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## Scenarios for the Development of the Sharing Economy: Digital Technologies and Value Orientations



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**Abstract.** The expansion of the sharing economy is related both to the rapid technological and digital development and to the transformation of behavioral patterns based on the development of network relations and the search for new forms of cooperation. However, the scenarios for the spread of this economic system will differ from country to country due to the heterogeneity of socio-economic conditions. The aim of the study is to identify scenarios for the development of the sharing economy, taking into account technological and value characteristics of a territory. The methodology of this study includes correlation and regression analysis, systematization methods, descriptive statistics, and graphical method. The information base for the study is data from the Timbro Sharing Economy Index, the World Bank, and the World Values Survey. As part of the research, we formulated and tested hypotheses on the impact of digital development and values on the development of the sharing economy. We show that the key factors in the development of the sharing economy are the level of digital technology as well as postmaterialist values. In the course of the study we identify and describe clusters of countries distinguished by these parameters. We formulate and describe scenarios for the development of the sharing economy. We reveal that these scenarios differ not only in the level of development of digital technologies and the readiness of citizens to use services of the sharing economy, but also in the scale of the territory to which the principle of collaborative consumption applies. Theoretical significance of the obtained results consists in modeling the development of the sharing economy and forecasting

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possible directions of its development. Practical significance is the application of these scenarios in the formation of urban infrastructure or the design of smart cities.

**Key words:** sharing economy, values, digital technology, scenario, values, postmaterialist values.

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### Introduction

The development of the sharing economy (collaborative economy) seems to be one of the results of technological and social changes caused by the impact of globalization processes, environmental challenges, coronavirus pandemic and other processes (Katsoni, Sheresheva, 2019). Changing patterns of behavior of economic agents, inherent in the sharing economy, in turn stimulated the process of their scaling up and facilitated the involvement of more and more participants. On the one hand, this transformation process caused the formation of new markets, on the other hand, it initiated changes in the existing markets, acting as a threat to their existence. The development of the sharing economy is caused by the rapid development of digital technologies (e-commerce, financial technologies, blockchain, artificial intelligence, big data, etc.) and by the need to find more effective models of interaction in society, which is closely connected, among other things, with the features of value transformation.

It is important to note that one of the features of the sharing economy is its heterogeneity, which creates difficulties in its comprehensive assessment. For example (J. Schor, 2016) notes that the sharing economy includes recirculation of goods, increased utilization of durable assets, exchange of services and sharing of productive assets. In addition, the sharing economy is closely intertwined with the platform economy, which leads, often, to considering them together and failing to take into account the features and significance of collaborative consumption and sharing. However, examining directly the platforms of the sharing

economy can also reveal significant differences in the collaborative consumption of material, labor, financial, or information resources.

The value orientations of a particular community (in this case, a country), as well as living conditions, will shape different motives for the development of the sharing economy. Thus, on the one hand, the resale of goods is initiated by the pursuit of economic benefits, on the other hand, by an orientation toward environmental protection. The development of sharing in transportation (carsharing, cabs, kick scooter sharing, etc.), on the one hand, is caused by the formation of the need for social mobility, on the other hand, it appears to be a more rational option for the use of durable goods. It is worth noting that the mentioned analysis of the motives of economic agents to participate in the sharing economy is generally covered in both foreign and Russian studies. At the same time, the influence of prevailing values on the development of this business model in a particular country is poorly represented in the scientific literature, which does not allow taking into account more fully both the potential and threats to the development of this business model when forming forecasts and directions of its development. All the above indicates that there is a gap with regard to taking into account the values and informal institutions prevailing in a particular territory in the formation of scenarios for the development of the sharing economy.

Thus, the purpose of this study is to identify scenarios for the development of the sharing economy, taking into account the technological and value characteristics of the territory. To achieve this

goal, we form hypotheses about the influence of technological factors and value characteristics on the development of the sharing economy. On the basis of correlation and regression analysis, we identify the factors that are most significant for the development of sharing, build the corresponding regression model, and describe possible scenarios for the development of the sharing economy, taking into account the combination of technological and value characteristics of countries.

### **Sharing economy: separate aspects of development**

The concept of sharing economy is usually associated with the works of L. Lessig, who began to use this term to describe the processes of social exchange, contrasted with the so-called “commercial economy” (Lessig, 2008). R. Botsman and R. Rogers with their monograph *What’s Mine is Yours: The Rise of Collaborative Consumption* (Botsman, Rogers, 2010) stimulated interest in this phenomenon, showing the prospects and demand for emerging models of interaction based on collaborative consumption. A dive into the research on the issue reveals that this topic arises from the convergence of a number of concepts manifested in the middle to second half of the 20th century: transaction cost theory (Coase, 1960), institutions for collective action (Ostrom, 2011), theory of two-sided markets (Rochet, Tirole, 2003), platform economics, institutional change theory (North, 1990), relational contract theory, and information society theory.

The combination of drivers of technological development and institutional change together with new social and environmental challenges initiated not only the formation but also the gradual growth of interest in this phenomenon. The close connection of technological and institutional changes with the development of the sharing economy is presented in the works of both foreign and Russian authors. For example, analyzing studies in the Scopus database for the query “sharing economy” in keywords brings up 3,245 papers

from 2012. The articles of 2012–2016 within the framework of this topic mainly describe the features of functioning of P2P platforms (Andersson et al., 2013), the transformation of this form of relations in the spheres of transportation (Chen et al., 2015) and tourism (Lampinen, Ikkala, 2015), issues of trust (Nunes, Correia, 2013), as well as review articles that reveal the essence of this phenomenon and the features of its adaptation to current socio-economic processes. Exponential growth in publications on this topic begins in 2016, and the peak of research is observed in 2019. At the same time, the list of topics has been significantly expanded to include both technical features of organizing sharing economy projects, including algorithm construction (Lee et al., 2015), platform design and application of distributed ledger technology (Bogner et al., 2016), and issues of regulation (Erickson, Sørensen, 2016), values and motivation (Mittendorf, 2017), etc.

We will examine in more detail the studies that reveal the use of digital technologies in the implementation of this type of activity, as well as the motives, incentives and values that, on the one hand, contribute to the spread of the sharing economy, on the other hand – substantiate the diversity of this phenomenon, as well as the heterogeneity of its development both in different types of activities and in different territories.

The papers published in 2014 mainly consider platform interactions as well as trust issues. Thus, M. Andersson, A. Hjalmarsson, and M. Avital divide peer-to-peer sharing, which is the basis of some models of sharing economy, into categories depending on the reason for the exchange. The object of collaborative consumption/sharing can be a digital, physical, or service interaction. The authors note that it should also be categorized according to the predominant patterns of coordination that are involved in indirect sharing. “Physical coordination can be decoupled (no co-location coordination necessary), or coupled (collaborating peers coordinate in time and space)” (Andersson et al., 2013).

In 2016, articles began to appear on the application of blockchain technology as it relates to sharing economy projects. The most cited articles on this topic were presented in 2016–2019. Thus, J. Sun, J. Yan, K.Z.K. Zhang examine the application of blockchain technology to apply it to sharing services in the design of smart cities. The authors note that “in the blockchain-based approach, being trust-free is a central feature of people’s relationships” (Sun et al., 2016). The technology provides “a viable alternative to eliminating intermediaries, thereby lowering operational costs and increasing the efficiency of a sharing service” (Sun et al., 2016). In other words, the technology in question makes it possible to dispense with the involvement of a third party, optimizing operating costs. F. Hawlitschek, B. Notheisen, T. Teubner show the differences in understanding trust when exploring blockchain and when considering the sharing economy. The authors reveal that blockchain technology is, to some extent, indeed suitable to replace trust in platform providers. However, trust-free systems are unlikely to be transformed into the sharing economy and will depend on the reliability of the interfaces used in ecosystems (Hawlitschek et al., 2018). M. Pouri, L. Hilty, considering the digital sharing economy, note that this digital sharing transition has enabled unprecedented efficiencies in coordinating access to resources (Pouri, Hilty, 2021). They make a matrix of the correlation between technological and social aspects of sharing and thus mark the boundaries of the digital sharing economy.

The first studies devoted to the regulation of the sharing economy also date back to 2016, which indicates the beginning of the search and formation of formal institutions that would make it possible for the new form of economic relations to adapt to the current socio-economic processes. It is important to note that the speed of development of the sharing economy contributed to its cross-country spread and the formation of the problem of embedding this business model in the market economy.

Russian literature also actively discusses these issues both within the framework of the development of platform relations and as a separate field of inquiry. Russian studies touch upon organizational, economic, legal and technological aspects of this phenomenon. A significant contribution to the development of this field was made by the authoring team under the leadership of E.F. Avdokushin. E.F. Avdokushin, E.D. Platonova and E.G. Kuznetsova consider the sharing economy as a modern approach to the widespread mobilization of the national internal resources of the economy available for the current period. They put forward the concept of close interrelation of the genesis of the platform economy and platform organization of electronic payment facilities as an element of the new economy in the era of mass digitalization (Avdokushin et al., 2023). I.Z. Ayusheeva, E.B. Poduzova, T.V. Soifer study the issues of civil-law regulation of relations in the sphere of sharing as a collaborative use of resources (Ayusheeva, Poduzova, Soifer, 2021). The authors analyze what types of agreements and contracts regulate relations in the sharing economy in Russian practice.

V. Katsoni, M.Yu. Sheresheva cover the issues of developing the sharing economy in the hospitality and tourism industry (Katsoni, Sheresheva, 2019). The authors show that this business model can be seen as a disruptive innovation that demonstrates the capitalization of emerging opportunities rather than an attempt to avoid emerging problems. K.S. Semina and D.A. Osipova emphasize the main effects that the sharing economy has on the economic system. Among these effects are reduction of adverse environmental impact; reduction of the cost of the final product when used in the B2B sector; reduction of transaction costs due to the transparency of the information provided; cost reduction and increase in the efficiency of the use of benefits (Semina, Osipova, 2019). A.N. Shmeleva considers the scenario of sharing penetration into economic models on the example of agriculture. She presents the system of business processes of

the agricultural wholesale and distribution center based on the principles of the sharing economy and believes that such a solution will contribute to the formation of added value of products by giving a presentation, compliance with the necessary norms and conditions of food safety, sales of products in new markets (Shmeleva, 2023).

When considering the aspects of embedding sharing economy into current socio-economic processes, we should mention the works of RAS Academician V.M. Polterovich devoted to the introduction and development of such a concept as “collaborative hierarchies” – mechanisms of cooperation combining hierarchical and peer-to-peer interactions. The author’s work goes beyond the boundaries of sharing. However, it shows that the principles of cooperation underlying joint consumption and sharing are not limited to individual services or industries, but have a chance to become a new form of interaction at different levels of economic activity, which will be indicative of a gradual but radical institutional transformation.

#### **The role of digital technologies and values in the development of the sharing economy**

When considering the digital trends that have influenced the spread of the sharing economy and the application of peer-to-peer relationships in the economy, we should first of all note the development of e-commerce, financial technology and blockchain technology. The first articles in Scopus for the “e-commerce” query date back to 1996 and are considered under computer science. In particular, S. Zaba analyzed the requirements for electronic protocols (Zaba, 1996). The paper of V. Lamersdorf, M. Merz, T. Tu presents a description and the role of distributed ledger (blockchain) technology. The organization of this technology requires an appropriate infrastructure, including basic communication mechanisms (mechanisms for remote procedure call and database access, trading services and brokerage functions, etc.), as well as a common middleware infrastructure,

component software techniques, distributed and mobile agent technologies, etc. (Lamersdorf et al., 1998). However, the application of blockchain technology in relation to the sharing economy is only being considered in 2016. The same period saw the publication of an article and book by K. Schwab on the Fourth Industrial Revolution, where he considers the sharing economy on a par with distributed ledger technology among other 24 profound changes (Schwab, 2016). After 7 years, we can say that the trends of change identified by K. Schwab are closely intertwined with each other, and the formation of interactions between economic agents at all levels is embedded in the daily life of each individual. In this regard, it is safe to say that the digitalization of the economy is a key factor that determines not only the efficiency of the sharing economy, but also the possibility of its development as such.

Thus, we formulate the following hypothesis:

*H1. Sharing economy is determined by a country’s level of digital development.*

Although technological changes form the basis for the development of the sharing economy, its development is conditioned, first of all, by the need for institutional changes, which is caused not only by the emergence of opportunities for more efficient organization of socio-economic processes, but also by the inefficiency of individual institutions. In this regard, one of the key topics most actively addressed since 2014 is the issue of trust. This topic, when interacting with the sharing economy, takes many forms: trust in the platform, trust between individuals interacting, trust/distrust in the government or business, etc. The combination of these factors brings its own features to the formation of the institutional environment in different territories. In addition, as P. Doney, J. Cannon, and M. Mullen point out, establishing trust depends on the common motives, values, beliefs, and identity of individuals, but human behavior and beliefs differ depending on the specific culture (Doney et al., 1998).

Thus, another important factor influencing the development of the sharing economy is the prevailing value orientations. D. Bell made a significant contribution to the study of values and their influence on social processes. In *The Coming of Postindustrial Society*, the author touches on the subject of the transformation of values in postindustrial society, essentially recognizing and denoting the formation of postmaterialist values (Bell, 2004). V.L. Inozemtsev in the preface of this work notes that, being an opponent of postmodernism, D. Bell recognizes that “the modernity era itself has largely determined the undermining of previous cultural forms and conditioned modern changes in the sphere of culture” (Bell, 2004, LVII).

The query “sharing economy” and “values” or “culture” found 208 articles in the Scopus database between 2015 and 2023. For example, Sh. Cai and co-authors propose a research model to explain why consumers engage in collaborative consumption from a value co-creation perspective. The authors identify that individuals’ attitudes toward collaborative consumption are influenced by economic and social values, entertainment values, and trust (Cai et al., 2017). B. Dreyer and others ask what is the impact of collaborative consumption business models on stakeholder value and what is the impact of the context of the developing economy. The authors emphasize the importance of adapting existing and new collaborative consumption models to local conditions (Dreyer et al., 2017).

K. Wu and J. Shen suggest to take into account the Hofstede’s cultural dimensions theory when building trust on the platform. The authors show how power distance, individualism, uncertainty avoidance, and long-term orientation affect different types of trust on the Airbnb platform – institutional trust, product trust, and interpersonal trust (Wu, Shen, 2018).

The research of motives of economic agents’ choice of interaction on the platform is also related

to the topic of value orientations. J. Hamari and co-authors in a survey of users of the sharetribe.com platform found that the interaction pleasure motive as well as perceived economic benefits influence the behavioral intention to participate in the sharing economy (Hamari et al., 2016).

Based on all of the above, we formulate the following hypothesis:

*H2. The development of the sharing economy is determined by the prevailing values in the country.*

At the same time, the impact of values on the sharing economy can be heterogeneous, due to the indistinct boundaries of this phenomenon, as well as the existence of different business models that take into account both economic and social aspects. When analyzing values, we should also highlight the studies of R. Inglehart and K. Welzel, as well as their cross-country survey of values. The authors compare countries in the following dimensions: survival values – self-expression values; traditional values – secular-rational values. Under their leadership, a worldwide values survey, based on a wide range of questions, identifies values around the world. R. K. Khabibulin, O.S. Deineka, based on this study, when analyzing the relationship between the indicators of psychological and political stability and the adherence of individuals to postmaterialist values, conclude that adherents of this type of values are less inclined to trust the government and less loyal to the current political regime, demonstrating greater willingness to participate in protest actions against the current government (Khabibulin, Deineka, 2015).

Consequently, materialist values will be related to the economic benefits of developing a sharing economy; postmaterialist values will be related to issues of sustainable development, social well-being, and the need for freedom, as reflected in the choice of an access model versus an ownership model, the choice to work remotely through the use of digital platforms, etc. On the one hand, labor relations realized through digital platforms do not provide

an adequate level of stability; on the other hand, short-term projects support individuals' need for constant change and independence not only from a single territory, but also from an organization or other system. The values of self-expression can also be realized through the development of sharing platforms and services. Secular-rational values include rational behavior, the pursuit of success, and a preference for a secular state over a religious one. The use of sharing services and platforms can indeed in some cases be considered as rational behavior, can provide new opportunities for socio-economic development, and demonstrates the transformation of behavioral patterns not only in the field of consumption, but in the field of life history in general.

Due to the fact that postmaterialist values include both self-expression values and secular-rational values, we considered not only the general group of postmaterialist values, but also separately each of these slices. However, materialist values were not separated, suggesting that this analysis would be redundant. The influence of traditional values and survival values will be reflected when checking the influence of their antagonists. However, separate hypotheses on the influence of materialist and postmaterialist should, in our opinion, be considered separately, due to the existence of countries where mixed values prevail.

Thus, we have detailed the H2 hypothesis.

*H2a. The development of a sharing economy depends on materialist values.*

*H2b. The development of the sharing economy depends on postmaterialist values.*

*H2c. The development of the sharing economy depends on self-expression values.*

*H2d. The development of the sharing economy depends on secular-rational values*

The combination of the level of technological development and value orientations forms different scenarios for the development of the sharing economy.

## Research methodology

### Data

As an indicator characterizing the sharing economy, we used the Timbro Sharing Economy Index (2018)<sup>1</sup>. It is calculated on the basis of traffic data of 286 digital platforms or services of the sharing economy in 213 countries. We should note that among open sources, only this index allows researching on a cross-country level. Eurostat's Collaborative Economy reports also provide data on short-term rentals in Europe at city, country and regional level. However, their consideration of only one direction does not allow forming a general picture about the level of development of the sharing economy<sup>2</sup>. In addition, the Consumer Choice Center (USA) assesses the sharing economy at the city level<sup>3</sup>. IndXX<sup>4</sup> Agency presents the worldwide trend of the sharing economy using the share price performance of the sharing economy companies. The Smart Cities Index also contains selected indicators that characterize the sharing economy. Timbro Sharing Economy Index was considered as a dependent variable.

To assess the level of technological and digital development, we used the digital development index ( $X_1$ ), as well as an indicator characterizing the share of the country's population using the Internet ( $X_2$ ). The ICT Development Index was calculated from 2009 to 2017 and suspended until 2022 when the methodology for its calculation was changed. This index takes into account indicators characterizing the spread and quality of the Internet, as well as the

<sup>1</sup> Timbro Sharing Economy Index. Available at: <http://www.epicenternetwork.eu/wp-content/uploads/2018/07/Timbro-Sharing-Economy-Index-2018.pdf>

<sup>2</sup> Commission (Eurostat) publishes first statistics on short-stay accommodation booked via collaborative economy platforms. Available at: [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_21\\_3293](https://ec.europa.eu/commission/presscorner/detail/en/IP_21_3293)

<sup>3</sup> Sharing economy Index (2020). Available at: <https://consumerchoicecenter.org/sharing-economy-index-2020/>

<sup>4</sup> Indxx US Sharing economy Available at: [https://www.indxx.com/assets/media/Indxx\\_US\\_Sharing\\_Economy\\_Index\\_Methodology2.pdf](https://www.indxx.com/assets/media/Indxx_US_Sharing_Economy_Index_Methodology2.pdf)

level of education of citizens<sup>5</sup>. The percentage of the population using the Internet is presented in the World Bank database.

The data presented in the World Values Survey were used for the assessment of values. This study aims to investigate value orientations and their impact on economic and social development, quality of life and democracy. There were seven waves of this research. The latest wave dates from 2017–2022, but included an incomplete list of countries. To expand the list of analyzed countries we used data not only from the 7th wave, but also from the 5th and 6th waves in case they were not included in the 2017–2022 study. Where country data were available in two or three of the waves considered, data from the later wave were used. For example, data for the USA, UK, Australia, Brazil and many others were obtained in 2017–2022, while for France, Switzerland, Italy, Norway, Bulgaria, Estonia, etc., data from the 5th wave (2006) were used. Data for Russia are presented in the 6th wave of the research.

To test the formulated hypotheses, we used the mean of the secular-rational values score ( $X_3$ ). Secular-rational values are contrasted with traditional values. While the traditional values include preference for religion, family, respect for authority, social conformism, etc., the second includes rational behavior, achievement of success, preference for a secular state, and a low role for religion. In addition, the proportions of respondents who exhibited more materialist ( $X_4$ ) or postmaterialist ( $X_5$ ) values were taken into account<sup>6</sup>.

<sup>5</sup> The ICT Development Index includes the following indicators: fixed telephone subscriptions per 100 inhabitants, number of mobile cellular subscriptions per 100 inhabitants, Internet bandwidth per Internet user (bps), percentage of households with a computer, percentage of households with Internet access, percentage of inhabitants using the Internet, number of fixed (wired) broadband subscriptions per 100 inhabitants, active mobile broadband subscriptions per 100 inhabitants, average years of schooling, total secondary education enrollment rate, total tertiary education enrollment rate.

<sup>6</sup> World Values Survey. Available at: <http://www.worldvaluessurvey.org/WVSCContents.jsp> (accessed: August 15, 2023)

The study uses data from 76 countries, as reported in the Timbro Sharing Economy Index, as well as data from the three waves of the World Values Survey.

### Research procedure

The research procedure includes six stages. At the first stage, we formulate hypotheses about the impact of the development of digital technologies, as well as value orientations on the development of the sharing economy. At the second stage, we formulate a list of indicators that can be used to assess the level of digital development, as well as the values prevailing in a particular territory. At the third stage, we carry out a correlation and regression analysis to identify which of the indicators have the most significant impact on the development of the sharing economy. At the fourth stage, we arrange the data presented by the proportion of the population using the Internet. At the fifth stage, we construct a graph that shows how countries are divided according to the level of digital development and the prevalence of postmaterialist values. At the sixth stage, we define and describe scenarios for the development of the sharing economy.

### Research findings

In terms of testing the H1 hypothesis about the impact of digital technology development on the sharing economy, we found a correlation both when considering the ICT Development Index ( $r = 0.49$ ) and when analyzing the share of the population using the Internet broken down by country under consideration ( $r = 0.47$ ).

When we tested the H2a and H2b hypothesis, we found an inverse relationship with the proportion of the population exhibiting materialist values ( $r = -0.37$ ) and a direct relationship ( $0.39$ ) with the proportion of the population with postmaterialist values. The values of Pearson correlation coefficients indicate a weak relationship, which is due to the heterogeneity of the sample, as well as the index form of presentation of the original data.

Self-expression values have less influence on the development of the sharing economy (H2c hypothesis). There is practically no connection ( $r = 24$ ) between the sharing economy and secular-rational values (H2d hypothesis).

During the construction of the final models, we found multicollinearity between materialist and postmaterialist values, which was the reason for removal from the model  $X_3$ . In addition, among the indicators  $X_1$  and  $X_2$ , there is also only value left  $X_1$ . The indicator characterizing the values of self-expression is not significant, which is the reason why we did not take it into account in the model.

The results of the regression analysis are presented in *Table 1*.

Thus, the development of the sharing economy can be described by the following formula (1):

$$Y = 0.014 \times X_1^{2.27} \times X_5^{0.53}, \quad (1)$$

where  $Y$  – Timbro Sharing Economy Index;

$X_1$  – The ICT Development Index;

$X_5$  – the percentage of the population in the country with postmaterialist values.

The model is tested for heteroscedasticity and autocorrelation of residuals. Heteroscedasticity is not detected in the model; autocorrelation of residuals is not detected.

**Results discussion**

The analysis allows concluding that hypotheses 1 and 2d are confirmed. On the one hand, digital technologies are a condition for the development of the sharing economy. On the other hand, the stimulus for the formation of the sharing economy is indeed the prevalence of postmaterialist values over materialist values. The development of the sharing economy, first of all, is characteristic of developed countries. However, its gradual diffusion has revealed that these values can also be extended to specific groups of consumers. For example, both foreign and Russian studies show that the consumer of the sharing economy is a citizen with an above-average income, under 30 years of age, a resident of a large city (Val’ko, Mal’tseva, 2020).

For more detailed analysis and identification of scenarios for the development of the sharing economy, we divided the countries under consideration into 3 groups according to the share of citizens using the Internet.

Table 1. Regression analysis results

Multiple R	0.66
R-Squared	0.46
Adjusted R-Squared	0.44
Standard error	1.28
Observation	76

Analysis of variance

	df	SS	MS	F	F-value			
Regression	2	100.3	50.2	30.6	2.23E-10			
Excess	73	119.7	1.64					
Total	75	219.9						

	Coeff.	SE	t-stat.	P-value	Low. 95%	Up. 95%	Low. 95.0%	Up. 95.0%
Y-intersection	-4.24	0.65	-6.53	7.73E-09	-5.52925	-2.94	-5.53	-2.94
LN( $X_1$ )	2.27	0.36	6.28	2.21E-08	1.552841	2.99	1.55	2.99
LN( $X_5$ )	0.53	0.23	2.296	0.024	0.069	0.99	0.069	0.99

Source: own compilation.

Countries with the highest level of sharing economy development are placed in cluster 1. It includes Norway, Canada, Netherlands, Switzerland, UK, Australia, Estonia, Sweden, New Zealand, Finland, Japan, USA, Singapore, Germany, Ireland, Spain, Chile, Cyprus, France. The median of the Sharing Economy Index for this cluster is 16 and the standard deviation is 12.6. The lowest values are in Germany and Japan, which is due to the features of sharing regulation in these countries. Cluster 1 countries are distinguished by a high level of digital technology development. The share of citizens using the Internet exceeds 81%. The share of the population with postmaterialist values varies from 4.4 to 38.1%. The average share of the population supporting postmaterialist values is 6.40%.

The second group of countries are those with a share of the population using the Internet from 50% to 81%. The median value of the Sharing Economy Index is 1.7. These countries are characterized by a lower level of digital technology development (6.04 at the median). Cluster 2 includes such countries

as Malaysia, Lebanon, Czech Republic, Slovakia, Azerbaijan, Slovenia, Belarus, Kazakhstan, Argentina, Poland, Hungary, Italy, Serbia, Greece, Türkiye, Maldives, Romania, Brazil, Vietnam, Armenia, Jordan, Morocco, Bulgaria, Tunisia, Colombia, Georgia, Ukraine, South Africa, China, Ecuador, Thailand, Mexico, Uzbekistan, Peru, Moldova, Algeria. It is important to note that the PRC data may be refined. Quite low values are related to the feature of data collection based on traffic analysis.

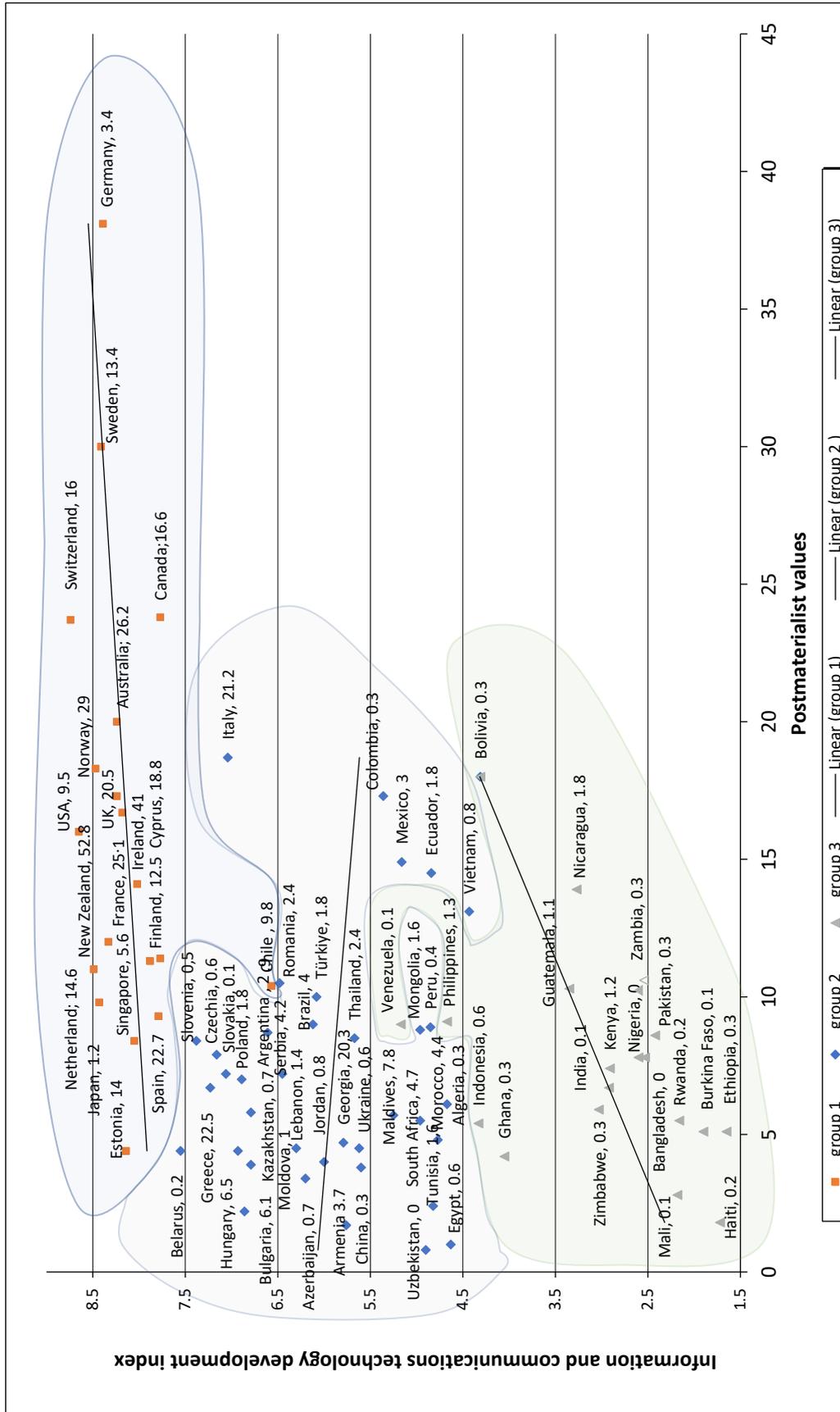
The third group of countries is characterized by a lower share of the population using the Internet – less than 45%. The median value of the Sharing Economy Index for this group of countries is 0.3. Postmaterialist values are generally held by 7.2 percent of the population (median). The ICT Index value (median) is 2.92. Cluster 3 includes the following countries: Bolivia, Philippines, Ghana, Guatemala, Indonesia, Nigeria, Nicaragua, Haiti, Zimbabwe, Bangladesh, Mali, India, Kenya, Rwanda, Ethiopia, Pakistan, Zambia, Burkina Faso, Venezuela, Trinidad and Tobago (*Tab. 2*).

Table 2. Description of country groups

Cluster of countries	Indicator	Descriptive statistics				
		Mean value	Median	Standard deviation	Skewness	Excess
Cluster 1	Percentage of population using the Internet	88.89	88.89	3.43	0.28	0.67
	ICT Index	8.13	8.24	12.59	-2	5.95
	Postmaterialist values	16.11	14.1	8.24	1.23	1.6
	Timbro Sharing Economy Index	18.6	16	12.59	1.27	2.03
Cluster 2	Percentage of population using the Internet	67.31	69.85	10.4	-0.38	-0.89
	ICT Index	5.96	6.04	0.92	2.66	-1.31
	Postmaterialist values	7.06	6.4	4.19	1.02	0.93
	Timbro Sharing Economy Index	3.59	1.7	5.61	2.66	6.5
Cluster 3	Percentage of population using the Internet	25.21	22.42	14.7	-0.18	-1.01
	ICT Index	3.19	2.92	1.21	2.09	0.04
	Postmaterialist values	7.29	7.2	3.72	1.16	2.22
	Timbro Sharing Economy Index	0.57	0.3	0.77	2.09	4.59

Source: own compilation based on the data of ICT Development Index, World Values Survey, World bank Database, Timbro Sharing economy Index.

Figure 1. Distribution of countries by level of development of digital technologies and postmaterialist values



Note: to the right of the country name is the value of the Timbro Sharing Economy Index.  
 Source: own compilation based on the data from ICT Development Index, World Values Survey, Timbro Sharing economy Index.

*Figure 1* shows the distribution of countries in coordinates: Information and Communication Technology Development Index – Postmaterialist values.

Countries with a high level of digital technologies are characterized by a higher level of development of the sharing economy. They tend to follow the path of embedding the sharing economy into existing ecosystems, developing norms and rules to regulate sharing economy platforms and services, as well as developing practices in regulation and dispute resolution. A vivid example of integrating the sharing economy into current socio-economic processes is the development of sharing cities – smart cities that use data sharing, artificial intelligence, and blockchain technology to create a favorable environment.

The next group of countries is characterized by lower levels of digital technology and postmaterialist values. The average level of development of the sharing economy is lower than in the first group, but there are countries with a high level of this index – Italy, Georgia, Greece. We believe that this feature is related to the high level of tourism development in the country, which constitutes the main area of development of the sharing economy. Postmaterialist values are less developed in this group. In addition, this group is characterized by a lower level of individualism<sup>7</sup>, indicating that processes of shared resource consumption can be built without the involvement of digital platforms. The development of the sharing economy becomes a potential area for raising money.

The third group of countries is characterized by the lowest level of digital technology development, which is a key and basic condition for the development of the sharing economy. In this case, the

development of digital technologies is also closely related to the level of socio-economic development.

Thus, we can formulate the following scenarios for the development of the sharing economy.

**Scenario 1. Developing the sharing economy through concerted cooperation and considering the sharing economy as a way to develop ecosystems.** The implementation of this scenario is seen in the increased harmonization of interests of all participants of interaction. It is important to note that this process will concern all participating subsystems. For example, if the sharing economy project is a part of smart city development, then harmonization of interests of business, citizens, municipal and regional governments will be a key task in the implementation of this scenario.

Implementation of this scenario requires 1) agreement on the goals and objectives of this project, 2) ensuring the necessary level of trust, which can be ensured through informal, formal institutions or digital technologies, 3) direct digital implementation of the project; 4) competencies for the implementation of the project. Scenario 1 appears to be a systemic innovation and requires alignment of key principles of organizational change management.

It is also important to note that the presented scenario can be implemented either bottom-up or top-down. For example, M. Bernardi and D. Diamantini (Bernardi, Diamantini, 2018) use the example of Milan and Seoul to show two ways of forming sharing cities. The implementation of the shared city concept in Seoul was initiated from the “top” and required a high level of digital infrastructure development. At the same time, keeping the focus primarily on the creation of conditions for citizens allowed activating civic initiatives as well. In Milan, on the contrary, the shaping of the sharing city is realized from the bottom-up, and local governments are only one element in a more complex system.

<sup>7</sup> Hofstede G. Dimension data matrix. Available at: <https://geerthofstede.com/research-and-vsm/dimension-data-matrix/>

Thus, we should note the following among the characteristics of scenario 1:

- 1) initiated by the authorities or civil society;
- 2) involves more than three stakeholder groups;
- 3) requires digital and technological infrastructure;
- 4) based on the implementation of the principle of cooperation;
- 5) focused on improving the efficiency of resource utilization.

**Scenario 2. Development of the sharing economy as a way to increase economic welfare and develop social infrastructure.** In this case, the sharing economy reveals its features as a new niche for business development. For example, the development of kick scooter sharing or carsharing is a new form of business based on the use of digital platforms. The expansion of this business can be realized through joint projects. For example, the development of carsharing in Moscow is supported by the city authorities and subsidies are allocated to companies that meet the requirements.

The development of investment and crowdfunding platforms, in our opinion, should also be included in this scenario. It is based on the creation of startups and the launch of new businesses as a response to the needs of a particular social group. Projects are realized at the B2C, B2B level. Thus, this scenario has the following characteristics:

- 1) initiated as a response to emerging societal needs;
- 2) includes entrepreneurial projects;
- 3) requires digital infrastructure for implementation;
- 4) based on the access to resources and reduction of operating costs;
- 5) focused on improving the efficiency of resource utilization.

**Scenario 3. Development of the sharing economy as an additional source of resources.** The low level of development of digital technologies is a key barrier to the development of sharing. Thus, the experience of African countries shows that the main obstacle

to the development of carsharing is low internet accessibility (Junaid, 2019). The results of our study also show that digital technology itself is a key driver of the development of the sharing economy. For example, the spread and development of Uber correlates with the share of the population using the Internet. This scenario can be compared with the first stages of development of the sharing economy.

Scenario 3 is characterized by the following features:

- 1) insufficiently high level of development of Internet accessibility;
- 2) low standard of living of citizens;
- 3) focus on improving the efficiency of resource utilization.

The development of the sharing economy in this case is seen as an additional source of income.

In addition, we should talk about mixed scenarios that combine the first and second, as well as the second and third scenarios. The joint development of all three scenarios can be presented in countries with a high level of differentiation of population and territories. For example, for some regions and cities of the Russian Federation, all three development scenarios will be manifested. Such cities include Moscow and Saint Petersburg, where the services of the sharing economy are closely integrated into the ecosystem of smart city development.

Smaller cities will be characterized by the second and third development scenarios, where services of the sharing economy develop as independent businesses and emerge as a reaction to the formation of new needs, for example, in mobility, faster transactions, etc. For small territories with a low level of Internet development, the development of sharing may not be feasible due to the established social ties and the use of alternative ways of joint consumption. It is also important to note that the spread of the sharing economy is closely linked to the values of security and freedom, which is one of the incentives for the spread of this form of relationship.

### Conclusion

We obtained the following results during the study.

First, we formulated and tested hypotheses about the impact of technological development and value orientations on the development of the sharing economy. We revealed that the level of development of digital technologies is a key factor in the development of the sharing economy. The prevalence of postmaterialist values in the country also stimulates the development of the sharing economy.

Second, we identified and described clusters of countries that differ in the level of digital technologies and the presence of postmaterialist values. The identification of these clusters contributed to the definition of scenarios for the development of the sharing economy.

Third, we formulated and described the scenarios for the development of the sharing economy. We show that they differ not only in the level of development of digital technologies and

the willingness of citizens to use the services of the sharing economy, but also in the scale of the territory to which the principle of joint consumption applies.

The scientific novelty of the obtained results consists in the development of the author's approach to analyzing the impact of values on the development of the sharing economy, including the analysis of trends showing the nature of the impact in the context of countries, identification of clusters of the sharing economy development, identification of scenarios for the development of this business model, taking into account the level of development of digital technologies and the presence of postmaterialist values. Theoretical significance of the obtained results lies in modeling the development of the sharing economy and predicting the directions of development. Practical significance consists in the possibility of using the scenarios in the formation of urban infrastructure or the design of "smart" cities.

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