

Problems of Assessing the Contribution of Digital Changes and Their Impact on the Development of the World Economy

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Abstract—The article presents the results of assessing the state of the digital sphere in Russia and the world at the beginning of 2020, and summarizes the analytical materials of leading world experts (GlobalWebIndex’s, Knoema, We Are Social, Hootsuite, etc.), which show that digital transformation is causing revolutionary changes in technology, politics, society, economy, and its consequences, both constructive and destructive, make it possible to track changes within a time interval for one generation. So, the authors of the article, having studied the structure of the e-commerce market in Russia and the world in the context of the categories “Travel”, “Fashion and beauty”, “Electronics and physical media”, “Toys, crafts and hobbies”, “Furniture and household appliances”, “Food and Personal Hygiene” marks the introduction of the concept of “omnichannel” into circulation, when consumers practically do not distinguish between “online” and “offline” when shopping. In the course of the study, the authors proved that the Russian e-commerce market structurally corresponds to the global one and averages about 1.0%. Conceptual approaches, methodological limitations, developing trends and the absence of a conceptual and categorical apparatus of the digital economy used in scientific research do not allow a qualitative approach to measuring the latest technological revolution - the digital environment. During the study, the authors identified the problems of assessing the contribution of digital changes to the global economy. The article examines three approaches used in world practice in measuring the digital economy: through measuring technology, through measuring the ICT sector, through accounting for consumer welfare based on the concept of “consumer surplus”. The paper identifies the problems of imbalance in the development of the market of information and communication technologies in Russia, including the unbalanced development of the main market segments, the imbalance of the telecommunications segment in terms of penetration and availability of basic services, imbalances in regional development.

Keywords—internet, global economy, digital change assessment,

consumers, social networks, COVID-19, digital revolution

I. INTRODUCTION

In modern conditions, making management decisions based on data has already become a certain cliché. It is known from history that even the ancient Sumerians, almost 5.5 thousand years ago, used clay tablets to track basic economic indicators (trade transactions, prices, harvests, etc.). Every day humanity creates about 2.5 billion gigabytes of data, and if this volume is compared with 100% loaded iPad-devices with a capacity of 1 terabyte, then 2.5 million pieces will be needed. However, despite the abundance and even an overabundance of data, modern researchers, analysts, scientists do not have a reliable method to track economic transformations in the new digital era.

II. CURRENT STATE OF THE PROBLEM

The report on the state of the digital sphere Digital-2020, prepared by We Are Social and Hootsuite, indicates that at the beginning of 2020, out of 7.75 billion inhabitants of the planet, almost 60% or 4.54 billion people use the Internet, an increase in relation to 2019 accounted for 7% or 298 million new users. At the same time, the audience of social networks is 3.8 billion people, or almost 50% of those who are online. Their growth in comparison with the previous year was 9% or 321 million new users. The study notes that 5.19 billion people in the world use mobile phones, the increase made 2.4% or 124 million people per year [1].

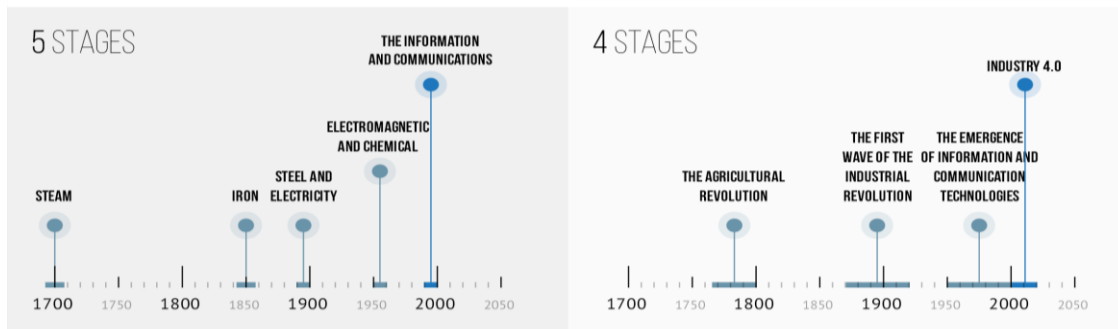
In 2020, the share of Internet users in the Russian Federation was 81%, or about 118 million people. The share of Internet users in Russia increased by 6.3 times, from 12.9% in 2004 to 81% in 2020, with an average annual growth rate of almost 15%. The audience of social networks is 70 million users, or 48% of the total population of the country, which only confirms the global trend [2]. The amount of time people spend online

differs significantly from country to country. So, if on average a person spends 6 hours 43 minutes on the Internet, then in Russia it is 7 hours 17 minutes, in the USA – 6 hours 42 minutes, China – 5 hours 50 minutes, Germany – 4 hours 52 minutes ... The Philippines starts this rating with 9 hours 45 minutes, and Japan closes the rating with 4 hours 22 minutes.

The digital transformation taking place all over the world is causing revolutionary changes in technology, politics, society, economy, and the consequences, both constructive and destructive, can be traced within a time interval for one generation. Studies [3-5] show that the massive introduction of digital technologies began in the early 1990s, and the economic and social consequences of them appeared 10 years later, in the 2000s. And in this regard, the lack of a generally accepted definition of the digital revolution in the dictionary emphasizes

not only the novelty, but also the speed of technological change (Fig. 1).

Compared to the previous four technological waves, the “digital revolution” has multiplied the pace of technological progress, and modern technologies exceed all the wildest expectations. These rates can be further accelerated thanks to catalysts such as COVID-19. The pandemic has forced industries around the world to further automate production and business processes, and more actively use the products of robotics and other additive technologies. As a result of the COVID-19 pandemic, the process of innovation in biotechnology and telemedicine has significantly accelerated, the online education market has increased, and businesses have introduced tools and technologies of remote work as widely as possible [6].



Atkinson and Wu (2017). False Alarmism: Technological Disruption and the U.S. Labor Market, 1850–2015.

Fig. 1. Technological revolutions in human history [6]

In the context of the globalization of the world economy, manipulations and modeling of big data make it possible to formulate and find solutions for various hypotheses, both in the economy and in ordinary human life: what is the current state of the world, how did life appear on Earth, what will happen in the future, or highlight trend watching in economics, politics, social development after the global spread of COVID-19.

Big data makes it possible to determine the critical benchmarks for all global changes, both on earth and in space. But here a certain contradiction arises, the more and better the generated data, the more complex and contradictory the models and forecasts developed on their basis can be, which in turn increases the risks from the decisions made. So, for example, the world information repository <https://knoema.com> is characterized by the following macro indicators of its own data warehouse: time series – 2.85V, sources – 1.21k, datasets – 24.74k, topics – 1.04k [7, 8].

III. RESULTS AND DISCUSSION

The global economy has long gone digital. Every year, the Internet industry increases the scale of services, customer base and geographic coverage, bypassing, or even winning from global economic crises and pandemics. The development and penetration of the digital environment into everyday life led to the introduction into circulation of the concept of “omnichannel”, which has become fashionable, when consumers practically do not distinguish between “online” and “offline” when shopping. A common practice where consumers visit a physical store, try on, evaluate a product, and then order it online. Thus, according to GlobalWebIndex data, в Internet users in the world aged 16-64 buy online every month. The

highest e-commerce penetration is observed among users in Indonesia (88%), Thailand (82%) and Poland (82%). In Russia, 60% of Internet users make online purchases. At the same time, the Russian Federation is in the final three out of 42 countries in the online shopping rating; after Russia South Africa comes – 56% of users who make purchases on the Internet every month and Egypt – 51% of such users. However, the level of economic development of a country is not the main factor determining the use of e-commerce. Important shopping incentives include the availability of language versions on sites and the cultural preferences of local consumers. Online purchases are more likely to be made from a mobile phone than from a laptop, although most people use both devices, and the choice depends on the type of product and the circumstances [7].

Practical data from Statista shows that the cost of online shopping in the world in 2019 increased significantly. In terms of product categories, “Travel” is the first in terms of sales – \$1.19 trillion, then “Fashion and Beauty” – \$620.1 billion, “Electronics and physical media” – \$456.9 billion, “Toys, crafts and hobbies” – \$383.2 billion, “Furniture and Household Appliances” – \$316.7 billion, “Food and Personal Care” – \$168.8 billion.

The average online user spends about \$500 annually on online purchases of consumer goods. But the range of spending across the world is very large, from \$1.441 per person in South Korea to \$20 in the Philippines. Residents of Russia spend on the net an average of \$190 per person per year, the United States – \$1389, Germany – \$1094, China – \$1021.

The structure of expenses in the Russian e-commerce market: category “Travel” – \$24 billion, “Fashion and Beauty”

– \$5.87 billion, “Electronics and physical media” – \$4.5 billion, “Toys, crafts and hobbies” – \$3.96 billion, “Furniture and household appliances” – \$2.66 billion, “Food and Personal Care” – \$1.63 billion. The study allows us to note that the Russian e-commerce market is structurally consistent with the global one and averages about 1.0%. E-commerce market trends show that there is no one-size-fits-all reliable way to lead users to a purchase, as their customer behavior suggests that they are equally willing to make purchases both online and in physical stores [9].

Practice shows that with all the importance of changing the technological structures of the information society, there is a qualitative change in the type of economic system – its social and market components. The radical modernization of the digital environment and the development of the digital economy imply: 1) changing the nature of information flows from vertical to horizontal; 2) complication of the structure of information, the prevalence of qualitative, value indicators over quantitative ones; 3) globalization of the scale of collection and processing of information [1].

The fundamental principle of existence, one might say – the mission – of the information economy is to equalize the chances of all social groups in terms of access to information: its consumption, production, broadcast and analysis [3].

Various conceptual approaches, methodological limitations, developing trends and the absence of a conceptual and categorical apparatus of the digital economy do not allow a qualitative approach to measuring the latest technological revolution – the digital environment. The conducted studies have shown that the main problems of assessing the contribution of digital changes to the global economy include the following:

- lack of effective coordination of all participants in the information process, who are both subjects of market relations and sources of various types of information [9];
- the different impact of the digital sector across countries on different types of consumers: both for households and for industries that rely on digital products to reduce costs, increase productivity, and generally remain competitive [4];
- the information economy (especially in developing countries) increases the unevenness of the socio-economic situation, needs and values of various social groups [5], increases the risks of leakage and subsequent misuse of personal data [11];
- economic uncertainty of information, depending on the time factor (unreliable forecast) [12];
- digital products and services appear at least once a year, while the standard practice of statistical research does not keep pace with such changes;
- many digital services are offered free of charge and/or shareware, which in this case means zero added value that cannot be measured using the traditional methodology of the system of national accounts;
- intangibility of most digital products and assets;
- the transnational nature of digital platforms makes many digital products and services invisible to national

statistical and tax authorities [13];

- the digital environment in the context of insufficiently developed copyright provokes the appropriation of intellectual property, putting many industries in a situation of “patent wars” [14], which, coupled with weak control of direct online sales, does not contribute to the entry of manufacturers into the legal field of economic relations [15].
- exposure to cyber attacks and dependence on automatic systems for collecting and interpreting data, which leads to increased volatility of markets, the state of which is closely related to the functioning of marketplaces [16].

Nevertheless, in the process of research, it was possible to identify the following three approaches used in world practice in measuring the digital economy:

- through the measurement of technology. The OECD has identified over 30 indicators for monitoring and assessing the size and penetration of the digital economy (number of smartphones, availability of broadband Internet, e-commerce indicators, etc.). However, this method does not fully assess the scale and impact of the digital sector on the economy.
- through sector measurement. According to the methodology of the system of national accounts, by taking into account the added value created by the ICT sector, it is possible to assess the contribution of the digital economy to GDP. However, the amplitude of the share of this sector both by country and by type of economic activity is too large – from 4 to 30% (Fig. 2). Thus, direct measurement of the added value created in the ICT sector does not provide a complete picture of the volume of the digital economy.
- through accounting for consumer welfare. In early 2020, economists at the Massachusetts Institute of Technology proposed measuring the digital economy by adjusting GDP based on the concept of “consumer surplus”. This concept assumes that consumers derive more value from digital services than they are currently expected to pay for those services. And so, according to scientists, the combined wealth created for consumers in the United States by popular digital services alone could generate an additional \$9 trillion, or more than 40% of US GDP.

IV. CONCLUSION

The study showed that the relatively young Russian market of information and communication technologies shows a high growth rate. And it is not only dynamically developing, but also shows high profitability of the commercial sector and overall profitability. However, the ICT market, like all rapidly growing markets, is not devoid of its own “growth pains” and demonstrates an imbalance in development, which can be conditionally divided into three levels. At the first level: market segments develop unevenly. The ICT market is traditionally divided into four main segments: telecommunications, IT services, software, equipment. At the same time, the first, second and third segments together account for only 28%, and 72% – for telecommunications. At the second level – penetration and availability of basic services, which include fixed and mobile communications, as well as broadband access – there is also a gap between large and peripheral cities. And

finally, at the third level, there is a disproportion in the development of the regional market of information and

communication technologies associated with the remoteness of territories, population density, and standard of living.

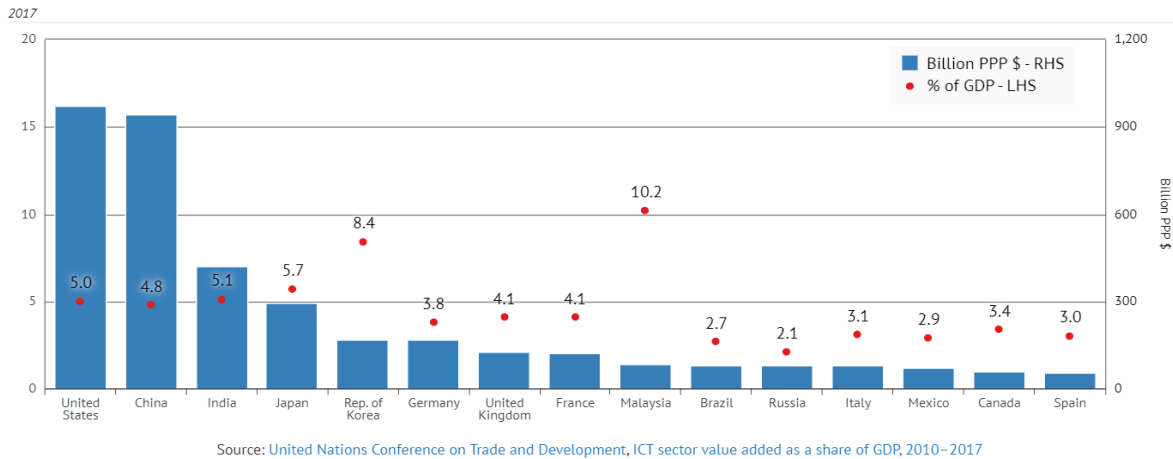


Fig. 2. Added value created by the ICT sector by countries [2]

Russia does not occupy the top but has very good positions in international rankings in the development of information and communication technologies, but a number of problems still remain unresolved. Without eliminating these problems, further development of the information economy in Russia seems impossible:

- the imbalance described above in the development of the telecommunications industry and the ICT sector as a whole;
- insufficient conditions for the formation of new markets and the use of new technologies in all sectors. We are talking, in particular, about the NTI markets (Aeronet, Avtonet, Marinet, Neuronet, Edunet, Fashionnet, Foodnet, Helsnet, Energinet, Technet, Safenet – now new markets are being formed within the NTI Foresight 2.0);
- insufficient conditions for market development in narrow industries: finance, healthcare, energy, public sector, etc.;
- low availability of broadband Internet access for a number of territories [10].

Globally, the digital revolution entails a digital divide, with developed countries receiving long-term rents and developing countries bearing the costs of addressing technological disruptions. However, if we assume that the success of a country's digital transformation is the development of its digital infrastructure and measuring the readiness of ICT infrastructure, will the digital divide change if developing countries open up markets and provide ready-to-use ICT infrastructure for developed countries? What changes in markets and advances in digital technology can be managed to bring digital equity on earth?

Thus, the formation of the global information society as a system, which is associated, among other things, with the influence of the development of Internet technologies, raises the question of additional research: in terms of studying the stability of this system, its ability to self-regulation, the causes and consequences of imbalance, and tools of external influence on development processes.

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