

The Impact of Formal and Informal Institutions on Innovative Economic Development



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Abstract. Formal institutions are important elements of the institutional structure of the national innovation system. The development of legislative regulation of the Russian innovation system fits within the framework of the administrative state evolution: the growth of the scope of regulation is accompanied by an increase in the number of laws and by-laws. Although the dynamism of formal institutions is an essential condition for adapting to changing environment, it also increases uncertainty and therefore has a negative impact on actors. The analysis of the functioning of formal institutions can be conducted from two perspectives: deductive and inductive. The deductive approach is based on the analysis of the legislative regulation-associated costs and is close to the new institutional economics tradition. The inductive approach, which is used in this paper, follows original institutionalism and narrative economics scholarly tradition. The following problems associated with the functioning of formal institutions have been highlighted in the analysis of narratives about the Russian innovation system: the lack of the

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necessary legislation, non-complementarity and inconsistency of laws and by-laws, the imperfection of existing legislation, lack of real support for innovations in the formal creation of relevant legal acts, funds and organizations, etc. An econometric modeling of formal and informal institutions influence on the innovative development of the economy has been carried out. Significant variables have been identified including the general indicators of formal institutions and social capital. It leads to the conclusion that the improvement of formal institutions is necessary for the innovative activity development, and high social capital contributes to building trust and, therefore, promotes knowledge sharing and cooperation, which are crucial for innovation initiation.

Key words: narrative economics, institutional economics, formal institutions, Russian innovation system, legal acts, institutional modeling.

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Introduction

Institutional economic theory traditionally pays considerable attention to the law and legal institutions in the context of the formation of existing rules for economic interactions. The law and the entire body of legal acts, from the constitution and constitutional laws to various bylaws, are usually referred to as formal institutions. However, the institutional structure of any economy includes both formal and informal institutions. Contradictions between these two types of institutions can be considered as one of the sources of institutional changes.

In the case of changes in formal institutions, for example during reforms, certain changes in some rules affect other rules and regulations. This can lead to unpredictable consequences (Klammer, Scorsone, 2022).

Formal institutions represented by various legal acts have an “objective” form, because they are essentially a text. However, the functionality of formal institutions depends on how they perform their regulatory functions. The effective or satisfactory performance of regulatory functions depends on law enforcement, the judicial system, administrative structures, as well as the possibilities

for their effective reproduction over time. In the modern world, the evolution of formal institutions is associated with a significant increase in the number of existing legal acts. Also, the effectiveness of formal institutions depends on a combination of formal and informal constraints, which together make up the institutional structure of society and economy (North, 2010). As evidenced from social history, it is informal institutions and culture that often do not allow formal norms to function effectively, even if they are made in the likeness of the best legal practices and norms, for example, during the import of institutions.

Modern economies of various developed and developing countries have a phenomenon that N. Ferguson called the “administrative state”. The administrative state is understood as a “hierarchical and bureaucratic in its mode of operation, dedicated to generating ever more complicated regulation that had precisely the opposite effect of that intended” (Ferguson, 2020). N. Ferguson cites the example of the USA, where in recent years there has been an avalanche-like growth of legal acts, accompanied by the growth of administrative structures responsible for their implementation (Ferguson, 2020).

The Russian legal system is developing in line with the global trends of the administrative state: an increasing scale of regulation is accompanied by an increase in the number of laws and bylaws. The Russian innovation system is also witnessing a continuing growth of the amount of legal and normative acts: from federal laws to a wide range of development programs at various levels. Formal institutions are changing quite dynamically. For example, Federal Law 127-FZ of August 23, 1996 “On science and state policy in the field of science and technology” has been amended 45 times, and 27 amendments have been adopted since 2010. The number of bylaws and departmental normative acts governing science and innovation is increasing as well. In this context, it is necessary to take into account that there are no strong and stable traditions of legal culture in Russian practice. This leads to manifestations of unintended forms of opportunistic behavior, when actors violate norms because they do not know and do not understand them. An example is legal nihilism in the field of education and science, which was pointed out in a witty remark of the historian L. Graham: “Entrepreneurs, university professors, government officials – all easily break the rules of the game, because no one knows exactly what they are” (Graham, 2014).

Interactions between formal and informal institutions are complex and depend on historical, cultural and social contexts. The influence of formal and informal institutions can have different effects on the activities of small and large firms, for example. Empirical studies show that large firms, unlike small ones, adapt better to the shortcomings of formal institutions; it depends on the ability to internalize certain aspects of activity (Kafourous et al., 2022).

Actors perceive legal and normative acts through the prism of existing rules that have been studied extensively within the framework of the original institutional economics. Current rules are not necessarily perceived in various social situations through the prism of the actors’ experience, as

well as social contexts that influence behavior in accordance with downward causation (Hodgson, 2003).

Studies of the institutional structure of the Russian innovation system should take into account that formal and informal institutions are evolving at different rates. This leads to various kinds of effects, for example, the Veblen – Ayres dichotomy (Volchik, 2008). To understand the features of the evolution of the institutional structure, consisting of both formal and informal institutions, it is necessary to use a synthetic methodology.

When analyzing formal institutions, the following points can be considered: 1) the frequency and pace of changes in legal acts, 2) the structure of legal acts, 3) features of legal regulation, 4) features of law enforcement, 5) the content of key regulations and their impact on transactions. In this paper, we proceed from a hypothesis that there is a relationship between institutions and the development of the innovation system. In this regard, the main goal is to study the influence of formal and informal institutions on innovative economic development from the standpoint of a qualitative approach with the use of narratives and a quantitative approach with the use of econometric modeling. The relevance of the work is due to the fact that a comparison of the conclusions obtained within the framework of traditional economic modeling of the Russian innovation system, its institutional analysis, and the results of narrative research will allow us to formulate new recommendations for further reforms.

Coupling formal and informal institutions

Discrepancy between formal and informal institutions has considerable influence on economic development. If informal institutions are understood as culture in a broad sense (Alesina, Giuliano, 2015), then it becomes clear that, for example, academic values and culture in the field of science and education can significantly influence the effectiveness of formal institutions introduced during reforms, especially if such reforms are

associated with the import of institutions. Therefore, studies of the evolution of formal and informal institutions should be considered within the framework of broad social contexts and public discourse that reflects how actors understand the effectiveness or ineffectiveness of certain institutions in a given context.

Narrative economics allows us to consider stories that are broadcast by actors as sources of important qualitative data about social contexts (Volchik, Maslyukova, 2021; Akerlof, Snower, 2016). Through narratives, it can be traced how ideas related to the issues of legal regulation of innovation activities circulate in public opinion.

The functioning of the national innovation system is connected not only with markets and the production of private traded goods. Many goods that are important for the creation and implementation of innovations have forms that differ from the traded private goods. This situation facilitates the creation of hybrid forms of regulation that combine market, administrative and collective forms. In this context, we can consider various property rights regulation regimes that are associated with the adaptation of actors, for example, as in the case of the use of common property (Ostrom, 2011).

The analysis of the legal regulation of the Russian innovation system in our work will be considered through the prism of the mutual influence of formal and informal institutions and narratives about these processes; thus it is necessary to use a synthetic methodology that would cover elements of the new institutional economics in the tradition of D. North, the original institutional economics in the tradition of J. Commons, and the narrative economics in the tradition of R. Shiller.

Modern economics considers law and formal institutions primarily through the prism of transaction costs and the specification of property rights. Indeed, in the new institutional economic theory, the Coase theorem in the classical version assumes the existence of zero transaction costs as a

prerequisite for an effective market distribution of property rights. However, Coase himself emphasized that in the real world with non-zero transaction costs, a legal decision is very important. The specification of property rights is also an essential prerequisite for the implementation of market exchanges, because only by delineating property rights can we clearly individualize them, which is critical for a market economy (Hayek, 1988).

In the national innovation system, formal institutional regulation can also be associated with the specification of property rights and transaction costs. However, there are new moments associated with the specifics of the goods produced in various fields of the innovation system. For example, in the academic sphere, not only private goods are produced, but also a number of others: public, experience and credence goods (Tambovtsev, 2016). If the goods are non-market, then legal regulation is also important, but the costs faced by actors when using such goods differ from transaction costs in open markets.

To the national innovation system, legal regulation is of great importance in determining the directions and areas of innovation activity that are supported by the state. However, it is necessary to take into account the factor such as clarity and fuzziness of institutions. In the case when fuzzy institutions dominate, actors face significant uncertainty and institutional entropy, which affects the efficiency of the functioning of economic industries and spheres (Balatsky, 2007).

Scientific literature pays considerable attention to formal institutions related to intellectual property in various contexts of the development of the national innovation system. The system of formal institutions, in addition to transaction effects, creates a variety of external effects, both negative and positive, which, in O. Golichenko's interpretation, are associated with the phenomenon of technological spillover, that is, a situation where the results of intellectual activity are used by actors that are not involved in the process of its

creation (Golichenko, 2011). Ultimately, the state innovation policy should lead to the creation of a system of formal institutions aimed at eliminating or compensating for the factors associated with “low motivation of actors to work within the framework of the national innovation system; outdated paradigm, underdeveloped innovative potential of actors, insufficient competence; lack of available resources and elements of the system capable of ensuring the functioning of its processes; violation and an insufficient intensity of the system’s connections; complexity and failures of the framework conditions” (Golichenko, 2017).

The dichotomy of formal and informal institutions of the innovation system can be considered through the prism of actors’ understanding of various effects associated with the institutional structure of innovation. What an actor perceives as a system of existing rules or norms may include both objectively existing norms, such as legislation, and subjectively perceived rules that are interpreted through the prism of social experience, values, specific circumstances of activity conditioned by various social contexts.

Informal institutions in economic theory are associated with slowly evolving and difficult to change phenomena, such as culture, ethics, including economic ethics, and religion. In addition, a whole class of phenomena that are usually attributed to social capital, such as trust and associations, is connected with informal institutions.

The influence of informal institutions on innovation activity is very diverse and depends on their historical and national features. A good example is the informal institution of cronyism in China. Studies have shown that an increase in regional clan culture by 1% dramatically reduces the risk on the part of managers of local enterprises by 2.66%; therefore, cronyism significantly affects the propensity of entrepreneurs to invest in risky innovative projects associated with a high risk of losses (Huang et al., 2022).

Formal institutions have an opposite property of changing rapidly in short periods of time. The variability of formal institutions is explained by the ongoing economic and social policy, the goals of which are aimed at improving the environment for innovation activity. However, the instability of formal institutions creates additional uncertainty for actors; this negatively affects long-term plans and is especially detrimental to the implementation of complex innovative projects.

The dualism of stability and variability inherent in informal and formal institutions cannot be resolved by simple and universal solutions or models. To improve the quality of the institutional structure of innovation, it is important to have a relevant picture of the condition of both formal and informal institutions. It is possible to obtain relevant knowledge by conducting institutional monitoring using various methods of legal and qualitative research.

Formal institutions of the national innovation system have a multi-level structure. These are federal laws, government resolutions, departmental legal acts, and regional legal acts. Promotion of innovation activity by the state is primarily associated with the type of formal institutions, which can be generically called “state projects and programs”. For example, scientific literature contains a similar classification of such formal institutions at the regional level: the institution for state support of innovation, the institution for the development of programs and strategies, the institution of technology parks and technopolises, the institution for the interaction of science and entrepreneurship (Popov, Vlasov, 2013).

Studies of formal and informal institutions: deductive and inductive approach

Studies of informal institutions in the context of their impact on innovation often apply quantitative indicators, which, according to the authors, characterize the importance of a certain institution for the productivity of firms that use innovations. For example, in the countries with the developed

informal institution of communitarianism, in which group goals are given preference over individual ones, often negatively affects innovative development, but conclusions about its impact must be correlated with the specific social contexts of a particular country (Ploeg et al., 2022). Therefore, quantitative studies of informal institutions require an understanding of social contexts in specific country or regional conditions. Social contexts are primarily information about rules, values, and restrictions that are important to actors. It is possible to obtain information about social contexts in the course of qualitative research, which is developed, for example, in economic sociology, economic anthropology or original institutional economics. Modern development of narrative economics can be complementary to the methods and approaches of original institutionalism, which allows analyzing narratives through the prism of actors' understanding of the essence and significance of certain institutions for structuring social interactions; this understanding is reflected in the discourses of the actors.

Formal institutions exist in cooperation with the mechanisms that ensure their implementation. These mechanisms are associated with various kinds of organizations, from law enforcement and control bodies to public associations. In turn, information mechanisms, as well as institutions, can be closely connected, explicitly or implicitly, with a network of informal institutions, for example, business practices.

The analysis of compliance or non-compliance with formal rules can be carried out from the standpoint of two approaches: deductive and inductive. From the standpoint of the deductive approach, compliance or non-compliance with the norms depends on the limited rationality of the choice of the actor. Formal institutions are violated when the expected benefits of the violation are greater than the expected costs of sanctions (Tambovtsev, 2016a; Tambovtsev, 2016b). The

benefits vary depending on what defines them and what types they may be of. The direct expected benefits of certain types depend on an action that does not correspond to a formal institution, but due to limited rationality, one may not know whether the expectation is true, and that this action is the best violation. Costs also depend on the types of potential violations. They may be related to the direct amount of sanctions, taking into account the probability of detecting a violation. Also, costs can be viewed through the prism of reputational losses in the community, if the violation is detected.

Non-observance of formal rules from the standpoint of the inductive approach may be due to the following reasons: their non-compliance with strong informal rules, actor's ignorance concerning formal rules, opportunistic behavior patterns that are more beneficial to actors than their compliance with formal rules, prohibitively high transaction costs associated with compliance with formal rules, the absence of an object for regulating formal rules (or rather, its gradual disappearance).

An important question is how the researcher finds out that a particular formal rule is not observed. Obtaining this information becomes a non-trivial task, given that "objective" information about non-compliance with formal norms is related to law enforcement statistics, but does not provide the researcher with knowledge about why this or that norm ceases to work. And here the approach of narrative economics can be useful – through narratives, it can be traced how actors explain the effectiveness or non-effectiveness of a particular norm.

In relation to innovations, formal institutions are usually considered in the context of ensuring the operation of market mechanisms and are therefore evaluated through the index of economic freedoms (Bennett, Nikolaev, 2021). According to this point of view concerning the role of formal institutions, informal institutions that promote innovation, respectively, are considered through the prism

of ensuring individualistic freedoms. Without disputing this approach, we can note that it relies on significant simplifications in the study of the impact of the institutional structure on the development of the national innovation system. For example, informal institutions associated with such negative phenomena as corruption and bribery can, under specific institutional conditions, promote rather than hinder innovation through overcoming excessive formal barriers to economic exchange (Chadee et al., 2021). Similar effects of informal institutions were noticed and investigated in the late 20th century in Latin America. Where the transaction costs of state regulation of entrepreneurship are high, informal institutions become a significant factor in entrepreneurial and other innovations (Soto, 1995).

Formal institutions in a broad sense are rules and regulations that are adopted by the state or related institutions and organizations. However, such norms affect the behavior of actors to varying degrees, depending on the field of activity (Hirao, Hoshino, 2020).

In the context of the present work, the study of the effectiveness of formal institutions regarding the regulation of relations in the Russian innovation system is based on the analysis of the distribution, through narratives, of actors' assessments of the effectiveness of certain regulatory norms, rules and regulations. In fact, through narratives we get information about the current rules (working rules) in the interpretation of the original institutionalism (Commons, 2011). The actors' narrative about their perception of regulation by formal institutions provides information about how actors perceive their impact on the processes in the innovation system and which norms are most relevant to them.

Narratives about formal institutions in the Russian innovation system

Formal institutions in the Russian innovation system are difficult to separate from the entire body of civil legislation, and in this article we do not set

such a goal. We consider formal institutions through the prism of actors' reactions to them in the course of actors' activities, therefore, in order to understand how the institutional structure of the Russian innovation system functions, the contexts in which actors talk about the problems of formal institutions are important. Among such contexts, the following can be distinguished.

1. For the introduction and mass production of innovative products, it is necessary to develop laws and regulations (lack of necessary legislation).

“It seems like the country’s leadership has the political will to change the situation, but there is no real support for domestic producers in the domestic market. Vladimir Kononov, chairman of the Board of Directors of one of the companies (Dubna), cited the following figures: in the second quarter of this year, his company managed to sell only five hemodialysis machines to Russian consumers, and delivered 52 abroad. We still don’t have a federal law “On innovation activity”; the concepts such as innovation activity, innovation, innovative product don’t have legally established definitions; consequently, there are no subordinate regulations that would create favorable conditions for the development of innovations. Customs regulation is conducted in such a way that, for example, it is much cheaper to import a finished medical device than components for domestic equipment; as a result, domestic equipment becomes uncompetitive on the international market from the start. The system of vocational education has been ruined, soon there will be no one left to work in the industrial sector”¹.

2. Non-complementary and contradictory laws and regulations.

3. Flaws in current legislation (laws and other normative acts hinder innovation and create high transaction costs).

¹ Fedorova V. Why do innovations slow down? Modernizers have calculated how many laws prevent them from working. *Moskovsky komsomolets*. June 29, 2011. Available at: <https://www.mk.ru/science/2011/06/28/601155-pochemu-tormozyat-innovatsii.html>

4. Lack of real support for innovation alongside formal creation of relevant legal acts, funds and organizations.

5. Legislation blocks high-risk investments in innovation areas (legislation needs to be changed to prevent risky investments from leading to criminal cases).

6. Uncertainty of legal norms.

7. Prohibitive model of legislation and behavior of officials.

8. Legislation related to innovation (intellectual property) is at the level of best global trends, but its application is poorly adapted to Russian realities.

“There is a proposal to work out amendments to Chapter 77 “Unified technologies” of Part 4 of the Civil Code, so that design documentation – the main element of intellectual rights – could be used in some way. I think it will take more than one year until the proposal is accepted; it’s a tough job. Managers show interest in it, discussions are underway. These amendments to the legislation will not apply to specific inventors.

In our Civil Code, the issues regarding intellectual rights have been worked out quite well at the level of best world trends in jurisprudence. However, the application of this legislation in Russia is very poorly adapted – the inventor simply cannot bring their invention to the stage of implementation.

Relations across the entire vertical – the state, state corporations, head executors, co-executors and further down – have not been fully settled. None of these structures has received a clear state directive to work with inventors. There is a paradoxical situation when everyone is talking about innovation, an innovation department has been created in every constituent entity of the Russian Federation, there is a deputy director for innovation at every enterprise, and so on; but everyone has forgotten that innovation is the introduction into economic circulation of a certain product created on the basis of an invention that has legal protection.

Since we have no clear algorithm of working with the inventor, it turns out that the inventor has no options to do something better; inventors are actually unmotivated... From here we return to the question of how to adjust the legislation so that everyone would be interested. If you build a competent incentive system, then the inventors in the company will know exactly who is stealing from them abroad and what they are stealing; the inventor will feel involved”².

9. Inflexibility of existing legal norms for startups.

Determining the influence of various elements of the institutional structure (formal and informal) of the national innovation system on its development is a non-trivial task. It is necessary to take into account the different nature of formal and informal institutions. And although within the framework of neo-institutionalism, all institutions are viewed rather as exogenous (Greif, 2006; Lee, Law, 2017), there exist alternative approaches. For example, within the framework of the original institutional economics, institutions are viewed as predominantly endogenous, influencing the behavior of actors through the evolutionary formation of habits (Hodgson, 2003).

Qualitative formal and informal institutions complement each other as part of the institutional structure of the national innovation system. Among informal institutions, the strongest influence of social capital is noted in relation to innovation (Lee, Law, 2017). Indeed, social capital can be considered as one of the ways to reduce transaction costs in communication within and outside the innovation system. However, the concept of social capital is very broad and is associated with trust, high indicators of which also have a positive impact on economic and innovative development (Volchik, Maslyukova, 2019).

² Zgirovskaya E. We have a very low level of foreign patent protection. *Gazeta.Ru*. June 25, 2016. Available at: <https://www.gazeta.ru/army/2016/06/24/8324447.shtml>

Assessing the effectiveness of certain institutions through various indices is certainly productive and quite widespread in modern social sciences. However, this approach to the study of institutions has its drawbacks. It does not answer the following questions: which specific norms hinder the development of the innovation system; why actors do not comply with certain norms; how actors evaluate various regulatory alternatives; the regulation of which interactions is associated with prohibitive costs of compliance or non-compliance with various norms.

Therefore, any quantitative study of institutions should be complemented by qualitative research aimed at identifying ineffective and non-working norms, as well as those spheres and forms of social interactions that they regulate.

Social interactions are structured by various institutions, which in the most general form are divided into formal and informal. Within the framework of narrative economics we get information about institutions through stories broadcast by actors. These stories provide an explanation of the interactions, as well as information about the social contexts in which they occur. During the analysis of narratives, we reconstruct and interpret the actors' understanding of how the national innovation system functions and how institutions contribute to or hinder its development.

The lack of consistency is an important feature of Russian formal institutions in the innovation sphere. The eclectic nature of legislation opens up opportunities for various forms of opportunistic behavior, and, conversely, insufficient incentives are created for conscientious innovators.

The legal framework for innovation activity is one of the main conditions for creating a favorable environment.

“The global practice of creating innovation systems presupposes system-wide efforts on the part of the state in this direction for eight to ten years. During this time, legislation is being developed and adjusted;

development institutions and venture funds are being created and are evolving. They act as catalysts of the process, provide the initial demand for innovative ideas and developments, and provide start-up financing. Then the supply market is already being formed, an innovation ecosystem is being built, initially around state development institutions, and then private money joins the expanding supply. Russia lacked three to five years to create the foundation for a future innovation economy. But the most important thing is that there was not enough time to form an economic environment in which competition for efficiency would be preferable to competition for the administrative resource”³.

The task of building an effective competitive environment is connected with the problem of adaptive behavior of actors in the innovation system. Indeed, competition can be of various types; in conditions of significant administrative allocation of funds and control, strong incentives may arise (and they do arise) to compete for an “administrative resource” to the detriment of the innovative product and its market prospects.

The instability and prohibitive bias of Russian legislation significantly hinder innovation. Entrepreneurs, when faced with these trends, are forced to adapt, to look for simpler and less innovative business lines. Regulation in such cases has to deal with a permissive-prohibitive dilemma.

“The development of new directions in the market attracts investors. However, the main thing that attracts them is stability of the environment in which the business will develop. Tightening the legislation on vaping will once again show that developing a business in Russia is an extremely risky task, because at any moment the rules of the game can change. Often, our legislation, like the artillery of a century ago, “hits the squares” without seeing significant nuances within the regulated industry.

³ Belova A. “Generators of the future”: How Russia can get back on the path of innovation. Available at: <https://www.rbc.ru/newspaper/2015/09/21/56bc9c139a7947299f72bb37>

It has been repeatedly stated in the highest echelons of power that it is necessary to create conditions for an economic breakthrough, the transition from a resource-based economy to an innovation-based one, and the development of small and medium-sized businesses. However, practice shows that many Russian officials prefer the “hold back and not let go” principle. With this approach, we still have to wait long for the successful development and diversification of the economy”⁴.

Formal institutions are part of the market infrastructure, which is a fundamental condition for the development of the national innovation system. However, the very creation of such an infrastructure is associated with quite a complex process of law making and the application of norms.

When analyzing narratives about the innovation system, we often come across the phrase “there are not enough laws and regulations to conduct innovation activity effectively”. Therefore, it is important to trace the path from awareness of the problem to the formation of current rules that allow solving a particular problem associated with the lack of regulation.

Moreover, there is a possibility that the new rules and regulatory mechanisms will be associated with an increase in transaction costs, which will level out the impact of their implementation in the practice of economic activity. It is necessary to arrange the problems related to formal institutions into two blocks: first, those related to the structural problems of legislation and second, those related to the implementation of legislation in specific industry and historical context.

Structural problems in legislation arise out of its dynamic and evolutionary nature. Legislation should be continuously evolving in order to create a regulatory framework for emerging activities, new technologies, and new externalities. When changing the structure of legislation, it is important

to eliminate conflicts between new legal acts and existing norms, which may show incompetence in regulating new technological and economic processes.

The implementation of legislation in modern conditions also becomes a task that depends on the dynamics of changes in regulated industries. A typical example is the legislation on innovation procurement for state needs, which, after repeated changes, has not led to the creation of a system that promotes innovative development of Russian enterprises and organizations (Tsygankov et al., 2021).

If we consider formal institutions from the perspective of a new institutional economics, then issues related to the costs of compliance with a particular law are coming to the fore. In economics, there are methods for assessing transaction costs associated with compliance with the law, for example, through the opportunity costs of increasing the working time spent on performing the procedures prescribed by law (Volchik, Nechaev, 2015). However, such an approach can hardly help to understand how the very content of certain rules affects the behavior of actors, since transaction costs can be implicit and simply block some activities. If certain types of activity are blocked and interactions are not carried out there, it is very difficult to identify the fact of such a situation without a qualitative analysis of the actors’ discourses.

The inductive approach allows us to obtain two approaches due to two types of explanations of the behavior of actors in the innovation system. The first approach is based on identifying the most general rules and explanations of behavior, which, for example, can be associated with simplified economic protomodels. We associate such simplified protomodels with protonarratives through which they are communicated. The second approach is based on the analysis of social contexts contained in actors’ narratives. Social contexts, when coinciding and recurring, can be reduced to generalizing narratives.

⁴ Shatilov A. Populism against logic. *Izvestia* (iz.ru). March 29, 2019. Available at: <https://iz.ru/862125/aleksandr-shatilov/populizm-protiv-logiki>

The analysis of protonarratives and generalizing narratives allows us to obtain a comprehensive picture of the actors' understanding of the actions and effectiveness of formal institutions in the effective or ineffective structuring of social interactions within the national innovation system. Based on the received understanding of how formal institutions function, attempts can be made to promote ideas for reforming legislation.

Malfunctions of intellectual property institutions can manifest themselves in modern conditions due to their connection, for example, with patents, practices and procedures. Thus, innovators tend to be reluctant when it comes to patenting an invention due to the practice of information disclosure.

“An industrial development that is a know-how can meet the requirements necessary for its recognition as an invention if this technology can be used in industry and if the information about it cannot be obtained from publicly available sources of information. But as soon as the know-how technology is submitted to the patent office, it automatically loses its secret status, since Russian legislation explicitly provides for the obligation of Rospatent to publish information on the grant of a patent for an invention, including the name and formula of the invention, in the open register”⁵.

One of the most important issues related to innovation is the problem of financing. In Russian conditions, the state plays a significant role in funding innovations. However, formal institutions and law enforcement practices hinder innovation activity.

“And we still don't have a streamlined practice of risk assessment in venture financing in Russia. When it comes to budget financing, the Prosecutor's Office and the Investigative Committee believe that if you failed, it means that budget money was spent

⁵ Zyablov E. Plant-inventor: How to keep the secrets of production secret. *RBK*. October 10, 2019. Available at: <https://legal-support.ru/information/publications/zavod-izobretatel-kak-sohranit-v-taine-sekrety-proizvodstva/>

inappropriately. And venture financing, financing and support of startups are always at risk of making a mistake, which is an absolutely common thing. Out of a hundred projects, ten can be a success. How can corporations properly build these mechanisms within the Russian legislation? Therefore, it was decided to develop the rules of the game. If you don't have the right to make a mistake, it is impossible to go further and talk about new technologies and innovations”⁶.

There are many formal institutions that are not directly related to innovation, but shape an environment that influences the behavior of entrepreneurs and businesses. For example, low competitiveness in regional and federal markets can be considered as one of the factors influencing the formation of demand for innovation.

“Because there is no demand for innovation. If there were demand, there would be innovation. This is a market economy. Indeed, the economy is somewhat haphazard, but still it is a market economy in which demand is crucial. But why is there no demand for innovation?”

Let me give you a hint. The statistics of the Federal Antimonopoly Service are quite revealing: from 50% to 60% of cases initiated for violations of the competition protection legislation are cases against authorities (at all levels, from municipal to federal). So, the main enemy of competition is the state. Such a conclusion simply follows from the statistics of the federal body responsible for the development of competition in the country.

But if there is no competition, then innovations are simply not needed, they are not an argument in the competition. It is much more important to have administrative resource”⁷.

⁶ The head of ASI Svetlana Chupsheva: “New technologies are needed everywhere: both in the domestic and foreign markets”. September 11, 2018. Available at: <https://asi.ru/news/95130/>

⁷ Igor Nikolaev, Director of the Institute for Strategic Analysis at Financial and Accounting Consultants company. Academic answer. *Gazeta.ru*. September 25, 2013. Available at: <http://www.gazeta.ru/comments/column/nikolaev/s62993/5668061.shtml>

Protomodels that are associated with formal institutions explain their significance, functions and malfunctions within a particular industry or economic issues. Protonarratives concerning the national innovation system can be attributed to various modifications of the Coase theorem (Coase, 2007, pp. 150–151). In narratives, actors broadcast several ideas related to transaction costs and the specification of various property rights, which in one way or another affects the development of the innovation system.

According to Coase, the presence of non-zero transaction costs and the insufficient specification of property rights require a legal solution, therefore, this is related to the creation of formal institutions and regulatory mechanisms.

Actors repeatedly point out that there are no systemic conditions for innovation in the absence of effective norms.

“There are several bottlenecks in the Russian innovation and venture ecosystem. The first one is that the legislation lacks an adequate organizational and legal form for regulating the activities of private equity and venture capital funds. The second one consists in excessive regulation and inflexibility of existing legal forms for startups. The third one is insufficient amount of grant support for innovators at the early stages for ensuring a stable flow of projects, as well as lack of a wide range of mechanisms for attracting funding to these projects. This can also include lack of services and shortage of infrastructure for the development of venture investment. A serious obstacle to the development of innovation from the point of view of business lies in the lack of legislation on the protection of intellectual property, as well as absence of effective technical regulation”⁸.

In the above narrative, we see that formal institutions, in particular, are associated with a

shortage of infrastructure for innovation. This factor is crucial to the dynamics of transaction costs and, consequently, formation of effective legal regulation.

The repeatedly noted problem of the absence of required legislation is fundamental to understanding that market mechanisms may not work with regard to creating strong incentives for effective innovation.

“Deputy Chairman of the Accounts Chamber of the Russian Federation Valery Goreglyad recalled one more problem: “We do not have a full-fledged innovation-related legislation, including on taxes. In fact, we formed it during the crisis period of development, when the problems with filling the government coffers were considerable”. According to Goreglyad, Russia had two options when choosing an innovation path. One was to create a full-fledged innovation environment with a liberal tax system, with a significant reduction in the tax burden on all economic entities, not just individual companies. The other included targeted solutions for designing elements of an innovation system. Russia has chosen the latter option, although the former is more preferable, according to Valery Goreglyad. But in the current socio-economic situation, Russia has neither the time nor the opportunities for this. For example, none of the major Russian companies used tax advantages for modernization purposes. And the money saved on taxes was exported through offshore companies and returned to Russia in the form of yachts...”⁹

And here the main problem when carrying out reforms is that the task of developing the Russian innovation system should be addressed comprehensively, taking into account fundamental conditions and prerequisites. The fundamental conditions include political and economic stability, entrepreneurial initiative, and mechanisms of increasing returns. Only when all these three conditions are met, the mechanisms of innovative

⁸ Kalysheva E. Igor Agamirzyan: There are several “bottlenecks” in the Russian innovation and venture ecosystem. *Rossiyskaya gazeta*. September 15, 2011. Available at: <https://rg.ru/2010/09/21/agamirzyan.html>

⁹ Teryaeva N. Russian firms did not take advantage of tax benefits for modernization. *Rossiyskaya gazeta*. December 14, 2010. Available at: <https://rg.ru/2010/12/14/igoty.html>

Table 1. Major issues of the Russian innovation system

No.	Major issues identified in the analysis of narratives	Number of narratives
1	State management of innovation activity	295
2	Selection of research topics and directions	292
3	Demand for innovation	229
4	Institutional structure and competitive environment for innovation	202
5	Issues related to personnel for research and innovation	80
6	Issues related to intellectual property	51

Source: own elaboration.

development are launched and the national innovation system starts developing effectively. In addition to these fundamental conditions, two more prerequisites must be fulfilled: creation and development of a market infrastructure, as well as a high-quality education and science system (Volchik, 2022).

Econometric modeling of the influence of formal and informal institutions on the innovation system

In the modern institutional economics, econometric modeling is widespread; we can also use it in the framework of this work. Quantitative analysis of institutions is a special class of inductive research based on various kinds of indices and indicators characterizing various aspects of the functioning of both formal and informal institutions. We evaluate formal institutions through the prism of the public administration efficiency index, and informal institutions through the Social Capital Index.

Indeed, based on the previously conducted analysis of 1,149 selected narratives about the Russian innovation system, six central problems were identified (Volchik, Maslyukova, 2021), which the actors consider the most relevant (Tab. 1).

According to the analysis of narratives, “state management of innovation activity” is the most mentioned problem of Russia’s innovation system. The narratives also pay significant attention to the issue of “institutional structure and competitive environment for innovation” (4th place in terms of the number of mentions in the narratives), which was the reason for the choice of variables for building the model.

In order to analyze the impact of formal and informal institutions on innovation, the following specifications of regression equations were used:

fixed effects model (within estimator):

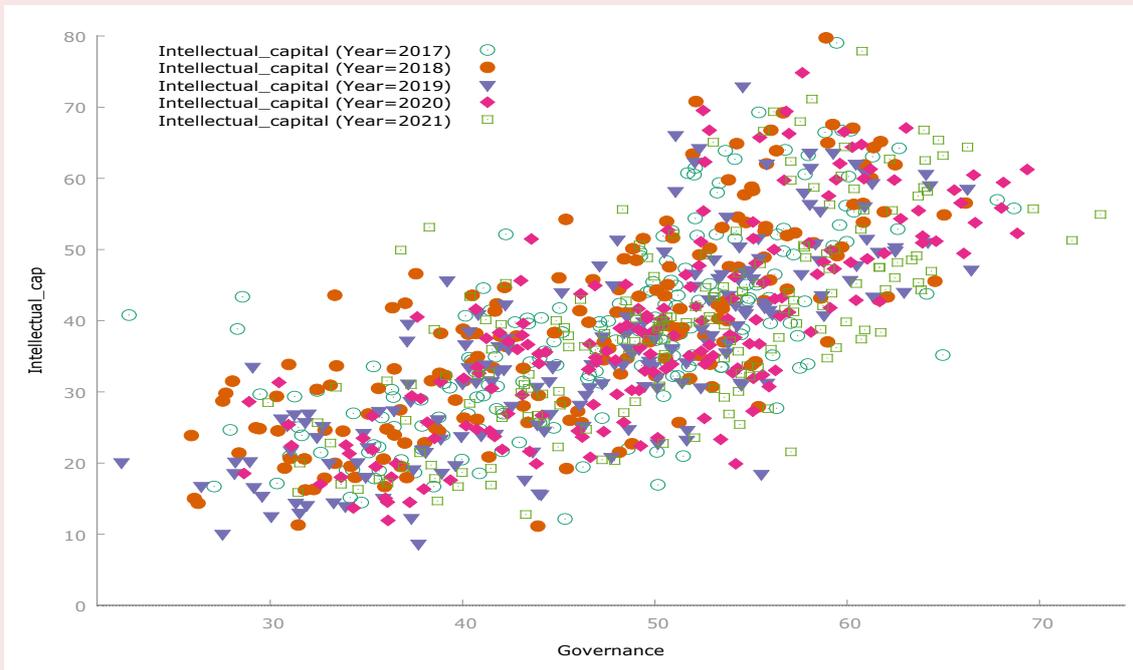
$$Intellectual_cap_{i,t} = \alpha + \delta \times Governance_{i,t} + \gamma \times Social_cap_{i,t} + \beta \times X_{i,t} + \mu_i + \varepsilon_{i,t},$$

$$Intellectual_cap_{i,t} = \alpha + \delta \times Governance_{i,t} + \gamma \times Social_cap_{i,t} + \beta \times X_{i,t} + u_i + \varepsilon_{i,t},$$

where i – country number; t – year; *Intellectual_cap* (intellectual capital and innovation index) – dependent variable – indicator of development of the national innovation system in the i -th country, *Governance* (public administration effectiveness index) – variable characterizing the level of development of formal institutions, *Social_cap* (Social Capital Index) – variable characterizing the social capital in the i -th country (level of development of informal institutions), X – vector of control variables, μ – specific country features (fixed effects), allowing to take into account the heterogeneity of countries, which is not reflected by other control variables; u – individual country features (individual effects); ε – random model errors, δ , γ , β – estimated model parameters, α – constant.

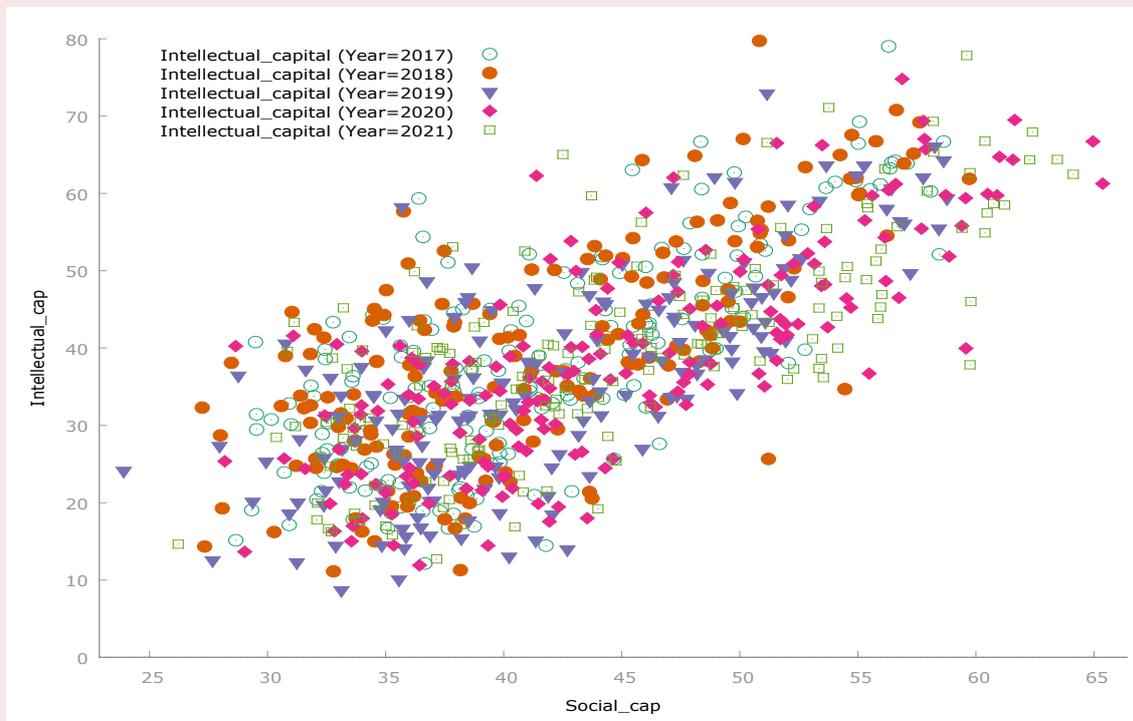
The parameters of the δ , γ , β models were assessed on the basis of panel data for 5 years (from 2017 to 2021) for 185 countries represented in the Global Sustainable Competitiveness Index (<https://solability.com/the-global-sustainable-competitiveness-index/the-index/>). The natural capital index (*Natural_cap*), which characterizes

Figure 1. Scatter chart showing the dispersion of innovation (*Intellectual_cap*) compared to formal institutions (*Governance*) (broken down by year)



Source: own elaboration.

Figure 2. Scatter chart showing the dispersion of innovation (*Intellectual_cap*) compared to social capital (*Social_cap*) (broken down by year)



Source: own elaboration.

Table 2. Model assessment results (dependent variable – Intellectual_cap)

Variable	Fixed effects model	Random effects model
<i>const</i>	30.670 *** (3.3610)	18.593 *** (3.091)
<i>Governance</i>	0.103 ** (0.041)	0.225 *** (0.044)
<i>Social_cap</i>	0.140 ** (0.055)	0.361 *** (0.051)
<i>Natural_cap</i>	-0.065 * (0.037)	-0.106 *** (0.036)
<i>Resource_Intensity</i>	-0.007 (0.032)	-0.037 (0.033)
<i>N</i>	925	925
<i>R²-within</i>	0.0384	-
<i>LSDV R²</i>	0.9563	-
Robust test for the difference of constants in groups Null hypothesis: Groups have a common intersection Test statistics: Welch F(184, 250.3) = 26.8641 p-value = P(F(184, 250.3) > 26.8641) = 7.69918 e-105		
Breusch – Pagan test Null hypothesis: Observation-error variance = 0 Asymptotic test statistics: Chi-square(1) = 913.456 p-value = 1.16593e-200		
Hausman test Null hypothesis: GLS estimates are consistent Asymptotic test statistics: Chi-square(4) = 196.283 p-value = 2.36608e-41		
Note: Standard errors are indicated in parentheses. *, **, *** – significance of the coefficients at the 10%, 5%, 1% significance level, respectively. Source: own research findings.		

the availability and level of depletion of natural resources, and the index of resource efficiency and intensity (*Resource_Intensity*), which characterizes the efficiency of using available resources as a measure of operational competitiveness in a world with limited resources, were used as control variables.

We assume that the coefficients δ and γ will be positive, showing that the higher quality of formal institutions and stronger social ties contribute to the development of innovation activity. *Figure 1* shows the correlation between innovation (*Intellectual_cap*) and formal institutions (*Governance*). *Figure 2* presents the correlation between innovation (*Intellectual_cap*) and social capital (*Social_cap*). Both graphs show that countries with better institutions and social capital tend to have more intensive innovation activity.

The results of assessing fixed and random effects models are presented in *Table 2*.

According to the robust test for the difference of constants in groups, and also according to the Breusch – Pagan test and the Hausman test, the fixed effects model is the best specification. The results of assessing the fixed effects model demonstrate that the overall indicator of formal institutions (*Governance*) has a statistically significant positive impact on innovation. This conclusion confirms the view that the improvement of formal institutions is necessary for the development of innovation. Social capital (*Social_cap*) also has a statistically significant positive impact on innovation: differences in the level of development of social capital determine differences in the intensity of innovation activity. The indicators *Natural_cap* and *Resource_Intensity* included in

the model as control variables turned out to be statistically insignificant.

The quantitative analysis of the impact of institutions on innovative development provides an important understanding of the significance of the quality of the institutional structure in terms of evolution of the national innovation system. However, comprehensive knowledge of specific rules and social contexts can be obtained with additional research of narratives. In the course of analyzing the influence of formal institutions using narratives as data sources, we focus on two points: identifying protomodels and interpreting the influence of social contexts on the behavior of actors in the innovation system.

Concluding remarks

The quality of formal institutions has a significant impact on the development of the national innovation system. Within the framework of institutional economics, two approaches to the analysis of formal institutions, deductive and inductive, can be distinguished. The deductive approach is connected with the scientific tradition of the new institutional economics, and the inductive approach is connected with the original institutionalism. The article uses an inductive approach to the study of formal institutions. We also use narrative economics approaches to analyze the institutional structure of the national innovation system, so the main source of data for qualitative analysis of formal institutions of the innovation system consists in the narratives that were selected during the analysis of Russian mass media and Internet sources.

As a result of the econometric analysis, the hypothesis of the existence of a relationship between the institutions and the development of the innovation system was confirmed. The analysis and the statistically significant variables identified in the model can later be used in collecting and analyzing qualitative data such as narratives about the development of the Russian innovation system. A joint qualitative study of narratives, along with econometric modeling, allowed us to obtain a deeper understanding of the functioning of formal and informal institutions and their impact on the creation and implementation of innovations. The analysis of the formal institutions of the Russian innovation system allows us to conclude that the legislation on innovation is not sufficiently systematic; it is fragmented and inconsistent. The redundancy of regulation is somewhat compensated by informal norms. However, informal institutions cannot compensate for regulatory failures in terms of creating strong incentives for innovation.

When reforming the legislation related to the functioning of the innovation system, there is a danger of moving toward creating excessive barriers and regulations that increase the bureaucratic burden on business. One of the ways out can be the adaptive framework nature of regulation, which was used during the reforms in China and is characterized by the well-known Chinese aphorism: “First get on the bus, and then buy a ticket”. Such a sequence of regulation means that the formation of norms should not hinder innovations.

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