for 2018, 2020). The volume of GDP was 101,164.0 billion rubles in 2017, while in 2018 it was 92,224.0 billion rubles (On the Federal Budget for 2017 and the planning period for 2018 and 2019). For 2019 and for the planning period of 2020–2021, the customers have placed 181,918 procurement plans to the total volume of 8.3 trillion rubles (Analytical report on the results of monitoring purchases, goods, services to meet state and municipal needs in accordance with Federal Law No. 44-FZ dated 05.04.2013, 2020). The planned GDP volume for 2019 was 108,414.0 billion rubles (On the Federal Budget for 2019 and the planning period for 2020 and 2021. Federal Law No. 459-FZ of 29.11.2018, 2018).

At the end of the first half of 2020, the volume of contracts concluded with customers amounted to 4.1 trillion rubles (Volume of state purchases in the Russian Federation in the first half of 2020 increased by 34%, to 4.1 trillion rubles, 2020), while the GDP volume for 2020 was 113,631 billion rubles; according to the analysts, the volume of purchases in the Russian Federation in the first half of 2020 increased by 34%, which may be due to the increased share of emergencies (On the Federal Budget for 2020 and the planning period for 2021 and 2022. Federal Law No. 380-FZ of 02.12.2019, 2019). Expenditures for bulk purchase as a percentage of GDP for the period 2017–2020 are about 0.01% (see Table 39.1), which is less than a good deal of money, although these figures indicate the consistency in planning of this type of budget expenditures, as well as the fact that planned amounts of expenditures for the procurement have received adequate financial support over the course of the fiscal year, and the only year when the deviation from the plan may be expected is 2020, which will be attributable to emergency.

Table 39.1***Budget Expenditures for the Financing of Public Procurement in 2017–2020***

Item No.	Period, year	Procurement volume, trillion rubles	GDP volume billion rubles	Procurement volume to GDP volume ratio, %
1.	2017	7.03	92, 224.0	0.01
2.	2018	7.9	101,164.0	0.01
3.	2019	8.3	108,414.0	0.01
4.	2020 (the first half of the year)	4.1	113,631. 0	0.01

Source: Compiled by the authors.

When we analyze the Conclusions of the Accounts Chamber of the Russian Federation, we can see that contracted expenditures amount to 4,557,130.7 million rubles, or 27.8 % of federal budget resources in the total volume of federal budget expenditures for 2017 (Conclusion of the Accounts Chamber of the Russian Federation on the report on the execution of the federal budget for 2017, 2020). In 2019, the actual execution of such expenditures was 4,826,362.8 million rubles, or 92 % of budget obligation limits transferred to public treasurers, which amounts to 26.5 % of federal cash budget expenditures (Conclusion of the Accounts Chamber of the Russian Federation on the report on the execution of the federal budget for 2019, 2020). Accordingly, in recent years, 1/3 of Russian budget expenditures was allocated for the financing of public procurement.

Public Funding in the Context of the Pandemic

Almost all countries of the world have revised the articles and volumes of budget financing with due account for the introduced quarantine measures and developed several fiscal measures to support economic entities. France, Germany, Italy, Japan, and the United Kingdom announced planning of the public sector to the total amount exceeding 10% of annual GDP volume with a view to preventing the impact of economic crisis and further advance of the COVID-19 (Ahmad et al., 2020, p. 73). In the EU, recommended economic measures include both support for maintaining employment of population, such as paid holidays and tax exemptions for affected organizations. In particular, in the United Kingdom, companies can claim 80% of their employees' salaries from the government every

month, while self-employed persons receive a taxable grant in the amount of 80% of their commercial profits per month together with a deferral of all taxes (Williams & Kayaoglu, 2020, p. 85).

In Australia, the budget response to the economic crisis caused by COVID-19, took shape of tax exemptions and temporary payments for people who have become unemployed as a result of the pandemic (Andrew et al., 2020).

In Germany, local budgets are the most affected by the economic crisis, since they have lost revenue from the sales tax, so it is suggested that they should be provided with differentiated financial assistance from higher-level budgets (Freier & Geißler, 2020, pp. 357–358).

The Russian Federation is characterized by the use of diversified measures, most of which can be efficient for the support of the Russian economy, while some measures, although they will accumulate funds in the budget, may potentially have a negative impact on it in the future (Malinovsky et al., 2021, pp. 284–285).

The main supportive measures include, in particular: repayment holiday; temporary moratorium on bankruptcy at the request of creditors; reduction of insurance premiums; deferral (installment) of taxes and duties; suspension of tax, customs, and other inspections of small and medium businesses; exemption of territorial entities of the Russian Federation from repayment of public budget loans in 2020, and so forth. Provision is made for the extension of time periods and adjustment of prices under contracts in case the counterparty violates its obligations due to the pandemic, as well as the reduction of the requirements for securing contracts when pursuing public procurement with small and medium businesses as supportive measures in the field of public procurement.

Just like in Europe, the pandemic has made significant adjustments in the United States in terms of scientific interest in public procurement. The growing interest of the academic community in the study of public sector management issues has become directly proportional to the impact made by procurement on national and global economies. American researchers come to the conclusion according to which an important aspect of efficient of public procurement in the United States consists in their stability, particularly in this day and age (Patrucco et al., 2017, pp. 230–232).

A number of existing problems related to the implementation of procurement in the United States had an additional negative effect on COVID-19, revealing the high dependence on international suppliers and the increase in the number of corrupt practices due to restrictions imposed by the pandemic, as well as the attraction of new “novice” suppliers for fluid deliveries in a very short time (Sadiq & Kessa, 2020, pp. 538–539).

In order to promptly respond to natural disasters, the researchers of the Republic of Ghana pointed out the need for revision of the emergency

procurement policy. Manipulations used in everyday practice of public procurement result in low-cost procurement, thus increasing the inefficiency of public administration in this field, and in case of emergencies eventually makes expenses disproportionate to the value of goods or services purchased. The possible solution to this problem is choosing several counterparties that are able to fulfill their contractual commitments rather than a single counterparty (Buor, 2019).

According to Heinrich and Hodess (2011) some provisions of law about public procurement in most developing countries have no clearly defined emergency procurement procedures, and there was no timely introduction of changes in legal acts in this part (Woodle, 2000, pp. 368–370).

As can be seen from the above, crisis, like any other critical situation, is a good and sufficient reason for the timely redistribution of public funds to additional and preferred procurement. However, due to the imperfections of legal regulation of the field of procurement, including bureaucratic costs of administration, the change of procurement plan appears to be the most complex procedure.

Taking the foregoing into consideration, we deem it appropriate to consider the possibility of revision (renewal) of statutory acts regulating public procurement in case of emergencies. In addition, it is necessary to focus efforts on reducing dependence on imported goods. This will be further contributed by comprehensive development of public-private partnership.

Public Procurement Planning as a Guarantee of the Efficient Expenditure of Public Funds

As a result of circumstances referred to above, active discussion of procurement planning is required, since it allows minimizing economic risks, as well as ensuring the priority and reliable functioning of financial activities of the State.

Public procurement planning is a process of making decisions of when, how and from whom the customer should make a purchase, as well as the prospects for development and cooperation for the counterparty. Procurement planning provides the following:

- transparency and foreseeability of procurement;
- the basis for monitoring and analysis;
- efficient management of resources, including budget expenditures;
- timely revision of priorities due to external emergencies (crisis, pandemic, etc.).

The procurement plan should serve as the basis for the compilation of the procurement schedule, which takes into account all pre-planned parameters in combination with external factors and economic political realia. Competent planning is necessary to avoid spontaneous one-time purchases. The major portion of budget savings in the procurement process is achieved during the process of initial planning and introduction of quality changes in the plan as an immediate response to external changes.

Hence, procurement planning effectively determines the strategy and mission of the customer in terms of implementation of the procurement process and its efficient financial support, since often limited budget resources combined with certain requirements force public servants to accept a compromise both during procurement planning and during budget adoption.

Considerable attention is also paid to procurement planning in the work experience of foreign countries. Most researchers are positive about advanced planning, despite the arising difficulties. For example, in many states of the United States, procurement planning in the field of electric-power industry is the key element of assessing their efficient financing. However, there are states in where procurement is carried out without regard to previously developed plans, since the plan may not be relevant anymore at the time of procurement. In addition, other proposals may appear, that emerge, in particular, as a result of unexpected changes.

In all cases under study, the difference between subsequent plans and initial plans was noted due to the initial lack of necessary information. For example, in such states as Idaho, Washington and Oregon, deviation from the procurement plan is acceptable; therefore, the parties to the contract are legally allowed to agree on new terms of performance of obligations. Up to five amendments to the procurement plan for a year have been registered in Nevada with high standards of planning (Carvallo et al., 2019, p. 9).

All of the above contributes to the formation of the negative attitude to advanced procurement planning. However, it is impossible to obtain efficient and effective expenditure of public funds without advanced procurement planning. The prospect of advanced procurement planning will help to avoid the duplication of procurement; will afford planned ground for the expenditure of budget commitments, as well as financial supervision.

We are fully aware of significance and relevance of changes in procurement plan. It is impossible to do without them in case of advanced procurement planning (Woodle, 2000). The very existence of such changes is indicative of the priority of the value of new information over the original information that was used in the preparation and approval of the procurement plan, including the changes in the revenue side.

In Brazil, public procurement is based on institutional planning, the feasibility of which is noted by Brazilian researchers. The significance of public procurement planning is formalized in statutorily prescribed requirements to procurement, in procurement planning documents and institutional planning documents (strategic plan and master plan) (Barboza et al., 2016, pp. 232–233).

In Russian procurements, due to the shift of emphasis to procedural issues, there is no direct relationship between procurement planning and the budget process (Kikavets & Tsaregradskaya, 2020). Only total amounts allocated for the projects can be traced and monitored—without breaking them down into specific individual purchases and contracts.

Experience has shown that the failure to meet time constraints or blank impossibility of the implementation of one procurement results in the inefficient expenditure of public funds allocated for the payment for other related procurements. The above can be avoided by means of thorough and advanced procurement planning, including the adaptive system of changes in the plans. However, the adopted collection of regulatory legal acts regulating the field of procurement does not pay due attention to planning.

Procurement planning carried out within one fiscal year (January 1 to December 31) is unable to ensure real efficiency and effectiveness of budget expenditures in such a very short time. In addition, there is no relationship between the procurement plan and fiscal revenues. The potential way of solving this problem may consist in the use of advanced procurement planning for a more extended period.

The limits of budget expenditures for the maintenance of public servants established in regulatory acts are not revised even in a climate of crisis and the pandemic. At the same time, the reconsideration of the needs of public servants towards saving the public cost (for example: abandoning private cars in favor of public transport or taxi, renunciation of noncritical purchases in favor of priority purchases, including priority financing etc.) allowed introducing timely changes in procurement planning and optimizing budget expenditures.

We believe that any procurement, following the coordination of its necessity, as well as assessment of costs required for it, becomes, in actual fact, a separate item (line in procurement plan). However, in the course of coordination and approval of the procurement plan, each item that is included in the plan must be treated not independently, but as a constituent part of the entire system of satisfaction of the public needs of the customer.

Thus, the presence of public funds allocated for the general coordinated complex of needs of the customer does not diminish the obligation of the latter to pay special attention to the efficiency of budget expenditures for each separate item. Hence, the failure to meet time constraints for the implementation of a separate item of the procurement plan or blank

impossibility of its implementation should result in stopping other purchases related to this item. Unfortunately, Russian procurements do not provide such a mechanism, which is a basis for numerous corrupt practices, resulting in the inappropriate or inefficient expenditure of public funds.

In our opinion, we should not only associate the procurement plan with the revenue side, but also approve only necessary goods, works, and services in the procurement plan in the context of setting priorities both by the state and the customer. Digital technology will contribute to the harmonization of relationship between the procurement plan and the budget process, identifying inefficient items (duplication of procurement, overshooting of prices, inexpedient procurement sequence, etc.).

CONCLUSION

To conclude the research, we should note that the complex epidemiological situation in the world has increased the focus on the problem of emergency procurement once again; if they were generally associated with natural disasters before, they are associated with the presence of coronaviral infection at present. Restrictions and prohibitions that are introduced by countries across the world during the pandemic have contributed to the rapid emergence of shortage of certain categories of goods and an increase in the number of corrupt practices which collectively result in additional budget expenditures.

The research has shown that public procurement planning is not only the basis of high-quality and complete satisfaction of the public needs, but also the efficient expenditure of public funds. The procurement plan is a platform for the timely and most efficient response of government authorities to any extraordinary changes (crisis, pandemic, etc.).

Therefore, public procurement planning issues are topical not only for foreign countries, but also for Russia, since the amount of public funds that are allocated for the financing of public procurement is 10 and more per cent of GDP of almost any State.

The research has revealed the key problem of Russian public procurement—the lack of relationship between the budget process and procurement planning.

Based on the foregoing, it is suggested to introduce advanced procurement planning (5–10 or more years) that will allow defining the basis for the financing of public procurement, the prospects for expenditures and revenues of the corresponding budget for an extended period with account of financing priorities.

Formulated differently, the expenditure side should be passed judging from strategic procurement planning of the customer. Current public

procurement planning in Russia is unable to ensure relationship to the budget process and the efficient expenditure of public funds, being usually restricted to one fiscal year.

Advanced planning will illustrate the real need for the purchase of products or results of works and services, with due account for the further use of the obtained result, including operation and maintenance. Advanced planning will make it possible to analyze not only the needs presented by each customer, but also the expenditures related to ownership of received goods or results of works and services but will also establish the basis for revision of the procurement strategy towards reduction of transaction expenses, introduction of innovative environmentally friendly and cost-saving technologies.

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CHAPTER 40

THE INFLUENCE NETOCRATIC PROCESSES ON THE DEVELOPMENT OF ECONOMIC INSTITUTIONS

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ABSTRACT

The aim of the chapter is to clarify and develop existing approaches to defining the essence of institutional processes in the context of digitalization of the public service sector, to identify problems associated with a change in the nature of public administration, the development of netocratic processes due to the increasing role of information networks. The research methodology is based on an extended content analysis of existing sources, the use of the results of Rosstat polls, methods of comparative statistical and graphical analysis, and so forth. The results include: the author's classification of existing approaches to terminology related to e-government and e-government services; the allocation of three groups of interaction in the field of public-services; the correlation dependence of the prevalence of

public services on the reasons for not using the internet; revealed the reasons for the digital inequality in the federal districts of the Russian Federation; the need to develop the skills of population digital interaction with public authorities, regardless of age, gender, place of residence, level of education. The originality of this chapter is associated with the identification of the specifics of netocratic processes in Russia and their impact on the development of public administration institutions.

INTRODUCTION

In recent decades, we can observe the digitalization process of various spheres of life. This trend contributes not only the efficiency increasing of the functioning of economic entities but manage the commercial and government structures. At the same time, we can observe digitalization at the consumer sphere. Moreover, not only purchases of goods and state and municipal services have moved into the electronic environment. The last thing, on the one hand, reflects the processes of transition to digital government, on the other, the availability increasing of various services for the population.

The digitalization is most often understood as the intensive using of information systems in various industrial and social processes. In our opinion, this interpretation does not fully reflect the essence of the digital economy, which, along with the introduction and intensification of digital technological processes, creates a new system of economic relations: digital rent, digital and additive manufacturing, mass production to order, flexible management, and so forth.

The development of e-government is accompanied by increasing the number of provided e-government services, which potentially increases the degree of their accessibility for the population and entrepreneurs and facilitates the process of both their receiving and producing.

In the legal field, the digitalization process of the state and municipal services producing is described at regulatory documents as the Concept of long-term socioeconomic development of the Russian Federation for the period up to 2020, the State Program "Information Society," the federal project "Digital Public Administration" as a part of the national project "Digital Economy," and so forth.

LITERATURE REVIEW

Given the diversity and contradictions of netocratic processes and the digital economy, we can find particular approaches to various characteristics

of this phenomenon in researches: methodology, definition of meanings, institutional norms, and rules of functioning.

The development of the information society in the 20th century has led to the emergence of new terms directly related to information flow management processes. Bard and Söderqvist (2002) associated the term “netocracy” with the transformation of the social structure and the emergence of a new format—a netocratic society in which power belongs to persons (netocrats) who owns information networks, controls, and determines the volume and direction of information flows. Control over the information and communication infrastructure of the entire internet space, carried out by the political and corporate elites, forms a new political regime—cyber-deutocracy (Freiberg, 2018).

The creation of electronic public services system is characterized not only by the ease way of production and using but also easy to control of this process. The interaction of subjects in the field of electronic state and municipal services can be divided into three groups:

- horizontal interaction between ministries and departments of government on the organization of production and the creation of electronic government services;
- vertical interaction between subjects of different levels of government on the creation of electronic government services and control over their delivery;
- interaction of state and municipal authorities with citizens on the delivery of electronic state and municipal services.

Tsivirko and Chugunov (2011) took attention to the legal aspects of public services delivery and the formation of the regulatory framework, according to analysis of the federal regulatory documents adopted by the government at the first stage of digitalization (until 2010), which concerns not only the state services (defining the list of services delivered by using information technology), but which also creates an infrastructure that allows the delivery of electronic government services. Based on the analysis of the Russian legislation, which regulates the electronic public services delivery, Evtyushkin (2011) proposed its development in the direction of formulating a register of legal norms, in which the functions of entering information about legal norms, storing it, searching and providing it would be performed by an information system. If authorized persons and information systems directly involved in the process of public services delivery form and send a request, they get an access to the relevant information.

A fairly large number of papers are devoted to the consideration of state (municipal) e-services. Styurin et al. (2019) concretized the concept of “state digital platform,” which among other things is considered as the basis for the development of conditions for the public services delivery.

One of the important issues in the government e-services delivery is the technology of their delivery and information protection. Urivsky and Chefranova (2011) pay attention to the possibility of using cryptographic technologies, since they have the main characteristics—easy to replicate, universal, automated, tested and correspond to such aspects of the public e-services delivery as user identification and authentication, personal data protection.

Bachilo (2010) noted the innovative nature of the implementation and development of e-government at creating an electronic basis for the implementation of public administration functions, including the public services delivery to individuals and legal entities. The ability to public services delivery through ICT is considered a defining component of e-government activities (Hogeveen, 2020). Kapsa and Musiał-Karg (2020) consider e-government in a broader interpretation—“as the use of ICT by the public sector to improve the efficiency and effectiveness of the functioning of the public sector, providing citizens and businesses with better access to information and services and to facilitate interaction and exchange information with interested parties.”

The development of e-government and the electronic format of public services can be considered as a factor in increasing the transparency of public administration processes and reducing the corruption component (Wu et al., 2020). Some researchers consider e-government as a form of development of e-democracy not only through the public e-services delivery and the information delivery to citizens with websites, but the possibility of assessing the effectiveness of e-government at the municipal level in correlation with certain characteristics of municipalities (Chapman, 2017). van der Meer et al. (2014), unlike other authors, consider e-democracy not as the only final stage in the development of e-government, but believe that e-government is developing in two parallel directions—e-government services and e-democracy, with this development of e-government occurs with the active use of e-participation.

Some papers reveal approaches to assessing the quality of service delivery. Alekseeva and Erman (2011) proposed an integral indicator for assessing the quality of the public e-service delivery, including such criteria as the time spent on collecting documents, registering on the portal, filling out the form and sending it, the cost of the service, the period of its delivery by the government, the degree of satisfaction with the result of the service, and benefit received by participants. Komkova and Ovchinnikov (2012) proposed to evaluate the development of public e-services in five

areas—to diagnose preconditions and work processes for the e-services delivery; current processes for government e-services delivery; e-service redesign process; analyze the regulatory framework for the creation and delivery of e-services; analyze the form of delivering these services (sites and applications).

An interesting classification of state electronic services was presented by Banasikovska (2014), dividing them into transformational (collection and storage of information, its delivery on request, electronic paperwork, electronic consultations and examinations, etc.), transactional (registration of rights, government procurement, electronic document management, online payment of taxes and fines, electronic voting) and providing access to intangible benefits (access to information). Some authors, analyzing the activities of e-government, reduce e-government services to three forms—facilitating communications with public organizations, delivering information to citizens about taxes and obtaining certificates of the presence (absence) of a criminal record, as well as simplifying the conduct of business for entrepreneurs by providing them with individual services in e-format (Fawareh & Al-Abed, 2020).

The public e-services delivery as an element of the sphere of consumption is analyzed by various researchers. Bershadskaya (2011) reviewed the process of service delivery by each of the participants in this process—delivering the service (federal, regional, and municipal authorities) and receiving the service (individuals and legal entities). On the part of service recipients, the main attention was paid to the analysis of consumer groups and the reasons for not receiving e-government services. On the part of services providers, the knowledge degree of information technologies of state and municipal authorities' employees, as well as the technical equipment of places, was analyzed. The paper takes attention to the fact that the agents delivering the service did not assess their level of computer technologies knowledge to a high degree and expressed the need to improve their qualifications in this area. Lapidus et al. (2019) conducted an analysis of Russian regions in order to identify the digital inequality degree based on a group of indicators: digital literacy index; the proportion of organizations and households using the internet, as well as having broadband access to the network; the share of active mobile subscribers using the mobile internet; the proportion of the number of active users of broadband access to the internet from the total population of the region and the number of active individual entrepreneurs per person of the working population. As a result of the analysis, the authors paid attention to the need to use the minimum digital basket of Russian regions in the implementation of digital development programs for regions and to identify obstacles in their implementation.

Pérez-Morote et al. (2020) conducted a study of the correlation between trust in government and the share of users of e-government services, the existence of a link between the digital divide and the prevalence of the use of public e-services, the direct dependence of the use of services by citizens e-government and the level of GNI per capita, the education level of the population, as well as the negative correlation between the use of public e-services and age categories (people over 65), and the share of the rural population. The study was based on Eurostat data for the 27 EU countries.

An increase in the share of the state and municipal e-services delivery with the subsequent complete transition to a digital format will be associated with a significant involvement of the country's citizens in all digital processes. The presence of a positive correlation between trust in government and the prevalence of the use of public e-services necessitates the development of various elements of both e-government and the digital economy—infrastructure, software, educational programs, and so forth.

METHODOLOGY AND RESULTS

The active development of information and telecommunication technologies contributed to the transition of some services to a remote format. Not only the commercial sector is actively developing, where if part of the activity transfers to the online format it allows to simultaneously cut down the costs of activities by reducing the places of services delivery in the offline format or to increase delivery volumes, complementing the traditional forms of delivering services by remote.

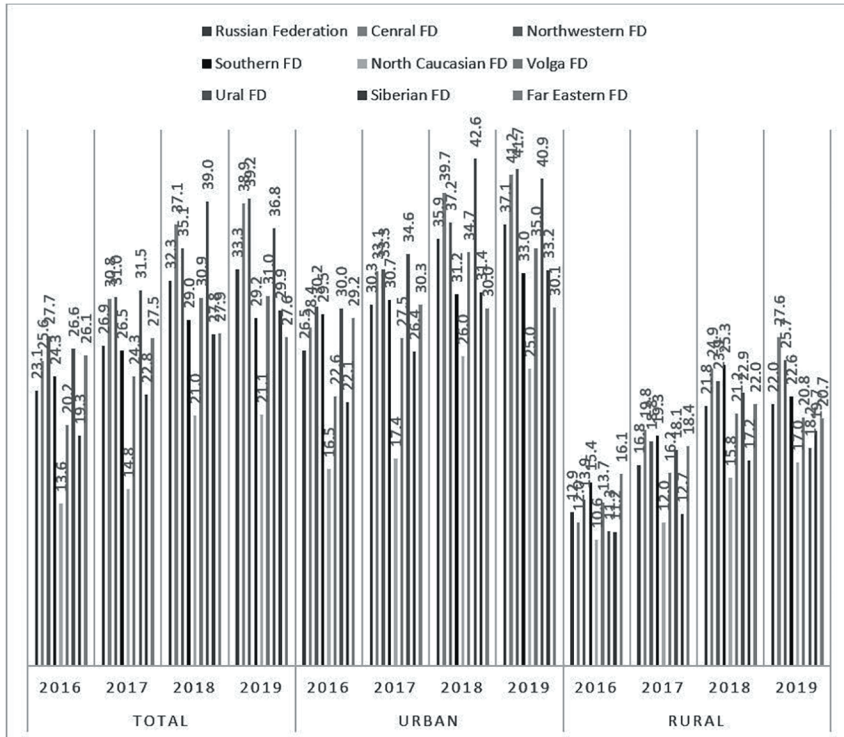
Despite the fact that this indicator lags behind developed countries in the buying the goods and services by the population via the internet, it is worth noting the significant dynamics in the precrisis period (until 2020), showing that a third of the Russian population (in 2019) used the internet to make orders. At the same time, there was an increase in rural areas from 13% in 2016 to 22% in 2019 (Figure 40.1).

In recent decades, the format of e-government has been developing, which provides not only the development of electronic document flow, but the interaction of government with citizens through information and telecommunication technologies. One of the constituent parts of this process is the digitalization of the public services sector (Figure 40.2).

Surveys conducted by Rosstat (2016–2019) show an increase in the share of citizens who applies to government and local authorities from 56% in 2016 to 74% in 2019. The greatest dynamics was observed in the Central Federal District from 55% to 82%. It should be noted that in the Southern, Volga and Ural federal districts, the population is more active in comparison with the country values for the period under review (Figure 40.3).

Figure 40.1

The Share of Population Purchasing Goods and/or Services Via the Internet (by Type of Settlement, %)



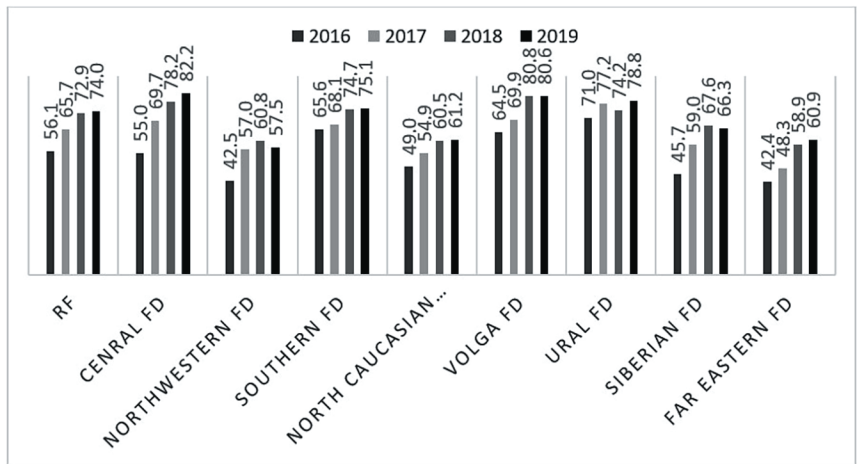
Source: Federal State Statistics Service (Rosstat) (2016–2019).

Despite the positive dynamics, only half of the population interacted with government and local authorities via the internet in 2019, which does not fully reflect the digitalization processes in the field of state and municipal administration, primarily in terms of interaction with the population.

In general, the proportion of people using the internet is increasing across the country. But the sample survey conducted by Rosstat (2016–2019) shows a sharp decline in 2017 (Figure 40.4) at every federal district. In 2019 the largest share of internet users was recorded in the Central Federal District—86.2%, which is 2.3% more than the national average. At the same time, a repeated decrease in the share of users can be noted in the Southern Federal District.

Figure 40.2

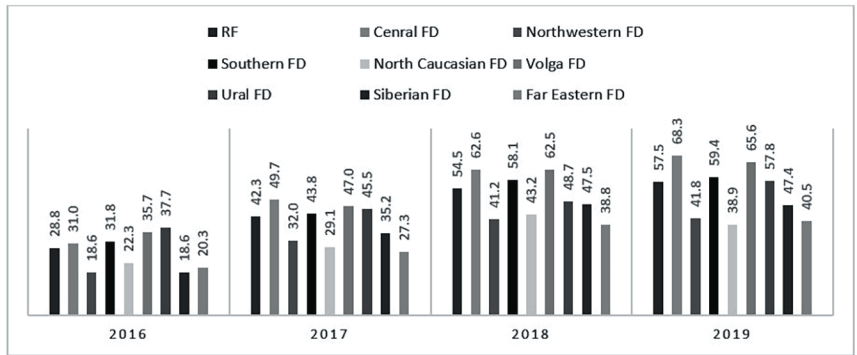
Population That Interacted With Government and Local Authorities, %



Source: Federal State Statistics Service (Rosstat) (2016–2019).

Figure 40.3

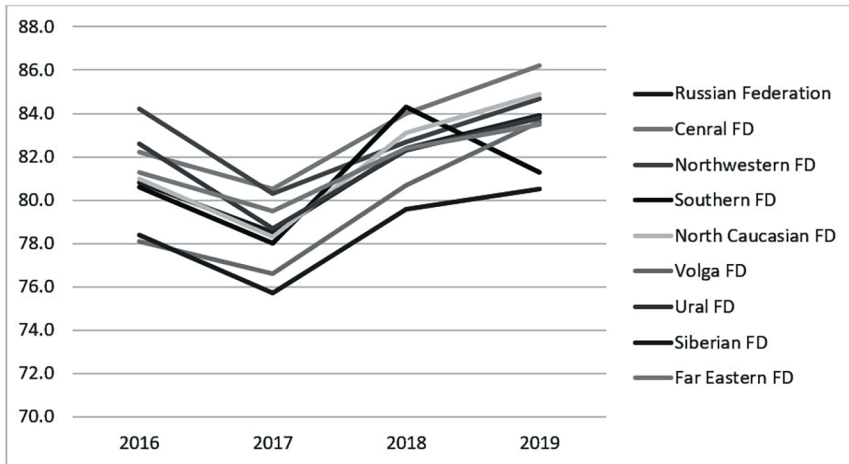
The Share of the Population That Interacted With Government and Local Authorities Via the Internet (official Websites and Portals, Mobile Applications, E-Mail, Self-Service Terminals), in %



Source: Federal State Statistics Service (Rosstat) (2016–2019).

Figure 40.4

The Share of the Population Using the Internet by Federal Districts of the Russian Federation, % (Aged 15–72)



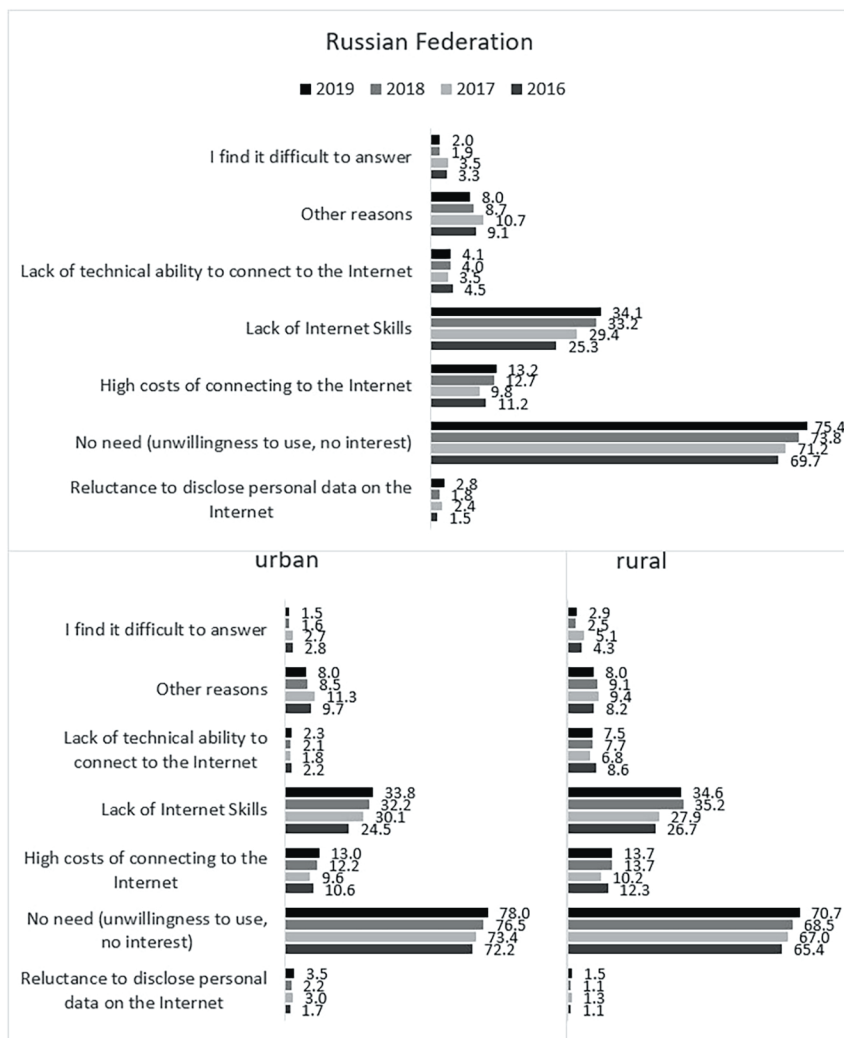
Source: Federal State Statistics Service (Rosstat) (2016–2019).

Data from Rosstat (2016–2019) were used to analyze the relatively low prevalence of internet use among the Russian population. Figure 40.5 shows data on several categories of reasons for not using the internet for three groups—for the country, among the urban and rural population. The presented reason “Unwillingness to disclose personal data on the Internet” is included in the group of reasons “For security reasons,” while the remaining sub-reasons in this group account for less than 1% and they were not considered in this study due to the fact that they do not have a significant impact on the degree of the internet using for the purchase of goods and services or contacting state authorities and local government.

In our opinion, the infrastructure support and the implemented state programs in the field of digitalization can be directly correlated to several reasons—unwillingness to disclose personal data on the internet (which is required when use e-services), a high level of costs when connecting to the internet, insufficient skill level to work on the internet, lack of technical ability to connect to the internet. Overcoming the influence of the first two reasons largely depends on the implementation of state programs, such as the state program “Information Society,” as well as federal projects “Information Security” and “Information Infrastructure.” The third reason is the insufficient level of skills for working on the internet, which accounts for more than 33% in 2019,

Figure 40.5

Share of the Population That Did Not Use the Internet, Due to Reasons of Non-Using and by Type of Settlement, %



Source: Federal State Statistics Service (Rosstat) (2016–2019).

it can be solved through projects of municipal, and regional authorities aimed at developing the skills of using the internet among the local population. The impact of the fourth reason can be reduced both by government programs in the field of digitalization and by programs aimed at improving the welfare of the population.

Based on Rosstat (2016–2019) data, we calculated the correlation coefficient to determine the relation between the proportion of the population that interacted with state and local authorities via the internet, and five criteria—the proportion of the population who has used the internet at least once in the last 12 months; the proportion of the population not using the internet for security reasons; proportion of the population not using the internet due to high level of connection costs; the proportion of the population that does not use the internet due to the lack of technical connectivity; proportion of the population who do not use the internet due to complete or insufficient level of skills to work on the internet.

According to Table 40.1, it is possible to determine the presence of digital inequality in federal districts and subjects of the Russian Federation, which is associated with the objective and subjective reasons discussed earlier.

Table 40.1

Pearson's Correlation Coefficient for the Indicator "The Population That Interacted With Government and Local Authorities—Via the Internet"

	1	2	3	4	5
Russian Federation	0.64258	0.369651	0.685109	-0.34539	0.999983
Central Federal District	0.69646	0.404312	0.856197	0.414261	0.949401
Northwestern Federal District	-0.0318	0.759219	0.21722	0.161757	0.887092
Southern Federal District	0.54953	0.157164	-0.17682	0.219368	0.896363
North Caucasian Federal District	0.66727	-0.23836	0.824135	-0.32749	0.922601
Volga Federal District	0.81563	0.704475	0.821491	-0.57847	0.945592
Ural Federal District	0.35695	-0.37283	0.723053	-0.99582	0.912925
Siberian Federal District	0.45846	0.252618	-0.57538	-0.78594	0.774295
Far Eastern Federal District	0.71269	0.195014	0.835341	0.734603	0.951485

1. Population using the internet, 2. For security reasons, 3. High costs of connecting to the internet, 4. Lack of technical ability to connect to the internet, 5. Lack of internet skills.

CONCLUSION

In the country as a whole and at every federal district, the greatest correlation was found with the fifth reason—not using the internet due to an insufficient level of skills to work in the network. This value of the correlation coefficient allows us to highlight the main directions of development as the sphere of public e-services and the e-government and the digital economy—the implementation of educational programs aimed at developing the skills of using the internet. Such programs will allow not only increase the volume of public services provided in e-format, but also to develop the form of e-participation of citizens in the life of the country, involving them in the discussion of projects of various state and municipal programs and strategies, as well as regulatory documents.

The presence of different levels of skills in using the internet, which arose due to various reasons, should not affect to the right of access to state and municipal services. Given the netocratic nature of the modern system of state and municipal government, it is necessary to consider the possibility of creating an institution of digital ombudsmen, whose functions should be focused on protecting the rights of citizens who have fewer opportunities to access public services in e-format.

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CHAPTER 41

HR-OUTSOURCING IN CORONA CRISIS PERIOD

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ABSTRACT

Human resources (HR) outsourcing aims to reduce operating costs and increase competitiveness through a deeper professional approach. American and European studies point to the growing popularity of outsourcing HR functions, while the similar Russian indicator is three to four times lower. The study deals with the factors that shape the demand for HR services (GDP, volume of revenue of enterprises in various industries, unemployment rate, etc.) and analyze them. The empirical basis of the study is the HR outsourcing market of Moscow in 2020 (corona crisis period). The chapter examines the level of monopolization of the HR outsourcing market, the intensity of competition, and market concentration. The research points to the maturity of the HR outsourcing market. Now it is not just a function of personnel recruitment or HR administration, outsourced to an external provider to reduce the company's internal costs. HR outsourcing has become more strategically oriented, influencing the transformation of business in general. Today, HR outsourcing does not replace the internal HR service, but complements it

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and opens new opportunities, for example, using digital technologies. The companies themselves have also become more professional in terms of using HR outsourcing. Large-scale outsourcing is reducing, giving way to exact professional solutions of specific problems, that is, HR outsourcing provides companies with access to higher levels of skills and knowledge.

HR outsourcing was one of the first types of outsourcing. It was formed as transferring HR functions to specialized providers in the 70s of the XX century (Momme, 2001). This method of organizing business processes appeared in Russian practice later, in the 90s of the XX century, which was closely related to the evolution of the country's economy: the development of private property and the arrival of foreign companies on the Russian market (Popkova et al., 2021a, 2021b). The 1998 crisis provoked the formation of a special form of personnel outsourcing—personnel borrowing. Formally, employees quit the company and were registered in the staff of a recruiting agency, while continuing to work for the company. Since the Law on Employment of the Population and amendments to the Labor Code appeared, agency work was prohibited, and recruitment agencies have been developed their activities in all areas of HR, in fact repeating global trends. Some difficulties have appeared in personnel outsourcing during the development of Industry 4.0 trends (Alpidovskaya & Popkova, 2019; Bogoviz et al., 2021; Haabazoka et al., 2019; (Lysova et al., 2020; Popkova & Sergi, 2020; Popkova et al., 2019; Ragulina, 2019; Saveleva et al., 2019; Sergi, 2019; Sozinova, 2019; Sozinova, Burtseva et al., 2019, Sozinova, Nabokikh, et al., 2019; Popkova et al., 2021a, 2021b).

To summarize, the outsourcing of any business processes aims to reduce operating costs and increase competitiveness through deeper professional implementation, that is, their reorganization (Sozinova et al., 2017b). Mansor et al. (2018), examining the impact of HR outsourcing on reducing costs and increasing strategy efficiency, pointed out that about half of the outsourcing agreements concluded were terminated for various reasons. Therefore, the need for a detailed assessment of the company's need for HR outsourcing is obvious. In addition, Charmi Patel has shown in his research that outsourcing affects reducing the agility of a company's HR functions (Patel et al., 2019).

Szierbowski-Seibel and Kabst (2018) pointed to the formation of a trend for the development of the HR function of companies in a more strategic direction, and HR outsourcing in general. His research was based on empirical evidence from 14 European countries. The number of companies using HR outsourcing is steadily growing in developed countries.

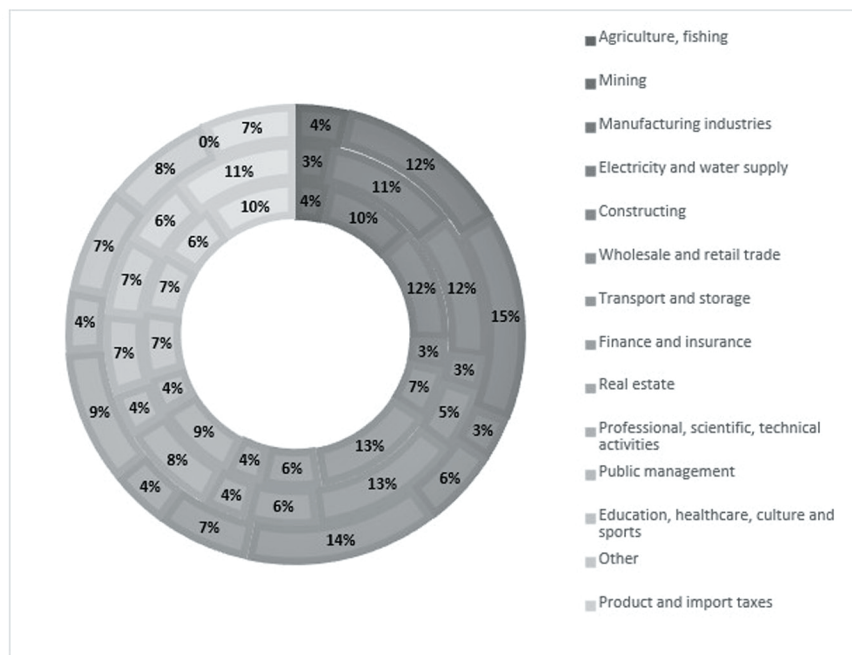
About 80% of North American companies practice outsourcing of any HR functions (Human Resource Outsourcing Trends Report, 2018). A similar indicator for European countries is about 62% (Berber, 2016).

The share of Russian companies using outsourcing is only 20% (Golubina, 2015). These figures have a logical explanation associated with the macro-economic indicators of the development of the country economy.

Adams et al. (1992) has clearly shown the dependence of the HR outsourcing market on GDP. An analysis of the sectoral structure of Russian GDP clearly describes the state of each segment. In addition, the dynamics of changes in the size of sectoral shares in the economy helps to pay attention to changes, both positive and negative. The structure of Russia's GDP in 2017–2019 (inner circle—2017, middle circle—2018, outer circle—2019) is shown in Figure 14.1.

Figure 41.1

Structure of Russian GDP by Industry



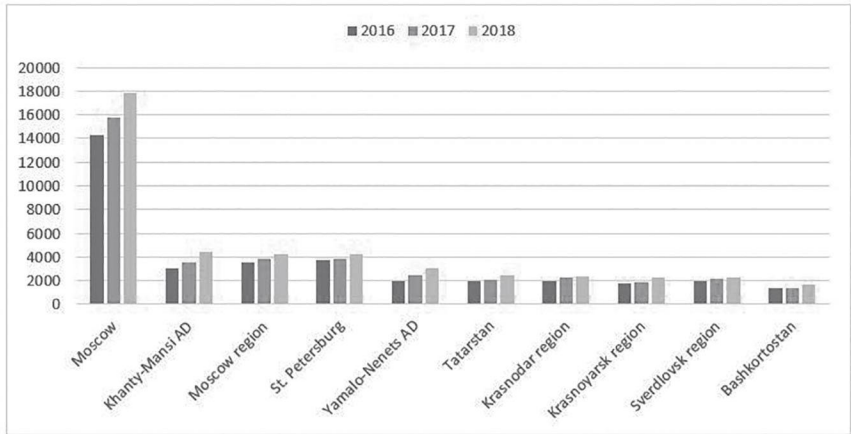
Source: Compiled by the authors.

Analysis of the GDP indicator in the dynamics of 2017–2019, in general, shows good dynamics of development of the selected industries. The largest growth is shown by the mining (+ 30%) and manufacturing (+ 20%) industries. Development stability is also demonstrated by the industries of wholesale and retail trade (+ 5%), construction (+ 2%), financial and insurance activities (+ 8%), transportation and storage (+ 3%).

The largest growth in the dynamics of three years (from 2016 to 2018) was shown by the Yamal-Nenets Autonomous Area (+ 57%) and Khanty-Mansi Autonomous Area (+ 46%). Also, good dynamics of development was in the Krasnoyarsk Territory (+ 29%), the Republic of Tatarstan (+ 27%), the city of Moscow (+ 25%) and the Republic of Bashkortostan (+ 24%). In general, all the Top 10 regions have retained their leading positions over the past 5 years. Separately, we should note the Republic of Crimea (growth of GRP since 2014 by 2 times) and the city of Sevastopol (growth of GRP since 2014 by 2.5 times). Although in absolute terms the GRP of these constituent entities of the Federation is small (391.3 and 79.3 billion rubles, respectively), the dynamics of stable positive changes make it possible to predict further significant growth of the regional economy.

Figure 41.2

Top 10 Constituent Entities of the Russian Federation in Terms of GRP in 2016–2018 (Billion Rubles)



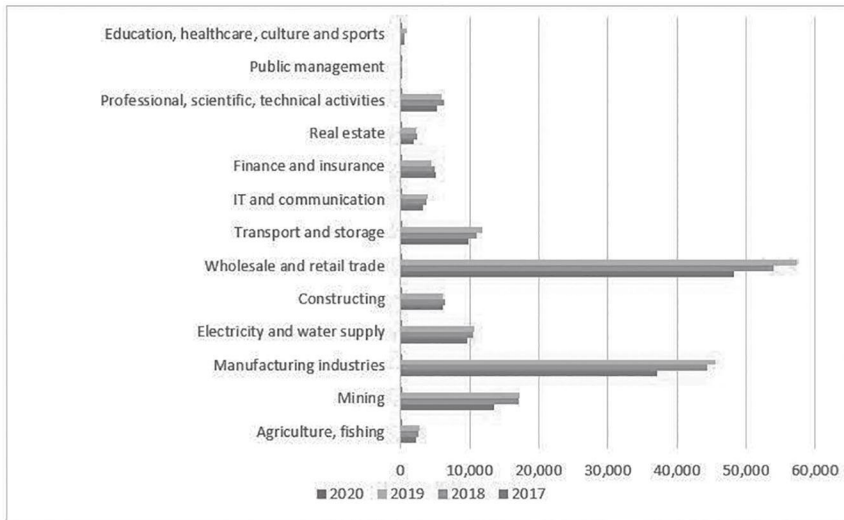
Source: Compiled by the authors.

The amount of revenue of the enterprise and the industry, in general, affects the number of jobs and vacancies. Revenue from the sale of goods, products, and works for the period from 2017 to 2019 is shown in Figure 41.3.

Analysis of the change in the revenue indicator of enterprises by industry showed the greatest growth in education, health care, culture, and sports (+ 79% over 2 years). Even though the absolute value of the industry's revenue is small, the significant growth in recent years allows concluding that there is good development potential.

Figure 41.3

The Volume of Revenue of Enterprises With More Than 15 Employees by Industry in the Dynamics of 2017–2019, Million Rubles



Source: Compiled by the authors.

Also, good growth is traditionally shown by the mining and processing industries (+ 27% and + 22%, respectively).

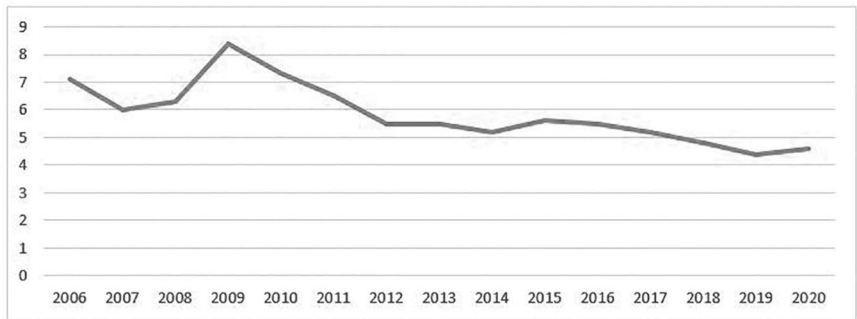
However, the most interesting is the sector of wholesale and retail trade (+ 19% with a total value of 57 billion rubles—14% of the country's total GDP). This industry “pulls” the development of the transportation and storage industry, as well as agriculture and fishing (+ 20% each industry). The branch of activity in the field of information and communication is also of interest, which is increasing the pace both globally and at the level of the Russian Federation (+ 17%).

At the end of 2019, the workforce was 75.9 million, with just over 95% (72.4 million) classified as employed in economic activity, and the rest as unemployed, meeting the International Labor Organization criteria (i.e., not had a job or profitable occupation, were looking for a job and were ready to start it in the surveyed week). The dynamics of the unemployment rate in the Russian Federation is shown in Figure 41.4.

In general, over the past five years, the unemployment rate has been relatively stable at 4.5–5.5%. An interesting trend: the level of employment in the leading regions in terms of GRP is higher than in other regions. So, with an average indicator of 59.8% of employed in the Russian Federation,

Figure 41.4

Unemployment Rate in the Russian Federation, % of the Economically Active Population



Source: Compiled by the authors.

the same indicator in the Yamal-Nenets Autonomous Area is 74.5%, in the Khanty-Mansi Autonomous Area 69.9%, in Moscow 67.4%, in St. Petersburg 66.6%. This trend is partly explained by the specifics of the rotational work method in YAMAO and KhMAO, as well as by internal migrations of the population towards Moscow and St. Petersburg.

METHODS

Analysis of the world practice of HR outsourcing has shown that not all HR functions are transferred to specialized operators (Table 41.1).

Analysis of 1,018 HR agencies operating in Russia has shown that there are:

- International HR-companies with representative offices in Moscow and other cities of Russia,
- Russian HR-companies of federal scale,
- Regional HR-companies without branches and representative offices in other regions (operating remotely),
- Local highly specialized recruiting agencies.

Analysis of 1,018 HR agencies operating in Russia has shown that there are:

Table 41.1

HR Functions Outsourced in Developed Countries

HR functions that are most commonly outsourced	HR initiatives tend to stay in-house
High-volume recruiting	Employee relations
Temporary staffing	Compensation design and delivery
Background checks and drug screening	Talent development
Relocation	Capital strategy planning
Payroll	Succession planning
Benefits administration	HR strategy
Coaching	Performance management
Creating/updating employee handbooks and policy manuals	Organization development
Compensation program development/implementation	Recruiting
Writing and updating affirmative action plans	HR department management
Providing sexual harassment training	
Independent contractor compliance	

Source: Analytical portal. <https://www.thebalancecareers.com/human-resources-outsourcing-1918386>

- International HR-companies with representative offices in Moscow and other cities of Russia,
- Russian HR-companies of federal scale,
- Regional HR-companies without branches and representative offices in other regions (operating remotely),
- Local highly specialized recruiting agencies.

International companies have a wide geographic presence with a large number of offices in different countries (Ancor, Staffline, Hays, Kelly Services, Antal, Brunel Russia, Coleman Service, and ManpowerGroup). Traditionally, their clients are the largest international companies, pulling an HR agency to each new location. The main service of all agencies is the search and selection of personnel, but each has its specialization, among which:

- Stuffing (provision of personnel “for rent”);
- HR administration, especially in terms of hiring foreign specialists;

- Outplacing (support and professional consultations of dismissed employees);
- Maintaining career trajectories;
- Search for specialists in rare professions (oil and gas and mining sector);
- Relocation of personnel;
- Labor protection and industrial safety.

A distinctive feature of international HR-companies is the lack of services for managing business processes, there is rarely only consulting in this area. At the same time, Russian companies, both federal and regional, have a directed tendency to promote services for managing business processes, not only in the field of HR but also in building a customer's process model in general.

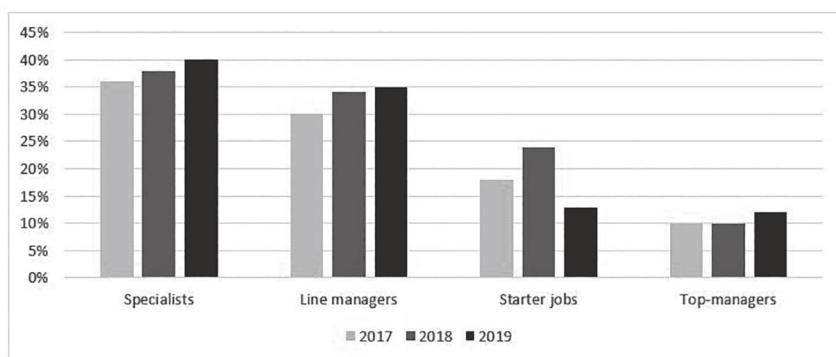
RESULTS

Information about the Russian HR outsourcing market is rather like an expert assessment since there are no official statistics in this regard. The Association of Private Employment Agencies (APEA) says that in 2019 the total volume of the Russian market for recruiting, staffing and outsourcing amounted to 79.7 billion rubles (a twofold increase in 6 years from 37.6 billion rubles in 2013). The market for the selection of permanent personnel showed moderate growth (by 7.7% compared to 2018). The labor supply market for employees following Federal Law-116 in 2019 grew by 12.2%, and the outsourcing market by 14.7% (Hays, 2019).

An analysis of the demand for vacancies indicates that most often with the help of agencies, specialists were hired (40%), and line managers (35%). Top-manager vacancies accounted for 12% of the total number of HR-agency vacancies (12%). A comparable share of vacancies was made by the so-called starter jobs (13%) (Figure 41.5).

There is a clear shift towards outsourcing the recruitment of highly qualified personnel with a simultaneous significant decrease in the initial positions of specialists.

As more and more complex vacancies began to be transferred to HR agencies, the average cost of a position per year increased by 20.5 thousand rubles on average (273.7 rubles in 2019). If the growth trend in outsourcing of highly qualified personnel has been observed steadily over the past years, then the decline in the demand for outsourcing of hiring specialists for initial positions occurred quite sharply, almost 2 times, in 2019, even

Figure 41.5*Distribution of Vacancies by Type of Position*

Source: Compiled by the authors.

before the start of the pandemic and the changes in the employment market that followed in connection with it.

However, there is still an acute problem of reducing the cost of recruiting mass personnel, as well as increasing the speed of rendering this service. High competition in the HR services industry as a whole contributes to better solutions.

In 2018, reports from the Association of Private Employment Agencies showed the largest growth in recruitment by industry:

- Resource extraction (oil, gas, minerals), chemical, energy—22% of all vacancies
- Healthcare (pharmaceuticals, medical equipment, clinical research)—11%

In general, the shares of vacancies were distributed as follows:

- Production of consumer goods (except industry)—11%
- Industrial production—10%
- Retail trade—9%
- Hi-Tech (IT & Telecom)—7%
- Finance, banks, investments—8%
- Construction and real estate—4%
- Transport and logistics—3%
- Automotive—2%

- Consulting—2%
- Agro-industrial complex—2%

The reduction in the need for employees in the retail sector concerned personnel directly involved in the retail service. Not the least role was played by the ever more deeply penetrating automation into the processes, as well as modern methods of organizing processes. This affects not only the number of required personnel but also the transformation of the tasks they perform.

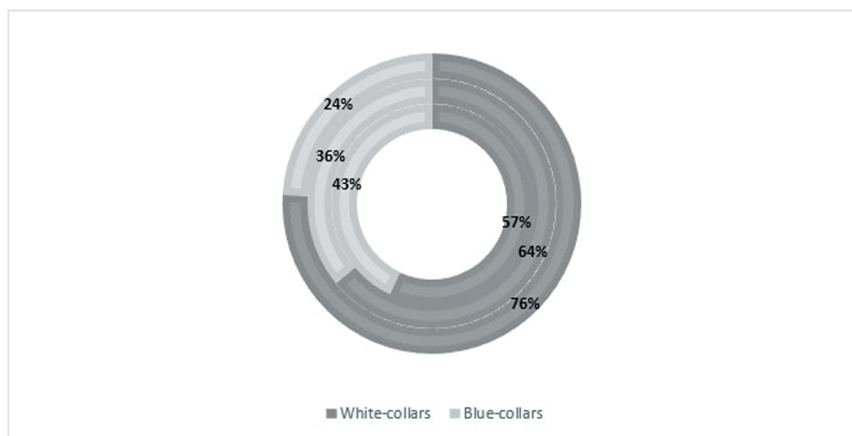
According to the results of a study by the independent research agency for marketing and sociological research MAGRAM Market Research, in 2019 there was a high demand for the selection of engineers and specialists in STEM (science, technology, engineering, and math), IT specialists. The main turnover of recruiting companies in the selection of permanent personnel was in five industries. In the first place were Natural Resources (oil and gas, chemistry, extraction, refining, energy)—24%, then—consumer goods, life sciences (pharma, clinical research, medical equipment)—11% each, retail trade, restaurants, hotels, industrial production (except consumer goods)—10% each. Next in terms of demand are vacancies in the areas of hi-tech (IT & Telecom, B2B)—7%, construction and real estate—5%, finance, banks, investments—4%, consulting and service, transport and logistics, agro-industrial complex and automotive—all 3% (MAGRAM, 2020).

In the natural resources sector, there was a shortage of qualified specialists and workers, the demand for which did not decrease in 2020. Nowadays foreign highly qualified specialists are actively involved in this industry, but the closure of borders due to the COVID-19 pandemic has made this practice much more difficult. Speaking in general about the situation in the oil and gas, chemical and energy sectors of Russia, there have been no major redundancies in employees. As of September 2020, we can talk about a slight slowdown in the rate of hiring employees by employers and a slight increase in the number of job seekers in this sector.

The number of requests for outsourcing the hiring of the office staff has increased. Interestingly, mostly white-collars are hired for temporary design jobs. Two-thirds of all employed workers in 2019 were from this category, up 15% from 2018 and 33% from 2017. 24% of temporary workers in 2019 were blue collars (36% in 2018 and 43% in 2017). Figure 41.6 shows the dynamics of changes for 2017–2019, the inner circle—2017, the average—2018, the outer circle—2019.

The top demand for outsourced vacancies was administrative, financial, trade, logistics, and IT staff.

In general, the personnel outsourcing market showed growth in the pre-crisis period, but the development of industries was uneven. Large

Figure 41.6*Outsourcing Structure for Hiring Temporary Employees, %*

Source: Compiled by the authors.

government projects and programs had a great influence on the emergence of vacancies.

Despite the active development of technologies and tools for finding personnel on IT sites, the availability and openness of resumes and contact information, the data of inactive candidates are often not presented on job boards or in professional communities. At the same time, specialists who are not actively looking for work often form a pool of qualified and in-demand employees. Such employees can only be attracted through head-hunting, and companies are ready to pay HR agencies for their search and selection.

DISCUSSION

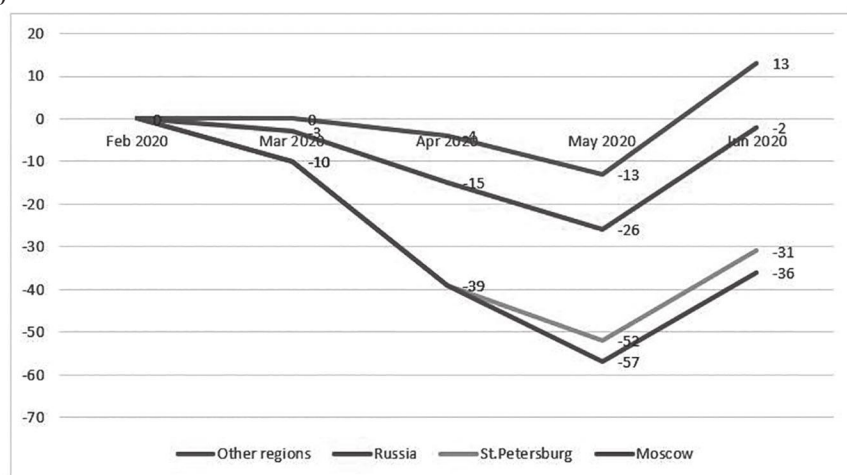
Due to the coronavirus epidemic, the global labor market has experienced the largest crisis in the last 70 years. The hotel business, wholesale and retail trade and the service sector are suffering the most, and a noticeable decrease in passenger traffic is also noticeable. For understandable and objective reasons, the health sector is the least likely to face reductions. The transformation and transition to a remote mode of work allowed the education sector to maintain its position. The increased demand for food products and an unprecedented harvest in 2020 ensured not only stability but also growth in the agricultural sector. The civil service and the sphere of ensuring public safety are also in high demand.

In Russia, in the first half of 2020, more than 20% of employees faced layoffs. This primarily applies to non-food retail workers. During the quarantine, approximately 32% of Moscow residents stopped working. Approximately 10% of the capital's residents were left without a source of income.

The massive lockdown naturally led to a decrease in the number of vacancies in the labor market. The most critical situation was in the first months—April and May. The number of vacancies during this period fell by a quarter compared to the “pre-crisis” February. At the same time, the decline was uneven: the decline was most noticeable in Moscow and St. Petersburg (by half), and the average decline in Russia was about 13% (Figure 41.7).

Figure 41.7

Dynamics of Vacancies in Russia, Moscow, St. Petersburg, and Regions in February–June 2020



Source: Compiled by the authors.

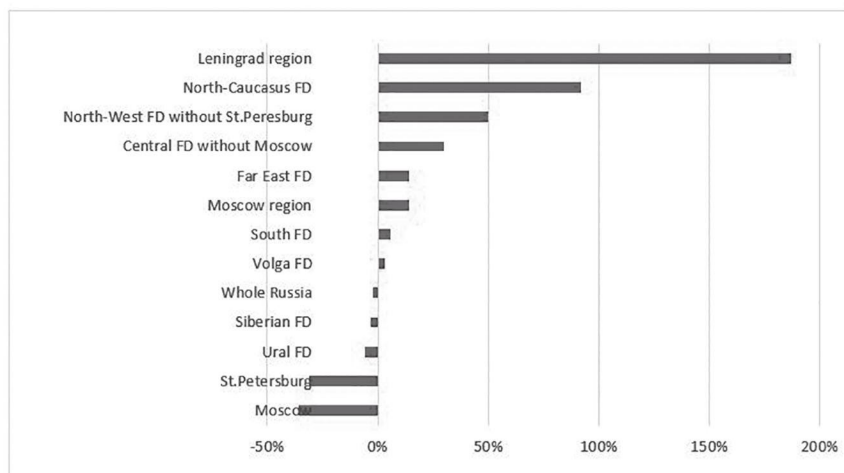
The hh.ru portal summarizes the data on the demand for labor resources in June 2020 (Figure 41.8).

By the fall of 2020, the demand for vacancies in many regions had recovered, but negative dynamics are still observed in Moscow and St. Petersburg.

Although job seekers are now pessimistic, in Russia, as in the world, the number of vacancies for remote work has increased. Already in March, there were 71% more of them than before the start of quarantine. For October 2020, the most popular are programmers, support specialists, digital

Figure 41.8

Dynamics of Vacancies by Constituent Entities of the Russian Federation in June 2020 Compared to February 2020



Source: Compiled by the authors.

marketing experts, database administrators. The least demanded professions for October 2020 are the following professions: transport, beauty and fitness industry, catering, retail trade in non-food products (especially clothing, footwear, and electronics).

It is obvious that the growing need for advanced training or retraining, as well as the increased opportunities for distance learning, will entail professional transformations in the labor and employment market.

Mass recruitment is still the leading service for all categories of operators. At the same time, analysis of job sites has shown that international agencies do not always have a large pool of vacancies. The obvious leader by a large margin is the international company Ancor (2002 vacancies), otherwise, there is no direct relationship between the number of vacancies and the origin of the company. Only half of the international companies are represented by a large number of vacancies. Market leaders—KS International, Kelly Services, ManpowerGroup, Unity, VENTRA, and Right Choice (> 200 jobs)—have almost no specializations and cover the largest possible range of job openings.

To assess the level of market monopolization, the market concentration coefficient is calculated. The aggregate share of the market leaders, that is, seven companies—Ancor, KS International, Kelly Services, Manpower-

Group, Unity, VENTRA, and Right Choice was 45%. This is a fairly high indicator, showing a strong concentration of the HR services market.

The intensity of competition for the distribution of market shares (U_d) can be calculated using the following formula:

$$U_d = 1 - \frac{\sigma_s}{S_m}, \quad (1)$$

where:

σ_s – standard deviation of the market share of enterprises;

S_m – average market share.

Calculation of the average market share based on the number of vacancies presented makes it possible to form two sectors: a share above average and below average (Table 41.2).

The average market share is $100/52 = 1.9$.

The average share of Sector 1 is 5.1% and Sector 2 is 0.8%.

The standard deviation of the market share is calculated using the formula:

$$\sigma = \sqrt{\frac{(a_1 - a)^2 + (a_2 - a)^2 + \dots + (a_n - a)^2}{n}}, \quad (2)$$

where:

σ – standard deviation,

n – sample size,

a – n -th sample element.

The results obtained for each sector were respectively: $\sigma_1 = 5.3$ и $\sigma_2 = 0.41$.

Thus, the coefficient of the intensity of competition in Sector 1 is:

$$U_{d1} = 1 - \frac{5,3}{5,1} = -0,04$$

And the coefficient of the intensity of competition in Sector 2 is:

$$U_{d2} = 1 - \frac{0,41}{0,8} = 0,49$$

Table 41.2***Shares of HR Agencies in Personnel Recruitment***

Code	Share	Sector		Code	Share	Sector		Code	Share	Sector	
		1	2			1	2			1	2
1	20.0	20.0		19	0.5		0.5	37	2.2	2.2	
2	5.8	5.8		20	1.5		1.5	38	1.0		1.0
3	4.1	4.1		21	0.1		0.1	39	1.4		1.4
4	2.7	2.7		22	0.3		0.3	40	2.2	2.2	
5	1.8		1.8	23	0.5		0.5	41	7.9	7.9	
6	1.1		1.1	24	2.7	2.7		42	0.3		0.3
7	0.7		0.7	25	0.3		0.3	43	0.7		0.7
8	0.8		0.8	26	1.0		1.0	44	0.5		0.5
9	0.9		0.9	27	0.3		0.3	45	0.7		0.7
10	0.5		0.5	28	1.8		1.8	46	0.3		0.3
11	0.8		0.8	29	0.8		0.8	47	0.4		0.4
12	0.7		0.7	30	0.8		0.8	48	1.1		1.1
13	0.4		0.4	31	0.9		0.9	49	0.9		0.9
14	0.6		0.6	32	1.2		1.2	50	1.9	1.9	
15	1.4		1.4	33	0.7		0.7	51	1.2		1.2
16	0.3		0.3	34	0.4		0.4	52	1.1		1.
17	1.9	1.9		35	0.5		0.5	Others	15.3		
18	0.5		0.5	36	1.2		1.2	Total	100.0		

Source: Compiled by the authors.

The intensity of competition in the distribution of market shares is higher, the lower the coefficient of variation of market shares at the end of the analyzed period. Hence, the competition in the sector of leaders is higher than among other companies.

The Herfindahl-Hirschmann Market Concentration Index (HHI) is calculated as the sum of the squares of the market shares held by all sellers operating on the market:

According to different values of the concentration ratios and Herfindahl-Hirschman indices, three types of markets are distinguished:

I type—highly concentrated markets:

at $70\% < CR < 100\%$ and $2,000 < HHI < 10,000$

II type—moderately concentrated markets:

at $45\% < CR < 70\%$ and $1,000 < HHI < 2,000$

III type—low concentrated markets:
at $CR < 45\%$ and $HHI < 1\,000$

The resulting indicators of market concentration make it possible to assess the degree of market monopolization, the uniformity (or unevenness) of the presence of economic entities on it. The Russian market for HR services satisfies the last system of inequalities and corresponds to the III type of the market—low concentrated.

A summary analysis of the Russian HR outsourcing market is presented in Table 41.3.

Table 41.3

Summary Analysis of the Russian HR Outsourcing Market

Indicator	Assessment criteria	Means	Characteristics of the market structure			Competition assessment	
			High	Middle	Low	Undeveloped	Developed
1. The number of business entities, units	–	1,018	The indicator does not allow judging the competition in the market, except if the number is small				
2. Generalized indicator of the intensity of competition	tends to 1	0.49		+			+
3. Market concentration ratio	$70\% < CR < 100\%$	45.0					
	$45\% < CR < 70\%$						
	$CR < 45\%$				+		+
4. Herfindahl-Hirschman index	$HHI > 2000$	810.58					
	$1000 < HHI < 2000$						
	$HHI < 1000$				+		+

Source: Compiled by the authors.

CONCLUSION

The analysis has shown that the Russian market of HR services in the coronavirus period demonstrates the following trends:

- HR outsourcing technologies and tools are actively developing;
- the availability of digital tools and services is increasing;
- the region's HR services market is highly competitive but low-concentrated;
- large international HR agencies are not always market leaders;
- despite the presence of highly specialized agencies and the clear presence of niches, market leaders provide a full range of HR services.

Analysis of trends in HR outsourcing in the first half of the 20th century in terms of blue-collar workers has shown the presence of:

- Lack of working personnel from among migrants (associated with lockdown and closure of transport links),
- The outflow of resources from production to retail,
- Compensation for the shortage of foreign migrants with labor resources from other regions of the Russian Federation, the transformation of forms of employment in terms of rotational working methods for production.

The growing need for advanced training or retraining, as well as increased opportunities for distance learning, will entail professional transformations in the labor and employment market.

HR outsourcing has become mature. Now it is not just a function of personnel recruitment or HR administration, outsourced to an external provider to reduce the company's internal costs. HR outsourcing has become more strategically oriented, influencing the transformation of the business in general. Today, HR outsourcing does not replace the internal HR service, but complements it and opens new opportunities, for example, using digital technologies. Companies have also become more professional in terms of using HR outsourcing. Large-scale outsourcing is reducing, giving way to exact professional solutions to specific problems. That is, HR outsourcing provides companies with access to higher levels of skills and knowledge.

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CURRENT PROBLEMS OF STATE PROJECT MANAGEMENT OF THE DEVELOPMENT OF CUSTOMS ADMINISTRATION IN RUSSIA

Indicators as the Key to Achieving Aims

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ABSTRACT

The current system of public administration is undergoing a series of reforms. These reforms imply forming a system of end-to-end goal-oriented project documents involving ministries and agencies in the context of introducing the principles of openness and digitalization of government activities and socio-economic life. Under these new conditions, there is a new methodological, systemic problem of conformity of several interrelated documents in the framework of goal-setting, indicators, and determining their values.

INTRODUCTION

The current development of customs administration is implemented within the digitalization of public administration as part of the smart government

system. It is reflected in several documents, among which the central place is given to the State Program “Development of Foreign Economic Activity” (SP-27) (Government of the Russian Federation, 2014) and the Strategy of the Federal Customs Service of Russia (FCS of Russia) until 2030 (Government of the Russian Federation, 2020).

Since the beginning of 2020, the President of the Russian Federation approves new editions of updated state programs, one of which is the State Program “Development of Foreign Economic Activity” (SP-27). Structurally, this program is included in the block “Innovative development and modernization of the economy,” which consists of 19 state programs.

State programs differ from other federal planning documents in that the Russian government finances them annually, which implies the effectiveness of the implementation of activities and key events planned by the program. Each activity and the achievement of indicators are the responsibility of a specific coexecutor and participants in the program, which are certain state executive authorities.

SP-27 includes six subprograms. Its responsible executor is the Ministry of Economic Development of the Russian Federation. The coexecutor for subprogram 5 “Improvement of customs activities” is the Federal Customs Service (FCS) of Russia.

RESULTS AND DISCUSSION

According to the results of 2020, the Accounts Chamber of the Russian Federation, as a comment on the implementation of all state programs, noted an insufficiently high level of execution of planned expenditures (Table 42.1). For the State Program “Development of Foreign Economic Activity” execution of expenditures as of September 2020 amounted to 59.9% of indicators of the consolidated expenditure schedule of 2020 with changes, which is higher than the level of execution for the relevant period of 2019 (56.6%).

This trend is also typical for subprogram 5 “Improvement of customs activities.” According to Table 42.1, the execution of this subprogram was 55% as of September 1, 2020.

It is necessary to note several reasons for the low level of implementation of the program:

- Spread of coronavirus disease (pandemic COVID-19);
- Late decisions on allocating funds;
- Closure of borders, which made it impossible to deliver equipment, for example, to the Kyrgyz Republic;

Table 42.1

Information on the Financial Support (Expenditure) of Subprogram 5 "Improvement of Customs Activities" of the State Program SP-27, From the Federal Budget of the Russian Federation In 2020–2023

	Expenditures for SP-27, total	Expenditures for SP-27, subprogram 5 "Improvement of customs activities."	The share of expenditures of subprogram 5 in the total expenditures for SP-27, %
2019			
Implementation in 2019	86,102.4	67,095.7	78
2020			
Approved in SP-27 (passport)	88,346.7	65,910.4	75
Approved in SP-27 (draft passport)	88,729.4	70,462.6	79
Consolidated quarterly profile as of September 1, 2020	88,729.4	70,462.6	79
Execution as of September 1, 2020	47,504.6	38,746.3	82
Percentage of execution of the quarterly profile	53.5	55	–
2021			
Approved in SP-27 (passport)	86,792.3	67,368.0	78
Approved in SP-27 (draft passport)	76,420.3	67,993.0	89
Deviation of the draft passport from the approved SP, %	88.1	100.9	-
2022			
Approved in SP-27 (passport)	84,379.2	69,154.4	82
Approved in SP-27 (draft passport)	76,721.5	69,190.3	90

(Table continued on next page)

Table 42.1 (Continued)

Information on the Financial Support (Expenditure) of Subprogram 5 “Improvement of Customs Activities” of the State Program SP-27, From the Federal Budget of the Russian Federation In 2020–2023

	Expenditures for SP-27, total	Expenditures for SP-27, subprogram 5 “Improvement of customs activities.”	The share of expenditures of subprogram 5 in the total expenditures for SP-27, %
2022			
Deviation of the draft passport from the approved SP, %	90.9	100.1	-
2023			
Approved in SP-27 (passport)	81,851.2	70,239.1	86
Approved in SP-27 (draft passport)	78,467.4	71,197.0	91
Deviation of the draft passport from the approved SP, %	95.9	101.4	-

Source: Compiled by the authors based on (Accounts Chamber of the Russian Federation, 2020a).

Table 42.2

Target Indicators and Their Values for Subprogram 5

No.	Name of the indicator	2020	2021	2022	2023	2024
1.	Share of goods items checked by customs inspection in the total number of goods items for which the goods declaration was filed, %	4.8	4.8	4.8	4.8	4.8
2.	Share of violations of customs legislation and other offenses identified when declaring goods using the risk management system in the total volume of such violations identified by customs authorities in the results of customs control, %	85.2	85.4	85.6	85.8	86

(Table continued on next page)

Table 42.2 (Continued)**Target Indicators and Their Values for Subprogram 5**

No.	Name of the indicator	2020	2021	2022	2023	2024
3.	The share of the utilization of budgetary allocations intended for implementing the measures on the provision of one-time social payments to employees with special ranks and other categories of citizens in cases stipulated by the legislation of the Russian Federation for the purchase or construction of residential premises in relation to the total amount of financing allocated for these purposes, %	99	99	99	99	99
4.	Total capacity of polyclinics of the Federal Customs Service of Russia	1,455	1,455	1,455	1,455	1,455
5.	Number of customs operations performed by customs authorities through the information systems of customs authorities without the participation of customs officials, units	4	4	5	6	7

Source: Government of the Russian Federation (2014).

- Lack of communication between the planning system and the budget allocations provided (Accounts Chamber of the Russian Federation, 2020c).

In connection with the above, the Government of the Russian Federation, simultaneously with the adjustment of budget allocations, amended the goals, objectives, expected results, targets, and other parameters of state programs. Changes were also made in the SP-27.

According to the results of the examination of state programs in 2020, the Accounts Chamber emphasized the shortcomings associated with the following (Accounts Chamber of the Russian Federation, 2020c, p. 48):

- Lack of correlation between the resource support and the achieved values of indicators;
- Deterioration of indicator values;
- Multiple changes in the composition of indicators;
- Presence of a low proportion of indicators determined based on state (federal) statistical observation data.

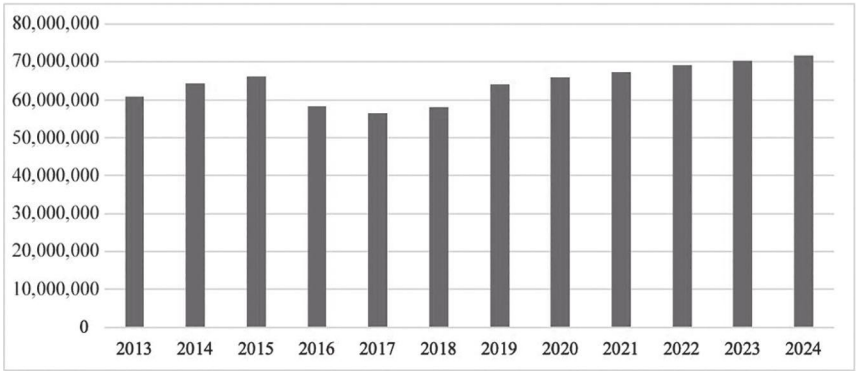
Thus, we can conclude that the risks of nonperformance (untimely performance) and nonachievement of the target indicators of the program are pretty high. In this regard, the Ministry of Finance of the Russian Federation is transitioning to project-based principles of management in its work with state programs. These principles provide for creating a system of unified program-targeted instruments and their synchronization in terms of content, procedures of formation, implementation, and reporting (Ministry of Finance of the Russian Federation, 2020).

According to Table 42.1, the largest share of funding (86%) falls on the fifth subprogram, the executor of which is the Federal Customs Service of Russia. Therefore, we will further focus on the analysis of subprogram 5 “Improvement of customs activities.”

According to the latest version of SP-27 “Development of foreign economic activity” (Government of the Russian Federation, 2014), the volume of budget allocations for the implementation of subprogram 5 is shown in Figure 42.1.

Figure 42.1

The Volume of Budget Allocations for Implementing Subprogram 5 “Improvement Of Customs Activities” For The Period From 2013 To 2024, Thousand Rubles



Source: Compiled by the authors based on (Government of the Russian Federation, 2014).

Figure 42.1 shows that the financing of the subprogram was extended until 2024, although initially, the subprogram was designed to be completed by 2020. Moreover, the amounts allocated for 2021–2024 are consistently higher than the amounts for 2020. Therefore, the Government of Russia attaches particular importance to improving customs administration to develop foreign economic activity, increase the competitiveness of the Russian economy, and ensure the country’s economic security.

Subprogram 5 singles out five indicators maintained from 2020 to 2022 (Table 42.2). In 2023, the number of indicators is reduced to three. The values of the two indicators are annually increasing, and the values of the three indicators are decreasing.

The planned values of the indicators for the time of customs control of risky/nonrisky shipments were achieved in 2018 and further excluded from the list of indicators (0.68 and 1.35 hours, respectively). Table 42.2 shows the relevant indicators for the period from 2020 to 2024.

The Accounts Chamber of the Russian Federation believes that the composition and meaning of the target indicators of SP-27 generally indicate their insufficiency, as well as the insufficient validity of their target values to fully assess the achievement of the goals and objectives of the state program (Accounts Chamber of the Russian Federation, 2020d, p. 11). This methodological observation seems to be perfectly correct. In our opinion, this conclusion can be extended to the content of the indicators of subprogram 5 “Improvement of customs activity.”

The indicators involve assessing the achievement of the planned goal, which is formulated broadly and generically—“the development of the system of customs administration.” It appears that a methodological error was made in the formulation of the goal, which does not allow for a relevant assessment of its achievement. Consequently, the vague formulation leads to the fact that assessing the degree of achievement of this goal is also varied and subjective.

Let us move on to the analysis of the indicators enshrined in subprogram 5. According to Table 42.2, although the share of violations detected by the risk management system is slowly growing, the share of customs inspections remains constant at 4.8%. The number of fully automated customs operations increases from 4 to 7.

Thus, the approved indicators and their quantitative values are generally aimed at achieving the goal of “developing the system of customs administration.” However, in the framework of effective project management, they cannot be regarded as significant indicators of achieving the goals of the FCS-2030 Strategy.

The period 2021–2024 covers the first phase of the implementation of the FCS-2030 Strategy. The Federal Customs Service of Russia has developed an action plan for 2021–2024 to implement the Development Strategy of the Customs Service until 2030 (Customs Service of the Russian Federation, 2020). In this case, the priority direction is the full-scale automation of customs clearance and control processes by developing and implementing a promising model of “intelligent checkpoint” across the state border of the Russian Federation.

However, according to subprogram 5 of SP-27 (Table 42.2), the proportion of inspections remains the same, and the proportion of violations

detected by the risk management system increases from 85.2 to 86%, which we consider to be insufficient in terms of the implementation of planned activities.

It is necessary to note the discrepancy between the target indicators of the planning documents of the federal (SP) and departmental levels (Strategy 2030). The departmental strategy has a more progressive and precise form than the higher-status SP-27.

This can be seen from the fact that the activities in the plan of the FCS of Russia reflect the widespread automation and informatization of customs clearance and control processes, as well as the development of interaction systems with various subjects of foreign trade activities.

In our view, the principles of project management are not fully implemented within the unified system of planning the results of SP-27 and the FCS-2030 Strategy. It should be noted that the preparation of the FCS action plan for the period from 2024 to 2030 is scheduled for October 2024 (Customs Service of the Russian Federation, 2020). By this time, the implementation of the SP should be completed, which means that there will be an opportunity to correct these discrepancies.

It seems that the measures implemented within the framework of the development of customs services to automate customs clearance and control processes played a crucial role in increasing Russia's place in the World Bank's Doing Business ranking on the indicator "International Trade." This can be seen in the movement of Russia from 170th place in 2015 to 100th place in 2017 (Table 42.3) (World Bank, 2020).

One of the expected results of the SP-27 is a significant increase in the position of Russia in the World Bank's Doing Business ranking on the indicator "International Trade" (40th place by 2024) (Government of the Russian Federation, 2014).

Russia's position In the World Bank's Doing Business International Trade ranking, Russia occupied 100th place in 2017 and 99th place in 2019, with a plan to rank 80th in 2019 and 2020.

Indicators that imply the final assessment of the indicator "International Trade" reflect the time and cost indicators of control activities and paperwork for exports and imports in the framework of border and customs control. In this regard, a significant increase in the ranking since 2017 is associated with the implementation of the following measures:

- Electronic declaration;
- Auto-registration;
- Auto-release;
- Entry into force of the EEU Customs Code;

Table 42.3***Russia's Place in the "Doing Business" Rating in Terms of the "International Trade" Indicator***

Indicator	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Planned position in the rating according to the roadmap (Accounts Chamber of the Russian Federation, 2020b)	79	–	–	17	–	–	–	–	–	–
Planned position in the ranking according to the SP-27	79	170	140	100	80	80	70	60	50	40
Actual ranking position	170	140	100	100	99	99	99	–	–	–

Source: Compiled by the authors based on (Government of the Russian Federation, 2014; Accounts Chamber of the Russian Federation, 2020a; World Bank, 2020).

- Abolition of the obligation to submit documents to the customs authorities when submitting a declaration of goods.

Thus, time and cost are internationally seen as the most indicative of the effectiveness of international trade.

Table 42.4 shows comparative data on the indicators of the "International Trade" of the rating "Doing Business" for Russia and the OECD countries.

There is almost a fourfold difference in the costs associated with passing customs and border control. The cost of processing documents for imports in Russia is almost six times higher than in the OECD countries. According to Table 42.4, the temporal indicators also differ significantly.

Such a comparative assessment plays an important role in forming unified international supply chains; it reveals significant differences in the logistics of international trade activities, primarily in monetary and time costs. However, in the planning documents of the strategic level (SP-27 and the Development Strategy of the FCS of Russia until 2030), this assessment is not given and not taken into account. It is indicated that the automation

Table 42.4

Indicators of the “International Trade” of the “Doing Business” Ranking for Russia (Moscow) for 2019 in a Comparative Assessment With the Average for the OECD Countries

Indicator	Export		Import	
	Moscow	OECD, high income	Moscow	OECD, high income
Time for border and customs control (hours)	66	12.7	12	8.5
Time to process documents (hours)	26	2.3	43	3.4
Costs associated with passing border and customs control (USD)	580	136.8	400	98.1
Costs related to paperwork (USD)	80	33.4	160	23.5

Source: (Accounts Chamber of the Russian Federation (2020d).

of “smart” customs and its decision-making will automatically reduce the monetary and time costs of participants of foreign economic activity in the passage of customs control.

A closer reading of the materials within the formulation of the corresponding indicators reveals a formal and uncoordinated approach to the formulation of indicators and the choice of their values. Thus, in the formation of strategic planning documents at the federal and departmental level, which determine the trends and future of customs administration, there is a uniform understanding of the general direction and goals of the development of customs administration. However, there is a discrepancy in the achievement of these goals, which is associated with different methodological approaches to their achievement (relationship of the indicator to specific activities and monitoring events that contribute to its achievement; adequacy and relevance of these formulations, activities, and their implementation with the goals set, etc.).

The lack of a unified system of interaction in the system of state administration of customs administration in this matter requires more consistent and effective implementation of a systematic approach of project modeling and management.

It also becomes clear that the planned values for the indicators are actually no longer difficult to achieve. Nevertheless, the indicators themselves and their values are formulated in a way that only indirectly contributes to

the requirement to achieve a higher place in the “Doing Business” ranking in the category “International Trade.”

According to SP-27, temporal indicators are excluded from consideration for the future, while meaningfully, they make up half of the indicators in the “International Trade” category.

The Federal Customs Service of Russia does not evaluate the cost indicators of export-import transactions. However, the aspect of risk management and building an effective system of customs administration from a position of “cost—result of control,” the intellectual core of which is a risk management system, is estimated at the level of maintaining the same value of inspection volumes and a slight increase in the percentage of detection of offenses.

The Accounts Chamber of the Russian Federation for the period 2018, 2019, and 2020 audited the application of the risk management system in the Federal Customs Service of Russia (Accounts Chamber of the Russian Federation, 2020b). The risk management system is central to the selection of objects of customs control and customs inspection. According to the auditors of the Accounts Chamber of the Russian Federation, the facts of non-application of the RMS, improper decisions within the framework of the RMS, the existence of the facts of non-declaration of inaccurate information about the goods, etc. are significant. Nevertheless, these aspects are not considered in the indicators of improvement of customs administration (SP-27).

This aspect is directly related to the question of how to reduce the total cost of export-import transactions in terms of reducing the bureaucratic burden on the customs authorities (the second important aspect of the “International Trade Indicator” of the “Doing Business” rating). The mechanisms of the risk management system generate their own risks, which have not been investigated to reduce the bureaucratic burden on the part of customs authorities. For example, the development and application of targeted risk profiles can lead to the failure to conduct customs control in respect of a number of necessary supplies of goods, and, as a consequence, the partial payment of customs duties and taxes. In this case, the reduction of the cost of export-import transactions can be assessed by the subject of foreign economic activity as high-cost (corruption issues of applying the risk management system) or low-cost (due to savings on payment of customs duties). These issues represent a promising research problem, the importance of which increases in anticipation of the development of new planning documents at the federal level (the roadmap for the implementation of the Development Strategy of the Federal Customs Service of Russia 2030 (Government of the Russian Federation, 2012). Currently, these issues have not been investigated and are not reflected in the indicators assessing the improvement of customs administration.

CONCLUSION

It is necessary to qualitatively revise the system of indicators of customs administration as part of the improvement of state project management. Moreover, it is required to form a unified approach to the reflection of indicators at the level of a common coordinating platform of the central office of the FCS of Russia, the Ministry of Finance of the Russian Federation, and the Accounts Chamber of the Russian Federation, which will allow for more effective use of project management principles to build an effective system of customs administration.

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CHAPTER 43

CONTRIBUTION OF RUSSIA TO THE WORLD EDUCATIONAL CULTURE

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ABSTRACT

Research in assessing Russia's contribution to the world educational culture shows that the formation of the Russian system for training specialists in higher economic and engineering education originated in the late 19th and early 20th century. The application of the historical method allows us to reveal the main elements of the system of national higher professional education as a unity of education and upbringing. The chapter shows that learning and enlightenment are two lines of the same educational space. The authors summarize the historical experience of the project "State System of Higher Professional Education of Russia" in the early 20th century and the model of training a wide profile specialist in the 1960s. The chapter reveals the essence of the educational process on the example of St. Petersburg State University of Economics. Historical milestones and strategic decisions in education are highlighted. The authors' position is based on the need to rethink the current education models, using the extensive historical experience of national educational culture. The year 2020 witnessed the ravages of the global coronation crisis. The fight against coronavirus has exposed the negative consequences of overconsumption, the problem of widening the gap between the poor and the rich, and the negative human impact on

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the environment and the planet. The authors believe that new educational models, which are based on the rich historical experience of national culture, can positively influence the reconsideration of a set of life values and the formation of socioethical and spiritual foundations of society. In the modern national educational system, there emerged a problem associated with the rethinking of Russia's contribution to the world educational culture and the search for ways to restore the link "education—training—enlightenment," which determines the subject, relevance, and novelty of chapter.

INTRODUCTION

In this paper, we focus on the content of the system of higher economic education created under the leadership of the Minister of Finance of Russia S. Yu. Witte (1991). Historical facts show that Russia, ahead of Europe, independently developed a system of higher professional economic and technical education at the end of the 19th century. Witte's idea of combining the training of engineers and economists in a common educational space (polytechnic institutes with different branches of knowledge) allowed for interdisciplinary communication of students, which broadened the horizons of young people. This provision was justified theoretically.

The technical sciences study the economic activities of people in terms of the expediency of the techniques that people use to meet their needs. The economic sciences study it from the standpoint of the social relations arising on its basis. In practice, the two are inseparable. It is preferable that every technician should be in some way an economist by training and that the economist should be a technician. (Den, 1904)

In current Russian realities, this idea is in high demand in economic universities.

The inextricable connection between education and enlightenment is the most valuable contribution of Russian culture to world education. Western culture had no such perception of educational space, and there is no such perception. Moreover, this perception of the educational space has not been formed to this day. In Western culture, there is no such dialectical connection; learning is not associated with enlightenment. The role of linking the branches of education, learning, and enlightenment is objective. Neglecting one of these components negatively affects the entire education system.

Russian thinkers, writers, and philosophers substantiated the concept of enlightenment back in the *silver age* of national culture. Enlightenment aims at "the development of mental and moral powers; a scientific education, with a clear consciousness of their duties and the purpose of life. Enlightenment by science alone is one-sided, and does not lead to good"

(Dahl, 1863). People who are not spiritually prepared can use knowledge to the detriment of society rather than for its benefit: “it takes more than intelligence to act wisely” (Dostoevsky, 1989).

At the end of the 19th century, Russian society realized that changes in the educational system were directly related to technical and economic changes in the country’s life. Nowadays, the digital transformation of society gives rise to new educational models, in which it is essential to consider the historical experience of the development of the national education system. It is evident that the newly formed digital educational space (education refers to systems with a delayed effect) lays the foundations for the unpredictability of the country’s future. The Russian education system is marked with a harmonious combination of classical education models and digital online learning.

In March–April 2020, more than 1.5 billion students worldwide (over 90% of the total student population) were under quarantine. There occurred a need for distance learning. It is important to note that we focus only on one of the components of the educational system—learning.

The distance learning system emerged as a solution to the current critical situation, but not as a replacement for the previous system. This model has highlighted several new problems. Let us name some of them. First, the following shortcomings of information and communication support of educational systems were revealed:

- Low level of technical base of students and teachers;
- Low level of knowledge of teachers and students of information and communication technologies;
- Lack of a clear understanding of how long the student can perceive educational material online;
- Lack of a clear understanding of the people responsible for creating a video library of training sessions and presentations;
- Lack of understanding about the system for knowledge control.

Evidently, no technology can replace the live communication between the teacher and the student, as well as its role in the education of students’ minds.

MATERIALS AND METHODS

Genera-logical methods and interdisciplinary techniques of educational research significantly contribute to meeting the need for new educational models. This research focuses on substantiating the author’s position on Russia’s inestimable contribution to the world educational culture. The

interdisciplinary approach to the study of the stated problem provides an opportunity to apply the knowledge of social, humanitarian, natural, and other sciences.

The application of systems theory identifies new properties of the studied subject. The authors consider the system of education as integrity, where the unity of general dialectical laws allows bridging the gap between different areas of knowledge. Russia's contribution to the world educational culture is presented in the context of cumulative knowledge and interdisciplinary approaches. This is evidenced by the assessment of the past and present experience in the educational system from the perspective of applying knowledge of the humanities and natural sciences. Restoring the balance between learning and enlightenment aims to foster the morality and responsibility of the learner for the application of the acquired knowledge.

RESULTS

Russian society is maturing in its understanding of the role of creative ideology and educational activities in the educational process. In the current situation, the training of specialists cannot be carried out generally without a creative ideology that generates harmony. In fact, ideology determines the organizing forms for the entire practice of society and fills them with appropriate content. This applies to forms of speech, forms of thought, and norms of morality. Ideology expresses the people's understanding of life. The correct perception of the structure of life mobilizes the forces of creation in the people. An ideology based on animal instincts begins to prevail in the absence of a creative ideology.

The main problem of the reform of Russian education was the rupture of the link "teaching-enlightenment." The education system was unclaimed. However, the crisis of early 2021 reminded us of the laws of social development. The State Duma supplemented the Law "On Education" with articles on education. This corresponds to the essence of the problem—the Russian education system now legally includes education and enlightenment. The amendments to the law came into effect on September 1, 2020. The new articles deal with the education of the students' conscience.

This problem brings us into the realm of spirituality. Spirituality encompasses moral values, the perception of the world, and the individual from a moral standpoint. Spirituality determines the mindset, attitude, and behavior of students—it is an essential factor in education. Teachers will have to consider the educational potential of the disciplines. This is nothing new. Such a requirement was part of the domestic educational model of training professionals. The value of an academic discipline was determined by the amount of new knowledge and its educational potential.

Another condition for the successful development of the educational space is that the use of digital technology must be complemented by the growth of spirituality and should not contradict the harmonious development of students.

The use of the latest technology in the educational system is associated with additional risks and unpredictability. In this case, uncertainty, which affects the interests of literally all of society, can lead to tragic consequences. It is hard to predict how the situation will develop in the future in Russia and internationally if the knowledge is not directed in a constructive direction. Russia already has the sad experience of ill-conceived borrowing of the Bologna system. Research has shown that many teachers would like to return to the Soviet model of education.

Distance learning has become a reality before our eyes; it will not disappear from the educational environment. Nevertheless, it will be a different online learning experience than what people originally envisioned. It will be necessary to change the content and format of the curriculum and master the skills of the future for the new digital world. Teachers and students will have to master changing information and communication technologies, adapt to new digital educational services and software products. Digital technologies and services are not an end in themselves, but only tools for the educational process. It is crucial to strengthen the educational space with digital technology (Afanasenko & Borisova, 2019).

The trend of national economies returning to protectionism encourages countries to pay more attention to developing their digital learning ecosystems. Let us consider the ecosystem as a unity of digital and human resources and human empowerment through the creation of information storage and application of artificial intelligence (AI). There is a problem of completeness of its interaction with the outside world. "Entering the digital world changes the whole way of life and raises questions concerning the nature of people who has mastered new forms of increasing their capabilities" (Afanasenko, 2016). The new reality attracts all participants in the educational process with the increased capabilities of information and communication technology. Nowadays, about 3,000 smartphones and hundreds of apps can be released in one minute, allowing millions of photos and messages to be transmitted around the world.

According to statistics, the global education market is about 5 trillion dollars and may soon rise to 7 trillion dollars. The digital part of this market covers about 3% and will exceed \$260 billion by the end of 2020. In Russia, the average annual growth rate of the digital education space is 20%–25%. In the United States, the average annual growth of online education is slowing (3%–5%) due to the sufficient maturity of the digital segment. In China and India, the average annual growth of online education is estimated at 15%–20%.

Consequently,

the society sees a polarization, which leads to a contradiction between those accepting changes and those resisting it. This inequality is not social but ontological; it occurs between generations. One of these generations was born into the digital world and takes it for granted. In turn, those who were born earlier have to adapt to it. (Borisova, 2019)

According to sociologists, well-being in society depends on the quality of the generation of 30-somethings. In Russia, this generation saw the difficult 1990s and the Bologna system of education. The generation of 20-year-olds, unlike 30-year-olds, is used to stability, but they will also have to deal with the processes of the formation of “service man” and the depreciation of living labor. By 2030, more than 2 billion jobs (more than 50% of all current jobs) may be at risk of disappearing. Automation and robotics are displacing mid-level competencies.

Several scholars link the formation of educational centers of the future with the use of AI, the development of new software products, research infrastructure, and search services adapting to the goals and capabilities of users. A cognitive self-learning system in the form of an online student advisor and learning visualization services have already been tried out in practice. Generalization of different points of view showed that the scenarios of cyber-physical interaction of participants in the educational environment are expanding; it is complemented by new solutions built on games and simulation of real processes (an increase of about 25%). It is not the replacement of teachers with digital services, but the constructive interaction and cyber-physical cooperation of participants in the educational space.

New requirements for the construction of educational models are formed given these circumstances. The use and experimental testing of AR and VR technology to study objects and phenomena are expanding. Visualization of learning with AR and VR technologies provides remote simulation of different research situations.

Short-term educational programs are being experimentally tested. The demand for microlearning is due to the opportunity to acquire relevant skills and competencies in a short period. Additionally, we believe that there are significant prospects in the development of asynchronous online learning: when the schedule, time of the study, its intensity, and schedule of classes is formed by learners themselves, independent of the teacher. Communication interactions between learners are expanding within the framework of university platforms-integrators. Moreover, there emerged new educational services where learners generate, analyze, transform, and share information. Convenient network access to digital services contributes

to the socialization of participants in the educational space and provides convenient access to distance learning platforms. Online classes are held in a virtual classroom, where teachers and students use their own gadgets and other technical devices for educational purposes. The behavior of the participants of online learning is characterized by how they communicate in the digital environment: prosocial and antisocial (Pogozhina et al., 2020). Under such conditions, the main task of the learner is the ability to master the skills of making a creative decision.

The university becomes a leader of change and a catalyst for creating innovative “state-education-business” communities and ecosystems of the educational environment. Initiatives and transformations aimed at the digital transformation of education put the role of the teacher, the expert, and the motivator in the modern educational space on the agenda. According to the new competencies, teachers are the organizers of ecosystems, the leaders of changes, and the part of constant professional development (De Corte, 2019).

It is logical to assume that the future lies in educational ecosystems of blended learning, where digital technologies stimulate new ways of learning that complement traditional education. In such systems, big data will allow to effectively manage the learning and education outcome of each learner and the whole system.

In the Russian educational community, discussions are underway, and pilot projects have already been launched for a new *2+2+2 model* of the educational system. This system focuses on the development of individual learning paths for students. In this context, it is planned to strengthen the general educational block in the first two years of study. After that, it is planned to allow students to choose a professional trajectory of study independently. In the project of the new *2+2+2 model* of the educational system, the main components are competencies.

- In this case, competencies include the following:
- Currently demanded professional skills (hard skills);
- Skills determining the ability to communicate in the social environment, independently make decisions in conditions of uncertainty, act constructively when solving various kinds of problems (soft skills);
- Skills of self-determination, self-education, and independent construction of an own educational program (self-skills).

The concept of “self-skills” has become well-established in the Russian and global educational community (Raitskaya & Tikhonova, 2018). The essence of the new educational model is that the first two years of educa-

tion in universities are a junior bachelor's degree. At this level, students acquire universal competencies with elements of professionalization and master the basic foundations of management knowledge.

At the second level, the students move to senior baccalaureate status. That is, from the third year of study, they are invited to implement the individualization of their educational trajectory and gradually combine study and work. This is currently called the "practice-oriented approach"; the students are invited as interns in the partner companies. The developers of the model believe that prospects for further study in the master's program will emerge during this period and after it. That is, the students will be able to move to the next level of the *2+2+2 model*. Thus, the four-year bachelor's degree is differentiated into two levels: a junior baccalaureate and a senior baccalaureate.

It is expected that the transition from the *4+2 model* to the *2+2+2 model* will allow students to choose their areas of study not at admission, but after the first two years of study, which will strengthen the block of general education and the formation of a holistic personality.

The developers of the new model call it *educational flexibility* and indicate the opportunity for students to apply *deferred choice* to their majors. The following arguments in favor of the new model are put forward:

- Training of specialists of a wide profile, demanded by the market (e.g., economists-marketers, logisticians, suppliers, etc.).
- Mobility of students (i.e., the ability to change universities after the first two years of study and after four years of study).

The advantage of the new model is associated with the ability of students to choose courses from different faculties. As a consequence, the first two years of university will not require stable study groups. Students will constantly be changing, and there will occur a need to earn credibility anew in each course. Therefore, self-selection of courses will increase the responsibility of students and promote their communication skills.

Students are expected to enter the educational space of the university without being tied to a specific faculty or department. Proponents of the new model believe that there will be no contradictions associated with the redistribution of budgetary places. Switching to another direction is either "manual" or formal. The only problem is that students will choose "easy" courses rather than courses according to the developmental goals and job prospects. However, in this case, they can get help from the institution of tutors. When implementing the *2+2+2 model*, a student can be expelled because of an incorrect secondary choice of direction or an inability to determine his or her educational trajectory.

According to the proponents of the new model, the educational space of the first two years should be the same in all universities. That is, the junior baccalaureate is the same for all students. This stage forms a worldview, critical thinking, and the ability to perceive the world from the perspective of different disciplinary frameworks.

In the next two years of the senior bachelor's degree, the university acts independently. The next stages are further education (master's degree, graduate school, or short courses) and continuous lifelong learning.

However, there arise legislative and organizational problems. Evidently, it will require appropriate legislation at the Ministry level and, consequently, organizational and structural changes at the level of the overall education system of the country.

A draft law was submitted to the State Duma of the Russian Federation and passed in its first reading. According to this draft law, from September 1, 2021, students will be able to obtain multiple qualifications in the first two years of training and change the profile of education (department) after the second year. Universities will be given more autonomy in terms of selecting educational programs and combining elements of training from different educational professional standards into new blocks demanded by the labor market. The autonomy of universities will increase their ability to adapt to the rapidly changing situation in the labor market.

Thus, the educational space becomes an ecosystem, and the university becomes its integral part. Currently, up to 90% of decisions are made online. Some universities (e.g., Tyumen State University) have established "Institutes of Distance Education" for part-time education and other educational purposes. Hybrid (with an online platform) global ecosystems are already being formed (e.g., *SBER* ecosystem), including education systems. In this situation, Russian economic universities can acquire the status of a subsystem of the second level (senior baccalaureate), where students who choose an economic profile of education will be trained.

In such a situation, we should look at the education system as an essential national task, which ensures the continuity of generations and determines the future of the country. The Russian education system must contain conditions for forming a moral personality and a positively thinking person (Afanasenko, 2016). Education cannot be seen as a service. Education is the unity of learning and enlightenment. This provision must be taken into account in the new educational models.

CONCLUSION

Let us highlight the fundamental provisions of the Russian education system, which was formed in the late 19th and early 20th centuries. Russia's

contribution to the world educational culture lies in the fact that public education is seen not as a service, but the most important national task, which solves the problem of intergenerational continuity and determines the country's future. This provision has now been borrowed by other countries, where education has become an essential state function.

The Russian and Soviet concepts of education combined two components—training (acquisition of knowledge, skills, and competencies) and enlightenment (cultivation of consciousness). Enlightenment triggers the mechanism of development of students, expands their consciousness, and increases the responsibility for the application of acquired knowledge. The educational potential of an academic discipline is realized by its impact on improving the moral level of the student. To avoid the reduction of the content of the education of consciousness of students to the preparation of numerous programs, schedules, reports, and so forth, it is necessary to determine the educational potential of academic disciplines, review the amount of workload for their mastering, develop new training courses, and prepare teachers. This is the main road of enlightenment—through the subject. This is the road every teacher should follow.

The challenge and opportunity lie in developing and implementing new educational models that combine the development of individual learning trajectories and collective (team) work with the joint management of change and the creation of the unknown. In this context, the fundamental issue in the development of the educational system is not its digital transformation, but the understanding and preservation of the balance of learning and education.

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CHAPTER 44

THE CONTENT OF THE CONCEPT OF “OBJECTIFICATION” AND ITS USE IN THE CONTEXT OF PEDAGOGICAL RESEARCH

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ABSTRACT

One of the main scientific methods is to determine the essence of the concepts used, which is a necessary condition for success in solving research problems. The chapter analyzes the content of the concept of “objectivization” in the context of the current state of scientific research in the field of pedagogy.

The purpose of the work is to reveal the content of the concept of “objectivization” and highlight the features of its use in scientific and pedagogical works. In the course of the research, the following tasks are solved: analysis of modern pedagogical works that use the term “objectivization”; identification

of the target of the use of the term “objectivization”; formulation in the broad sense of the definition of the concept of “objectivization” in pedagogical research.

The scientific novelty consists in the identification of the content and main peculiarities of the use of the term “objectivization” in the context of pedagogical research. Contextual analysis shows that “objectivization” is a polysemantic concept in modern research, not all authors define this category, but use it in various substantive aspects: from its interpretation as a method of ensuring the objectivity of evaluating educational results and development indicators to its use as a means of cognition that characterizes a person. The results of the content analysis show that the use of keywords for the definition of the concept under study in a small range of amounts indicates the ambiguity of the term, but makes it possible to define it in a broad sense as “objectivization in pedagogical research is a tool for transforming activities, phenomena or results in subject-object relations to solve specific pedagogical problems.”

The current state of society in a rapidly changing world requires innovation and dynamics, social development requires fundamentally new approaches to the processes of education and upbringing. At the same time, modern pedagogical science strives to concretize the basic terminology for a more precise definition and understanding of the main pedagogical problems.

One of the most important scientific methods is to determine the essence of the concepts used, which largely determines the success in solving research problems. The conceptual apparatus of the humanities, such as pedagogy, reflecting the influence of social phenomena on language, actively responds to various changes that accompany general changes in science and its main structural elements. We observe an active increase in the rate of enrichment of industry and general scientific terminology as a result of storing and receiving information as a research tool and a means of professional communication. At the same time, the scientific community is concerned about the blurring of the boundaries of pedagogical science itself, caused by the borrowing of various ideas, concepts, and methodology from related sciences (Kicheva, 2003).

The critical situation of pedagogy is caused by many reasons. The fundamental point was the absence of the process of systematization of terminology, along with the simultaneous accumulation of a large amount of theoretical information, which, with the increasing integrative links of pedagogy with other sciences, led to the ambiguity and diversity of their interpretation, and the abundant appearance of author’s terminological units.

In his works, Polonsky (2017) points out that the most important condition for the entry of Russian pedagogical science into the international scientific community is the solution of the problem of systematization of

terminology. For more productive and high-quality pedagogical research, it is important to use the appropriate conceptual apparatus. The main criterion for organizing the terminological apparatus within the framework of pedagogical science is to identify the correspondence of borrowed concepts to the goals, objectives, and content of pedagogical science.

To date, there are no studies related to the content of the concept of “objectivization” in the context of pedagogical research. The analysis of pedagogical works of domestic and foreign researchers shows a difference in the definition of the content of the concept of “objectivization,” which, in our opinion, depends on the goals, scope, motives and forms of its use in pedagogical research.

According to many researchers, the main methodological criterion for introducing a new concept into the terminological apparatus of pedagogical science is to ascertain its exact place in the system and the relationship with existing concepts.

METHOD

In our research, to determine the essence of the concept in the field of pedagogy, we relied on the methods of contextual analysis and content analysis. In the context analysis, we identified the features of the concept in question in various sources, such as scientific and educational literature. Further, the most significant features of the concept were identified by the synthesis method from the entire spectrum of identified features, on the basis of which the key concepts were formulated with the introduction, if necessary, of an additional feature (Galaguzova, 2016).

For the purposes of better understanding and clarification of the essence of the concepts used in pedagogical science, we used a step-by-step procedure for content analysis of a specific category, concept or pedagogical phenomenon that is part of the system of psychological and pedagogical sciences (Marinovskaya, 2015).

RESULTS

The analysis of the use of the term “objectivization” revealed the fact that the authors, as a rule, do not give their own interpretation of this concept, which is due to the peculiarities of its use. This term is used in relation to a phenomenon of reality or a procedure, and not to a person, as in the case when objectivization is used as a method of objective diagnosis. An example of such research is the work devoted to the diagnosis and analysis of the results of education or development. Thus, the term “objectiviza-

tion” is used to denote the method of objective assessment of the functional state of athletes. In such studies, objectivization serves as a method for identifying indicators of quantitative and qualitative measurements that illustrate the state and dynamics of the development of the object under study. The term “objectivization” is used in the analysis of methods for the qualitative determination of complex learning and performance phenomena that are used in sports or art in the development of algorithms for the technical value of various types of movements based on data obtained using the diagnosis and mathematical analysis (Annenko et al., 2015).

The use of the term “objectivization” is also used to evaluate the activity. In their work, such researchers as Grabelnikov and Zemlyanov (2018) use the term “objectivization” as a method for evaluating the effectiveness of the coach’s activities. This use of the term is explained by the problem of the lack of objective methods for assessing the professional level of a coach. The authors consider the concept of “objectivization” as a method of analyzing the effectiveness of coaching, which involves fragmentation the lesson into a certain number of parts for subsequent formalization. Thus, the term “objectivization” means to establish objective measures for the diagnosis of various conditions and dynamics of development, as well as the effectiveness of professional activity.

There are works where objectivization is used as a method of evaluating educational outcomes. Modern pedagogy aims at improving the assessment system, focusing on the humanization of the educational process. Theorists and practitioners strive for an objective assessment of the result of the work, which requires not only accurate technical, but also aesthetic assessment. Therefore, in this case, “the concept of “objectivization” should be understood as an improvement in the quality of the pedagogical process, as well as the formation of a sense of security and psychological comfort among schoolchildren, achieved as a result of increased confidence (in terms of objectivity) in the decisions that the teacher makes in the course of educational activities” (Nizhelskoy & Kubryak, 2017).

The concept of “objectivization” can be defined as the possibility of reducing subjectivity in assessing the results of education and development. In many ways, the desire for objectivity in the assessment of educational outcomes laid the foundation for qualimetry, which allows to analyze and develop a comprehensive program for assessing the quality of the educational process, based on the laws and principles of evaluating objects of any nature. This view of the understanding of the term “objectivization” is suggested in the following quote: “Since the learning process cannot depend on the point of view of the diagnostician, the objectivization of the results obtained was achieved through the use of relative units that allow us to compare the effectiveness of various stages of assessing the quality of education by quantitative methods” (Safontsev, 2015). Also, in

modern research, the technology of integral assessment serves as an objectivization of the process of evaluating students learning activities as one of the tools for leveling the subjective aspect, as well as achieving accuracy and adequacy in the process of evaluating the results of students learning activities (Chaikina et al., 2018). Thus, the term “objectivization” means ensuring the objectivity of the assessment of educational outcomes through the quantitative assessment of qualitative indicators.

In our opinion, it is acceptable to interpret the term “objectivization” in the context of pedagogical research as a definition of a material object in the context of objectified knowledge through printed, electronic, audiovisual or multimedia representation. Researcher Yakovlev (2012), for example, uses the term “objectivization” as “an opportunity to present the results of intellectual activity in a tangible medium by creating a thesaurus of subject activity.” Understanding the need for innovation in pedagogical creativity generates the process of objectivization as the definition of objects in the field of educational activity. It should be noted that in this case, the term “objectivization” becomes the opposite of subjectivity, which acts as a barrier in evaluating innovations in the educational process, which, in turn, prevents the definition of the value of pedagogical creativity (Zeer et al., 2011). Thus, the concept of “objectivization” can be applied when identifying the presence of pedagogical innovation in the educational process as a procedure for determining its constituent objects, which implies the allocation of precise criteria for evaluating novelty, aimed at establishing changes in terms of the content of the educational process, its organizational forms and methodological techniques. This leads to the emergence of terms and concepts that give a clear and understandable basis for the classification of objects of pedagogical creativity to the pedagogical community. Thus, the objects of pedagogical innovation are formed, and the term “objectivization” is used as the process of creating objects of innovative activity of students through the ability to turn the results of creative activity into intellectual property, and then into new goods and services. Thus, researchers Novoselov and L'vova (2016) interpret the term under consideration as a transition from the creative project activity of schoolchildren to the objective innovation activity.

The concept of “objectivization” is used in works devoted to the problem of learning, which in this case is an interdisciplinary phenomenon. In this way, various connections between the subject of learning and the object of learning are investigated. The objects of learning are knowledge, and in the current state of education should be equipped with the most high-tech complex of cognitive-behavioral skills (Volkov, 2016). That is, from the author's point of view, objectivization acts as a method of visual fixation of knowledge, which makes it possible to operate more effectively with them.

The term “objectivization” is actively used in the study and improvement of cognitive activity. From the point of view of education, scientific knowledge is objective, but the question arises about the possibility of objectivity of humanitarian knowledge. Thus, speaking about the problem of the selection process and structuring the content of education, Shabalin (2009) considers the concept of “objectivization” as a criterion for increasing the objectivity of humanitarian knowledge and offers as such a tool the objectivity of teaching, which is considered as a didactic method that allows determining the criteria for selecting educational material to be assimilated by students. In this sense, the “objectivization” of humanitarian education is not understood as a consideration of the system of value-emotional relations, but rather as an emphasis on the inclusion of factual material intended for research by students (Shabalin, 2009). This interpretation of the concept of “objectivization” in the field of the objectivity of humanitarian education serves as the basis for the use of the definition described by us in the organization of a purposeful process of education, the result of which, in line with the scientific and philosophical concept of the theory of knowledge, depends directly on the information that is chosen as a cognitive base.

The process of cognition first depends on the activity of the subject of cognition, which means that his system of values, guidelines, beliefs and interests largely determines how his consciousness reflects the surrounding reality (Karavaev, 2009), which gives us full reason to believe that the term “objectivization” can be applied not only to the objects being studied, but also to the perception of reality by a particular person.

DISCUSSION

There is no doubt that “objectivization” has great potential in the context of educational work, the purpose of which is to form the personality of the student as a subject of culture—on the one hand, and the creativity of the teacher—on the other. In this case, the definition of “objectivization” by Fokin (2002) as “the expression of the results of subjective experience in a form that can be perceived by other people” seems complete to us. Thus, within the framework of psychological and pedagogical knowledge, the concept of “objectivization” can be considered as the process of transformation of fragments of reality into objects of cognition through cognitive processes occurring in the consciousness of the subject who knows these fragments of the surrounding reality. Shivrinskaya (2004), raising the problem of self-education, considers the concept of “objectivization” as a process that includes objective and subjective aspects, where the first has an organizational character, and the second is based on individual and age characteristics of the individual. Consequently, “objectivization” in this way

appears as a source of activity of the subject, which encourages the subject to interact with the objects of reality, the nature of which is personally motivated.

Another definition of objectivization is formulated on a philosophical basis, which comes from dialectical materialism. In foreign sources, this phenomenon is called “Theory of Objectivization.”

It should be noted that in the context of pedagogical science, “Theory of objectivization” is associated with the works of Radford, who defines it through a dynamic holistic system governed by the dialectical relations between knowledge, cognition, and the knower (Radford, 2015). The process of objectivization always, according to the researcher, implies activity: this is an attempt to interfere with something culturally significant, something that is revealed to consciousness not passively, but through the bodily, sensory, emotional, semiotic, creative activity of the individual. In this context, learning is defined as the result of objectivization processes.

Gabriel (2018) considers learning from the point of view of the cultural-historical theory of activity as a transformation based on two axes of reflection and interpretation, corresponding to the processes of objectification and subjectivization. According to the position of the scientist, objectivization should be considered as a combination of indirect and reflexive efforts of students aimed at achieving a certain result of cognitive activity. In the context of these studies, the term “objectivization” can also be interpreted as a way of reflection at the stage of cognition.

Gilbert (2020) believes that there can be no objectivization in the absence of indirect manipulation (action), and vice versa, indirect manipulation inevitably generates objectivization. It is the process of objectivization, according to Gilbert, that distinguishes man from other animals. It should be noted that the process of cognition itself as a complex interdisciplinary phenomenon interests us as one of the grounds for defining the term “objectivization” in the context of pedagogical research. Thus, the term “objectivization” is used as a means of cognition, namely, an activity aimed at cognizing the surrounding world that is not limited to the goals of existence.

CONCLUSION

As a result of contextual analysis, we have identified several ways to use the term “objectivization” in pedagogical research:

- as a selection of certain objective indicators in relation to phenomena or procedural procedures for the diagnosis of various indicators of the development and effectiveness of professional activity;

- to ensure the objectivity of the assessment of educational results and learning activities through the quantitative assessment of quality indicators;
- as a definition of a material object the result of pedagogical or research activities;
- as a method of visual fixation of knowledge;
- as a source of activity of the subject, which encourages the subject to interact with the objects of reality, the nature of which is personally motivated;
- as a way of reflection at the stage of cognition;
- as a means of cognition that characterizes a person.

The result of the content analysis shows the main aspects of the definition of the concept of “objectivization”. It should be noted that in some sources the term is used together with expressions denoting the scope of application: the process of self-education, pedagogical creativity, artistic creativity, the results obtained, educational and innovative activities, patriotic education. The scope of the term is extensive, which may indicate its use as a transformation tool. The key words used for the definition include: “relationship,” “pedagogical process,” “results,” “transformation,” “activities,” “for organization,” “subjects,” “creativity,” “humanitarian,” “objective.” The use of keywords in a small range of amounts indicates the ambiguity of the analyzed concept, but allows us to formulate a definition in the broad sense of the concept of “objectivization” as a tool for transforming activities, phenomena or results in subject-object relations to solve specific pedagogical problems.

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CONTRADICTIONS AND PROBLEMS OF MODERN DIGITAL EDUCATION IN THE RUSSIAN ECONOMY

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ABSTRACT

Purpose: Digital education today is a new phenomenon for many countries around the world. In its most general form, it represents the next stage of informatization of education, but it has its own specific features. The authors continue a number of previous studies devoted to the problems of informatization of education, information socialization of the individual, and the formation of information culture.

Design/methodology/approach: In the course of the study, the methods of analytical review, analysis, comparison, and generalization, and the principles of dialectics were used.

Findings: The study showed that the main contradictions and related problems of digital education can be divided into three main levels: within pedagogical activity between traditional and digital forms of education, training and upbringing; between digital and traditional forms of elements of education (subject, object, means, environment, conditions, result, process, system); between elements of the main subsystems of culture (information, praxiological and axiological), the formation of which is the main goal of pedagogical activity.

Originality/value: The conducted research can be used to build models of digital pedagogical activity that allow us to study new principles of the relationship between digital education, training and education in the digital economy of modern society, new statuses and roles of subjects of pedagogical activity, a new paradigm of pedagogical interaction.

The 21st century brought significant changes to society. We are witnessing civilizational events that were predicted almost a century ago by the theorists of the concepts of the information society (E. Toffler, D. Bell, M. Castels, etc.). Today, many of the events they predicted come true. For example, one of the provisions stated that information will become a commodity, and information relations will be more widespread than material ones. Indeed, today the informatization of almost all spheres of public life leads to the fact that in the information space the processes of managing the economy, health, science, education, and so forth are carried out (Ursul, 2019; Gryaznova, 2021; Gryaznova, Treushnikov, et al., 2020).

The second aspect of the development of the information society is the assumption that with the help of information technologies, a person will be able to free himself from routine mental labor, that is, the implementation of information processes that do not require creative activity is transferred to technical devices. This position has also come true, and today the huge speeds of information transmission and processing, the arrays of information storage allow a person to live and work not only in the real world, but also in the information world, developing a new information sociocultural space for society (Rakitov, 2011; Yashkova et al., 2020).

An important prediction project was about the education system. It was assumed that it would become more accessible, it would be possible to get it from anywhere in the world and choose an individual learning path. Indeed, this assumption has come true, and today we have such an opportunity, having received distance education based on the use of digital information technologies (Craven, 2019; Kiryagana Isabirye & Makoe, 2018).

The reality of today is that society is moving to the next stage of informatization—to digitalization. This concept affects almost all spheres and

activities in the same way as informatization. Education is no exception. Digital education, following the digital economy, is becoming a development prospect for the coming years for the advanced countries of the world (Malushko & Lizunkov, 2020; Vaseyskaya & Glukhov, 2018).

Modern research increasingly raises questions about the prospects and trends in the development of digital education (Prokhorova et al., 2020; Tatarinov & Orlova, 2020). As positive prospects for its development, such aspects are considered as: the possibility of expanding the areas of additional education; increasing the effectiveness of educational technologies in the system of formal and nonformal education; adaptability to the conditions of the digital economy of all forms of education and its levels; strengthening the integration of the economy, science, and education; accessibility of continuing education for various categories of citizens, and so forth.

Nevertheless, the authors note a number of serious problems faced by the Russian education system in the transition to the digital model (Gryaznova, Lanskaya, et al., 2020; Shcherbina & Lomovtseva, 2020). Here it is necessary to note such issues as the problems of transformation of vocational education and the decline in its quality, the problems of staffing in education (Dorozhkin et al., 2019; Platov et al., 2019). An important issue addressed in the publications is the question of the readiness of educational subjects to live in conditions of uncertainty in the digital sociocultural space (Testov, 2019). The research papers highlight the perceived risks of introducing digital technologies into the pedagogical process, which are not mentioned in the Passport of the priority project Modern Digital educational Environment in the Russian Federation, and, consequently, many important negative aspects of the development of digital pedagogy may be overlooked and lead to undesirable consequences of the digitalization of education.

MATERIALS AND METHOD

The research was conducted on the basis of an analytical review, comparison and generalization of scientific publications of domestic and foreign authors devoted to the problems of digital education and the risks associated with the transition to digital technologies in the pedagogical process in Russia. The systematization of the main contradictions of digital education was carried out on the basis of the dialectical research method.

RESULTS

Contradictions arise between any phenomena, processes, objects in the course of their interaction and development. In system objects, contradic-

tions are multidimensional in nature. The modern education system is a rather complex and multi-element complex, which undergoes stages of changes in the conditions of modernization, which causes many contradictions and problems generated by them. The main stages in the change of education in our country, occurring since the second half of the twentieth century, can be divided into two: the transition from the traditional system to the information model of education and from the information model to the digital one. Today we have a very complex phenomenon—the education system, in which the elements of the traditional, information and digital education systems conflict.

Education as a philosophical category has a fairly broad definition. In its most general form—it is a form of being of the cognizing subject (Eisner & Naumov, 2020; Osipov & Pogodin, 2019). Like any phenomenon, education has phenomena that set the direction of its philosophical analysis in various aspects: activity, axiological, epistemological, praxeological, etc. In these senses, education is defined as a way of building an image of the world, as a mechanism for the formation of a person, as a form of existence of scientific knowledge, as an activity, as a system of values, as a social institution, and so forth (Kulikov, 2020; Merkusheva & Popova, 2020).

All the variety of phenomena of modern education allows us to determine its essential, specific qualities and properties. First, education is a special kind of culture, its attribute. Secondly, education is a mechanism for the formation of the information subsystem of culture. Third, it is a historically determined type of cultural transmission in society. Fourth, education is a socially regulated and normalized way of forming a subject's social experience. Fifth, education is a type of cognitive activity of a person. Sixth, education is the basis of all activities and exists in dialectical unity with education and upbringing.

The essential characteristic of education as an element of pedagogical activity is that it is a system of knowledge that forms the information subsystem of human culture. If we consider education as a special type of pedagogical activity, then all its elements are subject to change in the course of modernization. Pedagogical activity is a triune process of education, training, and upbringing. If we are talking only about the information component of pedagogical activity, then the transfer to digital content of the information necessary for its assimilation in the course of education is quite logical. Such a process requires the creation of a digital educational environment, which is provided for in state programs.

As you know, in our country in 2016, the federal project “Modern Digital Educational Environment in the Russian Federation” was launched. According to this project, until 2020, it is planned to: “modernize the system of education and vocational training, bring educational programs in line with the needs of the digital economy, widely introduce digital learning

tools and integrate them holistically into the information environment, provide the opportunity for citizens to study according to an individual curriculum throughout their lives at any time and in any place” (Passport of the Priority Project, 2016).

In other words, the program is about increasing the share of distance learning in mixed learning, providing for the development of online courses: “Students and teachers have been informed about the possibility of mastering online courses as part of the main professional educational programs, followed by crediting the results of training according to the decision of the educational organization” (Passport of the Priority Project, 2016). It should be noted that this program lists the following possible risks: non-implementation of the plan for the coverage of students studying online courses and the low level of their development; funding problems; problems of integration of various forms and levels of education. The program does not mention the risks associated with the psychological, social, and other problems of teachers and students, the problems of adapting the subjects of pedagogical activity to the new realities of digital culture.

Digitalization is, first of all, a change in technologies for processing, storing and transmitting information. A computer, a wireless push-button phone, and other devices that we are used to, but they are practically out of use, technically speaking—morally obsolete—are also digital devices. But, however, until a certain time, information technologies based on these devices were not called digital, although their basis is not analog, but digital signal processing. The fact is that digitalization is a technological process, first of all. Informatization, in fact, is the same digitalization, but in different technological conditions. Modern information technologies developed on the basis of more powerful microprocessors, a new element base, reducing in size, perform much more efficiently the functions of data processing and representation. It is thanks to this that they have created conditions for improving the quality of information processes, which allows them to create a high-quality interface for social interaction of people. Therefore, informatization in the scientific sociohumanitarian literature was defined as a sociotechnological process, that is, as a process in which a social subject enters into social interaction mediated by information technology. Informatization has created a new kind of culture—information culture, a new kind of social space-information sociocultural space.

Digitalization raises the possibilities of social interaction of people to a higher technological level. It allows you to create new models of economic, social, political, scientific, educational, and other relations. Here we can agree with those authors who talk about creating a new paradigm of communication (Marey, 2018; Nikulina & Starichenko, 2018).

The fundamental difference between the new paradigms of digital education is precisely that the status of the subject of the educational

process is changing. If in the process of informatization, the teacher used information technologies to increase the efficiency of the educational process and pedagogical activity in comparison with the traditional system, then digital technologies make it possible to create fundamentally different relations between subjects. Due to the fact that digital education provides for the full use of digital educational resources and the transition to online courses, the role of the teacher in this case is changing radically. On the one hand, it has the ability to use traditional forms of learning, transferring them to educational platforms, on the other hand, it gets the opportunity to completely exclude actual interaction from this process. In the field of digital education, conditions are created where students can gain knowledge without a teacher, interacting with digital educational content. The developed infrastructure of the digital educational space, its interface, and databases allow in certain situations to build pedagogical relations not with the subject of educational activity, but with the performer of his role-a quasi-subject. The teacher becomes more of a guide in the information educational space, and not the master of knowledge, as it was in traditional education. From the subject of pedagogical activity (teacher), an even higher level of qualification is required, including competencies not only in the ability to work with digital content, but also its constant modernization, adaptation and methodological support. The learner as a subject requires high motivation and preparation for independent learning in a digital environment. At the same time, the status of the teacher changes, he more often plays the role of a methodologist for the student, whose task is to teach him to search for and master information, turning it into knowledge.

At the same time, many other elements in the education system are also changing. Since education is an activity, all its components must change the subject, the object, the means, the environment, the conditions, the process, the system, the result.

New objects also appear in educational activities, since it is now necessary to study not only disciplines, but also ways of mastering them in the digital environment. The legal, financial, and organizational conditions of digital education are subject to change. For example, the degree of freedom to choose an individual education strategy, its directions, and duration increases. The goals of education are also undergoing changes. The main indicators are improving the quality of education, training specialists who are able to implement their knowledge not only in the domestic economy, but also in other countries. New digital means and conditions of education create a fundamentally different digital infrastructure (Strokov, 2020).

When changing the elements of the education model, new risks arise that were not inherent in the traditional model, but already took place in the information model. Thus, the authors call the risks associated with the transfer of educational relations to the digital environment Internet risks

propaganda of immoral, anti-ethical, anti-right actions in the youth environment, cyber-addiction, cyber-crimes, etc. (Perminova, 2020).

An important aspect of the digital risks of the new model of education, according to the researchers, is the unification of courses, teaching methods and total control of the educational process, which, in comparison with the traditional education system, leads to a reduction in creative thinking and reasonable necessary diversity in the pedagogical process, the displacement of spiritual principles from pedagogical activity (Sedykh, 2020; Strekalova, 2019).

CONCLUSION

The results obtained can be systematized by highlighting the levels of possible contradictions that arise in the digital education system in Russia.

The first level is the contradictions between the three main mechanisms of pedagogical activity: education, upbringing, and training. Even a partial transfer of education to the digital environment leads to the loss of traditional cognitive and communicative competencies of a person, such as writing, speech, communication and activity models, and the loss of traditional values of education and upbringing. The second level of contradictions is the contradictions between the elements of the education system, when there is a mismatch between their traditional and digital forms. They are manifested in the form of problems of constructing models of subjects of digital pedagogical activity, problems of developing and implementing digital educational content, digital educational environment, new methods and digital didactics, and so forth. The third level of contradictions is the contradictions between the subsystems of human culture: informational, praxiological and axiological. The new information culture, formed on the basis of digital educational technologies, requires the subjects of pedagogical activity to master new competence models. The teacher becomes a public person, alienating his work, intellect, and the results of creative activity in the digital information sociocultural space, losing involvement in spiritual education, turning into a methodologist, forced to constantly retrain and develop digital content. The student is forced to give preference to digital culture in the formation of social experience, changing the emphasis in the motivation for education. Even today, we have a generation of young people, for whom the first place is not the issue of obtaining education, but the possibility of using it in the future to have an economic profit, the value system at the same time has a mosaic character and weakly correlates with the concepts of spirituality, fatherland, patriotism, and so forth. Digital technologies force teachers to practically exclude education from teaching activities, because the digital economy, which is served by digital education,

requires the provision of educational services, and not the implementation of a spiritual pedagogical process. Axiological culture is transformed by the disappearance from its elements of the traditional system of values, norms, and rules of behavior in society. The worldview and consciousness of modern youth takes on a clip-like, fragmentary character, which requires the restructuring of the teacher's work in this particular style. For digital education, the main result is ensuring accessibility and opening up employment prospects after receiving it. However, without the other two components of human culture, such results acquire different values.

Based on the above, we can assume that the essence of digital education is to inform, and not to build an image of the world. The new way of communication in the teacher-student system requires separate and serious research, both pedagogical and psychological, sociological, and philosophical. First, it is necessary to identify the patterns of development and resolution of contradictions between digital and traditional education, training, and upbringing, and the possible consequences for all participants in the pedagogical process. Second, it is necessary to study the specifics of the pedagogical interaction between the subject and the quasi-subject, in the role of which the teacher's avatar or other information objects can act in digital education. Third, the digital paradigm of pedagogical interaction leads to a number of serious problems and issues, such as the economic readiness of the country to ensure the digitalization of the economy itself, first of all, and other spheres of public life; the readiness of the pedagogical community to form human resources to ensure the digitalization of education; the readiness and motivation of students to switch to new forms of interaction in the digital educational environment; the readiness of the state to ensure the management of the education system, including the development of regulatory documents, regulations for monitoring and adjusting digital pedagogical interaction.

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CHAPTER 46

APPLICATION OF PUBLIC-PRIVATE PARTNERSHIP MECHANISMS IN THE SPHERE OF HOUSING AND UTILITY SECTOR IN RUSSIA

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ABSTRACT

Concession agreements are the priority form of implementation of public-private partnership mechanisms in the housing and utility sector. Currently, the share of concession agreements in the housing and utility sector in Russia is 59% of the total number of agreements. Due to the investment amount in concession agreements, the sphere of housing and utility sector ranks second, behind the transport sector. The volume of investment obligations for housing and utility sector projects is 19% of the total volume of investments. There is a significant impact of the number of concession projects on the volume of investments.

The purpose of this chapter is to analyze the possibilities of attracting investment in the housing and utility sector based on the application of the concession mechanism. In the sphere of the housing and utility sector, the

most significant problems are solved with the help of concession agreements, such as the modernization of housing and utility sector objects and improving the quality of housing and utility sector services. The analysis of the dynamics of investments in the housing and utility sector made it possible to identify the main factors influencing investments in concessions. Comparative and regression analyses were used to collect and process the initial information. The result of the study is a model of factor analysis of the dynamics of investments in concession agreements in the field of housing and utility sector.

Russia has accumulated extensive experience in the application of concession agreements in various types of activities. Back in the 19th and early 20th centuries, public utilities were transferred on a concession to private entrepreneurs. Currently, this mechanism is still very relevant and actively used in almost all regions of Russia. Concessions are concluded particularly frequently in the housing and utility sector. The main reason for the need to attract private capital through this mechanism is rather high depreciation of the housing and utility sector infrastructure objects. Depreciation of heating networks—62.8% national average, water supply networks—64.8%. In certain regions, the situation looks even more depressing—the amount of wear in some municipalities reaches 80%. The result of such a state of the networks is an increased risk of accidents, deterioration in the quality of drinking water, and often huge losses of the resource.

According to the Ministry of Construction, about 2% of water supply and heat supply networks are renewed annually in Russia with great wear and tear and at least 5% must be replaced for a full renovation of worn-out networks. As a result of the pandemic, the situation with pace of renewal has worsened.

Ultimately, it leads to the rise in service rates, public discontent, and mounting non-payments. Utilities, in turn, cannot carry out high-quality repairs due to a lack of sufficient funds.

The infrastructure of the housing and utility sector requires large investments in a short period for the possibility of rational modernization.

Changes in legislation in 2013 made it impossible to lease the housing and utility sector with a high level of depreciation, so the only way out of this situation is to expand the use of concession mechanisms, which have proven themselves and withstood the test of time.

Thus, the use of concession agreements makes it possible to solve two painful problems at once—to create more quality services in the housing and utility sector and not to increase the fee for the consumer.

It should be noted that among the wide variety of PPP forms, concessions are used quite rarely in Russia and have an intermediary position between privatization and the work of a state / municipal enterprise.

The purpose of the article is to study the application of concession agreements in the field of the housing and utility sector in Russia. To achieve

the goal of the study, the following main tasks were set and solved in the chapter: an analysis of concession agreements in the housing and utility sector was carried out; the main factors affecting investment in concessions in housing and utility sector were identified; a model of factor analysis of dynamics in concession agreements in housing and utility sector was built.

METHODOLOGY

Concession agreements in the field of housing and utility sector were selected as an object of research is one of the priority forms of public-private partnership. The study of the mechanisms of public-private partnership in the field of housing and utility sector has found sufficient reflection in the works of Russian authors. The scientific researches of Gavrilenko and Khakimov (2019), Kokurin et al. (2017), Makarov et al. (2018), Savchenko et al. (2014), Svistunov and Kurkina (2018) are devoted to the problem of developing the mechanism of interaction between private business and the state in the housing and utility sector. The conditions and organizational and legal mechanisms for the implementation of concession agreements in the housing and utility sector were studied in the works of Aparina (2019), Vorotyntseva et al. (2016), Polyakova and Nelyubov (2020).

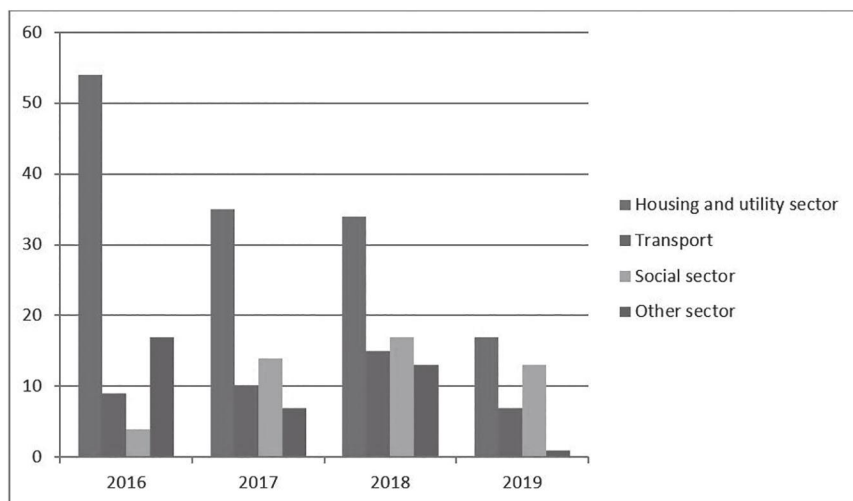
At the same time, the issues of attracting investments in the housing and utility sector based on concession agreements remain acutely under-researched.

In this regard, the relevance and practical importance of building a model for predicting investments in the housing and utility sector based on concession agreements are increasing.

RESULTS

The study of the mechanisms of public-private partnership for the period 2009–2019 showed that the housing and utility sector is the leader in terms of the number of concession agreements concluded. It was found that for the period from 2009 to 2019 the number of concession agreements in the housing and utility sector amounted to 164 projects or 59% of the total number of agreements (Annual report “Concessions in Russia—2019,” 2021). The dynamics of concessions in different industries is shown in Figure 46.1.

In the period from 2009 to 2019, the Volga Federal District was the leader in concluding concession agreements. The total investment amounted to 299 billion rubles, and the total number of projects was 59 units. Within the district, the largest volume of investments falls on the

Figure 46.1*The Dynamics of Concessions in Different Industries*

Source: Annual report “Concessions in Russia—2019: Main Results and Trends.

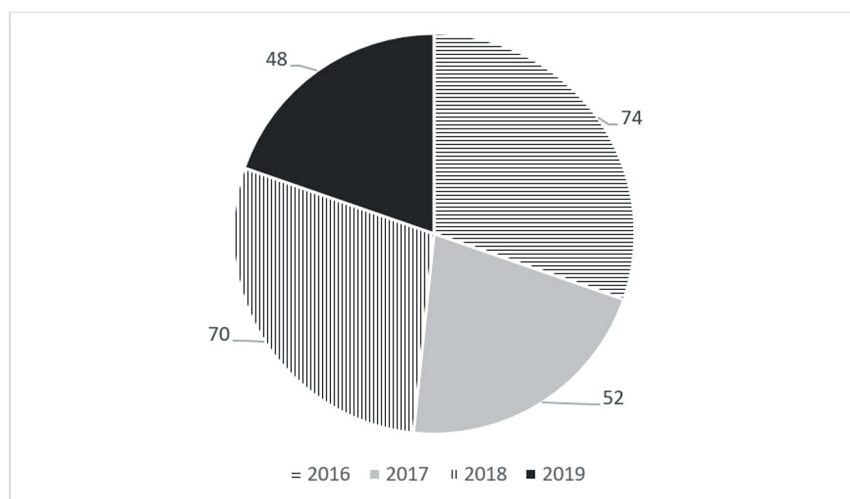
Samara region—123.2 billion rubles from 8 projects, but the largest number of projects (in the Volga Federal District) was concluded in the Nizhny Novgorod region—20 concessions. The leaders in terms of the number of concessions among the constituent entities of the Russian Federation are:

1. Khanty-Mansi Autonomous Okrug (25 agreements signed);
2. Moscow region (24 agreements);
3. Nizhny Novgorod region (20 agreements).

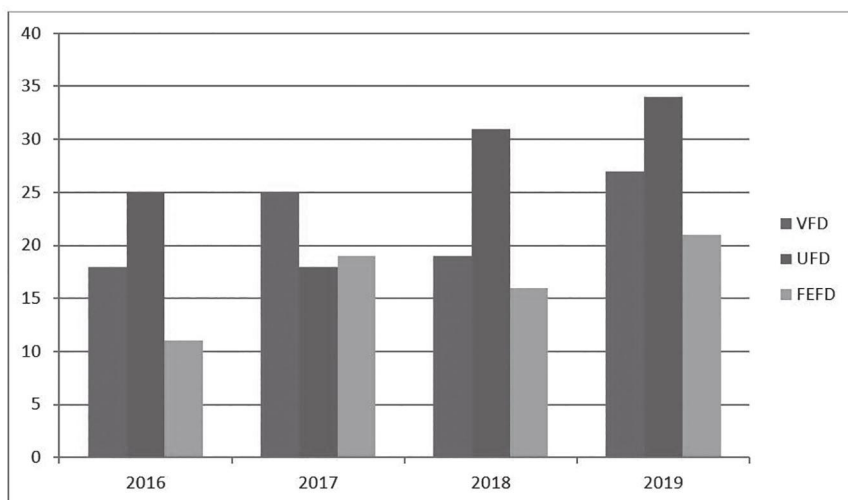
In 2019, compared to 2018, there was a twofold decrease in the number of concession projects in the housing and utility sector (from 34 to 17 projects), which led to a 50% reduction in the volume of investment obligations. The dynamics of investments in the housing and utility sector through concessions is shown in Figure 46.2.

The Ural Federal District is in the lead in the dynamics of the number of concession agreements and private initiatives from 2016 to 2019, outpacing the Volga and Far Eastern Federal Districts (Figure 46.3).

The pandemic that began in early 2020 has ensured that many PPP areas are at risk. Undoubtedly, the housing and utility sector also belongs to these areas. The projected drop in revenue in this sector in 2020 compared to 2019 is about 20%. There are risks of a collapse of the PPP market

Figure 46.2*The Dynamics of Investments in Housing and Utility Sector Through Concessions*

Source: Annual report “Concessions in Russia—2019: Main Results and Trends.

Figure 46.3*The Number of Concession Agreements in Leading Federal Districts*

Source: Annual report “Concessions in Russia—2019: Main Results and Trends.

and the use of concessions after the pandemic. The reasons for such consequences are the slow pace of recovery in demand and the reluctance of investors to enter into long-term agreements due to the higher risks. The way out of this difficult situation may be government support measures for the PPP market. It can be done by subsidizing interest rates on major concessions, facilitating covenants on loan agreements, and providing emergency assistance when needed.

Since the housing and utility sector is the most affected because of the pandemic, certain support measures were taken—the inclusion of housing and utility sector enterprises in small and medium-sized businesses to provide government support measures.

Using the Statistica package, a model for factor analysis of the dynamics of investments in concession agreements in the housing and utility sector was built. The information base was the statistical data of the Federal State Statistics Service of the Russian Federation for the period of 2010–2019.

The resulting model showed that investments in concession agreements in the housing and utility sector depend on the accident rate of housing, communications, and tariffs for housing and communal services, as well as on the rate of housing commissioning. In this case, the effective feature increases with an increase in the first factor and with a decrease in the second. With the help of factor analysis at 10 levels of the time series, it was possible to describe 80.7% of the variation in the investigated effective feature, mainly because the indicators that cause fluctuations in investment in concession agreements in the housing and utility sector were identified correctly and fully. The inclusion in the model of such factors as the degree of wear and tear of fixed assets of the housing and utility sector and the coefficient of renewal of fixed assets of the housing and utility sector leads to multiple regressions with statistically insignificant coefficients.

To describe the dynamics of investments in concession agreements in the housing and utility sector, seven indicators were considered:

x_1 – retirement rate of fixed assets of housing and utility sector;

x_2 – housing commissioning rates, %;

x_3 – consumer tariff indices for housing and communal services, %;

x_4 – share of emergency housing stock in the total area of the entire housing stock, %;

x_5 – number of water supply accidents, thous.;

x_6 – number of sewerage accidents, thous.;

x_7 – number of accidents at heat supply sources, steam and heating networks, thous (Table 46.1).

Table 46.1

Main Indicators of the Housing and Utility Sector in Russia

Year	Invest- ments in con- cession agree- ments in the hous- ing and utility sector, billion rubles, y	Retire- ment rate of fixed assets of hous- ing and utility sector, x1	Housing commis- sioning rates, %, x2	Con- sumer tariff indices for hous- ing and commu- nal ser- vices, %, x3	Share of emer- gency housing stock in the total area of the entire housing stock, %, x4	Number of water supply acci- dents, thous., x5	Num- ber of sewer- age ac- cidents, thous., x6	Num- ber of acci- dents at heat sup- ply sourc- es, steam and heat- ing net- works, thous., x7
2010	0.82	0.4	106.7	113	3.1	170	39.2	14.6
2011	1.39	0.5	105.4	111.7	3	154.6	42.6	10.7
2012	2.26	0.4	97.6	109.4	3	142.9	33.9	9.4
2013	5.24	0.5	107.2	109.8	2.8	109.1	31.4	8.1
2014	3.45	0.4	118.2	109.4	2.7	106.8	27.6	6.8
2015	6.42	0.4	101.4	110.1	2.5	84.8	37.2	5.8
2016	18.6	0.8	94	105.4	0.5	74.4	31.3	5.7
2017	10.86	0.3	98.7	104.6	0.6	64.4	31.8	5.4
2018	7.83	0.4	95.5	103.7	0.7	65.7	25.4	4.3
2019	6.53	0.5	106.1	105.1	0.7	60.2	17.7	4.8

Source: Rosstat (2019).

The matrix of paired correlation coefficients (Table 46.2) makes it possible to assess the degree of correlation of the variables with each other. Variables with a high degree of relationship will be combined into one factor using factor analysis.

Table 46.2

The Matrix of Paired Correlation Coefficients

Variable	y	x1	x2	x3	x4	x5	x6	x7
y	1,000000	0,598780	-0,579651	-0,718750	-0,806894	-0,723270	-0,315506	-0,639494
x1	0,598780	1,000000	-0,257386	-0,144918	-0,273292	-0,127765	-0,066116	-0,111555
x2	-0,579651	-0,257386	1,000000	0,506192	0,525691	0,321332	-0,050474	0,283945
x3	-0,718750	-0,144918	0,506192	1,000000	0,946604	0,889288	0,736039	0,848431
x4	-0,806894	-0,273292	0,525691	0,946604	1,000000	0,864032	0,638206	0,754127
x5	-0,723270	-0,127765	0,321332	0,889288	0,864032	1,000000	0,720571	0,955021
x6	-0,315506	-0,066116	-0,050474	0,736039	0,638206	0,720571	1,000000	0,693835
x7	-0,639494	-0,111555	0,283945	0,848431	0,754127	0,955021	0,693835	1,000000

Source: Developed and compiled by the authors.

The Kaiser criterion and the scree criterion allow grouping the factors for building the model. To apply both criteria, let's build a table with eigenvalues (Table 46.3).

Table 46.3

Eigenvalues

Value	Eigenvalues (Spreadsheet53) Extraction: Principal components			
	Eigenvalue	% Total variance	Cumulative Eigenvalue	Cumulative %
1	4,433444	63,33491	4,433444	63,3349
2	1,247974	17,82820	5,681418	81,1631
3	0,816679	11,66685	6,498097	92,8300
4	0,300938	4,29911	6,799035	97,1291
5	0,152912	2,18446	6,951947	99,3135
6	0,043028	0,61468	6,994975	99,9282
7	0,005025	0,07179	7,000000	100,0000

Source: Developed and compiled by the authors.

The Eigenvalue column contains the eigenvalues—the variances of the selected factors. The Cumulative column contains the accumulated or cumulative variance. Table 46.3 shows that the first factor explains 63.33% of the total variance, the second—17.83%, and so forth.

According to the Kaiser criterion, to build a model, it is necessary to select factors with eigenvalues greater than 1. In our example, only two factors are distinguished that satisfy this condition (Table 46.4).

Table 46.4

Factors With Eigenvalues Greater Than 1

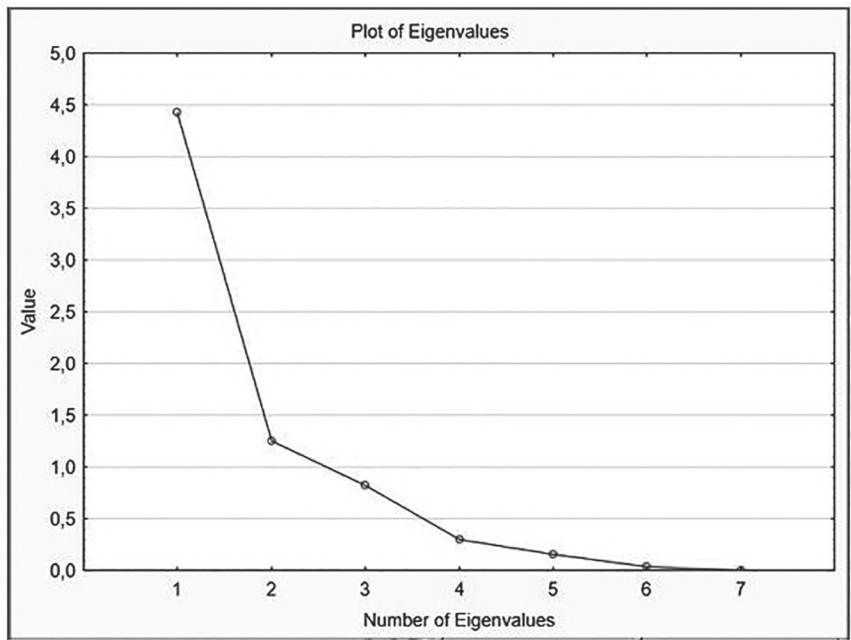
Value	Eigenvalues (Spreadsheet53) Extraction: Principal components			
	Eigenvalue	% Total variance	Cumulative Eigenvalue	Cumulative %
1	4,433444	63,33491	4,433444	63,33491
2	1,247974	17,82820	5,681418	81,16311

Source: Developed and compiled by the authors.

To apply the scree criterion, the eigenvalues presented in Table 46.3 are shown on a plot (Figure 46.4). The place where the decrease in eigenvalues slows down as much as possible corresponds to the required number of factors. Thus, one can try to distinguish two factors.

Figure 46.4

The Scree Criterion



Source: Developed and compiled by the authors.

Including two of the seven factors in the model will result in a loss of 18.8% of the information. However, since the number of variables decreases by 3.5 times, the construction of the model can be considered expedient.

Tables 46.5 and 46.6 show, respectively, the coefficients of the linear regression equations, according to which the program will calculate the values of the factors for each observation and the new values of the factors for each observation.

The data of the model of multidimensional dependence of investments in concession agreements in the housing and utility sector on the two selected factors, built using the Multiple Regression command, are shown in Table 46.7.

Table 46.5***The Coefficients of the Linear Regression***

Variable	Factor 1	Factor 2
x1	0,051969	-0,528670
x2	-0,103460	0,587345
x3	-0,219769	0,008945
x4	-0,212211	0,118352
x5	-0,215548	-0,111269
x6	-0,172916	-0,361721
x7	-0,206060	-0,139724

Source: Developed and compiled by the authors.

Table 45.6***Values of the Selected Factors***

Variable	Factor 1	Factor 2
x1	0,051969	-0,528670
x2	-0,103460	0,587345
x3	-0,219769	0,008945
x4	-0,212211	0,118352
x5	-0,215548	-0,111269
x6	-0,172916	-0,361721
x7	-0,206060	-0,139724

Source: Developed and compiled by the authors.

Table 46.7

The Model of Multidimensional Dependence of Investments in Concession Agreements in Housing and Utility Sector

N=10	Regression Summary for Dependent Variable: y (Spreadsheet113) R= ,89834829 R ² = ,80702966 Adjusted R ² = ,75189527 F(2,7)=14,638 p<,00316 Std.Error of estimate: 2,6471					
	b*	Std.Err. of b*	b	Std.Err. of b	t(7)	p-value
Intercept			6,34000	0,837083	7,57392	0,000129
f1	0,762509	0,166034	4,05225	0,882363	4,59250	0,002506
f2	-0,474984	0,166034	-2,52424	0,882363	-2,86077	0,024311

Source: Developed and compiled by the authors.

The multiple determination coefficient of the constructed model is 0.807. This suggests that 80.7% of the variance of the effective feature is explained by the regression. The value of the coefficient of determination is not very large, but given that the model was built on 10 observations, the result should be considered good.

Evaluation of the quality of the regression equation can be carried out using the *F*-test, which consists of testing the hypothesis *H*₀ of the statistical insignificance of the regression equation and the indicator of the tightness of the relationship. In our case *F*_{obs} = 14, 638, but *F*_{tab} = (2; 7; 0.05) = 4.74, which suggests that the regression equation and the indicator of the tightness of the relationship are statistically significant (as *F*_{obs} > *F*_{tab}).

The significance of the regression coefficients is assessed separately using the Student's *t*-test. According to Table 46.7, all coefficients and the intercept are statistically significant, since |*t*_{obs}| > *t*_{tab} = *t*(7;0.05)=2.36.

Thus, the constructed multiple regression equation:

$$y = 6.34 + 4.05225f_1 - 2.52424f_2$$

approximates the available data fairly well.

According to the constructed model, it can be concluded that investments in concession agreements in the housing and utility sector increase with an increase in the accident rate of housing, communications, and tariffs for housing and communal services and a decrease in the rate of housing commissioning.

CONCLUSION

Thus, using factor analysis at 10 levels of the time series, we were able to describe 80.7% of the variation in investment in concession agreements in

the housing and utility sector, mainly because the indicators that caused their fluctuations were identified correctly and fully. Note that the inclusion in the model of such factors as the degree of wear and tear of fixed assets of housing and utility sector and the coefficient of renewal of fixed assets of housing and utility sector leads to multiple regressions with statistically insignificant coefficients. It can be explained primarily by the low degree of correlation of these factors with the effective feature.

The proposed model can be used to predict investments in concession agreements in the housing and utility sector.

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CHAPTER 47

LABOR POTENTIAL DEVELOPMENT AS A FACTOR OF ENTERPRISE INTEGRATION INTO THE NATIONAL INNOVATION SYSTEM

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ABSTRACT

The purpose of the chapter is to identify the components of the employee's labor potential that have a statistically significant impact on the innovative

activity of the enterprise, and to propose measures for their development in order to integrate the enterprise into the national innovation system.

The *methodology/approach* is the positive relationship between a number of components of the labor potential of the employee and the enterprise, on the one hand, and the innovative activity of the enterprise, on the other, is confirmed by the results of a sociological study conducted by A. L. Mazin and A. A. Troitskaya, and the corresponding econometric calculations.

The results prove that the level of innovative activity is significantly influenced by such components of the labor potential of an employee and an organization as the level of professional skills of employees, the availability of a system of advanced training and the dependence of employees' incomes on their level of education, the potential for mobility, material interest in innovation, the level of conflicts in the organization (psychological climate), labor discrimination.

The chapter's recommendations include proposals aimed at the formation and development of key components of labor potential, which have a statistically significant impact on the innovative activity of the enterprise and its inclusion in the national innovation system.

Integration mechanisms place new demands on the quality of resources, their efficient use and optimal interaction, creating new opportunities for the successful development of economic systems. This fully applies to human resources, the role of which is increasing many times in the digital economy. In this regard, the problem of improving the quality of the labor potential of workers and organizations, enhancing their innovative activity is especially interesting. The ratio and role of the components of labor potential in innovative economy is changing, and this imposes new requirements on their theoretical understanding, fundamental changes in the education system and labor resources management, especially in the context of enterprise integration into the national innovation system.

THEORETICAL FOUNDATIONS OF THE RESEARCH

The concept of "labor potential" has been used for a long time in the research of many Russian scientists and there is a certain evolution in its interpretation. In the 1980s, many authors identified it with labor resources. Thus, "labor potential is the labor resources that society has at its disposal," according to Sergeeva and Chizhova (1982, p. 3). Later, other, more precise definitions began to appear in the literature. According to Egorshin (2019, p. 120), labor potential is part of a person's potential, which is formed on the basis of natural data (abilities), upbringing, education and life experience. A similar approach is followed by Shapiro (2017, p. 31), who also proposes to divide the components of labor potential into congenital and acquired.

We believe that the labor potential of an employee can be defined as an integral indicator of physiological, educational, professional, innovative, personal, social, and economic potentials used within a particular organization for the production of goods, works, and services. The labor potential of the organization includes the same components, excluding the personal potential.

Sometimes the labor potential of an employee approaches or even equates with his human capital, but not everyone agrees with this approach.

According to Genkin (2009), human capital is “a set of qualities that determine productivity and can become sources of income for a person, family, enterprise and society”; labor potential is a more capacious concept than human capital, but in turn, it is part of even more general concept—human potential (personality potential). We believe that the difference between these categories is not so much quantitative as it is qualitative, if we take into account not only the potential capabilities of an individual (as well as a group of individuals) associated with economic activity, professional self-realization, and so forth, but also income from this activity. With regard to human capital, it is important to emphasize that investments made in it must pay off (lead to an increase in the flow of income) otherwise they look useless. Investments in the labor potential of an employee (training, professional development, etc.) can benefit society, but not increase the employee’s own income (this often happens with Russian doctors and teachers). This difference is especially noticeable if we consider the level of the region, industry, country as a whole, and not limited to analysis at the microlevel (Troitskaya, 2020, pp. 71–73).

The labor potential of the organization is the result of the integral union of the labor potential of employees; it is characterized by the potential capabilities of all employees through the integration of knowledge, skills, abilities and competencies, implemented in cooperation with managers, specialists, employees and workers in the intra-firm labor market.

The economic success of not only the employee and the organization, but also of the society as a whole depends on what opportunities the organization presents for such implementation. For example, the competitiveness of an enterprise, the state of the industry to which it belongs, the region in which it is located and, ultimately, the development of the country’s economy depend on how innovative the products (works, services) of the enterprise are and what part of the personnel is involved in innovative activities. The labor potential of an enterprise is not only the sum of the labor potential of its employees; it can include, for example, the experience of mutual coordinated action in teamwork acquired by employees (or part of it).

A special role belongs to the innovative components of the organization’s labor potential, which manifest themselves in different ways. Some

of the innovative components of labor potential, which are inherent in an employee, are due to his personal qualities and labor opportunities. The others are associated with the working conditions of the employee in the organization, which do not form labor potential, but have a direct or indirect impact on its implementation, especially on the implementation of its innovative components. Such conditions include the opportunities that an employee of the organization has for training, advanced training, professional communication with colleagues at work. The labor potential of the region and the country as a whole consists of the totality of labor potential of workers and organizations, taking into account the relationship between them and federal and regional structures (educational, administrative, etc.). It is necessary to have a purposeful managerial influence on the formation and development of key components of the organization's labor potential within the framework of the strategy of its innovative development and integration into the national innovation system.

The concept of the national innovation system (NIS) was first proposed by Freeman (1987), who defined it as a network of private and public institutions and organizations, the activity and interaction of which leads to the emergence, import, modification and dissemination of new technologies. He argued that each country has its own innovation system, but some NIS is more efficient and some are less efficient (Bokachev, 2020, p. 105). Later Nelson (1993) defined NIS as "a set of institutions that determines the innovative activities of companies, actively interacting with each other." According to Kirsanov (2015),

The national innovation system is a set of interacting institutions of the state, society and private organizations, whose activities are aimed at creating and introducing new technologies and knowledge, based on competition, to increase the efficiency of the national economy, its modernization and restructuring, the result of which should be an increase in the standard of living of citizens of the Russian Federation.

In Russia, the officially used definition, formulated in the Draft Strategy for the Innovative Development of the Russian Federation until 2020, is the following: the national innovation system is a set of interconnected organizations (structures) engaged in the production and (or) commercial implementation of knowledge and technologies, and a set of institutions of legal, financial and social nature, ensuring the interaction of educational, scientific, entrepreneurial, and nonprofit organizations and structures in all spheres of the economy and public life (Innovative Russia, 2020, p. 138).

Thus, an enterprise involved in the creation, distribution and use of innovations must use innovative technologies and produce innovative goods or services; at the same time, at least some part of its employees should be directly involved in this process.

METHODOLOGY

This article examines the measure in which the labor potential of individual workers and the entire enterprise determines the integration of the enterprise into the national innovation system, and which components of labor potential primarily affect this. The results of sociological surveys of employees of enterprises in the city of Nizhny Novgorod and the Nizhny Novgorod region who studied in absentia at the universities of the city in economic and management specialties (394 respondents in 2011 and 399 in 2018) are used as an information base in the article (Mazin, 2018).

The integral indicator of the innovative activity of the enterprise *inn_int* proposed by the authors is selected as a dependent variable in econometric calculations of linear regression equations. Its composition includes the level of involvement of the enterprise personnel in innovative activities, the use of innovative technologies at the enterprise and the release of innovative products.

Matching Variables

1. the share of the enterprise personnel actually participating in innovative activities at the enterprise (the *inn_pers* variable, depending on the answer option, accepting seven values from 0 to 6);
2. the use of innovative technologies at the enterprise (variable *inn_tech* with values of 1 or 0, depending on the answer options “Yes” or “No”;
3. production of innovative products at the enterprise or provision of innovative services (variable *inn_prod* with values of 1 or 0, depending on the answer options “Yes” or “No”).

The greatest weight of 50% was assigned to the variable characterizing the output of innovative products at the enterprise and, accordingly, 25% to the other 2 when calculating the integral indicator. For the calculation, it was required to match the ranges of possible values of its components. They are in the range of zero and one, for the last of the three—in the range from zero to six in the indicators of technology use and product output. Accordingly, the last variable was divided by 6 before compiling a new indicator divide.

$$inn\_int = 0,25 * inn\_tech + 0,5 * inn\_prod + 0,25 * (inn\_pers/6)$$

Explanatory variables

The following indicators of the labor potential of an individual employee are used in the calculations.

1. The level of education with the answer options “secondary”, “secondary specialized” and “higher.” The *educ* variables are taking values from one to three respectively.
2. The employee’s assessment of the quality of his education with assessment options from one to five. The *educ_quality* variable.
3. The employee’s assessment of the quality of his labor skills with assessment options from one to five. The *skill_quality labor* skills.
4. The employee’s assessment of his potential for interfirm mobility with assessment options from one (absent) to five (high). The *mobility* variable.
5. The answer to the question of what is more important for the student respondent: knowledge or a diploma (the third answer is “equally”). The *knowledge_pref* variable, which takes the values three, two, and one respectively.

Indicators of the Labor Potential of the Enterprise

1. Material interest of employees in innovative activities at the enterprise, variable *inn_motiv*.
2. The presence of any system of advanced training at the enterprise. The *training* variable.
3. In case of a positive answer to the previous question: at whose expense the training is carried out (indicator values: 0, if at their own expense; 1 – at the expense of both the employee and the employer; 2 – if paid entirely by the employer). The indicator was also assigned zero values, because its meaning is to find out whether the payment of the employer for advanced training is important for cases where there is no training at all. The *trainingexp* variable.
4. Was there a conflict with the administration in cases where an employee who had previously trained at the expense of the employer was fired. A positive answer to this question can be considered an indirect signal of the likely inability of the management to competently manage the most qualified personnel. The respondents who answered to the previous questions that there is no system of advanced training at the enterprise, or the training is carried out at their own expense, usually did not leave this field blank, but gave a negative answer. The *trained_left_conflict* variable.

5. The presence of direct dependence of workers' incomes on their level of education at the enterprise, the *wage_educ* variable.
6. The presence of subjectivity of the head in relation to employees, the *boss_tyranny* variable. This question was formulated for better understanding in the questionnaire as follows: "Can you recall an example of subjectivity (or tyranny) of your manager in relation to an employee?"
7. The presence of discrimination in the field of labor relations at the enterprise, according to the respondent, the *discr* variable (Mazin, 2012).
8. For all questions with "Yes/No" options, the positive answer was given a value of 1, and the negative – 0.

ANALYSIS OF RESEARCH RESULTS

The coefficients obtained as a result of calculations based on 2011 data are presented in Table 47.1 and equation (1).

Table 47.1

Results of Calculations Based on 2011 Data and the Significance of Indicators

Dependent Variable: <i>inn_int</i>	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	Std. Error	
(Constant)	–0.167	0.136		–1.228	0.220
<i>inn_motiv***</i>	0.212	0.039	0.283	5.432	0.000
<i>training**</i>	0.135	0.059	0.160	2.284	0.023
<i>training_exp</i>	0.019	0.030	0.044	0.626	0.532
<i>training_left_con</i>	–0.086	0.054	–0.084	–1.613	0.108
<i>wage_educ</i>	0.060	0.039	0.078	1.522	0.129
<i>boss_tyranny</i>	–0.019	0.041	–0.026	–0.474	0.636
<i>discr*</i>	0.073	0.041	0.097	1.784	0.075
<i>educ_quality</i>	–0.036	0.030	–0.075	–1.202	0.230
<i>skill_quality**</i>	0.071	0.032	0.137	2.225	0.027
<i>mobility*</i>	0.043	0.023	0.100	1.880	0.061
<i>knowledge_pref</i>	0.030	0.026	0.059	1.148	0.252

* The coefficient is statistically significant at the level 0.1

** The coefficient is statistically significant at the level 0.05

*** The coefficient is statistically significant at the level 0.01

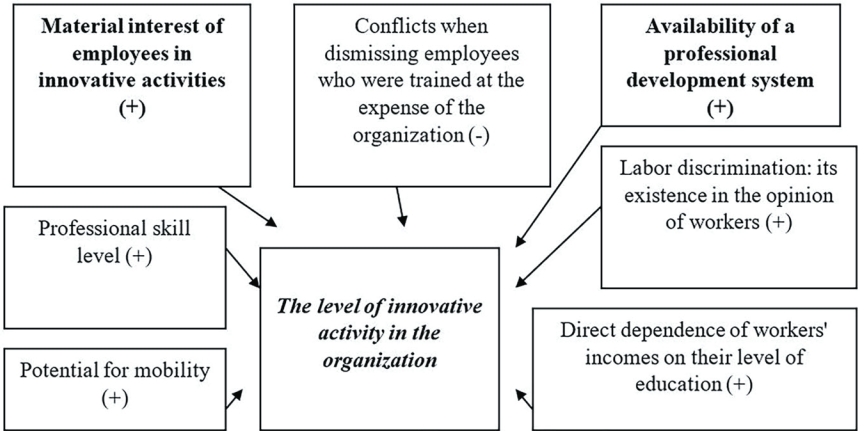
Source: Compiled by the authors.

Equation: $inn\_int = -0.167 + 0.212 * inn\_motiv^{***} + 0.135 * training^{**} + 0.019 * training\_exp - 0.086 * training\_left\_con + 0.459 * wage\_educ - 0.019 * boss\_tyranny + 0.073 * discr^{*} - 0.036 * educ\_quality + 0.071 * skill\_quality^{**} + 0.043 * mobility^{*} + 0.030 * knowledge\_pref(1)$

Immediately five coefficients out of eleven demonstrated statistical significance, and two were close to this. Only four factors—payment for training by the employer, the presence of subjectivity of management, employees’ assessment of the quality of their education and their choice of knowledge or “crusts” as a priority—do not have a pronounced connection with the integral indicator of innovative activity, which was influenced by the high weight of the indicator of innovative production in it, also not having a noticeable relationship with these factors. The components of labor potential, significantly affecting the integral indicator of the innovative activity of the enterprise, are illustrated in Figure 47.1.

Figure 47.1

Factors Significantly Affecting the Integral Indicator of the Innovative Activity of Enterprise



Source: Compiled by the authors.

Let’s consider the impact of the other seven components. The presence of material interest in innovation demonstrates the highest degree of significance, as well as the highest coefficient of all binary variables, as it was before. The presence of a professional development system (corresponding binary variable) also demonstrates high significance and a relatively large positive value of the coefficient. The level of professional skills and the potential for mobility, assessed by the employee himself, influence quite

strongly if we take into account the range of values not from 0 to 1, but from 0 to 5. Discrimination, or rather the selectivity and individuality of pay, perceived as discrimination by non-informed workers, have a positive impact. As for the two remaining factors, the presence of a direct dependence of workers' incomes on their level of education has a positive effect; the presence of conflicts when dismissing a previously trained employee has a negative impact. The error of the coefficients for the corresponding variables is higher than for others, but not so large as to ignore them.

Calculations made according to the 2018 survey confirm most of the results of the previously constructed model (Table 47.2).

Table 47.2

Results of Calculations Based on 2018 Data

Dependent Variable: inn_int	Unstandardized Coefficients		Standardized Coefficients	t-statistics	Sig.
	B	Std. Error	Beta	Std. Error	B
(Constant)	-0.107	0.226		-0.476	0.634
inn_motiv***	0.451	0.069	0.327	6.502	0.000
training*	0.228	0.122	0.135	1.872	0.062
training_exp	-0.027	0.058	-0.033	-0.469	0.640
training_left_con	0.020	0.117	0.009	0.173	0.863
	0.132	0.069	0.095	1.909	0.057
wage_educ*	–	0.076	-0.080	-1.517	0.130
boss_tyanny	0.040	0.087	0.024	0.458	0.647
discr	0.040	0.047	0.048	0.851	0.395
educ_quality	0.076	0.045	0.098	1.695	0.091
skill_quality*	0.052	0.042	0.065	1.239	0.216
mobility					
knowledge_pref	0.000	0.043	-0.001	-0.011	0.991

Source: Compiled by the authors.

Three of the five variables that significantly influenced the indicator under study in the main model, built according to 2011 data, remained the same in new calculations.

CONCLUSIONS

The identified relationships can be used in human resources management in the enterprise. A set of actions is needed to enhance the innovative activity of employees. Three components of such activity can be distinguished:

- ability to innovate (individually or as part of a group), suggesting relevant knowledge and competencies;
- willingness to participate in innovation;
- real participation in innovation, a prerequisite for which is the presence of the first two components, supplemented by the opportunities that the organization provides for this.

The organization's management should act in two directions to enhance the innovative activity of employees. The first one encourages the employee to increase, build up his innovative potential, his ability to participate in the development and implementation of various innovations. The second direction encourages such workers to realize, reveal their potential, and carry out innovative activities in practice. These areas, being closely related, provide for different actions of the organization in relation to employees.

The innovativeness of the enterprise itself matters a lot. If it is formal in nature and innovations are introduced "for show," innovative qualities from personnel, in general, are not required, and even if employees are capable of developing and implementing innovations, they will hardly be able to realize themselves as effective innovators.

Employees need to be motivated appropriately to become more innovative. Employees are affected not only by external incentives (rewards and sanctions), but also by internal motivation, which relies on (and influences) the needs, values and priorities of a person and, thus, encourages him to behave useful for the organization.

An important role in the formation and implementation of innovative qualities of employees is played by the culture of relations between management and ordinary employees. Excessive authoritarianism and the presence of arbitrariness on the part of the management negatively affect the involvement of personnel in innovative activities, as shown by the author's research. It is important for an organization to form not just loyalty, but also a sense of belonging to the goals and objectives of the enterprise, corporate patriotism among creative workers.

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SOCIAL FACTORS OF LITERARY TOURISM PROMOTION FOR THE PURPOSE OF SOCIOECONOMIC DEVELOPMENT OF THE NIZHNY NOVGOROD REGION

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ABSTRACT

The purpose of the chapter is to study the social factors of literary tourism development in the Nizhny Novgorod region. The authors believe that the phenomenon of literary tourism as an integral part of cultural tourism has a special potential, since it affects the formation of socioeconomic and cultural-educational policy and can act as a resource for the development of the region as a condition for introducing the population to world classical literature, studying the literary traditions of regional literary creativity.

The methodology is based on the content analysis of the problem under study, the authors understand literary tourism as tourism that introduces the tourist to the historical and cultural potential, literary heritage of the country (region). The results of a survey of 250 residents of the city of Nizhny Novgorod aged 17 to 65 years are presented, in the course of which it was revealed, as far as Nizhny Novgorod residents are familiar with the services

of literary tourism, their interest in literary excursions that reveal the life and work of writers of Nizhny Novgorod and the Nizhny Novgorod region, the priority of individual or group excursions.

The results of the conducted research allowed us to confirm the opinion that the tourism industry of the Nizhny Novgorod region faces the task of attracting attention to literary tourism. This makes it necessary to develop various literary and tourist programs and routes that purposefully solve a set of tasks in the field of spiritual, moral, and cognitive education of the individual.

In recent years, the tourism sector has been rapidly developing in Russia, which is becoming not only a powerful impetus for the socioeconomic development of the country, but most importantly—it forms the value world of a person, his intellectual range, and creative potential (Kaznacheeva & Emelyanova, 2019; Perova & Zakirova, 2014; Sergeeva & Kaznacheeva, 2014). Of particular importance is the solution of the problems of moral and creative education of the individual in the conditions of sociocultural threats of digital transformation and modernization of modern society (Gryaznova et al., 2020; Kislyakov et al., 2020; Smirnova et al., 2020). The tourism industry has a special role in this process, as familiarization with the cultural heritage is a key value of tourism (Belinova et al., 2020; Kaznacheeva et al., 2018; Lebedeva et al., 2017).

METHODOLOGY

The study of social factors in the development of literary tourism in the Nizhny Novgorod region is due to the fact that it is rich in literary heritage. Questions concerning the formation of this type of tourism are emphasized in the works of different authors.

Despite the fact that this issue has already been partially studied, in particular, there are definitions of the concept of “literary tourism,” routes of literary tourism, very rare studies among tourists in the regions, the purpose of which would be to identify the degree of interest in this type of tourism.

It is possible to distinguish two directions, the development of which will contribute to literary tourism:

- creating a positive image of the region, thereby increasing the number of tourists in it;
- development of interest in the study of literature and knowledge of literary creativity.

RESULTS

Company Booking.com It analyzed the responses of more than 20 thousand tourists from 28 countries in order to identify the main trends in the field of travel for 2021. Let us consider some of them in more detail (“Tourism Trends 2020–2021,” 2021).

1. *Travel is still with us.* Forty-eight percent of Russians surveyed said that their desire to travel has not faded. Fifty-four percent of respondents said that in 2021 they want to catch up. Thirty-two percent of respondents plan to celebrate a postponed event during their vacation due to the coronavirus. Almost the same number (33%) are willing to re-book their accommodation.
2. *Price and value.* More than half of the surveyed Russian respondents (61%), planning a trip, expect to pay more attention to prices. Sixty-four percent of respondents are going to follow special offers and promotions.
3. *Domestic tourism.* In 2021, 34% of respondents plan to travel to Russia within the next 7–12 months. Almost half of respondents (45%) expressed a desire to visit new destinations in their country or region, and 46%—to get acquainted with local natural attractions, 58% of Russians surveyed are going to visit places they already know.
4. *Travel safety.* Fifty-one percent of respondents will avoid traveling to certain destinations, and 60% expect that visiting tourist places will be regulated in order to comply with social distancing measures. At the same time, 71% of respondents will book a particular housing option only if they are provided with detailed information about measures to protect health and safety, and 72% will prefer housing where there are disinfectants.
5. *Growing awareness.* In 2021, 60% of Russians participating in the survey want to spend their holidays in an environmentally friendly and conscious way. The majority of respondents (71%) expect tours from tour operators that cause less damage to the environment. For example, 51% of respondents think about the need to reduce waste and recycling of plastic during their trips and to avoid the high season (47%) and crowds of vacationers (42%) will turn their attention to less popular destinations.
6. *Simple joys.* For many tourists in 2021, simple pleasures will be interesting: hiking (94%), walking in the fresh air (50%), outdoor recreation (44%) and relaxation (33%). During their trips, more than half (56%) of respondents from Russia will seek such leisure activities as walking and relaxing with their family, while 46%

expect to relax in the country and are generally willing to travel to less popular destinations in order to spend more time in the fresh air.

According to this study, it was concluded that the tourist market would develop rapidly, which means that competition for the consumer of its services will grow. Travel companies will make every effort to fully meet the needs of their customers and improve the quality of services provided. In our opinion, this determines, on the one hand, the development of special programs (including individual ones) and travel brands, and on the other hand, the timely training of managers who know the current trends in the development of the tourism industry (Belinova et al., 2020; Bicheva et al., 2016; Kaznacheeva & Chelnokova, 2018; Kaznacheeva et al., 2018).

One of the directions of development of the tourism industry is considered literary tourism, as an integral part of cultural tourism. Cultural tourism is understood as outbound tourism, the purpose of which is to learn about the world around us, get acquainted with the peculiarities of history, visit attractions, and satisfy cognitive and cultural interests. Russia with its rich cultural traditions and literary heritage has a high potential for the development of literary tourism.

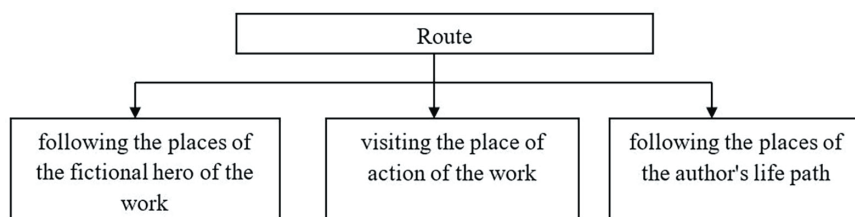
The relevance of studying the influence of literary tourism on the development of regions is due to the fact that today there are new trends in cultural life associated with the revival of forgotten names and events. As emphasized in the research, the historical heritage is subject to a new reevaluation (Gurov et al., 2018; Lebedeva et al., 2017; Martianova & Chesnova, 2017). In this regard, the development of literary tourism can become a real opportunity for socioeconomic and cultural growth, since the potential of literary tourism can act as a resource for the development of regions (Lapochkina, 2015). At the same time, the analysis of scientific sources indicates insufficient development of the problem of literary tourism. We note the works of Aslamov and Karasev (2015), Gurov et al. (2018), Lapochkin (2015), Martyanova and Chesnova (2017), Silaeva (2013) and other authors. The publications reveal some theoretical and practical issues of the development of literary tourism.

Literary tourism is a fairly young type of travel, the interest in which increases every year. The purpose of traveling is to get acquainted with sights, natural and ethnic features, historical and architectural monuments that are related either to the plot of literary works or to the life of the author. Literary tourism is based on the phenomenon of honoring the world's classical literature and the tradition of meeting and studying local literary creativity. When planning a trip along the literary route, the tourist expects to visit places associated with the life of the writer, the heroes of his literary works, to plunge into the atmosphere of the landscape-the

prototype of the artistic world of the work (Aslamova & Karasev, 2015). The emergence of interest in a particular area is facilitated by the fact that it is recognized as unique from the point of view of the attitude to the work of a certain writer, poet. The purpose of the trip may be to find an answer to the question of how this or that situation contributed to the formation of the personality of the author of the work influenced the writing of books. Figure 48.1 shows the routes that are included in literary tourism.

Figure 48.1

Literary Tourism Routes



Source: Developed and compiled by the authors.

Aslamova and Karasev (2015) believe that “literary tourism is a deep and informative type of activity, which allows it to act as an instrument of moral education of the individual.” Gurov et al. (2018) consider this concept as “a type of cultural tourism associated with places and events described in literary works, as well as with the life of the authors of these works.” Silaeva (2013) believes that “literary tourism is a type of cultural tourism associated with places and events described in literary works, as well as with the life of the authors of these works.”

We will understand literary tourism as tourism that introduces the tourist to the historical and cultural potential, as well as the literary heritage of the country (region).

In Russia, the concept of “literary tourism” has not yet entered the lexicon of tour operators, although in Moscow and St. Petersburg they conduct such excursions as “Through the pages of the novel ‘War and Peace,’” “Sergey Yesenin. Where does the fate of events take us ...,” “Mayakovsky: Happy stay!”, “Dostoevsky’s Petersburg” and “Pushkin’s Petersburg” and others.

The website TurStat (2021) has compiled a rating of cities and regions of Russia for literary tourism based on the results of an internet survey on the topic in which city and region of Russia the most interesting literary trips and tours to museums and estates of writers and poets. The top five cities and regions of Russia, popular for literary tourism and travel to museums and estates, were St. Petersburg, Moscow, Moscow, Tula and Leningrad regions.

For St. Petersburg as the best city for literary travel, 47% of votes were given, for Moscow 17%, for the Moscow region 11%, for the Tula region 8%, for the Leningrad Region 4%, for the Yaroslavl and Ryazan regions 3%, for the Tambov and Ulyanovsk regions 2%, for the Kostroma region 1% of votes. Among such trips to the Moscow region, the museum-estate of F. I. Tyutchev Muranovo, the museum-estate of A. P. Chekhov Melikhovo, the museum-estate of A. A. Blok Shakhmatovo are highlighted. In the Tula region, they prefer to visit the museum-estate of L. N. Tolstoy Yasnaya Polyana, the house-museum of I. A. Bunin in Efremov. In the Yaroslavl region, the museum-estate of N. A. Nekrasov Karabikha is popular, in the Ryazan region – the museum-estate of S.A. Yesenin Konstantinovo, in the Tambov region-the museum-estate of M. Yu. Lermontov Tarkhany, in the Kostroma region-the museum-estate of A. N. Ostrovsky Shchelykovo (TurStat, 2021).

Nizhny Novgorod also has a significant tourist potential. The Nizhny Novgorod region has a rich cultural history and unique attractions, museums, favorable location and extensive transport infrastructure, the status of the center of the Volga Federal District. The city has 746 objects of cultural heritage (including 92 objects of federal significance and 654 of regional significance). Currently, the development of the cultural leisure system in the Nizhny Novgorod region allows us to offer 64 excursions on the topic “Literary”, which are organized by the travel agencies Pilgrim NN, Almi Travel, Stagecoach Tour, Serpentine, and so forth. Let us consider some of them (Table 48.1).

Table 48.1
Examples of Literary Tourism Programs in the Nizhny Novgorod Region

Program name	Description of the program
M. Gorky in Nizhny Novgorod	The tour introduces the life and work of the great writer. The tour Includes a visit to the “House of Kashirin,” the museum-apartment of M. Gorky.
Pushkin places in Bolshoe Boldino	The tour includes a visit to the Pushkin Museum-Reserve, the Pushkin Estate, the Luchinnik Grove as the poet’s favorite walking place
One-day sightseeing tour to Arzamas	The tour includes a sightseeing tour of Arzamas, a visit to the Museum of the Russian Patriarchate, the literary museum of A. P. Gaidar and the house-museum of the children’s writer.
“Literary Nizhny”	The tour introduces the life and work of the great Russian writers M. Gorky, A. Melnikov-Pechersky, N. Dobrolyubov, V. Korolenko, I. Dahl, T. Shevchenko and others associated with the Nizhny Novgorod region. It is possible to visit the museum of one of the writers.

Source: Developed and compiled by the authors.

Nizhny Novgorod is the birthplace of the famous writer Maxim Gorky. For a long time, the city bore his name. His memory is preserved by three museums and many places associated with his life, work, and active social activities.

Speaking about the preferences in the choice of routes of literary tourism among the younger generation, it is impossible not to say about the world-famous state literary-memorial and natural museum-reserve of A. S. Pushkin "Boldino." Pushkinskoe Boldino is one of the most important places in the Nizhny Novgorod region. Tourists have the opportunity to plunge into the atmosphere of the romantic and mysterious 19th century, in the era of A. S. Pushkin, reigning here. No wonder Boldin autumn is famous all over the world. And the Boldino Museum is considered the largest Pushkin museum in Russia. The estate was restored based on drawings and historical research. Arriving in Boldino, the tourist will have an unforgettable experience: Pushkin's study with authentic manuscripts, corrections, drawings made in the poet's rapidly flying handwriting. It was in Boldino that the Muse was especially favorable to the poet. Here were created "Belkin's Stories," "The Bronze Horseman," "The Queen of Spades," "Eugene Onegin," famous fairy tales. Visiting the Boldino estate, tourists will recognize another Pushkin. Not a classic, known all over the world, but an energetic young man, with his own problems and joys.

The basis of the Literary Museum in Arzamas is the personal fund of Arkady Gaidar, which is still replenished by the descendants of the writer. Here you can view published translations and lifetime editions of books, listen to stories about the difficult fate of Gaidar and learn the secret of the origin of the pseudonym. In the house-museum, a small wing, Arkady Golikov spent his childhood and youth.

As mentioned above, travel agencies of Nizhny Novgorod offer various excursions to the corners of the city and region related to the life and work of poets and writers of Russia. These excursions are organized for both schoolchildren and adults. It is important to note that the cost of these tours is relatively low, which increases their availability. Consider the approximate prices of one-day routes (Table 48.2).

The authors conducted a survey, which revealed how familiar Nizhny Novgorod residents are with this type of tourism as a literary one. The survey was conducted among 250 residents of the city of Nizhny Novgorod aged 17 to 65 years.

The first question allowed us to find out whether they are familiar with literary tourism (Figure 48.2).

Only 23% of respondents gave a positive answer. Almost half of the respondents (44%) have never heard of it.

Table 48.2

Excursions on Literary Subjects (Based on the Site “Excursions in the Nizhny Novgorod Region” <https://extraguide.ru/russian/nizhny-novgorod/region/>)

The name of the tour	Group Size	Price of tour	Excursion type
Pushkin's places in Bolshoe Boldino	up to 20 people	1,850 rubles per person	Group bus and pedestrian
Small trip to Bolshoe Boldino	1–3 people	from 9,550 rubles	Individual bus and pedestrian
	4–7 people	from 11,550 rubles	
	8–19 people	from 16,550 rubles	
Boldino and Arzamas: Pushkin was here	up to 19 people	4,000 rubles per person	Individual bus and pedestrian
Bolshoe Boldino	up to 6 people	11,900 rubles	Individual bus and pedestrian
Museum of Childhood of A.M. Gorky “Kashirin's House”	up to 10 people	100–200 rubles per person	Individual pedestrian
Museum-apartment of A.M. Gorky	up to 10 people	100–300 rubles per person	Individual pedestrian
Gorky's World	up to 10 people	2500 rubles	Individual Pedestrian
Literary and graphic route	1–5 people	2,000 rubles.	Individual Pedestrian
	more than 5 people	400 rubles per person	
Maxim Gorky-a man and a steamer	Up to 15 people	2,500 rubles	Individual Pedestrian

Source: Developed and compiled by the authors.

The answers to the question “Are you interested in excursions related to the life and work of writers living in the Nizhny Novgorod region” showed that 86% of respondents would be happy to visit such an excursion.

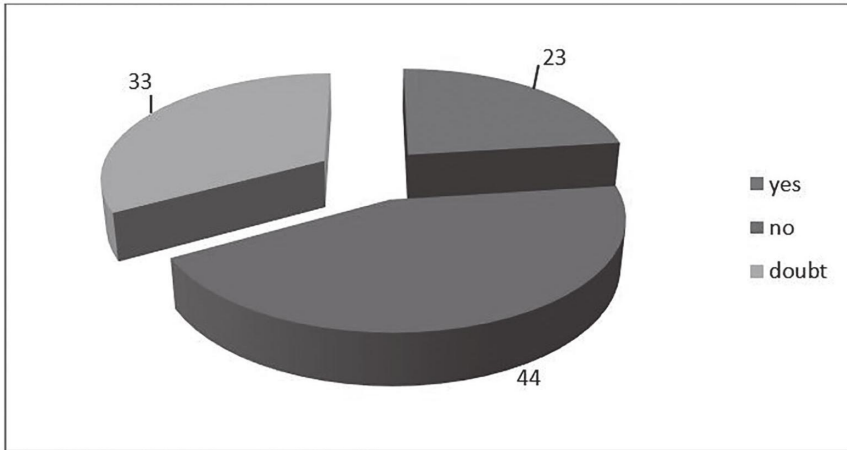
The answers to the following question: “Which excursions would you choose: individual or group” were distributed as follows (Figure 48.3).

Consequently, the vast majority (83%) would prefer group excursions. This choice is primarily due to the cost of the tour.

The study of theoretical and practical aspects of the problem under study shows that respondents show a special interest in the study of literary heritage, which indicates the need for targeted development of literary tourism in the Nizhny Novgorod region.

Figure 48.2

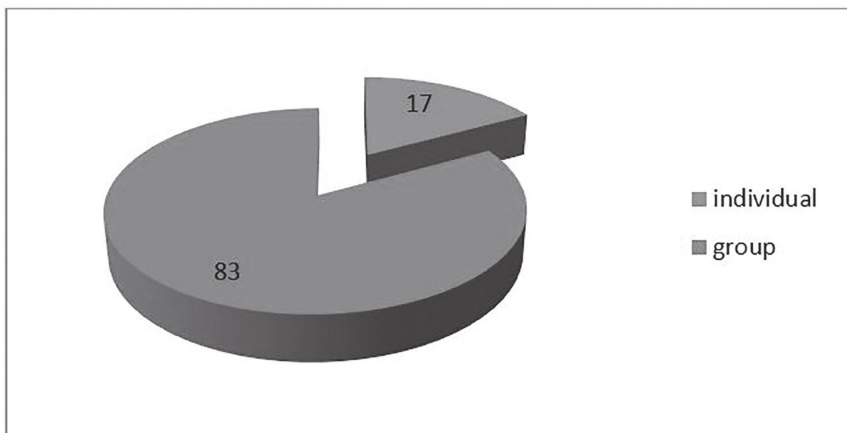
The Answer to the Question "Are You Familiar With Literary Tourism," %



Source: Developed and compiled by the authors.

Figure 48.3

Answer to the Question "Which Excursions Would You Choose: Individual or Group," %



Source: Developed and compiled by the authors.

CONCLUSION

The conducted research testifies to the high relevance of the development of literary tourism as an integral part of cultural tourism, the phenomenon of which has a special potential that affects the formation of cultural and educational policy. The preservation and popularization of the literary heritage of a particular territory can be considered as its unique tourist resource and an innovative way to expand cultural life, contributing to the increase of the region's competitive advantages.

The above causes the need to develop various literary and tourist programs and routes that purposefully solve a set of tasks in the field of spiritual, moral, and cognitive education of the individual. We consider the most significant:

- familiarization with the Russian and world literary classics, the formation of a sense of belonging to the cultural traditions and practices of a particular region;
- the acquisition of new experience (emotional, literary-artistic, literary-historical, biographical) and the development of a stable interest in the study of literature and the knowledge of literary creativity.

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JUSTIFICATION OF THE CHOICE OF OBJECTS FOR THE CONSTRUCTION OF INTERREGIONAL AVIATION CENTERS IN THE RUSSIAN FEDERATION

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ABSTRACT

The chapter examines the network of regional airports in Russia in order to select from their number of objects those that are most suitable for solving the problem of the congestion of the Moscow aviation hub.

The authors propose a set of selection criteria that form the basis when using the hierarchy analysis method (passenger traffic, technical equipment, airline base, remoteness, transport accessibility, ownership of aviation infrastructure facilities, availability of land reserves, traffic routing, the population living within a radius of 150 km (from the airport).

The following applicants were selected from the considered list of airports in the Russian Federation using this method: “Tolmachevo,” “Koltsovo,” “Kurumoch,” “Platov,” “Irkutsk” airports, based on which it is economically expedient to create interregional aviation centers as reference points for building an alternative route network of the Russian Federation.

The implementation of the proposed recommendations will increase the competitive advantages of air transport in comparison with road and rail transport; increase the mobility of citizens of the Russian Federation by increasing the availability of air travel.

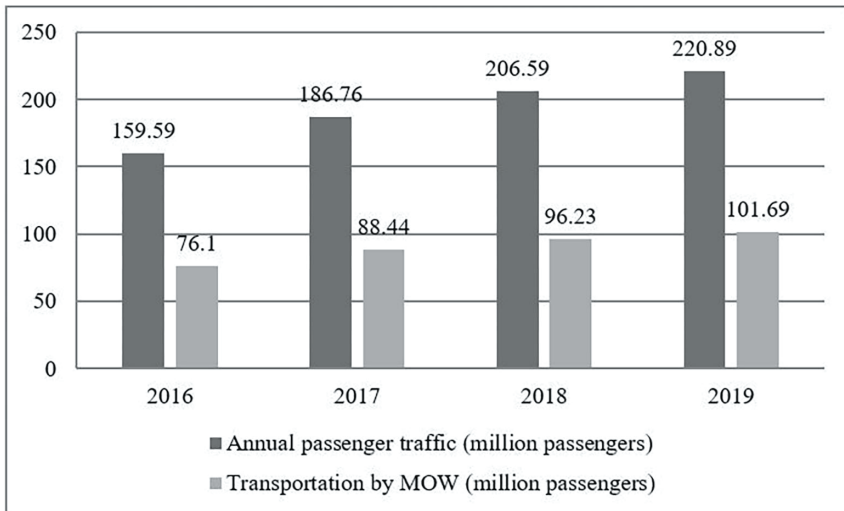
Most of the air traffic between the regions of the Russian Federation is carried out not directly but through the Moscow aviation hub. About 50% of air passenger traffic performed by Russian airlines falls on three airports: “Sheremetyevo,” “Vnukovo,” “Domodedovo.” The Moscow aviation hub also includes the “Zhukovsky” airport. The Moscow aviation hub provides communication between individual parts of the state between themselves and the regions of Russia with foreign countries. This practice is the reason for the rise in the cost of transportation. Passengers prefer cars and trains to air travel due to the high cost (Gliuzberg et al., 2019; Pokrovskaya et al., 2020; Sokolov et al., 2018).

The data in Figure 49.1 is based on information from the Federal Air Transport Agency. They confirm that most of the flights of Russian airlines are carried out with a transfer at Moscow airports.

The purpose of this scientific article is to develop mathematically justified proposals for the creation of interregional aviation centers based on regional airports in Russia to reduce the congestion of the Moscow aviation hub.

Achieving the goal involves solving such problems as:

- study of the reasons for the congestion of the Moscow aviation hub;
- the use of mathematical calculations to justify the choice of regional airports for the formation of interregional aviation centers;
- making recommendations for the establishment of centers.

Figure 49.1*The Structure of Air Transportation in the Russian Federation*

Source: Compiled by the authors based on data from Traffic volumes at the airports of the Moscow aviation hub (2021).

METHODOLOGY

The research methodology requires studying the causes of the current situation.

The authors of the chapter consider the following reasons for the congestion of the Moscow aviation hub:

1. The lack of direct air communication between regions. According to the Federal Air Transport Agency (Rosaviatsiya), 46.04% of air traffic in the Russian Federation was carried out through the Moscow aviation hub in 2019 (Official Website of the Federal Air Transport Agency, 2021). This is happening with the aim of additional loading of the aircraft in Moscow.
2. The lack of direct air communication between the regional airports of the Russian Federation and foreign countries due to a decrease in purchasing power of the population and, as a result, a lack of consumer demands. For this reason, most of the international flights are carried out through the developed airports of the Moscow Aviation Hub, where passengers get using different types of transport.

3. The high level of cost and, as a result, the low availability of transport services for the population.
4. The underdeveloped infrastructure of regional airports in the Russian Federation. Runways; taxiways on the airfield; platform; parking spaces for aircraft; hangars where aircraft maintenance and repairs take place are unable to accommodate new, heavy aircraft such as Boeing and Airbus.
5. Incomplete aircraft loading leads to an increase in prices due to the need to recoup an increase in the number of fees, rates for services of airports in the Russian Federation, an increase in prices for Aviation fuels and lubricants.
6. Basing of the largest Russian airlines at Moscow airports (“Aeroflot”—“Sheremetyevo,” “S7 Airlines” — “Domodedovo,” “Russia” — “Sheremetyevo” and “Vnukovo,” “UTair” — “Vnukovo”).
7. The lack of constraining restrictions for transportation through the Moscow aviation hub by the state.
8. The lack of incentive system for interregional aviation.

The reasons given above confirm the need to create new interregional aviation centers (hubs). These regional airports must meet the list of requirements (selection criteria) and have the status of “international airports of the Russian Federation,” have the opportunity for further development, communication with each other, with all regional airports in the country and with airports of foreign countries.

The following airports were selected for research based on geopolitical location and infrastructure development (Official website of Tolmachevo Airport, 2021; Official website of Koltsovo Airport, 2021; Official website of Strigino Airport, 2021; Official website of Platov Airport, 2021; Official website of Kurumoch Airport, 2021; Official website of Irkutsk Airport, 2021; and Official website of Yakutsk Airport, 2021):

1. “Tolmachevo” Airport (Novosibirsk).
2. “Koltsovo” Airport (Yekaterinburg).
3. “Strigino” Airport (Nizhny Novgorod).
4. “Platov” Airport (Rostov-on-Don).
5. “Kurumoch” Airport (Samara).
6. “Khrabrovo” Airport (Kaliningrad).
7. Irkutsk Airport.
8. Yakutsk Airport.

It is proposed to use the “Saati” method—the method of “analysis of hierarchies” as a mathematical method for the selection of regional

airports in order to build hubs. It assumes a pairwise comparison of two objects with each other based on the existing table (scale) of preferences (Hierarchy Analysis Method, 2021). The content of the main principle is that if the first object (in comparison with the second one) gets the value n , then the second object (relative to the first one) has the opposite value, that is $-1/n$. The method allows comparing objects according to a large number of criteria. A certain weight on the scale of preference is assigned to each criterion during the analysis. Selection and ranking are carried out based on expert opinion.

RESULTS

The authors propose to use the following criteria for ranking regional airports of the Russian Federation:

1. Annual passenger traffic of regional airports of the Russian Federation.
2. The level of technical equipment of the airport (the number and quality of runways, taxiways on the airfield, the availability of the required number of aircraft parking spaces).
3. Airline basing.
4. Optimal disposal and transport accessibility.
5. Form of ownership of aviation infrastructure facilities.
6. Availability of land reserves in the vicinity of the airport for the possibility of further expansion.
7. Transportation routing (variety of domestic and international flight destinations).
8. The number of humans living within a radius of 150 km (from the airport).

At the first stage, the weight of each criterion was calculated. The calculations are presented in Table 49.1.

It is necessary to multiply the scores for each criterion by rows, and then to extract the root (in this case, the eighth degree—determined by the number of criteria) from the product in order to determine the degree of each criterion. It is necessary to divide the value of each criterion, calculated by extracting the root, by the total value of the values for all criteria in order to calculate the final weight of the criterion (Hierarchy Analysis Method, 2021; Saati Analytic Hierarchical Procedure, 2021). The total weight of all criteria (with correct calculations) should be equal to one.

Table 49.1***Assessment of the Degree of Significance of the Criteria Used by the "Saati" Method***

Criteria	1	2	3	4	5	6	7	8	Degree	Criterion weight
1	1.00	1.00	2.00	4.00	5.00	5.00	3.00	1.00	2.22	0.218
2	1.00	1.00	2.00	4.00	5.00	5.00	3.00	1.00	2.22	0.218
3	0.50	0.50	1.00	3.00	4.00	4.00	2.00	0.50	1.36	0.134
4	0.25	0.25	0.33	1.00	2.00	2.00	0.50	0.25	0.57	0.055
5	0.20	0.20	0.25	0.50	1.00	1.00	0.33	0.20	0.37	0.036
6	0.20	0.20	0.25	0.50	1.00	1.00	0.33	0.20	0.37	0.036
7	0.33	0.33	0.50	2.00	3.00	3.00	1.00	0.33	0.87	0.085
8	1.00	1.00	2.00	4.00	5.00	5.00	3.00	1.00	2.22	0.218
Total									10.21	1.000

Source: Compiled by the authors.

Table 49.1 shows that the most important criterion is the annual passenger traffic of the regional airport. This is a key indicator when assessing development prospects.

The ranking of airports was carried out at the next stage according to the criteria: "annual passenger traffic," "level of technical equipment," "basing of airlines," "optimal distance and transport accessibility" (Tables 49.2-49.8).

The throughput of airport terminals, the number of takeoff and landing operations per hour, the length of the runway, the use of airport production facilities was taken into account when ranking regional airports according to this criterion. As a result, the need to expand the territories of regional airports, as well as the availability of land reserves that could be used to expand the territory, was assessed.

A summary table of ranking the regional airports of the Russian Federation in terms of the degree of importance was formed for each of the criteria based on estimates. On its basis, the priority of regional airports was formed to assess the feasibility of creating interregional aviation centers.

The highest rating belongs to the "Tolmachevo" Airport (Novosibirsk), as can be seen from the summary table. Also "Koltsovo" Airport (Yekaterinburg), "Kurumoch" Airport (Samara), "Platov" Airport (Rostov-on-Don) and Irkutsk Airport were included in the five best airports in the Russian Federation.

Table 49.2***Assessment of Regional Airports in the Russian Federation by Annual Passenger Traffic***

	1	2	3	4	5	6	7	8	Degree	Rating
1	1.00	2.00	5.00	3.00	3.00	4.00	4.00	6.00	3.11	0.307
2	0.50	1.00	4.00	2.00	2.00	3.00	3.00	5.00	2.09	0.206
3	0.20	0.25	1.00	0.33	0.33	0.50	0.50	2.00	0.48	0.047
4	0.33	0.50	3.00	1.00	1.00	2.00	2.00	4.00	1.30	0.128
5	0.33	0.50	3.00	1.00	1.00	2.00	2.00	4.00	1.30	0.128
6	0.25	0.33	2.00	0.50	0.50	1.00	1.00	3.00	0.77	0.076
7	0.25	0.33	2.00	0.50	0.50	1.00	1.00	3.00	0.77	0.076
8	0.17	0.20	0.50	0.25	0.25	0.33	0.33	1.00	0.32	0.032
Total:									10.13	1.000

Source: Compiled by the authors.

Table 49.3***Assessment of Regional Airports of the Russian Federation by the Level of Technical Equipment***

	1	2	3	4	5	6	7	8	Degree	Rating
1	1.00	2.00	4.00	4.00	3.00	6.00	5.00	6.00	3.39	0.321
2	0.50	1.00	3.00	3.00	2.00	5.00	4.00	5.00	2.34	0.322
3	0.25	0.33	1.00	1.00	0.50	3.00	2.00	3.00	0.96	0.091
4	0.25	0.33	1.00	1.00	0.50	3.00	2.00	3.00	0.96	0.091
5	0.33	0.50	2.00	2.00	1.00	4.00	3.00	4.00	1.54	0.346
6	0.17	0.20	0.33	0.33	0.25	1.00	0.50	1.00	0.38	0.036
7	0.20	0.25	0.50	0.50	0.33	2.00	1.00	2.00	0.60	0.057
8	0.17	0.20	0.33	0.33	0.25	1.00	0.50	1.00	0.38	0.036
Total									10.56	1.000

Source: Compiled by the authors.

Table 49.4

Assessment of Regional Airports of the Russian Federation by the Presence of Based Airlines

	1	2	3	4	5	6	7	8	Degree	Rating
1	1.00	3.00	5.00	4.00	2.00	4.00	2.00	2.00	2.57	0.27
2	0.33	1.00	3.00	2.00	0.50	2.00	0.50	0.50	0.92	0.09
3	0.20	0.33	1.00	0.50	0.25	0.50	0.25	0.25	0.36	0.04
4	0.25	0.50	2.00	1.00	0.33	1.00	0.33	0.33	0.56	0.06
5	0.50	2.00	4.00	3.00	1.00	3.00	1.00	1.00	1.57	0.16
6	0.25	0.50	2.00	1.00	0.33	1.00	0.33	0.33	0.56	0.06
7	0.50	2.00	4.00	3.00	1.00	3.00	1.00	1.00	1.57	0.16
8	0.50	2.00	4.00	3.00	1.00	3.00	1.00	1.00	1.57	0.16
Total									9.66	1.00

Source: Compiled by the authors.

Table 49.5

Assessment of Regional Airports of the Russian Federation by the Level of Transport Accessibility

	1	2	3	4	5	6	7	8	Degree	Rating
1	1.00	1.00	2.00	3.00	4.00	2.00	0.50	0.50	1.36	0.14
2	1.00	1.00	2.00	3.00	4.00	2.00	0.50	0.50	1.36	0.14
3	0.50	0.50	1.00	3.00	4.00	1.00	0.33	0.33	0.87	0.09
4	0.33	0.33	0.33	1.00	2.00	0.33	0.25	0.25	0.45	0.05
5	0.25	0.25	0.25	0.50	1.00	0.25	0.20	0.20	0.31	0.03
6	0.50	0.50	1.00	3.00	4.00	1.00	0.33	0.33	0.87	0.09
7	2.00	2.00	3.00	4.00	5.00	3.00	1.00	1.00	2.28	0.23
8	2.00	2.00	3.00	4.00	5.00	3.00	1.00	1.00	2.28	0.23
Total:									9.78	1.00

Source: Compiled by the authors.

Table 49.6***Assessment of Regional Airports of the Russian Federation by the Form of Ownership of Airport Infrastructure Facilities***

	1	2	3	4	5	6	7	8	Degree	Rating
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.125
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.125
3	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.125
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.125
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.125
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.125
7	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.125
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.125
Total:									8.00	1.00

Source: Compiled by the authors.

Table 49.7***Assessment of Regional Airports of the Russian Federation by the Availability of Land Reserves in the Vicinity of the Airport***

	1	2	3	4	5	6	7	8	Degree	Rating
1	1.00	2.00	4.00	3.00	3.00	5.00	5.00	6.00	3.19	0.31
2	0.50	1.00	3.00	2.00	2.00	4.00	4.00	5.00	2.16	0.21
3	0.25	0.33	1.00	0.50	0.50	2.00	2.00	3.00	0.84	0.08
4	0.33	0.50	2.00	1.00	1.00	3.00	3.00	4.00	1.36	0.13
5	0.33	0.50	2.00	1.00	1.00	3.00	3.00	4.00	1.36	0.13
6	0.20	0.25	0.50	0.33	0.33	1.00	1.00	2.00	0.52	0.05
7	0.20	0.25	0.50	0.33	0.33	1.00	1.00	2.00	0.52	0.05
8	0.17	0.20	0.33	0.25	0.25	0.50	0.50	1.00	0.34	0.03
Total:									10.31	1.00

Source: Compiled by the authors.

Table 49.8

Assessment of Regional Airports in the Russian Federation by the Traffic Routing

	1	2	3	4	5	6	7	8	Degree	Rating
1	1.00	3.00	5.00	4.00	4.00	6.00	6.00	7.00	3.96	0.366
2	0.33	1.00	3.00	2.00	2.00	4.00	4.00	5.00	2.06	0.190
3	0.20	0.33	1.00	0.50	0.50	2.00	2.00	3.00	0.82	0.076
4	0.25	0.50	2.00	1.00	1.00	3.00	3.00	4.00	1.32	0.122
5	0.25	0.50	2.00	1.00	1.00	3.00	3.00	4.00	1.32	0.122
6	0.17	0.25	0.50	0.33	0.33	1.00	1.00	2.00	0.51	0.047
7	0.17	0.25	0.50	0.33	0.33	1.00	1.00	2.00	0.51	0.047
8	0.14	0.20	0.33	0.25	0.25	0.50	0.50	1.00	0.33	0.031
Total									10.82	1.000

Source: Compiled by the authors.

Table 49.9

Assessment of Regional Airports in the Russian Federation by the Number of People Living Within a Radius of 150 km from the Airport

	1	2	3	4	5	6	7	8	Degree	Rating
1	1.00	0.33	2.00	0.33	0.50	3.00	3.00	5.00	1.22	0.11
2	3.00	1.00	4.00	1.00	2.00	5.00	5.00	7.00	2.84	0.26
3	0.50	0.25	1.00	0.25	0.33	2.00	2.00	4.00	0.80	0.07
4	3.00	1.00	4.00	1.00	2.00	5.00	5.00	7.00	2.84	0.26
5	2.00	0.50	3.00	0.50	1.00	4.00	4.00	6.00	1.86	0.17
6	0.33	0.20	0.50	0.20	0.25	1.00	1.00	3.00	0.52	0.05
7	0.33	0.20	0.50	0.20	0.25	1.00	1.00	3.00	0.52	0.05
8	0.20	0.14	0.25	0.14	0.17	0.33	0.33	1.00	0.26	0.02
Total:									10.85	1.00

Source: Compiled by the authors.

It is advisable to create interregional aviation centers of Russia based on the above-mentioned airports of the Russian Federation to solve the problem of the congestion of the Moscow aviation hub.

CONCLUSION

The study made it possible to substantiate the choice of regional airports for the construction of aviation hubs.

This will require modernizing the aviation infrastructure of airports (expanding runways; increasing their number; updating passenger terminals and equipment for ground handling of aircraft).

However, attracting sufficient funding will be the main challenge. State funds that are allocated to finance airports under federal targeted programs can cover only a small part of the costs.

As a rule, one source of funding will not be enough to implement such a large-scale project. Therefore, it is necessary to consider several options (for example, to attract investors and shareholders, to use the mechanism of public-private partnership, to use borrowed funds).

The implementation of the obtained results into practice will require a revision of the existing air route network of the Russian Federation, which should directly connect all regions of the state and ensure the connection of regional airports with foreign countries.

The introduction of new air routes, bypassing the Moscow aviation hub, will reduce the cost of transportation and the travel time of passengers.

This project will have a positive effect on the competitive advantage of air transport by increasing the demand for air transportation of the population, and it will also ensure the implementation of the most important socioeconomic task of the state—to increase the mobility of Russian citizens and the coefficient of flight activity of the population.

The coefficient of flight activity should be 1.7 flights per year per one average Russian citizen by 2030, according to the Transport Strategy of the Russian Federation. For comparison, this ratio was 0.3 in 2008, and it approached 0.9 in 2019 because Russian airlines had transported about 130 million passengers in total.

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ESTABLISHMENT OF A COMPLEX IN ORDER TO IMPROVE WORKING CONDITIONS OF WORKERS IN INDUSTRIAL ENTERPRISES

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ABSTRACT

The state of the air environment in workplaces in heavy and harmful workshops is unsatisfactory today. Measurements carried out in foundries show that the maximum permissible concentration (MPC) for dust in various zones is exceeded from several times to several tens of times. A situation is similar with emissions into the environment because the MPC standards in many cases are significantly exceeded.

The purpose of the work is to create a set of solutions to improve the working conditions of workers in industrial enterprises, through the development

of the design of a treatment apparatus. This allows liquidating the shortcomings of existing problems and improving the efficiency of air purification in workplaces.

Our research methodology is based on the analysis of information published in the open press. The chapter provides data on the current situation in foundries. Foreign and domestic experience in the cleaning of ventilation emissions is considered, which shows a different picture. Based on the analysis, it was proposed to take a number of actions towards improving working conditions at workplaces.

The current situation was a consequence of the fact that during the construction and development of foundries in the past years (up to the beginning of the 1980s), normal working conditions were not given much importance. Ventilation systems were assembled randomly, often without design studies, and the current specifications of a project even theoretically not meet today’s standards (Cao et al., 2020). Equipment for them was chosen on the principle of purchase possibility

As a result, at the beginning of the 2000s, there were 605 exhaust ventilation systems in the foundries, of which only 198 were equipped with 257 cleaning devices. In production models 16 operates fans made in enterprises (Table 50.1) and 10 types of sewage treatment apparatuses (Table 50.2), manufactured by seven plants.

Table 50.1

List of Fan Manufacturers Used in Foundries of Metallurgical Production

No.	Fan type, Production no.	Manufacturing plant
1.	C4-70 from No. 3 to No.12.5 L from 500 up to 50,000M ³ /hour	1. Establishment UY-400/5 Don, Tula region 2. Chekhov, Moscow region, Kryukovsky ventilation plant 3. Moscow “Moven” 4. Naberezhnye Chelny “Kamazenergoremont”
2.	C14-46 No.6.3 No.8 L = 10,000, 20,000M ³ /hour	city Naberezhnye Chelny “Kamazenergoremont”
3.	C4-76 No.16, No.20 L=100000, 120,000M ³ /hour	1. Chekhov, Moscow region Kryukovsky fan plant 2. Khabarovsk plant “Air conditioner”

(Table continued on next page)

Table 50.1 (Continued)**List of Fan Manufacturers Used in foundries of Metallurgical Production**

No.	Fan type, Production no.	Manufacturing plant
4.	C6-28 L = 20,000m ³ /hour	Foundry equipment plant "Amurlitmash"
5.	CP7-40 No.6.3 L = 20,000m ³ /hour	Tula boiler and fan plant
6.	CP6-45 No.8 L = 20,000m ³ /hour	city Naberezhnye Chelny "Kamazenergoremont"
7.	Smoke exhauster D-13, 5-2u L = 60,000m ³ /hour	Barnaul boiler plant
8.	Exhauster D-15.5 L = 100,000m ³ /hour	Khabarovsk plant "Energomash"
9.	KC4-84 L = 40,000m ³ /hour	Don, Tula region
10.	K109-19 L = 50,000m ³ /hour	Trust "Santekhdetal"
11.	06-300 No.10 L = 30,000m ³ /hour	Kryukovsky fan plant 1. Chekhov, Moscow region
12.	MP No.10 L = 30,000m ³ /hour	OJSC "GAZ"

Source: Developed and compiled by the authors.

Table 50.2**Characteristics of Gas-Dust Collecting Installations of Foundries of Metallurgical Production**

Name	Service life	Efficiency
SIOT	20–25 years	74.1%
Rotoklon	19 years	62%
PVM-20	10-15 years	71%
PVM-20	3 years	59.8%
PVM AS 8546.E43	2 years	95%

(Table continued on next page)

Table 50.2 (Continued)

Characteristics of Gas-Dust Collecting Installations of Foundries of Metallurgical Production

Name	Service life	Efficiency
KHTI	13–23 years	74.8%
KHTI	2 years	65.7%
tr. Venturi	5 years	54.9%
tr. Venturi	3 years	48.7%
Kimpactor	5 years	61.6%
CVP-8	13 years	74.4%
PVM-40	16 years	74,9%
SIOT	5–10 years	64%

Source: Developed and compiled by the authors.

Table 50.1 shows the passport data of fans, which are actually 20–30% not achieved during operation, which is caused, inter alia, by poor workmanship and imperfection of the design. Almost all purchased fans have a belt-drive, separate bearing housings fixed on a welded frame, and bearing assemblies are poorly protected. This fan design has led to high labor intensity of maintenance, lower reliability and service life (Kozlova, Morozova, et al., 2021).

Table 50.2 shows the types of cleaning devices and the actual performance indicators achieved on them. As you can see, the actually achieved efficiency is low, which does not allow ensuring compliance with the MPC standards.

In production, centrifugal wet cleaning devices (cyclones SIOT, CVP, KHTI, etc.), devices with shock-inertial wet cleaning principle (rotoklone, PVM), coalescing pipes (Venturi pipes) in combination with these devices are used in a number of cases dry cyclones (Kuznetsov et al., 2020). Along with these devices, the system running on the air filtration principle was used. However, at high dust concentrations and for collecting wet dust generated in most of the production of sources (mixture preparation, forming) they are unsuitable. In addition, the durability of hoses is low, as well as the replacement is laborious and expensive.

METHODOLOGY

Study of foreign and domestic experience in ventilation exhaust purification issues showing different character patterns (Shiryaeva et al., 2021; Wu

et al., 2020). For example, in the countries of Western Europe, more and more preference is given to filtering emissions through the materials of bag or cassette filters, which, of course, provide a sufficiently high degree of purification up to a content of $2 \div 20 \text{ mg/m}^3$ concentration of dust particles in emissions. However, there are advantages, these filters are not devoid of significant drawbacks. Their operation is quite complicated, requires constant monitoring by personnel, the durability of filtering materials is limited, which necessitates frequent replacement of very expensive hoses or cassettes (Kuznetsov, 2018). A big disadvantage is the difficulty in cleaning the emissions from the wet, and sticky dust. The main obstacle to the introduction of these filters is the need to allocate significant areas for them, which is practically impossible in the conditions of existing industries.

Wet cleaning systems are compact, easy to operate; many enterprises have sludge removal systems.

Comparison of various devices in terms of cleaning efficiency, stability of operation, water consumption led us to the conclusion that the most acceptable is the use of devices with internal water circulation such as a wet dust collector (PVM) or Rotoklon-N, which were widely used at many enterprises, including PJSC "GAZ" (Garina et al., 2021). However, the presence of ventilation systems equipped with these cleaning systems did not lead to success either in the field of environmental protection or creating favorable sanitary and hygienic conditions in the workplace. The reason for this, in our opinion, was the disunity between the creators of the devices and the operators. As practice has shown, sometime after the launch of new vent systems, the situation is normal, but after 6–8 months deteriorates sharply. Some design flaws do not allow to operate the devices sustainably with a minimum level of service.

The cleaning devices Rotoklon-N and PVM have an imperfect design of the droplet collection system, which at high productivity does not guarantee droplet entrainment. A device clogs up completely when traps adhering dust and dust of fibrous materials for 10–20 days of operation.

Over the past 10–15 years, attempts have been made to attract various design organizations and firms to solve the ventilation problem in foundries.

Various options were proposed: bubble washing and foam filters, corona-based cleaning, devices using high-pressure nozzles, various dry and wet cyclones, aerodynamic and magnetic devices, and so forth. Some of them have been purchased and tested, but without significant positive effect.

The applied cleaning devices each individually have significant disadvantages: wet cyclones are capricious in operation, ineffective, and require a large water consumption. The same applies to Venturi scrubbers (pipes), which also require high-pressure fans or high-pressure smoke exhausters. Since the mid-90s, all newly installed systems were mainly equipped with PVM devices (wet fan dust collector), which showed sufficiently high effi-

ciency for medium and coarse dust, consumed little water, and were quite simple. However, the imperfection of the design of the droplet collection system, its inefficiency and fragility, the lack of reliable, stable working fans reduced the efficiency of these systems (Romanovskaya et al., 2020; Samarskaya & Ilyin, 2018).

The approach to design was also wrong, which was that each system was designed individually, based on the required “exactly” calculated performance. This led to a variety of types of fans, a variety of gear ratios of belt drives, caused complication of operation and organization of centralized repairs (Kozlova, Kuznetsova, et al., 2021).

RESULTS

These facts have led to a number of actions to improve the current situation.

Our analysis made it possible to divide the sources according to the properties of dust into four groups.

1. Electric melting units (primarily arc furnaces) are characterized by the release of finely ached, by approaching to smoke properties. The amount of dust particles less than 1 micron is up to 50%, particles of 100 and more microns are practically absent.
2. The fractions-blasting treatment units and tumblers. The amount of dust particles larger than 3 microns is 95%, there are particles up to 200 microns in size (especially large ones are sucked off from fractions separation systems).
3. Equipment for handling sand castings. The number of dust particles larger than 10 microns is 99%.
4. Mixing preparation, knockout, molding, transport equipment for molding sections. The number of dust particles larger than 2 microns is 85%. Wet dust.

Dust from the first group of sources is the most difficult to capture, the amount of these sources in production is small, therefore, even at low levels of purification (about 70%), the impact on the environment will be within acceptable limits. The release of dust from these sources is accompanied by the release of gases (CO, nitrogen oxide), which practically do not capture (CO partially burns).

Equipment replacement is a radical means of reducing emissions from these sources.

Sources of dust release of the second group are characterized by very high concentrations of up to $40\text{--}50\text{g}/\text{M}_3$, which leads to a heavy load on the cleaning apparatus and complicates the removal of dust. At least two-stage

cleaning is required; the fractional composition is very wide. There is heavy dust, intensively deposited in the air ducts, and at the same time, there are particles with a very low hovering speed. It is necessary to place cleaning devices, at least the first stage of cleaning, directly at the source of dust in order to separate heavy particles and prevent air ducts from overgrowing.

Dust from the third group is the easiest to catch, there are practically no additional emissions of harmful substances, therefore, when a sufficient degree of purification is achieved, it is possible to return air to the production room. The requirement for the placement of dust collectors is the same as for the sources of the second group.

Emissions from sources of the fourth group are characterized by the fact that the dust has high humidity. They are released together with water vapor. At the same time, the content of clay or bentonite particles in it leads to intense adhesion in the air ducts, which sometimes become almost completely clogged. The only radical means that reduces this phenomenon and allows efficient operation of air ducts is the placement of cleaning devices directly at dust sources excluding horizontal sections of air ducts. This is ensuring sufficiently high speeds in them. It is also necessary to exclude high speeds in suction from the equipment due to the implementation of equalizing nozzles, funnels, and so forth. Since at high speeds it is possible to remove an excessive amount, including useful dust particles of binders. The release of dust from these sources is accompanied by the release of products of thermal destruction of lubricants and additives.

The lack of a reliable and powerful fan that develops a high enough pressure to ensure efficient operation of the cleaning apparatus. As well as water treatment devices, forced to do the design and manufacture of this equipment. In the design, the goal was to create equipment that does not require labor-intensive maintenance, easy to manufacture, reliable, and as unified as possible. During the study period, it was produced 5 experimental types of fans and 10 modifications of the cleaning apparatus.

Fan design on the now almost finalized and the first fan of this type are excellent for more than 6 years without bulkheads, lubrication, and replacement of bearings. The fan is mounted on a cast frame together with the motor. It has a bearing assembly, unified with shot-blasting machines. They are equipped with effective seals that guarantee the protection of the bearings. Performing housing integral with the bore of the seating surfaces with a single installation, possible to use non-deficient ball bearings and ensure their long-term operation. The belt drive is eliminated; this simplifies maintenance and increases reliability.

When solving the problem of the cleaning apparatus design, the goal is to eliminate the shortcomings of existing ones, and if possible, to increase the efficiency of cleaning. Considering that the exact theory purifier calculations do not exist, it took a series of prototyping, on which all questions

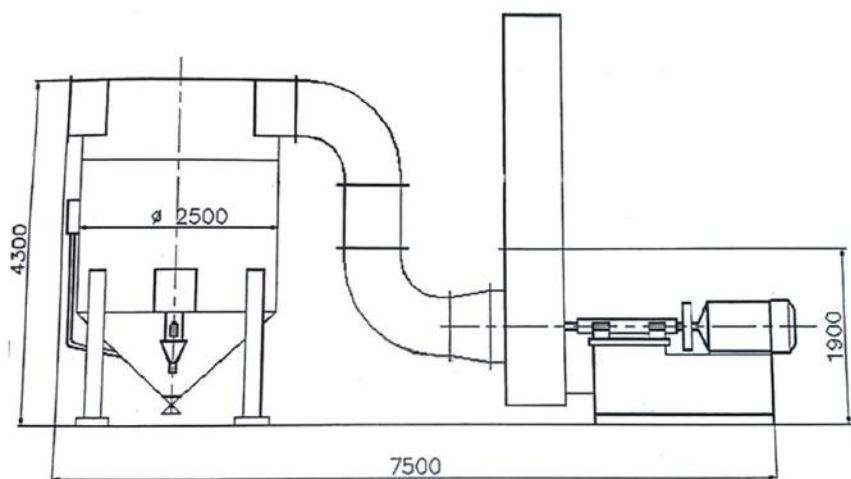
were tested. This work required the production of 8 modifications and took 5 years.

During the development, a scheme with internal water circulation was chosen, which allows to drastically reducing its consumption. The issues of self-cleaning of droplet collection systems were also resolved. As a result, it was possible to find such a design and mode of operation of the apparatus, which provided circulation in the system of compounding a significant amount of water, thus preventing overgrowing dust deposits and practically eliminate the need for forced washing.

Because of the PBIV apparatus and the fan, a modular aspiration “Complex for air purification” is assembled (Figure 50.1).

Figure 50.1

Air Purification Complex



Source: Developed and compiled by the authors.

The experience of operating the “Air Cleaning Complex in Foundry Production” shows that it is advisable to place them directly at sources of formation of emissions. This makes it possible to reduce the length of the air ducts, eliminate dust overgrowth, and reduce the labor intensity of maintenance. The completeness of the developed module makes it possible to implement this principle.

Six years of experience in operating such systems at PJSC GAZ allows us to conclude that they are simple, reliable, and economical.

It is advisable to use such modules in foundries and forging shops to collect dust.

During the period from 2002 to 2016 in the forging and foundry car factory installed 47 systems to clean the air. Implementation costs for this period amounted to about 90 million rubles. Introduction complexes could substantially reduce the dust content of the air in the workplace, and the amount of suspended particulate emissions (Tables 50.3).

Table 50.3

Actual and Standard Values of the Measured Parameters

Date of measurement	Specific component	Average result, mg/m³	Accuracy, %	PVD substances, mg/m³	Average result, g/s	PVD substances, g/s	ND designation on MVI
1	2	3	4	5	6	7	8
02.11.2020	B-370 (435) Sand filling						
	Dustiness (before cleaning)	249.1	15	–	0.9362	–	GOST 330007
	Dust content (after cleaning)	47.8	15	–	0.1563	0.2	GOST 330007
	Cleaning Efficiency: 83%						
	B-370 (436) Sand filling						
	Dustiness (before cleaning)	193.1	15	–	2.1717	–	GOST 330007
	Dust content (after cleaning)	21.3	15	–	0.2108	0.373	GOST 330007
	Cleaning Efficiency: 83%						

Source: Developed and compiled by the authors.

Production facility: PJSC “GAZ”

Subdivision: Business Unit Metallurgical Production. Foundry No.7

Objective tests: Control of harmful substances in industrial emissions into the atmosphere

Date of event: 02.11.2020-03.11.2020

Date of the test: 03.11.2020-03.11.2020

CONCLUSIONS

The long-term practice of operating air purification complexes suggests that one complex is capable of capturing up to 3 tons of dust per year.

Improvement of working conditions at workplaces had a positive effect on reducing the occupational morbidity of the respiratory system, especially among metallurgists.

The presented complex surpasses the well-known foreign analogues in its characteristics and is 1.5–2.0 times cheaper. Replacement of outdated air purification devices (wet ventilation dust collector type) with new ones made it possible to obtain an economic effect in the amount of 29.4 million rubles by saving water. The environmental effect is to reduce air pollution. In 2018 it achieved a reduction in dust emissions by 30 tons. The social effect is in reducing the incidence of workers 4.5 times. As a result, the manufacture of most of the elements of PBIV-30 on our own made it possible to reduce the cost of devices in relation to purchased products by 19.3 million rubles.

Patents of the Russian Federation No.2174040 from September 27, 2001, the Russian Federation No. 2211080 on August 27, 2003, protect the design of the device.

The total degree of purification at high input concentrations reaches 96–99%.

Such a level of purification allows keep within the European standard EPA—90 in terms of emissions.

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CHAPTER 51

DIRECTIONS FOR IMPROVING THE LEGISLATIVE FRAMEWORK OF THE PUBLIC-PRIVATE PARTNERSHIP MECHANISM IN RUSSIA

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ABSTRACT

The mechanism of public-private partnership acts as a way to accelerate the implementation of long-term projects, solving socially significant problems. Its development in Russia has been constrained for a long time due to the

lack of the necessary legislation and mechanisms for long-term financing. Currently, deficiencies in legal regulation in this area persist.

The purpose of the study is to identify and reveal the directions of further development of the legislation on public-private partnership in Russia based on the analysis of regulatory legal acts, judicial practice, statistical data, foreign experience. The authors point out the competition between the mechanisms of public-private partnership and the contractual system of public procurement, the danger of re-qualification of concluded agreements in court as one of the key legal problems.

Methodological tools are selected taking into account specific goals and objectives of the work. It is based on an interdisciplinary approach, using comparative legal, formal legal, statistical, structural and functional and other methods of scientific knowledge, which made it possible to identify and substantiate the ways of legal development of the public-private partnership system.

The authors conclude that there is a need for a clearer delineation of the legal concepts of a capital grant, a minimum guaranteed income, a grantor's fee, norms on the financial state participation, the development of public-private partnerships in the IT-sphere based on various legislative initiatives.

The mechanism of public-private partnership allows not only solving priority, socially significant tasks, but also implementing modern advanced technical solutions, ensuring effective management of objects created within the projects, and, in general, improving the economic condition of the country and its regions by increasing their investment attractiveness. The development of public-private partnerships relations in Russia has been constrained for a long time by the lack of the necessary legislation and mechanisms for long-term financing. Currently, the necessary legal framework has been created: Federal Law No. 115-FZ dated July 21, 2005 "On Concession Agreements" (hereinafter - Law No. 115-FZ), Federal Law No. 224-FZ dated July 13, 2015 "On the public-private partnership, municipal-private partnership in the Russian Federation and Amendments to Certain Legislative Acts of the Russian Federation" (hereinafter – Law No. 224-FZ), the relevant regional laws are being implemented, state programs have been developed and are being implemented.

The Ministry of Economic Development of the Russian Federation annually forms the rating of the constituent entities of the Russian Federation, depending on the level of development of the public-private partnership. The rating data indicate that more than half of the entities (46 out of 85) improved their performance in 2019 compared to 2018 or retained their positions. The top ten includes such regions as Moscow, Moscow Region, Nizhny Novgorod Region, Novosibirsk Region, Perm Territory, Tambov Region, Yugra, and so forth ("Rating of the Constituent Entities," 2020). However, the use of public-private partnership has not been stable in two

decades; this is due to political, economic, organizational, and other reasons, and legal conditions, which determines the relevance of this study.

METHODOLOGY

Various aspects of the PPP mechanism, including Russian, regional and foreign experiences, economic and legal aspects, are the subject of theoretical and applied research, the results of which are presented in scientific articles, dissertations, monographs and other publicists materials (Gerrard, 2001; Boeuf, 2003; Yescombe & Farquharson, 2018; Belitskaya, 2011; Volkova, 2013; Dyatlova, 2017; Kiyamova, 2012; Lukina, 2016; Matyavina, 2008; Popov, 2016; Popondopulo & Sheveleva, 2015; “Private Initiative in Concessions,” 2015). This confirms the scientific interest in this problem and necessitates further research.

General scientific and specific scientific methods of cognition constitute the methodological basis of the research. Methodological tools are selected considering the specific goals of the work. This research is based on an interdisciplinary approach.

The dialectical-materialistic method of cognition allows considering the development and functioning of a public-private partnership system, interaction with related phenomena, to substantiate the advantages and disadvantages of various approaches to solving issues of its development.

The following methods of formal logic are used in the work: description, comparison, analysis and synthesis, and so forth. The work also uses specific scientific methods of cognition: comparative legal, formal legal, statistical, structural, and functional methods to substantiate the main directions of legal regulation in the area under consideration.

RESULTS

Public-private partnership is a way to accelerate the implementation of long-term projects within the framework of interaction schemes between private business and the state, acting as a manifestation of a mixed economy. The state shifts some economic functions to the private sector, which in turn minimizes entrepreneurial risks by investing knowledge, know-how, organizational experience, investments, pooling resources. Society receives a higher quality of goods, a level of service at a relatively low cost.

The public-private partnership mechanism is quite young, it began to develop in Russia in 2004 in the absence of a systematic approach. The legal regulation of public-private partnership relations initially began to form at the regional level. St. Petersburg became the first region where the relevant

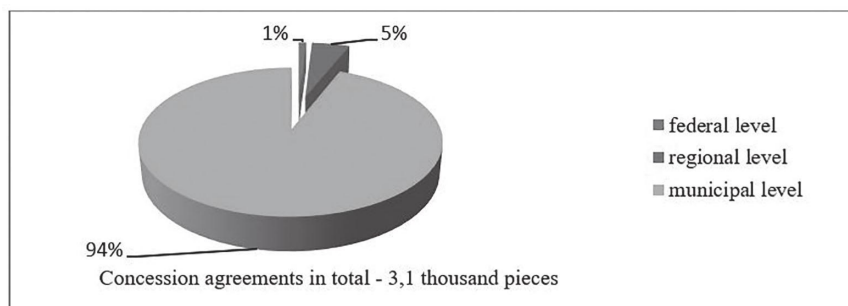
law was adopted. Foreign experience shows that the most successful public-private partnership practices have developed in the United States, Great Britain, Canada, Australia, India, Germany, which have been analyzed and adopted by Russian legislation (“Private Initiative in Concessions,” 2015).

The legal mechanism of concessions and public-private partnerships is provided not only in the Civil Code of the Russian Federation but to a greater extent by federal laws “On the public-private partnership, municipal-private partnership in the Russian Federation and Amendments to Certain Legislative Acts of the Russian Federation” and “On Concession Agreements.” Concession and public-private partnership markets are developing on this legislative basis. Information and analytical review of the Ministry of Economic Development of the Russian Federation (Information and analytical review of the Ministry of Economic Development of the Russian Federation on the development of public-private partnerships in the Russian Federation, February 2020) show that the concession market is developing more actively. The volume of investment obligations under concession agreements is 1.7 trillion rubles, which is 1.6% of GDP in 2019; this figure in Canada is 8.1%, in Australia and New Zealand—6.9%, in the United Kingdom—6.6%. Five hundred concession agreements with an investment volume of 280 billion rubles annually are concluded on average over the past 5 years in Russia, but this is insufficient and indicates the need for additional measures. The significant part of concession agreements falls on the municipal level (Figure 51.1), the significant part of investments - at the federal level (Figure 51.2).

One of the features of the concession agreements concluded in Russia is their validity period. Thus, only 10 concession agreements were concluded

Figure 51.1

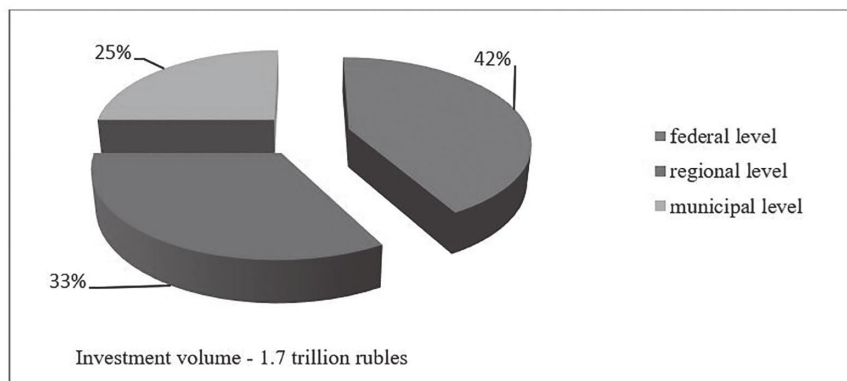
Distribution of the Number of Concluded Concession Agreements by Administrative Levels at The Beginning of 2020



Source: The figure was prepared by the authors of the chapter.

Figure 51.2

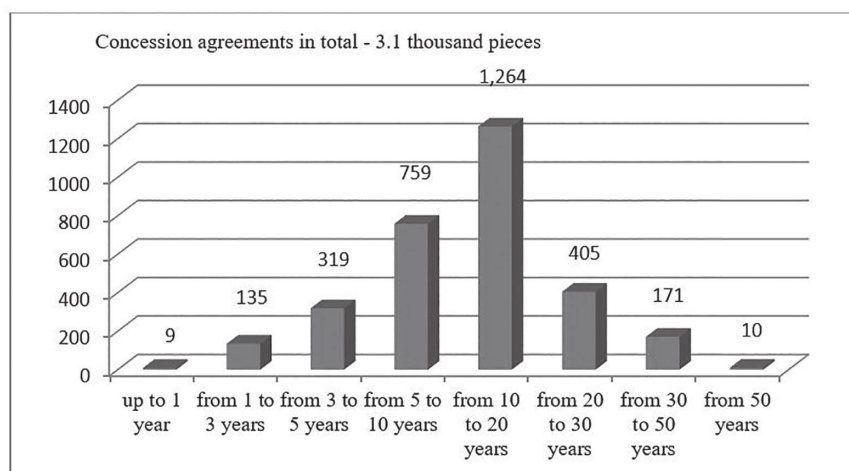
Distribution of Investment Volume Under Concession Agreements by Administrative Level at the Beginning of 2020



Source: The figure was prepared by the authors of the chapter.

Figure 51.3

Distribution of the Number of Concession Agreements by Duration



Source: The figure was prepared by the authors of the chapter.

for more than 50 years, which is 0.3% of the total number of concession agreements concluded. A significant part of concession agreements—1,264 pieces—is concluded for 10–20 years, which is 41%. The average term for all concession agreements is 12 years, in the social sector—22 years, in the transport sector—21 years, in the utility sector—11 years. One hundred and forty-four concession agreements were concluded for less than 3 years, which is 5% of the total number of agreements (Figure 51.3).

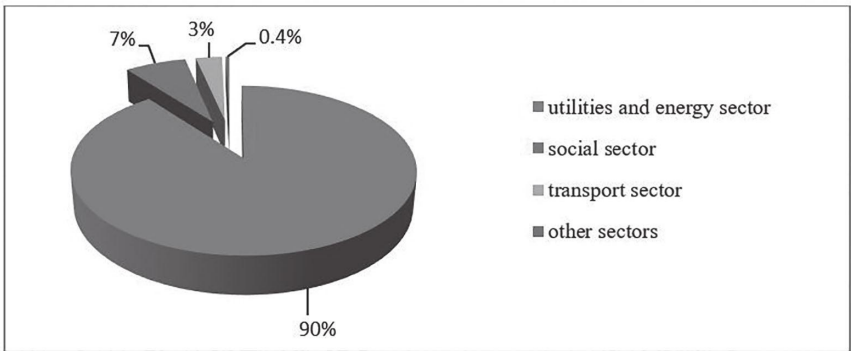
Most of the agreements are in the utility sector (Figure 51.4), the largest agreements in terms of investments were concluded in the transport sector, such agreements are 3% of the total, while they represent 70% of the total investment (Figure 51.5).

The largest number of concession agreements and investments in the transport sector falls on the infrastructure of highways, including the construction of a bridge crossing over the Volga River bypassing the city of Togliatti (concluded in 2019), construction of start-up complex No. 4 of the Central Ring Road (2017), construction of the highway “Bypass of the city of Khabarovsk” (2015), construction of the seventh and eighth stages of the toll highway M-11 “Moscow—St. Petersburg” (2014), and so forth. (“Information and Analytical Review,” 2020).

As for public-private partnership agreements, they were concluded in a much smaller volume compared to the number of concession agreements—25 agreements, including 1—at the federal level (in the IT-sphere), 6—at the regional level, 18—at the municipal level. The total investment amounted to 59.6 billion rubles. Most agreements are in the sphere of education (Figure 51.6).

Figure 51.4

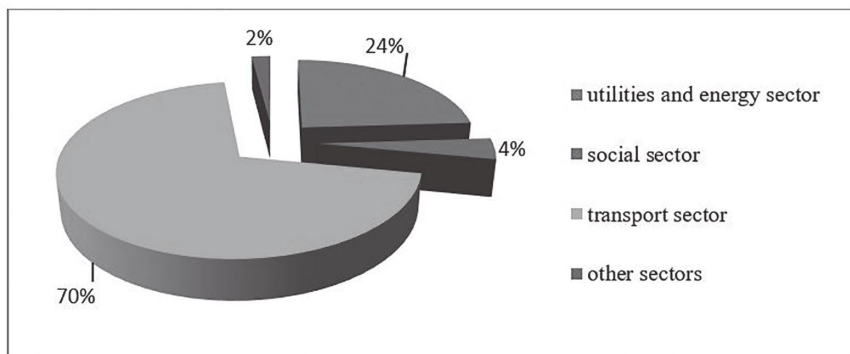
Distribution of Concession Agreements by Areas of Implementation



Source: The figure was prepared by the authors of the chapters.

Figure 51.5

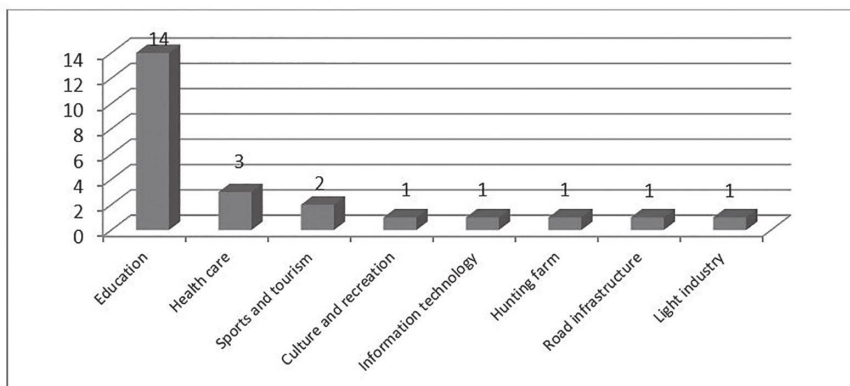
Distribution of the Volume of Investments Within the Framework of Concession Agreements by Areas of Implementation



Source: The figure was prepared by the authors of the chapter.

Figure 51.6

Distribution of the Volume of Investments Within the Framework of Concession Agreements by Areas of Implementation



Source: The figure was prepared by the authors of the chapter.

Information on monitoring the development of public-private partnership, which is carried out by the Ministry of Economic Development of Russia, confirms that the level of investment in infrastructure in Russia through this mechanism is insufficient ("Information and Analytical Review," 2020).

One of the problems is the competition between the public-private partnership and the contractual public procurement system. It is noted that many regions prefer to act following the Federal Law "On the contract system in the procurement of goods, works and services for state and municipal needs." The practice of control and supervisory authorities and courts also acts as a constraining factor. Some projects are "imitation of a concession," bypassing the mandatory legislative requirements in the field of state (municipal) procurement, because all expenses of the concessionaire are compensated from the budget, according to the Federal Antimonopoly Service (FAS). In some cases, the courts supported the position of the FAS. Judicial practice is contradictory and it does not allow the partnership to develop fully.

Currently, a draft law has been developed on amending Law No. 224-FZ, which provides a clearer distinction between the forms of financial participation of the grantor, the legal concepts of a capital grant, the minimum guaranteed income, payment of the grantor. The draft law determines that the size of the capital grant cannot exceed 75% of the costs of reconstruction, construction of the concession object, the term for transferring the fee by the grantor must not be less than 5 years, the reimbursement of the income not received by the concessionaire from the use (operation) of the concession agreement is carried out taking into account the requirements of budgetary legislation ("Review of the Draft Law," 2021).

The draft law details the forms of financial participation that are in demand among participants in public-private partnerships, reduces their risks, and generally provides for legal provisions that meet international practice. At the same time, many provisions of the draft law are controversial, in particular, it is considered to increase the size of the capital grant to 85% taking into account the practice of project implementation, to reduce the term for transferring the grantor's fee to 3 years to prevent artificial cost overruns, to define the list of forms of financial participation of the grantor as open. It seems that these proposals deserve attention and can be taken into account in the process of working on the draft law.

The possibility to include conditions on the compensation of expenses to the person who has come up with such initiative in the tender documentation is an important novelty of the draft law aimed at stimulating the private concession initiative.

The draft law includes a provision aimed at developing a system of tripartite agreements, for example, concluded between a municipality, a concessionaire and a constituent entity of the Russian Federation, and so forth. Such a mechanism may be relevant for linear objects and objects created in several Russian regions.

The range of objects of agreements on public-private partnership in Law No. 224-FZ has been expanded over the last 5 years. Until 2018, exclusively immovable or movable property together with immovable could be the objects of agreements if there was a technological connection between them, for example, these are roads and objects for fixing violations, airfields and navigation aids for landing, etc. At the same time, the search for ways of interaction between the state and the investor in the IT-sphere was carried out; however, the emerging practices had their drawbacks and did not have sufficient transparency in terms of their legal assessment. Analysis of foreign legislation and the practice of its implementation (United States, Great Britain, Germany, and France) showed that this area accounts for 5 to 10 % of the volume of all concluded public-private partnership transactions. As a result, this gap in legislation was filled.

According to the head of Rospatent G. P. Ivliev “this model will allow ensuring continuous improvement of IT systems without attracting budget funds, and, most importantly, to interest the private partner in the long-term use of the object of the agreement” (Redichkina, 2018).

Since 2019, investment in IT infrastructure has increased significantly (to about 20% of the total volume) (“Investment in Infrastructure and PPP,” 2021).

Interest in digitalization is growing, some Russian regions announced the implementation of project initiatives related to digital technologies, including Moscow, St. Petersburg, Nizhny Novgorod - to create digital educational platforms, telemedicine, IT systems in transport. The important task for many regions of Russia is to improve the availability and quality of digital communication services throughout the territory. It was announced the launch of PPP projects to create distribution communication networks to ensure high-quality coverage of settlements, including remote and sparsely populated areas, in Yakutia and the Sverdlovsk region (“Investment in Infrastructure and PPP,” 2020).

The legislative unsettledness of public-private partnership relations with information technology objects at the municipal level remains. Law No. 224-FZ explicitly prohibits concluding agreements on municipal-private partnership for IT facilities, the Law No. 115-FZ does not contain such a provision. At the same time, the law on concession agreements does not establish an authorized body that makes a decision on concluding a concession agreement in respect of those IT objects, the exclusive right to which belongs to the municipality. Within the framework of Law No. 115-FZ,

there is legal uncertainty regarding the possibility of concluding concession agreements at the municipal level in relation to IT facilities. There is a need in the market for such initiatives, for example, municipalities will be able to implement projects of the “Smart City” format with the help of concessions.

CONCLUSION

The public-private partnership market in Russia is developing despite the difficult economic conditions, risks and challenges caused by the coronavirus infection COVID-19. Legal shortcomings and gaps in legislation in this area are an additional deterrent, legal regulation is crucial for defining clear and understandable «rules of the game» for both private and public participants in this kind of relationship. The draft law on amendments to Law No. 224-FZ is not devoid of shortcomings. Coordination of the positions of regulatory, control and supervisory authorities, business representatives, resolution of contradictions will create the necessary legal basis for increasing the efficiency of their interaction, stimulating private initiative, and, ultimately, creating legal conditions for the growth of investments and solving the socioeconomic problems of the country.

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THE ROLE AND STATUS OF THE INSTITUTION OF THE NATIONAL STATE IN THE CONTEXT OF THE GLOBAL CRISIS

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ABSTRACT

The unprecedented concentration and centralization of capital and, consequently, political resources indicate the emergence of a qualitatively new political entity capable of effectively regulating global processes, accompanied by the reduction of the nation-state institution's status. This contributes to reducing public social services and the growth of authoritarianism due to the expansion of market domination. The transformation of the nation-state institution's role was studied using such theoretical methods as analysis, synthesis, and deduction. This chapter analyzes the general state of the market socioeconomic system and conducts further research on combining the features of the nation-state institution by various criteria. This research allows us to conclude that the geopolitical and geoeconomic status of the nation-state institution is reducing, and a qualitatively new entity capable of regulating global economic processes is formed. The results of our research allow us to interpret the ongoing global transformation of the socioeconomic system and predict the possible ways of further development of the whole system and its constituent elements.

In the conditions of the global crisis provoked by the COVID-19 pandemic, the accumulated contradictions of the current global socioeconomic system have got the possibility of resolution implemented exclusively within the framework of the transformation of the entire economic system. In particular, Klaus Schwab, in his work *COVID-19: The Great Reset* (Schwab & Malleret, 2020), describes the ways to sustain economic recovery and justifies the lack of possibility of a return to the economic system known before the crisis of 2019. The decentralized and extraterritorial system of power relations emerging under the global transformation is given the opportunity to resolve the accumulated contradictions that have reached a critical level.

The increasing pace of globalization processes, integration, internationalization, universalization, and transparency of national borders caused a change in the status and role of the nation-state in international relations (Popadyuk, 2015).

Thus, the relevance of the research topic is due to the transformation of the international system of socioeconomic relations and the increasing influence of the ongoing transformation on all subjects of the transformation process, which exacerbates the problem of competitiveness of national economies in the new conditions.

The research aims to identify cause-effect relationships and patterns of transformation of the role and status of the nation-state institution as an element of the global socioeconomic system. The research aim is achieved by solving the following tasks:

- Analyzing the general state of the market socioeconomic system;
- Identifying the specific features of the national state institution at the current (crisis) stage of development;
- Revealing the role and status of the institution of the national state in the regulation of global economic processes.

Thus, this study focuses on assessing the impact of the institutional features of the modern world economy on the economic mode of action of the state institution.

METHODS

The vast majority of scholars recognize the emergence of critical phenomena in the world economy. Under the conditions of globalization and the general degradation of the market-capitalist society in the 21st century (Fursov, 2013), there is an avalanche-like growth of critical contradictions (Wallerstein et al., 2013/2017; Wallerstein, 2006/2018) of the entire system

of economic management. Within this system, the world community has entered into a range of interrelated crises (economic, environmental, and sociocultural), in which the national state is ending its existence. This phenomenon is due to the restrictions on capital imposed by the government. Thus, the economic model of the world economy is undergoing a systemic transformation (Dubinskaya, 2020), accompanied by the destruction of the entire system of democratic achievements and values of the Enlightenment (Žizek, 2014/2021).

The COVID-19 pandemic was the trigger for the crisis of 2020. However, it is worth noting that the root causes of the global economic crisis lie in the very foundation of the economic model of the world economy, which is characterized by insoluble contradictions by definition. The global economic crisis of 2020, similar in scale to the Great Depression of the 1930s, has qualities distinguishing it from similar phenomena known to history (Shlychkov, 2020), particularly the permanent crisis as a dynamic of modern economic development (Bondar, 2020).

Institutions, as human-made structural conditions of political, economic, and social interaction, perform regulatory functions. As the primary social institution, the state performs the function of the reproduction of social relations. The destruction of institutions on a global scale and, above all, the institution of the state leads to the destruction of the foundations of social processes and socioeconomic relations (Fursov, 2008; Plotnikov, 2014). Thus, the destruction of the market and democracy (Attali, 2011) leads to the emergence of a qualitatively new global system of social and economic relations different from the known market system.

The global transformation of the systemic level leads to the transformation of human society (Alpidovskaya, 2021), accompanied by the withdrawal of the state from the regulation of socioeconomic relations (i.e., from the function of creating infrastructural conditions that consider the interests of all participants of socioeconomic relations and help to maximize their mutual realization). This contributes to the development of institutional alienation of individuals, both from the production means and the possibility of physical and intellectual participation in the creation of real wealth. Consequently, there is a deformation of the objective content of the reproductive functions of economic activity. In other words, institutional alienation, consisting of the confrontation of institutions with individuals in their economic activity, is materialized (Alpidovskaya & Stompeleva, 2020). Therefore, the state loses its role of arbiter in the relations between owners of capital, which aggravates the existing reproductive processes of the global socioeconomic system. This trend is primarily due to the socioeconomic nature of the current economic system, which contributes to the corrosion of the institution of the state and the formation of qualitatively new power relations of a global scale implemented by geopolitical

and geoeconomic actors of the mega-level. Under these conditions, the national sovereignty of the country gives way to the so-called “functional sovereignty” (Ryaskova, 2016), consisting of the provision of new mega-level entities with some of the economic functions of the country.

Since the purpose of mega-level commercial organizations is to maximize profits, such trends as privatization (classical objects of property rights and newly allocated objects) and the dismantling of social services come to the fore. In turn, this fact evidences the degradation of the state institution, whose purpose is the welfare of citizens.

The loss by the state of its ability to influence global processes (which is critical in conditions of global turbulence) and the emergence of mega-level actors capable of coping with the emerging contradictions of socioeconomic relations on a global scale indicates the transformation of the structure of the world economy. The indicated transformation leads to the reduction of the status and role of the government and the formation of subjects of global governance possessing economic, military, and scientific resources for resolving the emerging crises.

RESULTS

During the research on the transformation of the role and status of the national state institution on the global scale, we revealed that the government transfers a part of its economic functions to the subjects of geopolitical and geoeconomic activity of macrolevel in the conditions of reorganization of the world economy. This fact reduces the role of the government in resolving emerging contradictions and smoothing the effects of the permanent crisis. Moreover, it reduces the status of the government from the mega-level to the macrolevel of interaction. Thus, the government shifts the resolution of the global multilevel crisis to a single body of global governance, which threatens the socioeconomic efficiency of national economies and national economic security. In connection with the above, there appears a need to search for alternative models of economic development (Alpidovskaya et al., 2018) in the emergence and consolidation of original economic and behavioral norms of implementation of economic interests of the subjects of mega-level.

DISCUSSION

The research results allow us to actualize a systematic approach to the study of global economic processes and phenomena and draws our attention to the transforming conditions of socioeconomic interaction between subjects

of relations of different levels, the cause of which lies in the global transformation and the formation of qualitatively new subjects of the mega-level.

CONCLUSION

Under the conditions of the international economic, political, and cultural integration and unification developing within the framework of the market economy, qualitatively, new forms of subjects of relations of the global level are formed. These new forms receive new levers of influence on social and economic relations within the financialization, virtualization of world space, and leveling the role and status of the national state. It should be noted that the emerging institutional environment hinders socioeconomic development and, consequently, the implementation of the economic interests of society.

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The consequences of current experiments in socioeconomic global transformation are not favorable for Russia. At the same time, the optimum development trajectory of the country has not been clearly delineated by either theorists or practitioners either in political or socioeconomic terms. The paradigm of the market economy has become outdated and is now an object of exploitation by global transnational corporations. There is a need for interdisciplinary consolidation, which can become the basis for understanding the role of the political and economic components of knowledge about the economy and society, the necessity and possibility for its improvement, and its application for the benefit of the country and the world, not excluding departure from obsolete stereotypes while maintaining the basic principles of logic and morality.

It is time to redirect the apparatus of economic science to achieve real national and global welfare by eliminating irrational practices characteristic of both government intervention and private entrepreneurship, aimed at the realization of bureaucratic and oligarchic interests.

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