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DIGITAL ECONOMY OF INNOVATIVE REGIONS: A EUROPEAN AGENDA AND DEVELOPMENT INDICATORS

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Abstract

The development of digital economy in Russian innovative regions is tied to the quality of feasible policy choices of digitalization and the evaluative indicators of development levels. European best practices are of great importance while working out the above mentioned managerial tools to be used for the development of digital economy in the regions those are the members of the Association of Innovative Regions of Russia (AIRR). The authors have specified the concept of «digital economy» as an activity based upon the semantic analysis of its definitions given by foreign scholars in the framework of theoretical objectives. The paper has made the conclusion on the compliance of the digitalization directions of Russian economy with the European agenda and the European parliament policy in digital economy digital transformations of regional development in this context. Based upon DECA methodology, evaluative indicators for the development levels of digital economy in innovative regions are worked out and tested for the Samara Region – an AIRR member. The authors have characterized digital economy development in the region as «emerging» and found out the factors constraining its development. The recommendations on the use of the developed methodology in the practice of managing the development of Russian innovative regions are given and may be used by any other Russia region aiming at innovative development.

Keywords: Region, digital economy, indicators, European agenda.

1. Introduction

Current scientific concepts, policy and strategy of economic development associate innovative factors with digitalization – the process of creating, introducing, distributing and using Information and Communication Technology (ICT). Digitalization leads to the creation of digital economy – the form of business organization drastically changing market, business environment and the conditions of regional development. The Message from the Russian President to the Federal Assembly in 2016 noted the importance of digital transformation and suggested to launch a large-scale systemic program of digital economy development – the economy of the new technological generation (Presidential Executive Office, 2016b). In that regard, a number of key strategic documents was adopted, among them the Strategy for scientific and technological development, the Strategy for Information society development, the National Project «Digital Economy» that are aimed at federal projects of digital environment regulation, information infrastructure and training, information security, digital technologies and digital public administration. The implementation of these strategies is expected to provide the creation of digital economy in the country and result in the swift development of the Association of Innovative Regions of Russia (AIRR) members. The improvement of global and national competitiveness of AIRR members in the context of digital economy requires the examination of the European agenda, the definition of priority areas in digitalization, the selection of indicators of digital economy development, the use of evaluative techniques in managing regional development. These goals require further research into the theory of digital economy, the analysis of academic foundations made by Tapscott (1997) who were the first to introduce the concept and predicted the directions of digital economy development in the next two decades, pointed out the role of the Internet and the youth as a new generation using digital technologies. A number of European researchers have differentiated the components in the structure of digital economy within digital goods and services; mixed digital goods and services; services and IT-dependent goods production, the segment of IT industry serving the three above mentioned components of digital economy (Lane, 1999; Haltiwanger & Jarmin, 1999). These theoretical foundations set the European agenda of digital economy development provided in the documents by the European parliament (Van Gorp & Batura, 2016), Organization for Cooperation and Development (OECD, 2014), authoritative professional associations (UNCTAD, 2017).

2. Problem Statement

Despite the range of developed theoretical foundations, there is no broadly accepted notion of «digital economy» in the works of modern scholars which results in the interpretation of urgent digitalization directions and evaluative indicators of digital economy development from various approaches and points of view. In territorial management, theory incompleteness results in the uncertainty of the term and requires to specify the term of «digital economy». The solution of theoretic and methodological problems is limited by insufficiently researched and loosely defined European agenda of digitalization, successfully realized for the creation of digital economy in the EU countries as well as evaluative indicators of digital economy development in regions, the use of evaluative methodology in managing the development of innovative territories.

3. Research Questions

Theoretical and methodological problems prevent the development of digital economy in the AIRR members and define the research questions. The necessity to clarify the term of «digital economy» derives from multiple definitions and their evolution, the complexity of the notion. The research of the directions, scenarios, areas, objects of digitalization resulting in the creation of digital economy in EU countries is aimed at the use of the European agenda of digitalization as the basis for selecting the directions in digital economy development in Russian regions, strategic decision-making efficient at the regional level. As for methodology, the European practices of indicative assessment is a key issue. The use of standard indicators and evaluative techniques for measuring the development of digital economy is aimed at grounding, working out managerial tools of developing innovative regions in the context of economic digitalization.

4. Purpose of the Study

The research is aimed at theoretical and methodical foundations of digital economy development in the AIRR regions based upon the European agenda and development indicators. In order to achieve the goal stated above, the following objectives were set and realized: a) the concept of «digital economy» has been clarified; b) the directions of digitalization leading to the creation of digital economy in the EU member states have been systematized; c) the evaluative methodology of digital economy development in Russian innovative regions has been worked out based upon European best practices, with Russian AIRR member regions in focus of research. The subject of research is in organizational and economic relations being established in the digital transformation of regional economy.

5. Research Methods

The methods of research involved the semantic analysis of the «digital economy» concept, its evolution in scientific publications and formalization. The methods of synthesis and analysis are used to systematize the digitalization directions of the EU member states, inductive and deductive reasoning are used to define the priorities for the digitalization of the economy of Russian innovative regions. The method of economic statistics and ratings are used to select indicators for assessing digital economy development, work out the evaluative methodology and substantiate the recommendations aimed at its use in the practice of managing the development of Russian innovative regions.

6. Findings

6.1. The concept of «digital economy»

The term «digital economy» was first used by Tapscott (1997), who pointed out the opportunities of the Internet to change drastically markets and business environment, social relations, the projections for the economy in line with growing up new generation using digital technologies. However, these authors' academic works sought a clear definition of the term «digital economy». The analysis of what constitutes and the context of the notion «digital economy» in foreign authors' academic papers

demonstrates the continuing evolution of the term associated with digital technologies development and economic digitalization. According to Lane (1999), digital economy is "…the convergence of computing and communication technologies in the Internet and the resulting flow of information and technology that is stimulating all of electronic commerce and vast organisational changes" (p.318). Haltiwanger and Jarmin (1999) defined the digital economy as "having three primary components: e-business infrastructure; electronic business (e-business) is any process that a business organization conducts over computer-mediated networks; electronic commerce (e-commerce) is the value of goods and services sold over computer-mediated networks" (p.21). Benni, Elmasry, Patel, and Aus Dem Moore (2016), concludes that digital economy is "less as a concept and more as a way of doing things" but with three attributes: "creating value at the new frontiers of the business world, optimizing the processes that execute a vision of customer experiences, and building foundational capabilities that support the entire structure" (p.14-15). The best-known definition was given by Knickrehm, Berthon, and Daugherty (2016) who defined digital economy as "the share of total economic output derived from a number of broad "digital" inputs". According to the author, these digital inputs include "digital skills, digital equipment (hardware, software and communications equipment) and the intermediate digital goods and services used in production" (p.2). Rouse (2016) specifies Knickrehm's definition from the technological point of view considering that «the digital economy is the worldwide network of economic activities enabled by information and communication technologies (ICT)" (p.5). Dahlman, Mealy, and Wermelinger (2016) go even further in that direction defining digital economy as "the amalgamation of several general purpose technologies (GPTs) and the range of economic and social activities carried out by people over the Internet and related technologies (p. 11). It encompasses the physical infrastructure that digital technologies are based on (broadband lines, routers), the devices that are used for access (computers, smartphones), the applications they power (Google, Salesforce) and the functionality they provide (IoT, data analytics, cloud computing)".

The semantic analysis and the synthesis of submissions allows for conclusions about digital economy as an activity based on digital technologies, whose product are digital goods and services or mixed goods and services the production of which is dependent from digital technologies. According to its territorial platform, digital economy is a worldwide network of economic and social subjects creating and using the possibilities of the Internet and the technologies derived from it.

6.2. The priorities for digitalization and building up the digital economy

According to the European developers of the reports «Measuring the Digital Economy A New Perspective» (OECD, 2014) and «Information Economy Report 2017 – Digitalization, Trade and Development» (UNCTAD, 2017), G20 initiatives (Presidential Executive Office, 2016a), as well as van Gorp and Batura (2016) who research into the policy of the European parliament toward the digital economy, the European agenda for digitalization includes a wide range of economic activities that include using digitized information and knowledge as the key factor of production, modern information networks as an important activity space, and the effective use of information and communication technology (ICT) as an important driver of productivity growth and economic structural optimization, as well as regional economies and the creation of territorial innovative systems. The agenda for digitalization being pursued

by the EU creates «Industry 4.0» that is the digital economy containing technologies and products of cloud computing, mobile devices, IoT platforms, location detection technologies, advanced human-machine interface, authentication and fraud detection, 3D printing, smart sensors, big data analytics and advanced algorithms, multilevel customer interaction and customer profiling, augmented reality/wearables.

The Russian Strategy for Digital Economy also includes the digitalization issues resulting from the European agenda, and the program "Digital economy of the Russian Federation" contains markets and economic sectors; platforms and technologies; regulation; information infrastructure; staff and information security. The main cross-cutting digital technologies of the program are big data; neurotechnologies and artificial intelligence; distributed ledger platforms; quantum computing technologies; Internet of things, robotics and sensory components; DECT technologies; virtual and augmented reality technologies. The European agenda for digitalization has obviously been reflected in the Russian documents of strategic planning and created the solid institutional framework of the digital economy development in the Russian subjects. The digitalization priorities being realized are drastically changing the business environment and the conditions of employment in regions, providing economic growth, productivity gains, reducing transaction costs, facilitating the access of local businesses to world markets. The 15-25 per cent growth recorded by the digital economy within the last decade rewards regions with "digital dividends" in the form of lower regional inequality in the levels of socio-economic development, the increase in average per capita incomes, the creation of unique local markets of digital goods and services. However, the European best practices show that digitalization is incurs the risks of limited or imperfect resources and institutes, lack of opportunities to create the digital economy in particular regions. The risks of creating the digital economy are associated with the problems of redundant workers because of changes in technologies, the danger of marginalized workers as the digital labour increases, fragile privacy and digital security, the risk of decrease in traditional production and premature de-industrialization. Faced with new opportunities and the existing risks created by digitalization, the development of the digital economy needs to be well-managed and approved on the priority areas – the regions of innovative development that are the AIRR regions in Russia.

6.3. The indicators of measuring the digital economy development in Russian innovative regions

The well-run digital economy development would provide the whole society with "digital dividends" in the form of increased national wealth, business profits and transparency of public administration which are realized by a Digital Economy Country Assessment (DECA) methodology to help countries and regions assess their readiness for digital adoption developed by the World Bank in collaboration with the Institute of the Information Society (see Table 01).

Table 01. The set of indicators of digital economy assessment

Conditions	Content
Non-digital factors	State policy and strategic planning; leadership and institution; laws, regulation and standards; human capital; R&D; business environment; trust and security in the digital economy
Digital factors	Digital infrastructure; digital platforms and digital technologies
Digital sector	ICT-sector, content and media

Source: authors based on data of World Bank Group (2018)

The DECA framework is designed as a common set of indicators that can be applied for the whole country, for its regions, and for certain sectors of the economy. According to the results of comparative assessment, a region is ranked at elementary, emerging, intermediate, advanced, high levels of digital economy development. The Samara Region is among 16 Russian subjects – the AIRR members, and the digital transformation of the economy is designated as a priority task of long-term development in the Strategy of the socio-economic development. The analysis of the digital economy development in the Samara Region based on DECA methodology enables to assess its readiness for digital adoption as "emerging" (see Table 02).

Table 02. The set of indicators of digital economy assessment in the Samara Region in 2017 (DECA methodology)

Indicators	Russian Federation	Samara Region
Non-digital factors		
Proportion of businesses involved in R&D, per cent	8.5	4.3
Number of students studying in bachelors, masters or doctoral programs per 10,000 persons of the population	289	312
Growth rates of ICT costs, per cent	119.1	126.1
Digital factors		
Proportion of households having broadband Internet access of the total number of households, per cent every day or most days	72.6	73.7
Proportion of people using the Internet every day or most days in the total population, per cent	60.6	56.7
Proportion of businesses using global information networks in the total number of businesses, per cent	89.7	78.5
Number of PC with the Internet access per 100 employees, pcs.	33.0	31.0
Proportion of businesses having broadband Internet access in the total number of businesses, per cent	83.2	71.1
Proportion of businesses using special software in the total number of businesses, per cent	73.0	72.5
Digital sector		
Growth rates of supplied product and services in activities in the field of information and communication, per cent	117.2	116.3
Growth rates of business turnover in the field of information and communication, per cent	121.0	115.9
Growth rates of numbers of businesses in the field of information and communication, per cent	100.1	95.5

High quality of DECA methodology and the European experiences in developing the evaluative indicators is that the assessment methodology includes the indicators to measure the comprehensive set of conditions and results of the digital economy. For the Samara Region, the use of the DECA methodology reveals poor results in the digital economy development provided that circumstances are conducive expressed by a more educated population (the proportion of students in total population is higher than in the Russian Federation) and high level of economic activity (growth rates of ICT costs exceeding the average for the whole country).

7. Conclusion

The development of digital economy in innovative regions will need high quality informed policy choices for digitalization and efficient managerial tools. The research methods being used lead to the conclusion that digital economy is an activity based on digital technologies and creating digital goods or services. The priorities for economic digitalization in the AIRR members are defined by the government strategies being realized and comply with the European agenda and successful examples from around the world. However, the results of DECA methodology assessment reveals low ("emerging") level of digital economy development in the Samara Region that is the AIRR member. The estimates show that the use of the DECA methodology in managing the development of Russian innovative regions would ensure even faster rates of the development in digital sector and the use of digital technologies in the economy and management that is a constraint for the Samara Region.

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