

# *Digital economics of foreign trade activities in action: institutional capacities and limitations of complex ecosystem regulation*

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**Abstract** — The article describes the institutional possibilities and limitations of the digital economy regulation of foreign trade activities in the context of international economic integration. A comparative analysis of conceptual approaches to the definition of the nature and forms, functions and structure of the digital economy in foreign and national scientific literature has been carried out. The problem of institutional changes caused by digitalization in the Russian economy has been highlighted. The strengths and weaknesses of the economic components of the economy digitalization process, as well as new opportunities and threats to society when changing to a digital scenario of economic development are identified. The trends of institutional environment changes in the financial sector are described and a paradigm for regulating the digital economy during the period of institutional transformations is proposed.

**Keywords** — *digital economy, institutional implications, hybrid institutions, financial sector, general purpose technologies, sharing economy.*

## I. INTRODUCTION

Creating of a favorable institutional environment for Russian companies to enter foreign markets, taking into account ongoing digitalization processes, is one of the state's priority tasks, for which solution it is not enough to take point or fragmentary measures. This complex problem requires rejection of attempts at its isolated study (including the development of a regulatory paradigm) within the framework of individual sciences and the transition to interdisciplinary synthesis.

It is primarily about information theories (in the tradition of C. Shannon, N. Wiener, A. Kolmogorov et al.), Information asymmetry (K. Arrow, G. Akerlof, M. Spence et al.), Economic information theory (starting with G. Stigler). An important role in this emerging synthesis is played by the theories of the post-industrial society (D. Bell, K. Ohmae and others), information economy, knowledge economy (and knowledge society), network and Internet economy, as well as new and controversial concepts of the economy of wisdom [22, 89-107] and a wise society [3, 36-45], cognitive capitalism [20, 13-36], cognitive-cultural capitalism [18], creative capitalism [7], etc.

However, within the framework of separate approaches, an understanding of strengths and weaknesses, limitations and opportunities, scenarios and models of the digital economy development is impossible. The intensified process of sciences integration requires an interdisciplinary solution of complex

system problems and, in particular, the study of mechanisms for transforming economic and legal relations under the influence of digital general purpose technologies development.

## II. METHODOLOGY

The problem of complex, profound and multifaceted institutional changes in the Russian economy under the influence of digitalization involves systematization and modernization of the methodology and theory of the digital economy analysis. The updated conceptual framework should take into account multidimensionality, heterogeneity, complexity, hybridity, inconsistency of digital processes, avoiding simple interpretations and recommendations. In the case of the digital economy, simplistic and reductionist approaches will clearly lead to wrong conclusions for economic policy. In particular, it is important to avoid the liberal and statistic paradigms, recognizing that digital processes will require a flexible combination of market self-regulation and state strategic regulation, as well as new institutional regulatory mechanisms at the meso level. In addition, it is necessary to be aware of the real scale of the social effects generated by the digital economy, if possible avoiding the approach of economic determinism in its analysis. Simple prognostic conclusions such as the complete substitution of workers by a "digit", the complete disappearance of intermediaries, or the complete elimination of transaction costs should be questioned.

This study is based on the use of the innovation methodology elements of post-institutional analysis based on interdisciplinary synthesis. This methodology involves overcoming the monodirection, dichotomousness and dogmatism of many concepts of orthodox neoinstitutionalism [8].

For the first time the term "digital economy" in the scientific literature began to use almost simultaneously D. Tapscott (University of Toronto) and N. Negroponte (Massachusetts Institute of Technology). The first of them in 1994 published a book called "The Digital Economy", and the second published a non-fiction book "Being Digital" in 1995. But for quite a long time this term existed in a kind of "sleep mode", since its use was sporadic and only metaphorical. Only at the turn of the XX – XXI centuries the use of this term began to acquire an ever wider, increasing, cascade character. Currently, the term "digital economy" is increasingly used by scholars, experts, politicians, journalists, businessmen, and

teachers in their speeches, discussions, and publications. However, its content still remains heterogeneous and many attempts at clear conceptualization of this phenomenon are significantly discordant.

The definition of the digital economy is an important part of its institutionalization, shaping its contours as an object of regulation, investment, support for innovation, etc. Incorrect (too narrow or too wide) bordering, as well as too soft or too rigid fastening of these borders can become factors of braking digitalization. As experience in the regulation of biotechnologies and nanotechnologies shows, fictitious adjunction of scientists, experts, politicians and entrepreneurs to new technologies are often observed in the hope of obtaining additional resources, both monetary and image. This nuance should be taken into account as an objective component of any rapidly developing “general purpose technology” wide application technology.

Most often, the digital economy is defined as a subsystem of the economy, including economic relations in the processes of production, exchange and consumption, which are mediated by the Internet, cellular communications and information and communication technologies in general.

Many experts believe that the key distinction of the digital economy is the techno-digital form of economic relations; accordingly, all goods, services, employees, companies, organizations and industries that acquire the techno-digital form and together constitute the digital economy [5, 149-151]. Many regulators take this position: The Russian government understands the digital economy as an ecosystem in which data in digital form is a key factor in production and various social activities. This approach (specific definitions within its framework vary in a very wide range) can be considered an interpretation of the digital economy from the supply side, i.e. from the standpoint of production, its key factors and the most significant technologies. There is an alternative (but and less common) point of view, according to which a digital economy is “an economy whose characteristic feature is maximum satisfaction of the needs of all its participants by ... information and communication and financial technologies, as well as accessibility of infrastructure, together providing the opportunity full interaction in the hybrid world of all participants in economic activity” [9]. This approach is essentially an interpretation of the digital economy from the demand side, i.e. in terms of needs, preferences, goods, services, segments, markets. Of course, ideally, it is necessary to operate with an integrated interpretation uniting production and market-centric concepts. Only in this case, during the regulation of digitalization, there will be no imbalance of advantages in favor of certain actors and, accordingly, the strengthening of digital inequality. Producers and consumers should be (ideally) equalized in their rights, i.e. a kind of institutional parity, the principle of the digital economy actors’ status equality is needed.

It is especially important to reject from the isolated, sectoral definition of the digital economy, as a more or less separate sector (digital sector), including the main sectors of the digital goods and services production, including Internet business, online platforms and the sharing economy [11]. Such an approach should be considered very dangerous in terms of the delayed negative effects of regulation, although, according to IMF experts, this interpretation greatly simplifies the task of measuring the digital economy. But it is extremely important to understand that the digital economy in reality is not only its “core” (that is, the digital sector), but

also the broad “shell”, i.e. digitalized economy. Therefore, it is extremely difficult, if not impossible, to accurately assess the scale of digitalization. But it is extremely important to understand that digital components (from individual actions, processes, transactions and up to professions, lifestyles, behaviors, common beliefs, subcultures) become part of the social reality, creating a mass of implicit economic effects. These effects cannot be directly derived from the development trends of the digital sector itself, which is necessary for regulators to be aware of.

It is very important, when studying and regulating the digital economy, to distance themselves from overly idealistic and over-optimistic assessments. For example, Big Data was an invisible resource before the advent of digital processing technologies. The development of these technologies has led to the fact that the pyramid “data - information - knowledge - wisdom” actually turned upside down: now it is Big Data (i.e., diverse data of huge volumes arriving in high-speed mode) that became the key success factor. Moreover, if in the conditions of economics knowledge, automation and robotization were mainly subjected to “blue collars”, as well as low- and middle-skilled professions of “white collar workers” in industrial sectors [11], now, under the conditions of the digital economy, a phenomenon has arisen the so-called high-skill automation, which marked the new stage of the race of machines and people [1; 2]. Artificial intelligence technologies combined with machine learning and Big Data have mastered the ability to perform many specialized tasks that previously required expert knowledge, including in the areas of analytics, decision making, content creation, etc. Architects, lawyers, marketers, bankers, doctors, insurance specialists, financial analysts, journalists, auditors, administrators, and many other white-collar workers are experiencing growing competitive pressure from digital technologies. These professions are no longer considered highly qualified and will be replaced with a high probability by technological solutions. Undoubtedly, digitalization will not only lead to the disappearance of many professions, but also to the creation of new specialties of high qualification [19], but this process will be quite complicated. In particular, a big problem, which has not yet been clearly resolved, is the automation of middle-skilled jobs that are occupied by the middle class, which leads to an increase in inequality.

Denmark can be cited as the most illustrative example of building an effective digital economy management system at the state level. The study (Schou J., Hjelholt M., 2018) describes the nuances of building public policy based on the CPE approach, classifying digitalization as a priority structural transformation of the state. Studying this research, based on issues of institutional policy and municipal digitalization through the use of open data and meta-management, we observe implicit theoretical and conceptual assumptions contained in major part of the existing literature. Against the background of purely technological or depoliticized materials, researchers demonstrate the political ambitions and institutional implications of government policy in the field of digital technologies, which have multiplied and qualitatively changed over time [18, 569-571]. The starting point for regulating the development of digital technologies and foreign trade institutions in the context of international economic integration should be recognized as discursive selectivity associated with creating a hegemonic vision that digitalization should include (and exclude) as a real economic ecosystem. As a result of this institutionalized image of the future of the

digital economy, a set of priorities for investing in state and public-private resources emerges. Therefore, creating a hegemonic image is a complex process that involves many competing views, long time negotiations and complex interactions across institutional boundaries.

The most clearly innovative institutional forms and effects of digitalization are manifested in the financial sphere, which has become a pioneer area of the mass introduction of digital technologies and their use by the broad masses of people. The Russian financial sector has not been an exception - since 2017 it has officially joined the digital transformation [21], although in reality this process began much earlier.

After the global financial crisis in 2008, the financial technology sector (Fin-Tech) became one of the fastest growing entrepreneurial areas in the world that are beginning to rapidly destroy traditional banks (Melike Belli-BKM 2016) [6]. Digital Fin-techs startups are starting to offer financial services to clients almost free of charge from payments to asset management. Tinkoff Bank is the first and only fully online bank in Russia, serving more than eight million customers, established in 2016. In 2007, the international investment bank Goldman Sachs became one of the owners of a credit institution; in 2008, it was joined by the Swedish investment fund Vostok Nafta. In the mid of 2012, the international private equity fund Baring Vostok Private Equity Fund IV during the additional issue invested US \$ 50 million in the capital of TCS Bank. In October of the same year, the Horizon Capital fund entered the capital of a financial institution (specializes in investments in companies with medium capitalization and high growth potential; its headquarters is located in Kiev). In less than five years, the cost of TCS Bank increased almost sevenfold [13]. Sberbank is leading among banks in terms of the speed of introducing digital technologies. So, in November 2017, with its participation, the first in the history of Russian banking practice a pilot payment transaction was conducted using the IBM Blockchain HyperLedger Fabric platform. The development of the so-called trimodal organization, combining a cascade development methodology and Agile-approaches and including the development of three development directions: Run (support of current processes and operations), Change (replacement of current processes with more efficient ones) and Disrupt (creation of new processes and products to create competitive advantages). In terms of staff training, Sberbank is focused on training T-shaped people, i.e. specialists with deep skills in a certain area of knowledge, but with a number of additional skills from other areas and able to develop them in the future. By 2025, the bank expects to automate almost all simple and many complex operations, in particular, in the coming years digital technologies will completely replace the staff of call centers [4, 82].

Large technology firms such as Apple or Samsung are trying to expand their payment system to different markets globally. Financial and technological firms become at the same time competitors and partners. The most valuable assets of banking in the digital world are the customer base and customer data that they have in their CRM systems. Banks and other financial institutions must decide whether to admit themselves to the digital age and create new services and applications that attract customers of the digital age almost free of charge, or lose their profitability and efficiency. Due to digital technology solutions in the form of applications in

smartphones, the client gets open access to the use of potential resources. In a Sharing economy conditions, there is no need to purchase software — this is replaced by cloud technologies; no need to go to a bank or a state institution - all services are available online; amateurs compete with professionals on equal terms: so, it is possible to find someone who will care for your dog when you are on holiday, at a lower cost than accommodation at the hotel for animals. If we understand the definition of the main problem for the economy as the satisfaction of unlimited human needs due to limited resources, then the sharing economy becomes the best solution, increasing its scale with the massive introduction of digital technologies in all spheres of society. Creation of services is made possible by global digitalization, which in turn creates infrastructure problems for employees of traditional industries. It is expected that by 2025, the resource sharing economy will bring income up to US \$ 335 billion. and its impact is expected to affect almost all industries [15]. Uber and Airbnb already have become a new reality for the financial sector of the economy. Instead of buying cars, hotel rooms and more, bank customers rent time and space on demand through special applications. This means less demand for car loans and less cash flow of hotels. Finance sharing practices are less known than Uber or Airbnb, but such technology products have a very large growth potential in terms of meeting needs and accessing a limited number of resources. Despite the fact that applications for P2P payments are becoming increasingly popular, banks still have an advantage in this area, because most of the participants in these applications already have an account and a credit card in a bank (or banks). The key point is to appeal to POS-merchants and small business owners. Mobile and virtual POS-terminals and digital wallets can easily exceed other non-bank P2P payment competitors. But to overtake them, banks must provide services in a cheaper and more flexible way than they offer now. To do this, it is necessary to rebuild the institutional system of the banking sector at the state level, while maintaining public confidence in small fintech-companies that can provide cybersecurity and preserve financial assets of clients. Thus, banks and other traditional financial institutions will be able to integrate themselves into the digital economy, receiving a share of transactions and maintaining their stability in a rapidly changing business environment.

Another new institution of the digital economy, to which banks and financial institutions have to adapt, is blockchain-crowdfunding. Crowdfunding is a viable version for crediting in the digital world, when a client does not want to take a big loan, but would like to receive additional funds, for example, to develop his start-up project. Through crowdfunding, donors contribute to a project, idea, or person to achieve its goal. This happens between peer chain members. The borrower receives cash through the fund-raising sites, where no compensation is offered and he reimburses the funds received within his means and interest. Personal crowdfunding is different from crowdfunding a business when you do not offer shares or shares as compensation. Personal crowdfunding involves raising funds that the borrower does not pay, but instead offers a reward to encourage people to donate and thank them for their contributions. The transition to blockchain-crowdfunding will also create an institutional challenge for traditional financial structures [12, 22].

### III. RESULTS

Modern digital technologies (Big data, machine learning, artificial intelligence, distributed registries, etc.) are increasingly being used in foreign trade financial transactions. They allow to reduce transaction costs, increase the volume of transactions and their speed, ensure the customization of financial services through interactive collection and analysis of customer data. One of the most valuable traditional assets of banks and financial institutions is their customer database, which they have collected over a long time period from various sources according to different parameters. These traditional financial structures will be able to remain leaders in the field of banking and financial services to best meet the emerging needs of customers by integrating existing databases with big data. With the help of predictive analytics of big data and social networks, new data sources and opportunities are available for banks and financial organizations. In this regard, the question arises that the existing model for modern FINTECH companies is no longer suitable [10, 797-801]. New technologies require an appropriate regulatory and management model for themselves, and most of the data that banks and financial institutions have is not structured for use in digital analytics. The most promising scenario for the development of the banking sector will be the creation of B2C-services and individual offers for the needs of private clients and small and medium-sized businesses. International practice in the field of regulation and supervision recommends using models such as Supervision Technology (SupTech) and Regulatory Technology (RegTech) in practice. SupTech implies the improvement of existing methods of supervision and regulation using new technologies to provide effective ways to identify and assess risks, collect and analyze data, while RegTech is connected with the use of innovative technologies by supervised financial institutions to increase the efficiency of regulatory requirements and risk management.

### IV. APPLICATION

The change in the regulatory environment of the digital economy is an evolutionary process and objectively slower than the ultrafast processes of introducing digital financial innovations into all spheres of social life. Disappearing of traditional financial institutions and the financial market as a whole boundaries is an objective trend accompanied by a sharp increase in decentralization, including the emergence of private cryptocurrencies (altcoins) and tokens, an increase in the number of fintech startups and uberized business models. These trends of institutional development cause a predominantly negative attitude on the part of regulators who need to be overcome. It is extremely important to avoid stereotyped assessments and reductionist conclusions about the prospects for digitalization, in particular at the financial sector. Despite competition from fintech companies, banks and other traditional institutions will be able to maintain their market positions by joining new players and creating new banking models. Similar processes will occur in other sectors and spheres of the economy, which requires a review of the existing regulatory paradigm, which is too static and centralized. A holistic regulatory paradigm is needed, perceiving the digital economy as a complex, heterogeneous, dynamic ecosystem with many actors and stakeholders, and, most importantly, with hybrid institutions. The hybrid institutions, which combines the features of the virtual and

real, commercial and non-commercial, industrial and service, digital and material institutional order.

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### References

- [1] D. Acemoglu and P. Restrepo, *The Race Between Machine and Man: Implications of Technology for Growth, Factor Shares and Employment*. NBER Working Paper no. 22252. Cambridge: NBER, 2016. 87 p.;
- [2] D. Acemoglu and P. Restrepo, *Robots and Jobs: Evidence from US Labor Markets*. Working Paper no. 23285. Cambridge: NBER, 2017. 91p.
- [3] A.J. Balloni and A.S. Targowski, *Challenges and Reflections on Information, Knowledge, and Wisdom Societies and Sociotechnical Systems // Enterprise Systems. Strategic, Organizational, and Technological Dimensions / D. Sedera, N. Gronau, M. Sumner (eds.)*. Berlin: Springer, 2015. P. 216-237; Goede M. *The wise society: beyond the knowledge economy // Foresight*. 2011. Vol. 13. № 1. P. 36-45.
- [4] E.R. Immortal, *Digitalization of the financial sector of the economy: Who will get digital dividends? // ECONOMICS. TAXES. RIGHT*. 2018. No.2, pp.75-83
- [5] R. Buht and R. Hicks, *Definition, Concept and Measurement of the Digital Economy // Bulletin of International Organizations*. T. 13. № 2. 2018. C. 143–172. C. 149-151.
- [6] Chris Skinner-Digital Banking-BKM Pub, *Big data in financial services and banking—Architect’s guide and reference architecture introduction*. Oracle Enterprise Architecture White Paper-2015. 2016.
- [7] *Creative Capitalism, Multitudinous Creativity: Radicalities and Alterities / G. Cocco, B. Szaniecki (eds.)*. Lanham: Lexington Books, 2015. 288 p.
- [8] D.P. Frolov, *Postinstitutionalism / D.P. Frolov, I.V. Maruschak*. Volgograd: Publishing house VolSU, 2017. 284 p.
- [9] A.V. Keshelava, V.G. Budanov, V.Yu. Rumyantsev, I.D. Dmitrov, K.S. Sorokin, I.L. Hayet, A.V. Shcherbakov, *Introduction to the "Digital" economy. Book One. On the verge of a "digital" future. Book One*. Keshelava AB, editor. Moscow: VNIIGeosystem. 2017
- [10] A.V. Lavrentyeva, A.E. Kalinina and D.P. Frolov, *Institutional anomalies in new general-purpose technologies development during digital economy formation in Russia, "2nd International Scientific Conference on New Industrialization: Global, National, Regional Dimension (SICNI 2018)"*. 2019. pp. 797-801.
- [11] *Measuring the Digital Economy*. IMF, 2018.
- [12] *The main directions of development of the financial market of the Russian Federation for the period 2019-2021*. Project. M.: Bank of Russia, 2018. C. 22.
- [13] *About the bank* [appeal date 12.03.2019] URL: <https://www.banki.ru/banks/bank/tcs/>
- [14] *The program "Digital Economy of the Russian Federation."* Approved by the order of the Government of the Russian Federation dated July 28, 2017 No. 1632-p. URL: <http://static.government.ru/media/files/9gFM4FHj4PsB79I5v7yLVuPgu4bvR7M0.pdf>.
- [15] *pwc Blogs* [appeal date 02/10/2019] URL: <https://www.pwc.co.uk/issues/megatrends/collisions/sharingeconomy/outline-for-the-sharing-economy-in-the-uk-2016.html>. 2014.
- [16] J. Schou and M. Hjelholt, *Rolling Out Digitalization: Hegemonies, Policies and Governance Failures*. In: *Digitalization and Public Sector Transformations*. Palgrave Macmillan, Cham. 2018. [дата обращения: 28.04.2018]. URL: [https://link.springer.com/chapter/10.1007/978-3-319-76291-3\\_4](https://link.springer.com/chapter/10.1007/978-3-319-76291-3_4)
- [17] H.L. Sirkin, M. Zinser and J. Ryan Rose, *The Robotics Revolution: The Next Great Leap in Manufacturing*. BCG, 2015. 28 p.
- [18] A.J. Scott, *Beyond the Creative City: Cognitive–Cultural Capitalism and the New Urbanism // Regional Studies*. 2014. Vol. 48. № 4. pp. 565-578. pp. 569-571.
- [19] *The Future of Jobs Report 2018*. World Economic Forum, 2018. 133 p.

- [20] C. Vercellone, From Formal Subsumption to General Intellect: Elements for a Marxist Reading of the Thesis of Cognitive Capitalism // *Historical Materialism*. 2007. Vol. 15. № 1. pp. 13-36.
- [21] In 2017, in accordance with the Decree of the President of the Russian Federation "On the Strategy for the Development of the Information

Society in the Russian Federation for 2017–2030" of 09.05.2017 No. 203, the Government of the Russian Federation prepared the program "Digital Economy of the Russian Federation".

- [22] Walker S. Design and Spirituality: Material Culture for a Wisdom Economy // *Design Issues*. 2013. Vol. 29. № 3. pp. 89-107.