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**INSTITUTIONAL CHANGES AND DIGITAL ECONOMY**

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***Abstract***

The relevance of the problem is caused by the fact that the theory of institutional changes is poorly disclosed in Russian economic thought, while the institutional system forms the prerequisites for economic growth and development, as well as provides the conditions necessary for the transition to the digital economy. The article reveals the approaches to the theory of institutional changes, a quantitative assessment of institutional changes for the period 2010-2017 on such parameters as density of institutional environment, the vector of institutional changes, the group structure and the parameters of transaction costs. In modern conditions, the main determinant of institutional changes in the economy is its digitalization. Analyzing the main approaches to understanding the essence of the digital economy, the authors prove the need for significant institutional changes, without which a successful transition to the digital model of economic development is impossible. The methods of analysis and synthesis, statistical methods, which allow revealing peculiarities of institutional changes both in general and in certain spheres of the economy are used in the work as a scientific and methodological basis. The digital sector, which includes data related to information, information environment, communication, and information security of legal entities and individuals to assess the readiness of institutions for the digital economy, is considered separately. The study showed that the institutional environment reform is heterogeneous; in the digital sector the density of the institutional environment is low, which indicates the complexity of the transition to the digital economy and requires targeted incremental institutional changes.

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**Keywords:** Institutional system, institute, institutional changes, digital economy.



## 1. Introduction

By the process of institutional changes the authors mean the change of formal and informal rules, norms and compulsions that constitute the institutional environment of society. Institutional changes are discrete and incremental, spontaneous and targeted. Discrete changes are understood as changes in formal rules that occur as a result of conquest and revolution. Incremental changes mean that participants in an act of exchange voluntarily review their contractual relationship in order to obtain some potential gain from the transaction.

Spontaneous are those institutional changes that occur, arise and spread without any prior design or plan. Targeted institutional changes, on the contrary, arise and spread more or less in accordance with some consciously designed plan. On the basis of the origin of institutional changes, in addition to these two types, it is possible to distinguish a mixed type, when the new rule appears unplanned, and its dissemination is carried out quite deliberately.

In Russia, the Message of the President of the Russian Federation to the Federal Assembly of December 1, 2016 can be considered the starting point for the development of the digital economy. In the message it was instructed to propose system approaches for increasing personnel, intellectual, technological capabilities of the Russian Federation in the field of the digital economy. The program “Digital economy”, developed by the Expert Council under the government of the Russian Federation involves the implementation of a number of goals: increasing the involvement of citizens and economic entities in the work in the digital space, the creation of infrastructure that ensures the interaction of entities in the digital space, reducing the costs of economic entities and citizens in interaction with the state and among themselves, improving the competitiveness of the economy.

At the same time, the introduction of cross-cutting digital technologies such as big data, neurotechnology and artificial intelligence, blockchain, quantum technologies, industrial Internet, robotics and sensor components, wireless communication technologies, will require changes in formal and informal rules, norms and enforcement, which represent institutional changes.

## 2. Problem Statement

North, considering the causes of institutional changes, concluded that institutional changes occur because it becomes profitable for economic agents or groups to take certain costs to implement these changes, since they will allow individuals to get extra profit (North & Thomas, 1970). Bush (1987) in the book of the same name, “The Theory of Institutional Changes”, considered development as a theoretical scheme of institutional forms and dynamics of value-based behavior.

Libecap (1993) connects the emergence of institutional changes with several causes: shifts in prices, changes in technological processes, forcing agents to perform contracts, as well as shifts in the preferences of individuals.

A number of scholars suggest four areas of institutional change theory: neoclassical Economics, sociology, historical school, and evolutionary institutional Economics (Scott, 2008; Caballero & Soto-Oñate, 2015).

Elsner (2017) connects the theory of institutional change with the theory of games in its evolutionary and institutional interpretation, which allows a more in-depth analysis of institutions, revealing the value base in the theory of games, instrumental and ceremonial asymmetry.

For the Russian science, the problems of institutional change are relatively new. However, even today we can note the significant contribution made to the study of the theory of institutional changes by V. Tambovtsev, V. Volchik, S. Kirdina, and others. Their research presents the characteristics of institutions, the institutional environment, the theory and methodology of analysis, changes in the Russian economy, as well as the regional dimension of institutional development (Kirdina, Kirilyuk, Tolmacheva, & Rubinstein, 2010; Volchik, 2012; Matveev, Trubetskaya, Lunin, & Matveev, 2018).

The term “digital economy” first appeared in the works of Negroponte N. in 1995, thanks to the intensive development of information and communication technologies that form the IV technological structure.

Anderson L. and Wladawsky-Berger I. consider digital economy to be an economy of unlimited possibilities for some economic agents and a source of ruin for others (Anderson & Wladawsky-Berger, 2016).

International Monetary Fund studies define digital economy as all activities that use digitized data (Ducharme, 2018). Goldfarb and Taker (2017) believe that the emergence of digital technologies in society does not require a new economic theory but assumes research in finding out how digital technologies affect the costs and limit the economic actions of individuals. A number of economists in their studies dealt with the negative effects of the digital economy, such as spam, online crime, etc. (Rao & Reiley, 2012, McAfee & Brynjolfsson, 2017; Hollinger, 2016).

Meshcheryakov R. considers digital economy from two positions: first, it is an economy based on the development of digital technologies, primarily the field of services and electronic goods. Second, digital economy can be explored as economic production using digital technologies (Meshcheryakov & Savchuk, 2011). They considers digital economy a new socio-cultural-economic reality in the new world, a “smart” reality.

But the key factor in all definitions is the exchange of knowledge, technologies by means of people who are able to participate in and manage this exchange.

### **3. Research Questions**

Since the theory of institutional changes in Russian economic science is insufficiently disclosed, therefore, the main questions of this study will be:

- Features of the existing system of institutions in the Russian economy.
- Is there a corresponding institutional environment for the development of the digital economy?

### **4. Purpose of the Study**

The purpose of the study is to quantify the dynamics of institutional changes based on the analysis of the legislative practice of modern Russia, characterizing the vector of institutional changes, as well as assessing the readiness of Russia's transition to digital economy.

## 5. Research Methods

In the course of the study, the following methods were used: theoretical (analysis, synthesis, generalization, analogy method); empirical study of regulatory documents); and methods of mathematical statistics and graphical presentation of results.

The use of theoretical methods of cognition made it possible to identify characteristics of institutional changes that can be quantified. Assessment of the density of the institutional environment, the vector of institutional development became possible due to the use of the method of empirical comparison. Methods of mathematical statistics allowed to form groups of statistical data, with the help of which the quantitative parameters of the model of institutional changes. The methods of mathematical statistics allowed forming a group of statistical data, which were used to assess the quantitative parameters of the model of institutional changes.

## 6. Findings

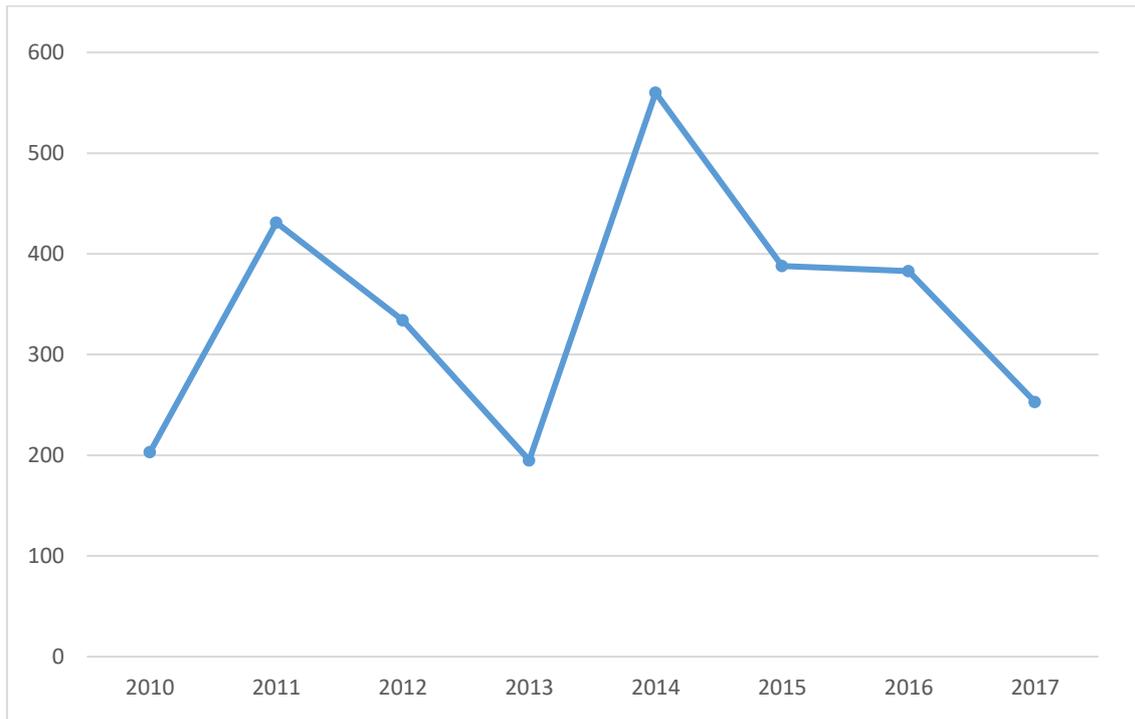
According to experts, Russia has made significant progress in many areas of digital development. There was an increase in domestic expenditure on research and development in the organizations of information and computer technologies (ICT) from 1.3 % to 3.6% in 2016, and in the number of subscribers of broadband access to the Internet from 12.2 % in 2011 to 21% in 2017. Also, the share of organizations using the Internet increased from 56.7% in 2010 to 81.8% in 2017, the share of organizations placing orders on the Internet increased during the period under review by 6.6%, and the share of organizations receiving orders for manufactured goods on the network increased by 2.4%. (Indicators of the digital economy, 2017).

At the same time, the share of gross added value of the sector to GDP decreased from 3.4% in 2010 to 2.9% in 2016 and it is 2-3 times less than in the leading countries, which indicates a lag in the development of the digital sector of the Russian economy. Further development of the digital economy will require transformation of formal and informal rules and restrictions, a system of incentives for economic agents, i.e. institutional changes.

To assess the existing and ongoing institutional changes in the Russian economy, the authors took the base Lawstream.ru, which contains data on Federal laws formed by the synthesis of data from the official website of the state Duma of the Russian Federation and information provided in the “Consultant-Plus” legal reference system. The authors supplemented this database with calculations for 2017; and the sector of information and communication technologies, which includes data related to information, information environment, communication, and information security of legal entities and individuals to assess the readiness of the institutional environment for the digital economy, was singled out separately.

To assess institutional changes, the authors use such characteristics of the institutional environment as density, an indicator of which is the number of necessary laws and their structure, as well as assessment of the role of the main groups in the legislative process in implementing institutional changes and assessing the dynamics of transaction costs in the process of adopting federal laws. In order to assess the density of the institutional environment, let's consider the data on the number of laws, their structure and areas of regulation in Fig. 01.

It can be seen that the maximum number of adopted laws was in 2014, and further there was an alignment of the level of adopted laws to the situation in 2011, and in 2017 there was a sharp decline. At the same time, the peaks and minimums of the adoption of Federal laws correlate with the terms of beginning or ending of the powers of the State Duma of the Russian Federation's deputies. So, the peak of the adoption of the Federal laws of 2011 came at the end of the work of the Duma of the 5th convocation and a decline in 2016-2017 is associated with the beginning of work of the Duma of the 7th convocation.



**Figure 01.** The number of laws adopted for 2010-2017 (Source: calculated by the authors on the base of “[www.duma.gov.ru](http://www.duma.gov.ru); <https://consultant.ru>”)

The growth of legislative activity of deputies by the end of their term of office may be related to their desire to finish what has been accumulated over the years of parliamentary activity, since the arrival of new members of parliament may complicate or even stop working in the promotion of a specific legislative initiative. Trends in Federal legislation suggest an increase in the density of the institutional environment in which laws play a significant role.

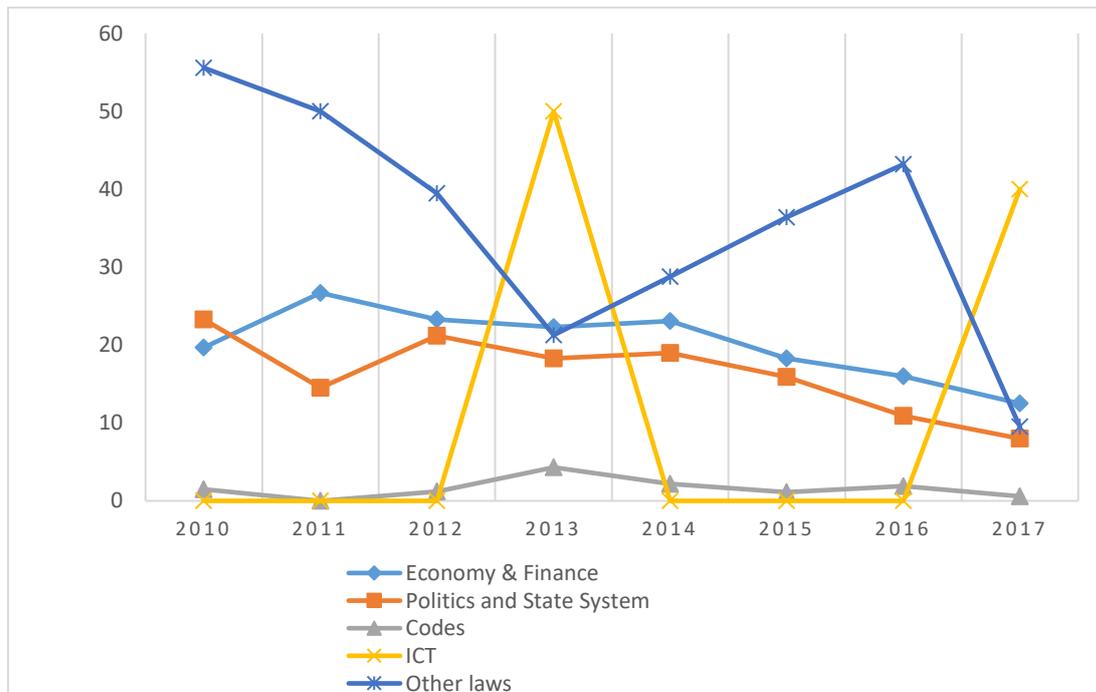
Distribution of adopted Federal laws by areas of regulation (see table. 01) shows that most of the laws were adopted in the spheres of Economy and Finance (on average 21.2%), codes (24.1%) and other laws (on average 38.6%). In the field of information and computer technologies, the number of adopted laws was minimal (on average 0.65%), which indicates the low density of the institutional environment in the field of information technologies, as well as the fact that the growth of the digital sector does not coincide with changes in the relevant institutions.

**Table 01.** Distribution of adopted Federal laws by areas of regulation (percentage by date of introduction)

Years	Economy and Finance	Politics and State System	Codes	ICT	Other laws
2010	31	19.7	14.4	0.2	34.7
2011	23.8	15.2	16.3	0.1	44.7
2012	20.9	16.1	20	0.1	43
2013	22.2	15.3	20.2	0.1	42.2
2014	9.8	15.8	25.6	1.5	47.3
2015	1.3	14	20.4	0.2	52.1
2016	26.5	18	17	1	38.5
2017	22.1	9.8	59.6	2	6.5
Average	21.2	15.5	24.1	0.65	38.6

Source: calculated by the authors on the basis of “[www.duma.gov.ru](http://www.duma.gov.ru), [https:// consultant.ru](https://consultant.ru)”

Not only the dynamics of the density of the institutional environment, but also the ratio of new laws and laws amending existing laws make it possible to judge about the vector of institutional changes. The graph in fig. 02 shows the general trend of decreasing the share of new Laws in the total number of adopted Laws. While in 2010 the share of new Laws in the sphere of “Economy and Finance” reached 19.7%, in the sphere of “Politics and State System”-23.3%, “Other laws” - 55.6%, in 2017 their share decreased respectively to 12.5% in the economy, to 9.5% in the field of “Other laws”, to 8% in “Politics and State System”. The peculiarity of the adoption of new Laws in the information sector is that new Laws were adopted only in 2013 and 2017.



**Figure 02.** The share of new federal Laws in the total number of adopted Laws and amendments on regulatory areas, %, 2010-2017

Source: Authors

There are several obvious trends. First, the long-term process of reducing the share of new laws in the total number of federal laws adopted over the years is characteristic of all areas of regulation. Second, it is possible to identify areas where the correction of legislation occurs more often than in other areas. As shown in the data provided, the codes are much more often refined than other federal laws. This is evident from the smallest share of new laws in the area of codes adoption (amendments are dominant).

In general, it can be concluded that there is some stabilization of the institutional environment, since the focus is more often directed at improving legislation than adopting new legislative forms. On the other hand, a high proportion of amendments may characterize the fact that laws are not well thought out and have to be constantly amended.

As for the digital sphere, the low level of adoption of new laws in the overall small number of adopted laws in this area indicates the underdevelopment of the institutional environment.

It is possible to estimate transaction costs of institutional changes by considering the time of laws adoption depending on the year of introduction of the law (“queue length”), depending on the year of adoption of the law (“speed of consideration”).

The number of days spent by legislators in the process of adoption of the law represents transaction costs of coordination of lawmaking subjects.

**Table 02.** Average time of passing the law (from introduction to the State Duma to the adoption by the State Duma, by the year of adoption, (days)

Years	President	Government	Deputies	Regional legislative bodies	Courts	Average
2010	108	145	281	278	278	202
2011	80	193	367	398	439	251
2012	107	193	302	286	276	214
2013	101	199	313	379	305	241
2014	146	179	277	282	308	221
2015	140	200	209	333	345	209
2016	69	169	240	259	265	189
2017	74	160	210	260	178	176
Average for the period	103	180	275	309	299	212

Source: calculated by the authors on the base of [www.duma.gov.ru](http://www.duma.gov.ru), <https://consultant.ru>)

Table 02 shows what was the average time for passing the law in the State Duma, that is, how many days the bills submitted in a given year were waiting for their approval. The average time taken for the passage of the law as a whole was reduced from 251 days in 2011 to 212 days in 2017.

The most significant decrease is observed in regarding the laws introduced by the President - the bills introduced by the President to the State Duma in 2017 were waiting only 74 days for their approval. The bills of the government and courts waited for their approval, on average, 160 and 178 days, respectively that year. For laws initiated by regional subjects, as well as by deputies of the federal assembly, the waiting period was 260 and 210 days, which is higher than that of other subjects.

Considering the dynamics for the entire period, it is possible to identify general trends to reduce the time of passage for all bills, regardless of the initiator, but the rate of its reduction varied. If for the

presidential bills the terms of consideration were reduced by 2 times, for the laws of regional subjects the reduction was insignificant.

The speed of adoption of laws is presented in table 03. The speed refers to the average time of passing the law in the state Duma by the year of introduction of the law. The resulting amount means how much time it took on average to consider bills in the state Duma in a particular year, from the moment of introduction to adoption as a law after three readings.

**Table 03.** Average time for passing the law (from introduction to the State Duma to the adoption by the State Duma, by the year of adoption, (days)

Years	President	Government	Deputies	Regional legislative bodies	Courts	Average
2010	108	145	281	278	278	202
2011	80	193	367	398	439	251
2012	107	193	302	286	276	214
2013	101	199	313	379	305	241
2014	146	179	277	282	208	221
2015	140	200	209	333	345	203
2016	69	169	240	259	265	189
2017	76	151	132	164	252	155
Average for the period	103	179	265	297	296	210

Source: calculated by the authors on the basis of [www.duma.gov.ru](http://www.duma.gov.ru), <https://consultant.ru>

Thus, the average period of passing laws decreased slightly in 2017 compared to 2010 from 202 days to 155 days. If we consider the dynamics of the subjects, the highest speed of adoption of laws for the period under review was with the President (as it decreased from 108 days in 2010 to 76 days in 2017), with the deputies (from 281 days in 2010 to 132 days in 2017).

All other laws were slower - on average, the speed of passing laws was 294 days for laws of regional subjects and 296 days for judicial bodies.

Let's assess the dependence of the timing of laws coordination on the sphere they are designed to regulate.

**Table 04.** The average period of passing the law in terms of regulation (from introduction to the State Duma to the adoption by the State Duma, by the year of adoption, (days)

Years	Economy and Finance	Politics and State System	Codes	ICT	Other laws
2010	202	180	167	312	194
2011	251	277	236	300	193
2012	214	190	186	256	221
2013	241	294	196	111	213
2014	221	161	142	220	236
2015	209	188	188	60	191
2016	189	143	156	120	200
2017	129	157	179	102	168
Average for the period	207	199	181	185	202

Source: calculated by the authors on the basis of [www.duma.gov.ru](http://www.duma.gov.ru), <https://consultant.ru>

This table shows that the difference between the periods of passing laws in different areas of regulation is not very great. The shortest terms occurred in the sphere of “Economy and Finance” - from 202 days in 2010 to 129 days in 2017 and in the sector of “Information and communication technologies” (ICT) - from 312 days in 2010 to 102 days in 2017. The terms for adopting laws in the areas of “Politics and State System”, “Other Laws” slightly decreased, and the terms for revising Codes slightly increased from 167 days in 2010 to 179 days in 2017.

## 7. Conclusion

In the course of the study, the following results on quantitative parameters of institutional changes and an assessment of the readiness for transition to a digital economy were obtained.

The number of adopted Federal laws for the period 2010-2017 has increased, which indicates an increase in the density of the institutional environment, thus the norms and rules that have developed in the society are becoming more formal.

The adoption of Federal laws has distinct recessions and peaks, which is associated with the terms of the beginning or the end of the powers of the State Duma deputies.

The reform of the institutional environment is heterogeneous: most of the adopted laws relate to the economic sphere and the sphere of codes. In the digital sector, the number of laws adopted is minimal, which indicates a low density of the institutional environment, as well as the fact that formal changes do not keep pace with informal transformations of norms and rules.

The general vector of institutional changes indicates an increase in the stability of the institutional environment, which is reflected in a decrease in the share of new laws compared to the adoption of amendments to the already existing federal legislation. At the same time, it is possible to identify areas where the correction of legislation occurs more often: these are codes. Unlike main trends there is an increase in the share of new laws in the ICT sector, which indicates rather the underdevelopment of institutes in this area.

There is a reduction in transaction costs, expressed in the average period of passage and adoption of the law in days. If in 2010 the average waiting period for the law was 202 days, in 2017 it was 155 days. Within the period under review, transaction costs decreased unequally, in 2011-2013 there was an increase in the terms of consideration of laws, which is associated with the beginning of the Duma of the 6th convocation.

The greatest speed of laws adoption during the period under review was with the President (it decreased from 108 days in 2010 to 76 days in 2017) and deputies (281 days in 2010 and 132 days in 2017). The differences between the terms of the adoption of laws are not so dependent on the economic sphere, as on the initiators. The shortest terms occurred in the areas of “Economy and Finance” - from 202 days in 2010 to 129 days in 2017 and in the sector of “Information and communication technologies” - from 312 days in 2010 to 102 days in 2017. The terms of adoption of laws in the sphere of “Politics and State System”, “Other laws” were slightly reduced, while the terms of revision of Codes slightly increased – from 167 days in 2010 to 179 days in 2017.

The results suggest that institutional changes form a more efficient economic model, in which there is a reduction in transaction costs of coordinating decisions at the level of formal institutes, but at

the same time, it is still difficult to talk about the digitalization of the economy, since the transformation of formal institutes is very slow, they are rather adapted to the already existing informal institutes and norms that have been established in this area. Therefore, the further development of the digital economy will require targeted incremental institutional changes.

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