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GLOBAL CHALLENGES OF DIGITAL TRANSFORMATION OF MARKETS

VOLUME II

Elena de la Poza • Sergey E. Barykin
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Contents

Preface

This book is devoted to the challenges of digital transformation in logistics and supply chain management, digitization of trade networks and global markets, with a primary focus on business processes and marketing transformation.

In fact, this book collects half of the works presented in the international conference Global Challenges of Digital Transformation of Markets 2020, while the other half were published in the NOVA book *Global Challenges of Digital Transformation of Markets* (2021).

The book embraces chapters related to the design and development of digital technologies (Chapter 1) to improve the efficiency of the logistic processes worldwide (Chapter 6, Chapter 11, Chapter 24) and its link to education (Chapter 40) or more territorially focused such as the Eurasian Economic Union (Chapter 37) or Russia (Chapter 21, Chapter 36, Chapter 39). Then, Chapter 33 discusses how digital technologies are useful to increase the firm's competitive advantage but are also helpful to alleviate poverty (Chapter 14). In addition, supply chain management (Chapter 16) and blockchain development are tackled in the book (Chapter 25) from an international comparative perspective (Chapter 28).

The second component of the book focuses on the digitalization and application of new technologies such as artificial intelligence (Chapter 12) or blockchain (Chapter 23) to retail and their connection with brand strategy (Chapter 29) and digital marketing (Chapter 32), corporate social responsibility (Chapter 26), employee behavior (Chapter 13), consumer behavior (Chapter 9, Chapter 22, Chapter 35), citizen attitude (Chapter 4), market segmentation (Chapter 38), global markets creation (Chapter 3) and attracting foreign direct investment (Chapter 42).

Then, the third fragment of the book argues different aspects of HR management in the age of digital transformation, such as the effectiveness of digitalization of HR departments (Chapter 30). In addition, modern trends and technologies of HR management are analyzed (Chapter 2). Such subjects as the transformation of HR branding (Chapter 5) to human capital management (Chapter 20), change management, and new requirements on the quality of human resources in the context of digitization are considered.

Following this, the fourth part of the book deals with research related to ways to develop trade in the era of digitalization (Chapter 34, Chapter 41), how digital tools can support market interaction (Chapter 8, 10), the assessment of the degree of mutual influence of employment and gross domestic product in China on the basis of empirical analysis (Chapter 31), business processes transformation in the digital economy (Chapter 18, Chapter 19), transformation of marketing competences and communications in the age of digitization (Chapter 21, Chapter 29,

Chapter 37) and the risks of migrants on the labor market (Chapter 7). Later, the fifth section of the book reflects on different aspects of digitalization and its connection with education (Chapter 17, Chapter 19, Chapter 27).

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Chapter 1

Intellectual Infrastructure Conceptual Design for Business Processes of Technological Development

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Abstract

The relevance of the formation of the intellectual infrastructure of business processes of technological development is revealed, due to the trends of the observed technological evolution, the leading of which is the digitization of technologies. The study was carried out on the basis of the proposed infrastructure-reproduction approach, which takes into account the reproductive inter-claim of elements of the intellectual infrastructure, as well as its functional purpose associated with providing service support for business processes of technological development. The study used systems analysis and scientific modeling, as well as economico-statistical methods. An assessment of the level of theoretical business in the studied area was made, which made it possible to establish a fragmented character of the state of the theory of the intellectual infrastructure of business processes of technological development, represented by certain aspects. As a result, the aim of the study was to conceptualize and form the foundations of the theory of the intellectual infrastructure of business processes of technological development of industrial enterprises. The key result of the research stage is the development of conceptual elements of the formation of the intellectual information structure of technological development business processes, which made it possible to classify the organizational levels of its formation that affect the levels of reproduction of the intellectual resources of personnel and technological development of the enterprise. In addition, a typology of personnel policy at the enterprise is proposed depending on the organizational level of the formation of in-thermal infrastructure of business processes of technological development.

Keywords: technological development; infrastructure; personnel intellectual resources; conceptual elements; economy digitalization; personnel policy; efficiency criteria; organizational levels; business processes; HR-management

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1. Introduction

The factor of the advanced intellectual development (mainly intellectual resources of personnel) in the modern stage of economy technologization, which is under the influence of intensive development of digital technologies, determines the development of social and economic systems and processes at all levels from micro to macroeconomics to an increasing degree of influence, with varying degrees of mediation (Ransbotham et al., 2017; Bumblauskas et al., 2017; Schwab 2016).

The causes of this influence are due to the fact that the basis of the modern digital economy is predominantly technologically advanced and science-driven industrial production. An integral part of the production development is innovative, intensive, and intellectual-resource basis. Strategic value and requirements to the basis quality level have increased substantially. Thus, both at the economic theory level and at the level of economic activity practice in the conditions of new industrialization, research scientists and practical employers actively discuss the problematic issues of forming a developed infrastructure that ensures the technologization of industrial enterprises in terms of "Industry 4.0" enterprises (Loebbecke and Picot 2015; Markus and Loebbecke 2013; WEF et al., 2018; Morrar and Arman 2017).

As open systems, modern industrial companies are inevitably resource dependent. However, based on the current stage features of industrial and technological evolution, this dependence is increasingly dominated by the personnel intellectual resources in comparison with various types of material resources. Moreover, it is observed that hi-tech companies, represented by top managers, are less focused on labor productivity indicators. The managers mostly include creativity and efficiency in the project team as the key performance indicators (KPI) for assessing the competence level of personne (Valebnikova, Valebnikova, and Kalinina 2019; United Nations 2019; Lapidus 2018; Lyovina et al., 2019).

It is no coincidence that one of the most reputable international publications, the Oslo Manual, Guidelines for Collecting, Reporting and Using Data on Innovation, distinguishes a special group of significant factors identified as non-explicit knowledge, i.e., accumulated mainly in the form of personnel intellectual resources and contributing to the effective implementation of innovative processes. This group was distinguished among many economic factors that affect the level of technological development of a modern industrial enterprise (Maydanova and Ilin 2019; Vasetskaya and Gaevskaia 2019).

2. Materials and Methods

Intellectual infrastructure conceptual design for business processes of technological development of industrial enterprises is based on the principles of infrastructure and reproduction approach (Zhilenkova et al., 2019; Cleary and Quinn 2016; Schiuma and Lerro 2008) with application of system analysis and scientific modeling methods, as well as economic and statistical methods (grouping, type designs, dynamics series constructing, ratings determining, etc.) in order to analyze and summarize statistical information, identify trends and features of technological development of industrial enterprises.

The particularity and novelty of the applied infrastructure and production approach are related to:

a) the reproduction interpretation of intellectual infrastructure elements: elements of planning and forecasting, formation and development, effective application of personnel intellectual resources;
b) providing service support for business processes of technological development.

3. Results

3.1. Theory

The analysis of Russian and international theoretical developments in the study area allow us to conclude that there are no independent areas of research on the formation and development of personnel intellectual resources based on the infrastructure and reproduction approach. Nevertheless, we can distinguish several research areas that are more or less related to the reproduction of intellectual resources and their infrastructural significance in relation to the business processes of technological development.

Table 1. Classification of research areas for certain aspects of intellectual infrastructure of business processes of technological development

Direction	Characteristics of researches aspects	Researchers
Institutional transformation	The problems of intellectualization of society and economy in modern conditions of global new industrialization are studied	D. Bell, Th. Veblen, V. L. Inozemtsev, C. Clark, J. Naisbitt, B. Santo, E. Toffler, J. Fourastié
Labor	The resource dependence of labor intellectualization process is determined by personnel intellectual resources and investments in their development	B. M. Genkin, N. A. Gorelov, P. Drucker, C. Landry, R. Florida, I. Fitz-enz
Managerial	Various types of intellectual resources are studied as an object of management, including the personnel intellectual resources, and objects derived from them	*I. Personnel management:* *A) Human resource development:* E. Gostick, J. Joy-Matthews, Megginson D., P. Senge, A. V. Spivak, M. Surtees *B) Innovative personnel management.* B. Adams, E. Anderson, M. Armstrong, T. DeMarco, T. Lister, Yu. G. Odegov, K. Heldman *II. Managing intellectual objects of the economy (resources, products, services):* *A) Information and knowledge management.* J. Bell, C. Viig, M. Polanyi, I. Nonaki, H. Takeuchi *B) Intellectual capital management.* E. Brooking, S. Pike, L. Prusak, J. Ruus, C. E. Swaby, T. Stewart, L. Fernstrom, L. Edwinson *C) Management of intellectual and technical resources of the enterprise:* G. B. Kleiner, M. Rubinstein, A. Firstenberg
Territorial	The leading role of highly educated population in the innovative development of territories is determined	R. Barro, C. Landry

Compiled by the authors.

Thus, as a result of the scientific ideas analysis concerning the intellectual infrastructure of business processes of technological development, the following areas of research are identified and classified as relatively established and developing: institutional and transformational (intellectualization of society, economy), labor, management, and territorial areas. The characteristics of these research areas and their most famous representatives in the scientific world are shown in Table 1.

In total, the analysis and systematization of scientific ideas concerning the intellectual infrastructure of business processes of technological development allow us to draw the conclusions about the level and state of the theoretical basis in the subject area under study.

1. Only certain research aspects of the intellectual infrastructure of business processes of technological development that have a certain scientific specialization are identified.
2. A whole picture of the intellectual infrastructure of business processes of technological development is the issue that has not been analyzed in previous researches in Russia and worldwide. This whole picture is from the management perspective, which will allow revealing the features of the intellectual infrastructure as an object of management, determining its key points, targets, methods.
3. Preconditions for the development of new scientific areas of the intellectual infrastructure research for business processes of technological development are based in the field of personnel management (innovation management, human resource development) and management (innovation management, intellectual capital management, resources, products and services management).
4. At present, the theory of intellectual infrastructure of business processes of technological development is in the process of formation with a non-established terminology.

The authors set the objective of the research and outlined its promising horizons, considering the experience of theoretical developments in the subject area, sharing the positions of preceding scientists, and taking into account the identified scientific gaps in the research of the intellectual infrastructure of business processes of technological development.

3.2. Research Objective

Based on the relevance of the research issue, the development and implementation of business processes intellectual infrastructure of industrial enterprises technological development and on the basis of the existing theoretical basis, the objective of this research work is to conceptualize and form the theory basis for business processes intellectual infrastructure of industrial enterprises technological development. It will allow developing methodological solutions for its practical organization in the current stage of digital technology diversification.

3.3. Intellectual Infrastructure Formation of Business Processes of Technological Development: Conceptual Elements

The methodological approach allowed developing the authors' concept on forming the intellectual infrastructure of business processes of technological development. As the formation general vector, the organization of personnel intellectual resources management is defined, taking into account the components of intellectual resources (health, education, normative and moral component, as well as professional, qualification, organizational, and creative components). The resulting management influence is presented by stages of intellectual resources reproduction in a matrix form in Table 2. The main methodological meaning of the matrix (Table 2) is in the need for a reasonably uniform distribution of management influence and the reproduction stages of personnel intellectual resources and their components.

Table 2. Matrix of management influence by reproduction stages of personnel intellectual resources and their components (personnel collective level)

Reproduction stage of personnel intellectual resources	Components of personnel intellectual resources at the collective level:				
	Health	Education	Normative and moral	Professional qualification	Creative
Forecasting and planning	±	→	±	→	±
Forming	±	→	±	→	±
Development	→	→	→	→	→
Application	→	→	→	→	→

Compiled by the authors.
Note: «→» is a direct management influence; «±» is an indirect managerial influence.

Table 3 shows the content of the authors' concept on the main elements that reveal the specifics of improving the management of personnel intellectual resources of business processes of technological development based on the infrastructure and reproduction approach.

Table 3. Authors' concept of intellectual infrastructure formation of business processes of technological development

Element	**Characteristics**
Formation subject	Intellectual infrastructure of business processes of technological development: improving the organization of personnel intellectual resources management
Formation object	Business processes of technological development
Formation goals	Service-providing business processes for technological development of industrial enterprises
Functions groups of personnel intellectual resources formation by reproduction stages	- forecasting and planning - forming - development - application
Formation tools	Organizational, economic, moral, and psychological

Compiled by the authors.

The formation subject and object. Improving the management of personnel intellectual resources is associated with the development of traditional understanding of the goals, principles, methods, functions, and technologies of personnel management, or rather, with deepening of their tendency on the business processes of technological development. Personnel

management, which is being transformed this way, becomes inseparable from business processes of technology development, turning into an infrastructure for its provision with personnel intellectual resources.

The formation objective. The objective of forming the intellectual infrastructure of business processes of technological development is to achieve and stabilize the required reproduction level of personnel intellectual resources. In other words, the formation objective is to provide the company with the necessary professional qualification level of personnel in accordance with current and prospective business plans for technological development.

Moreover, it is essential to ensure the maximum convergence of this target setting of the enterprise and the individual goals of highly professional and qualified employees. Unacceptable and inefficient ways of using personnel intellectual resources may be their underemployment, as well as their full application in case of a low-quality level.

Implementation of the necessary (compliance with the quality of intellectual resources) and sufficient (the price of achieving the required quality) conditions for effective management of personnel intellectual resources of business processes of technological development requires the implementation of regular practical measures aimed at reducing the cost of forming and developing personnel intellectual resources and increasing the economic results of their application.

Formation functions: grouped by personnel intellectual resources reproduction stages.

4. Discussion

One of the key problems of forming an intellectual information structure for the technological development of industrial enterprises is the problem of staffing business processes for the development of technologies, usually based on innovative and developing personnel management, which is rather systemically and comprehensively disclosed in the scientific works of such Russian researchers as: V. G. Zinov, A. Ya. Kibanov, Yu. G. Ode-gov, V. A. Svivak. The theoretical basis for the formation of the institutional structure of the intellectual infrastructure for the technological development of industrial enterprises is formed by the scientific achievements of the new institutionalism, the representatives of which in Russia are V. L. Tambovtsev, V. S. Avtonomov, V. V. Radaev, R. M. Nureyev, using and developing the institute-national-evolutionary concept that determines the priority of the institutional environment in the formation of various socio-institutional.

Meanwhile, the multiple aspects of the formation of the intellectual infrastructure of industrial enterprises in the conditions of the modern stage of diversification and technological modernization of the Russian economy, taking into account the specifics of the industrial balance of the intellectual resources of the personnel of the innovation sector of modern industrial enterprises, are not covered by research.

The conceptual interpretation of the intellectual infrastructure formation of business processes of technological development proposed within the infrastructure and reproduction approach allows classifying various organizational levels of the enterprise formation:

a) a passive level - the reproduction process of personnel intellectual resources cannot be organized as a full cycle;

b) medium-active level - the organization of a full reproduction cycle of personnel intellectual resources is significantly difficult;
c) active level - the reproduction process of personnel intellectual resources can be organized under the condition of further development of specialized personnel management functions;
d) focused-active level - the reproduction process of personnel intellectual resources is organized and effective as intellectual infrastructure of business processes of technological development;

We considered the following as separate management elements of personnel intellectual resources (hereinafter PIR), determining the organizational level of intellectual infrastructure formation of business processes of enterprise technological development:

- forecasting and planning of personnel intellectual resources;
- formation of personnel intellectual resources: personnel selection, formation of a personnel reserve for the implementation of the enterprise plans for technological development;
- development of personnel intellectual resources: qualitative improvement of personnel in accordance with the needs of technological development of the enterprise;
- application of personnel intellectual resources in business processes of technological development, which implies effective transformation of personnel technological competence into the economic potential of the enterprise.

A more wide influence of organizational levels formation of intellectual infrastructure of business processes of technological development on the intellectualization of personnel and technological development of the enterprise is shown in Figure 1 in the coordinates "reproduction level of personnel intellectual resources" – "level of the enterprise technological development," considering the critical conditions for the effectiveness of the intellectual infrastructure formation, which include the following:

1. A necessary condition (Osipov, Yudina, and Geliskhanov 2019; Rojko 2017; Astafyeva, Nikonorova, and Shlykova 2018; Mayr et al., 2018; Zhou, Liu, and Zhou 2016):

$$\mathrm{PIR} = \mathrm{PIR_A} = \mathrm{PIR_{t,}} \quad (1)$$

where PIRA is actually used personnel intellectual resources in business processes of technological development; PIRt is personnel intellectual resources required for quality technological development.

A sufficient condition (Plutova, Lagutina, and Sadkova 2019; Manakhova et al., 2020b; 2019; 2020a):

$$\mathrm{K_{pire}} > 1, \quad (2)$$

where Kpireis the efficiency of PIR application in the business processes of technological development (Tezikova 2019).

$$K_{pire} = R_{pire} / C_{pire} \quad (3)$$

where Rpire is a monetary equivalent of the economic results from PIR application in the business processes of technological development; Cpire is a monetary equivalent of the cost of PIR forming.

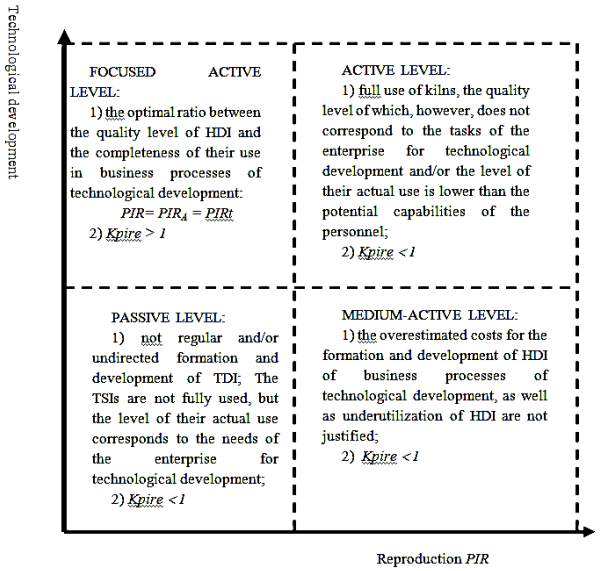

Figure 1. Different organizational levels of Intelligent business process infrastructure development and their impact on the reproduction of PIR and the results of enterprise technologizaition (compiled by the authors).

Table 4. Types of personnel policy of industrial enterprises depending on the organization level of intellectual infrastructure of business processes of technological development

Organization level	**The criterion of the organization level**	**Main elements of the *PIRL***	**Type of personnel policy**
1	**2**	**3**	**4**
Passive	Representation of at least one *PIRL* element in the company's personnel policy	1. The development of intellectual resources	Passive focus on technological development
Medium-active	Representation of at least two *PIRL* elements in the company's personnel policy	1. The formation of intellectual resources. 2. The development of intellectual resources	Medium-active technological tendency
Active	Representation of at least three *PIRL* elements in the company's personnel policy	1. The formation of intellectual resources. 2. The development of intellectual resources 3. Application of intellectual resources	Active technological tendency
Focused-active	Representation of the full set of *PIRL* elements in the company's personnel policy	Balanced-rational representation of all control elements in *PIRL*	Focused-active technological tendency

Compiled by the authors.

Therefore, in accordance with the formation organizational levels of the intellectual infrastructure of business processes of enterprise technological development, it seems logical to distinguish certain types of personnel policies of industrial enterprises. Their identification in terms of technological development priorities is shown in Table 4.

In the modern stage of industrial enterprise technologization, the achievement of a focused-active level of formation of the intellectual infrastructure of technological development and the corresponding type of personnel policy becomes an alternative necessity in terms of solving problems related to the "Industry 4.0" technological compliance.

Conclusion

As a result of the research, based on the infrastructure and reproduction approach, the intellectual infrastructure conceptual essence for the business processes of industrial enterprises technological development is determined. It is revealed through the subject, object of forming the intellectual infrastructure, as well as the objectives, functions, and methods of formation.

In total, the research results are aimed at solving the problem of staffing business processes of industrial enterprises technological development in accordance with the logic and trends of modern technological dynamics.

Further development of the intellectual infrastructure conceptual elements for the business processes of technological development will allow its conceptual modeling. It will determine the essential relationships of the modeled infrastructure elements and management parameters that characterize the effectiveness of management influence.

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Chapter 2

Technological Parameters of the HR Management System in the Conditions of Digitalization

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Abstract

This article presents the results of research in the field of personnel management, taking into account the challenges of national technological transformation of business processes and digitalization. The research is based on the information and analytical base of the Russian economy, a number of countries in Europe, and Central Asia (Kazakhstan). The article identifies modern trends in the intellectualization of society, the growth of innovation activity, and the effectiveness of research activities, taking into account the introduction of digital technologies and the education of digital culture in the field of information and communication technologies. It is shown that along with the relevance of transforming the company's development strategy and optimizing business processes, digital management methods are among the priorities of the updated HR-management system at the level of companies and regional platforms. The authors identified critical areas of production organization in the direction of human resources capitalization, including motivated stimulation of personnel to reveal the potential of "green" technologies in the sectors of raw materials economy, development of business processes according to the "closed cycle economy" scheme, business modeling of innovative self-development of regional ecosystems, globalization in the field of IT outsourcing, and implementation of the "Smart Nations" concept. It is concluded that it is possible to accelerate the development pace of the world economy and overcome the current crisis in the most open information and digital space, an important element of which is digitalization based on the knowledge economy.

Keywords: HR-management, technological integration, business processes, digital economy

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1. Introduction

In the context of changing global economic and epidemiological situation, as well as growing demands for digitalization of production, modern enterprises are transforming the main approaches to organizing business processes. Human resources have become a factor of production, which is considered an investment object that can multiply the income of companies, even those that are currently experiencing a lack of funding and problems with the sale of products and services.

How important is the openness of the borders of the production economy and the knowledge economy at a critical moment? Perhaps it is joint efforts at the level of related industries that form a single value chain that goes beyond specific industries and states that will help to stabilize production/sales and identify innovative activities that use the achievements of the digital economy. Relevant research in these areas is carried out and devoted to the search for ways of digital and technological modernization of the Russian economy (Veselovsky et al., 2019; Bekniyazova et al., 2020; Vishnyakova et al., 2020; Smirnov et al., 2019; Popkova et al., 2020). Digital techniques for managing innovative industrial complexes are actively considered in relation to Chinese and European enterprises in the studues of researchers as CK. Gao, HM. Na, KH. Song, F. Tian, N. Strawa, T. Du (Gao et al., 2020), P. Ghisellini, S. Ulgiati (Ghisellini and Ulgiati 2020), A. Papageorgiou, A. Fernandez-Fernandez, S. Siddiqui, G. Carrozzo (Papageorgiou et al., 2020) and other scientists (Barykin, Bochkarev, Dobronravin, et al., 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al., 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al., 2021). However, the issue of human resource management in the context of widespread digitalization remains not entirely studied. In this regard, this study aims to identify potential points of influence on the personnel management system and identify critical areas of production organization in the direction of human resources capitalization by creating a special platforms where business entities of related industries, research centers, educational institutions, and government structures interact by helping to accelerate the overall technological breakthrough. This cooperation is aimed at implementing joint projects to optimize business processes, increase the level of digital literacy and transition of industrial facilities to a new stage of digital transformation.

2. Materials and Methods

The research is based on the use of open statistical sources and official websites. Research materials include comparative statistics for the countries of Europe, Russia, Kazakhstan, Turkey, USA, and China. The scientific database include open sources of the international innovative production and educational system. To study trends in the development of labor resources, the authors used methods of economic and statistical analysis (dynamic series, structural analysis), a graphical method of illustrating data, and the results of sample observation. The research materials also include the results of a survey of employees of HR-services of Kazakhstanian companies located in a large industrial region bordering Russia. Using the research data makes it possible to organize joint activities of enterprises and organizations of different industries and countries, in particular Russia and Central Asian countries, to develop universal approaches to personnel management. Implementation of joint use of these methods allows to optimize business processes at enterprises by a qualitative

transformation of labor resources and determine the most important directions of transformation of the "Human Resource Management" system (HR-management or HRM), taking into account external and internal challenges.

3. Results

The openness of the global economy provides an opportunity for information exchange of achievements in the field of HRM. In support of this, we can cite ways of technological influence on the enterprise management system through a combination of macroeconomic and microeconomic factors (see Figure 1).

However, when it comes to the digital economy, there are added technological factors to the objective conditions for ensuring production efficiency, including the level of technologies development for deep processing of raw materials, human capital, information and communication technologies (ICT), and technological integration. These factors allow participants in economic relations to interact, despite differing starting positions before the global intellectualization of production.

Observations show that the indicator of compliance with the digital transformation regime is its production technologies which contribute to the development of strategic industries of a particular state in the face of external challenges and threats. For example, the Russian economy is gradually overcoming its dependence on the supply of foreign technologies and specialized equipment and is also actively conducting research and development in the field of digital technologies (see Figure 2).

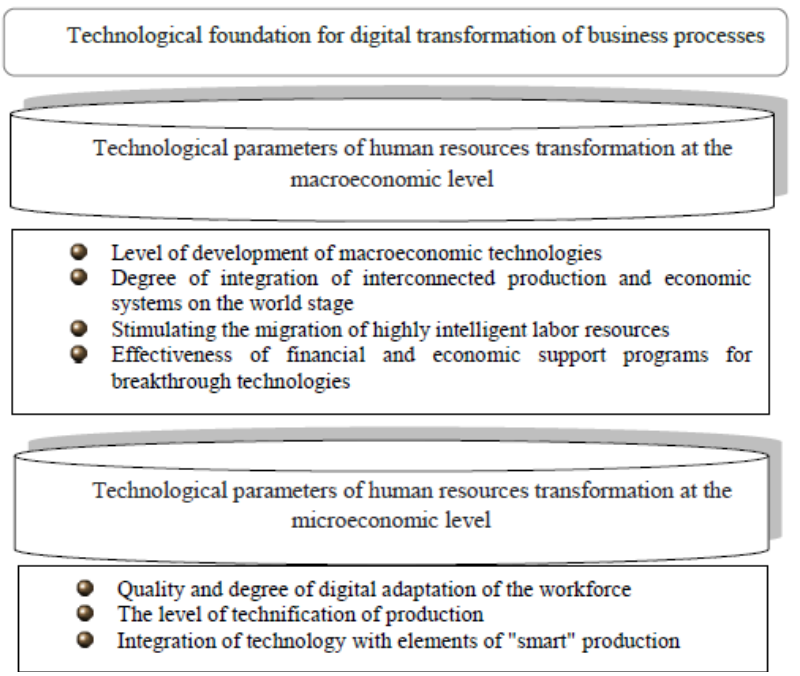

Figure 1. Technological parameters for building a related business processes (compiled by the authors using (Popkova et al., 2020; Vishnyakova et al., 2020; Bekniyazova et al., 2020; Veselovsky et al., 2019)).

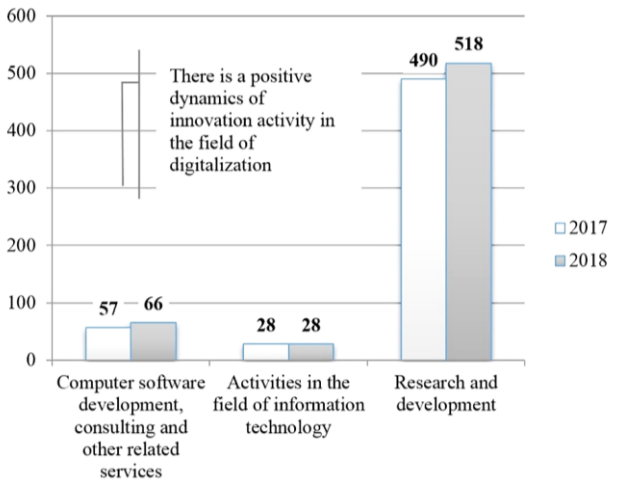

Figure 2. The number of developed advanced production technologies in the field of research and digital technologies in Russia for 2017-2018, units (authors on ("Federal State Statistics Service of the Russian Federation," n.d.)).

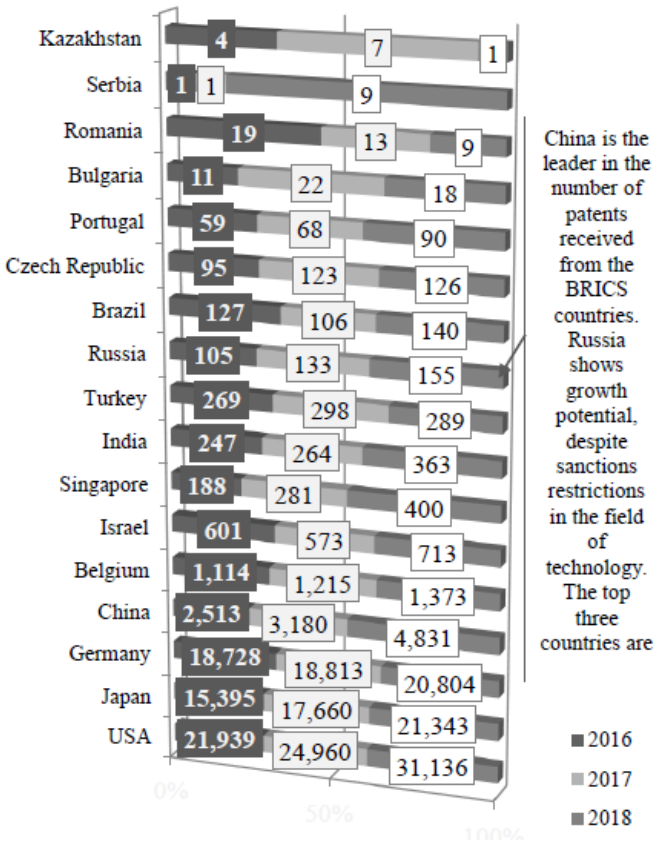

Figure 3. Dynamics of the movement of patents issued by the European patent office for the period 2009-2018 for the country of residence of the first applicant (authors on ("European Patent Office," n.d.)).

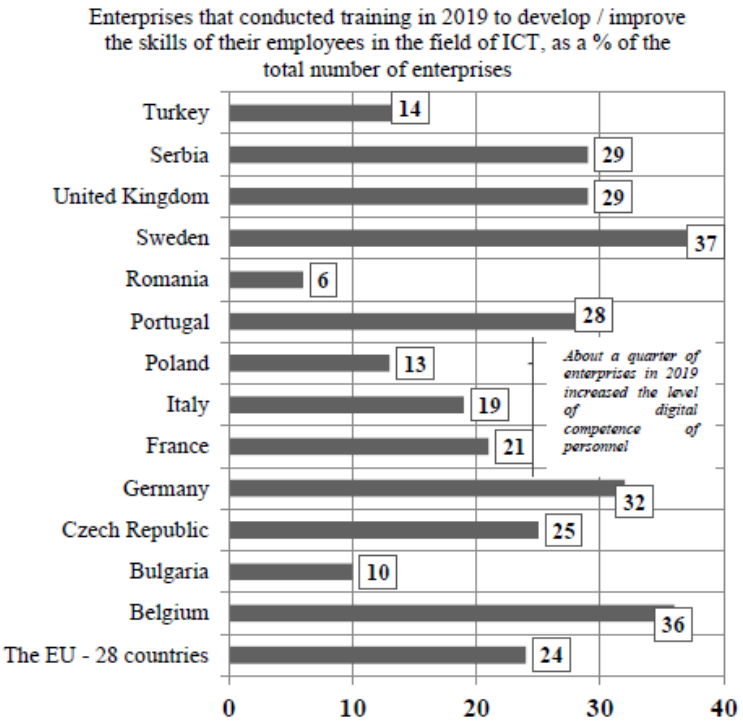

Figure 4. The number of enterprises in a number of countries in Europe and Turkey (excluding the financial sector with 10 emplyees or more) that conducted employee training in 2019 for the purpose of developing/improving skills in the field of ICT (authors on ("Database - Eurostat," n.d.)).

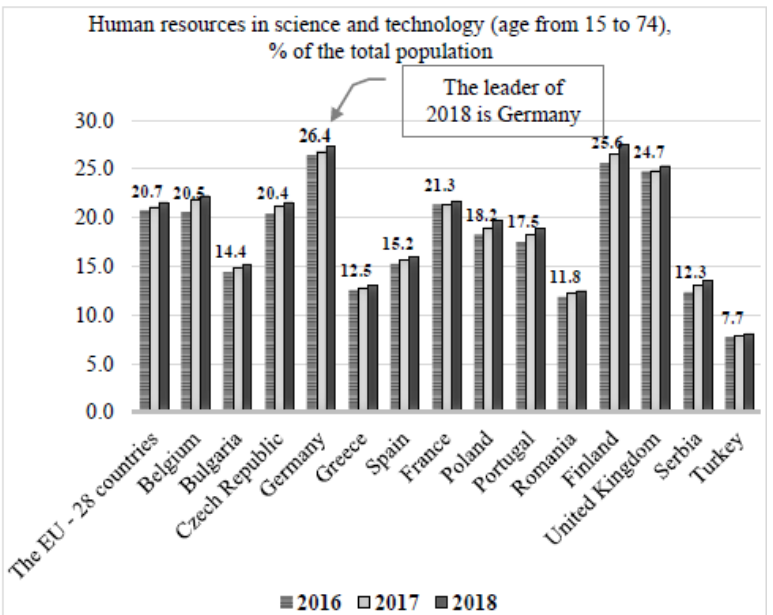

Figure 5. Individuals employed in science/technology sphere in a number of European countries and Turkey aged 15 to 74 years, % of the total population (authors on ("Database - Eurostat," n.d.)).

International statistics confirm the fact that despite sufficient conditions for the protection of their technologies and developments, various forms of incentives for the population in the field of patenting, licensing of special types of activities that constitute a set of areas of legal regulation of economic activities, and protection of intellectual property are an important guarantee of promotion in the market of technological services. One of the criteria in this aspect is the number of applications submitted and approved on the territory of other states.

Conducting a quantitative assessment of patenting by the European Patent Office, it can be concluded that the BRICs countries have open prospects for promoting technologies on a global scale. But when forming a strategy for scientific and technological growth, we must not lose sight of the highest level of competition from several European countries, as well as the United States and Japan (see Figure 3).

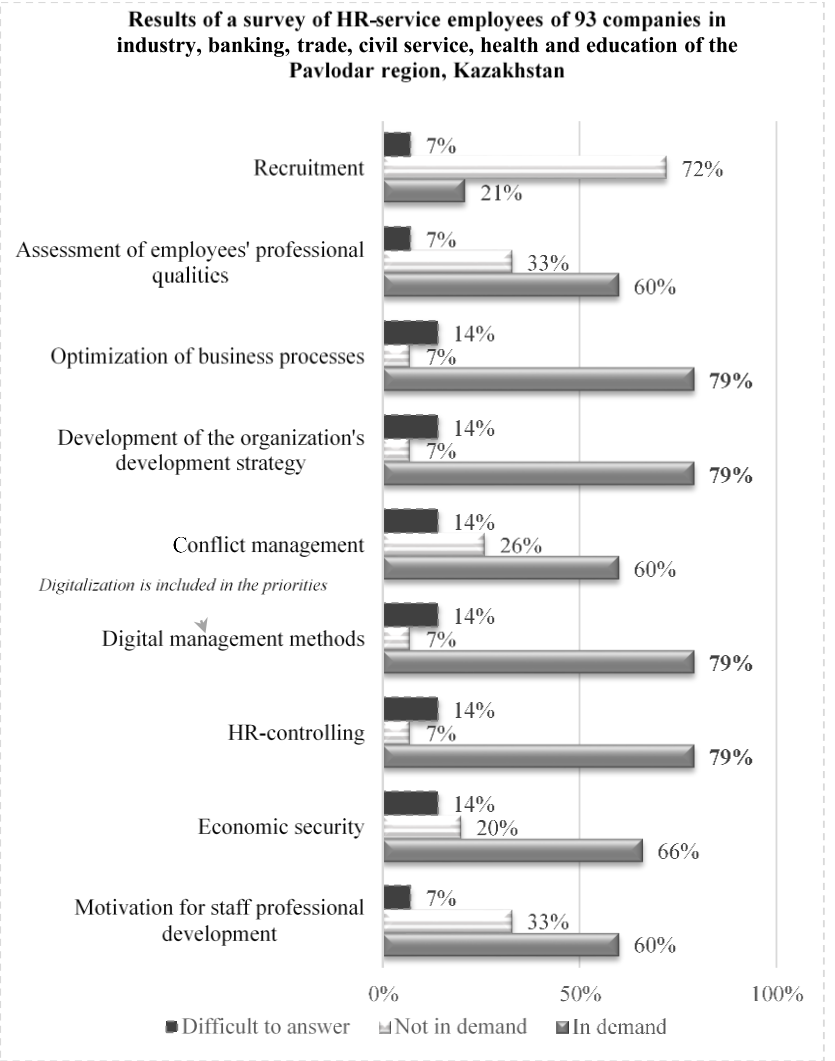

Figure 6. Identification of popular areas in the field of "HRM" in Kazakhstan market, 2019 (% of all respondents).

An important emerging trend of technological transformation of the HRM system is manifested in the digitalization of the economy. It is accompanied not only by the modernization of production capacities, more precise regulation of production and technological processes, but also by the qualitative transformation of human resources, which are the most vulnerable link among the resources of enterprises and the need to change working conditions (especially in the "remote access" system during the introduction of quarantine restrictions), the development of new competencies in the field of digital data processing, and in-depth analytics. In this case, companies in every possible way solve the problems of human capital development in the conditions of high technology-related business processes. In this regard, cycles of programs and training modules are organized with the involvement of regional universities and partner companies. This pattern is typical of the vast majority of developed countries (see Figure 4).

Speaking about the quality of human capital, it is worth noting that it has unique properties of increasing knowledge, and this occurs at different periods of the life cycle of people engaged in professional, scientific, and technical activities. Russian statistics on resource potential range from 15 years to 72 years and shows that, in 2018, 5.6% of the total population was employed in the scientific and technological sphere, which is almost three to four times lower than the average European equivalent (see Figure 5).

While searching for a way out for the current global crisis and focusing on the open borders of the digital economy, scientists emphasize the special status of the functioning of joint research and technological educational platforms, which include representatives of large and small businesses, educational institutions, and educational centers. This collaboration makes it possible to conduct case studies in the field of HRM in order to study and improve the operating conditions of industrial companies and other participants in regional ecosystems that have chosen digitalization and development of the market for high-tech products as their strategic goals (see Figure 6).

4. Discussion

The facts of growing digitalization of society revealed as a result of the research, despite the significant differences between countries and regions, show that for effective decision-making at the level of related business processes, the system of professional and research competencies development of a person throughout his life is an important issue. We concluded that the concept of "Smart Nations" can be considered as an effective model of technological transformation of the HRM system, which allows us to identify at an early stage and promote practice-oriented skills along the entire chain of professional growth, starting from higher school to targeted labor training programs in the digital economy to management of "intelligent" production. The progressive practice of special economic clusters emphasizes the importance of combining professional and personal growth of company employees (Appendix, Figure 7).

Research on the issues of digital transformation of industrial and economic relations shows that this process is influenced by the deep motivation of employees of acompany to develop innovative projects in the field of resource-saving technologies, transition to alternative sources through active digitalization of production, and the public sector.

Table 1. Elements of public and private technology partnership (European practice)

Participants	Tools to support technological development	Purpose, amount of funding
SME representatives, Walloon Agency for the enterprise and the Innovation (AEI), Belgium	Providing "technology cheques" ("chéquestechnologiques") to SMEs established in Wallonia to pay for technological and technical services	The budget allocations for 2014-2020 amounts to € 2.3 million. Additional financial support is provided to SMEs for creating websites, developing e-business and commerce
Households, SME representatives, government of Denmark	Financial support for the deployment of broadband connections (if the Internet download speed is less than 10 Mbit/s or 2 Mbit/s)	The budget is DKK 200 million for the period 2016-2019
SME representatives, national Council for industry (Conseil National de l'industrie, CNI), participants of the "InvestissementsAvenir" project of Bpifrance, France	Tax incentives for investments in software and digital technologies (up to 40% of the market value). Lending to SMEs engaged in the automation and robotization of the production and mining process	Coverage of material and non-material costs for the purchase of equipment, feasibility studies, personnel training, and purchase of services related to the project. The loan amount varies from € 100,000 to € 5 million
SME representatives, the Portuguese Agency for Competitiveness and Innovation (IAPMEI), Portugal	Financial support for projects in "Business innovation and entrepreneurship"	Stimulating qualified entrepreneurship with growth potential in new areas
SME representatives, the German Government	Support for "Trusted Cloud Platform" Projects, "competence Centers" Project, "Go-Digital" Program in the field of IT-security, online marketing and digital business processes	The target group is SMEs with fewer than 100 employees. The total budget is € 1.5 million. Financial support of competence centers in the amount of € 2 million for three years

Compiled by the authors on (OECD 2019), p. 37-40.

Table 2. Critical areas of production organization in the direction of human resources capitalization in the conditions of modern challenges

Direction	Target orientation	Authors
Encouraging employees and the public to unlock the potential of "green" technologies in the sectors of the raw material economy	Popularization of "clean" technologies, promotion of energy-saving technologies to achieve the goals of sustainable development of the metallurgical industry in China. Digitaltechniquesforthemanagementofinnovativeindustrialcomplexes	C. K. Gao, H. M. Na, K. H. Song, F. Tian, N. Strawa, T. Du (Gao et al., 2020)
Organization of business processes according to the "closed-cycle economy" scheme	The "recycling" economy allows for the technological growth of most organizations involved in the supply chain, from the collection of waste after consumption to the recovery, processing, and production of secondary raw materials (progressive experience of 292 organizations in Italy, aimed at reducing costs, repair, reuse, recovery, recycling)	P. Ghisellini, S. Ulgiati (Ghisellini and Ulgiati 2020)
Direction	Target orientation	Authors
Technological development through the expansion of ICT usage zones	Computerization and modeling of the broadband Internet network as an innovative service in the development of public ICT	A. Papageorgiou, A. Fernandez-Fernandez, S. Siddiqui, G. Carrozzo (Papageorgiou et al., 2020)

Direction	Target orientation	Authors
Impact of violations in the field of cyber security services	Classification of industrial assets within the framework of "Industry 4.0" and possible adverse effects on business performance due to loss of confidentiality, integrity and availability of data related to network production machines	A. Corallo, M. Lazoi, M. Lezzi (Corallo, Lazoi, and Lezzi 2020)
Business models of innovative self-development of regional systems	The concept of business modeling in enterprises, the formulation of a strategy for adapting regional systems to the conditions of economic and technological challenges	N. A. Zavalko, V. O. Kozhina, E. V. Yudina, O. N. Beketova, A. V. Lavrenova (Zavalko et al., 2020)
Synthetic model of integration of knowledge in the process of training and potential research	Unlocking the potential of business knowledge management in the field of sociology of knowledge to theorize the integration of public knowledge by the state, development of international business	V. Pyrozhenko, (Pyrozhenko 2020); NF. Crespo, D. Aurelio (Crespo and Aurélio 2020)
Globalization in the field of IT-outsourcing	Strategies for "extratextual" and "intertextual" placement of exchange devices in the context of organizing virtual business meetings	J. Lockwood, Y. Song (Lockwood and Song 2020)
Evolution of the Kevin Ashton chain concept: origin, 1999-public discussion of the "Internet of things" ("IoT") in The United Nations report, dynamic growth, 2005-present	The scope of "IoT" expansion among major manufacturers, taking into account the vision of developers and marketers with respect for consumer privacy	J. Chin, V. Callaghan, S. Ben Allouch (Chin, Callaghan, and Ben Allouch 2019)
Mechanisms for reducing the negative impact of sanctions restrictions on economic development	Research of the nature of economic sanctions, identification of positive and negative effects in the development of trade relations and scientific and technological partnership of the target countries and subjects of sanctions	S. Afontsev (Afontsev 2019)
Innovation policy within regional innovation systems to implement "Smart Nations"	Smart specialization in the development of the regional economy as a political tool for developing and implementing a strategy for intellectualizing production and society in conditions of the increased complexity of technologies and know-how	B. T. Asheim (Asheim 2019); S. Novikov, O. Kazakov, N. Kulagina, M. Ivanov (Novikov et al., 2019)
Technological integration of industrial complexes with the formation of an ecosystem at the regional level	Cluster transformation of sustainable ties considering the new challenges of the digital economy	S. V. Kuznetsov, A. E Miller, L. M. Davidenko (Kuznetsov, Miller, and Davidenko 2019); D. Rodionov, I. Rudskaia (Rodionov and Rudskaia 2018)
Formation of financial structures of the organization and new competencies in the field of digital technologies	Development of a system of intelligently oriented consultation for the financial function of enterprises	O. A. Valebnikova, N. V. Valebnikova, O. V. Kalinina (Valebnikova, Valebnikova, and Kalinina 2019)

Compiled by the authors.

Table 1 categorized the characteristic of the combination of state support methods for small and medium-sized enterprises (SME) in European countries which is systemic in nature and has similar features to the economic policy of the EEU countries (Table 1).

As for recommendations for solving problems in the field of technological transformation, it is important to use the most valuable things that people have already accumulated in the process of establishing an industrial format of public relations (Table 2).

From our point of view, it is important to take into account the level of development of industrial relations and the state of digital equipment of production in different countries and industries. In particular, we share the point of view of C. K. Gao, H. M. Na, K. H. Song, F. Tian, N. Strawa, T. Du (Gao et al., 2020), P. Ghisellini, S. Ulgiati of the need to organize business processes according to the principles of "clean" technologies and waste-free

production, when digitalization helps to achieve a high effect in managing complex interconnected processes.

The management practice of the last decade shows how the efficiency of companies' outcome depends on technological equipment and digitalization. A team of researchers consisting of A. Papageorgiou, A. Fernandez-Fernandez, S. Siddiqui, G. Carrozzo draws an analogy between the quality and availability of digital technologies and the level of human development (Papageorgiou et al., 2020). Of course, different countries have different levels of development and implementation of digital tools and technologies, which is reflected at the level of organization of business processes of enterprises, but access to common databases gives users a chance to bring their companies to the level of world technological leaders (Corallo, Lazoi, and Lezzi 2020).

The study shows that the possibility of a technological breakthrough and incentives for company employees is becoming the main goal of interaction at the level of regional associations and industry clusters. Many Russian and Kazakh scientists consider the digitalization of intelligent production management to be an important tool through the formation of stable cluster connections within industrial and educational ecosystems of a new format (Zavalko et al., 2020; Pyrozhenko 2020; Rodionov and Rudskaia 2018; Kuznetsov, Miller, and Davidenko 2019). This shows the continuity and commonality of human resource management policies in different countries.

Conclusion

Having conducted a case study in the field of technological transformation concerning human resources in the era of digitalization, we can conclude that the current state of society and the world economic system, taking into account the accumulated experience and newly emerged circumstances, require a review of approaches to personnel management. While the growing desire of companies to train digital skills and competencies of employed personnel, the introduction of individual professional growth programs can be identified as development priorities. Despite possible critical changes in the external environment, companies are focused on mobility and restructuring of production activities, for which, along with technical and technological re-equipment, they are actively improving the personnel management system. This proves the assumption that the accelerated pace of the world economy development and overcoming the crisis become possible in conditions of parity between companies and other participants in production and economic relations in the most open information and digital space, including the digital economy based on the knowledge economy.

Of course, the parameters of ensuring economic security and digital transformation can be supplemented with a description of the technological process, elements of production organization, conditions for technologization and compliance with the order of technological integration, platform interaction of economic activity participants, while they will remain available for management and adjustment in any business environment. The inclusion of technological parameters as indicators of the state of business processes will allow us to develop and implement mechanisms for the digital support of the management system of individual economic structures and complexes promptly.

Acknowledgments

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Appendix

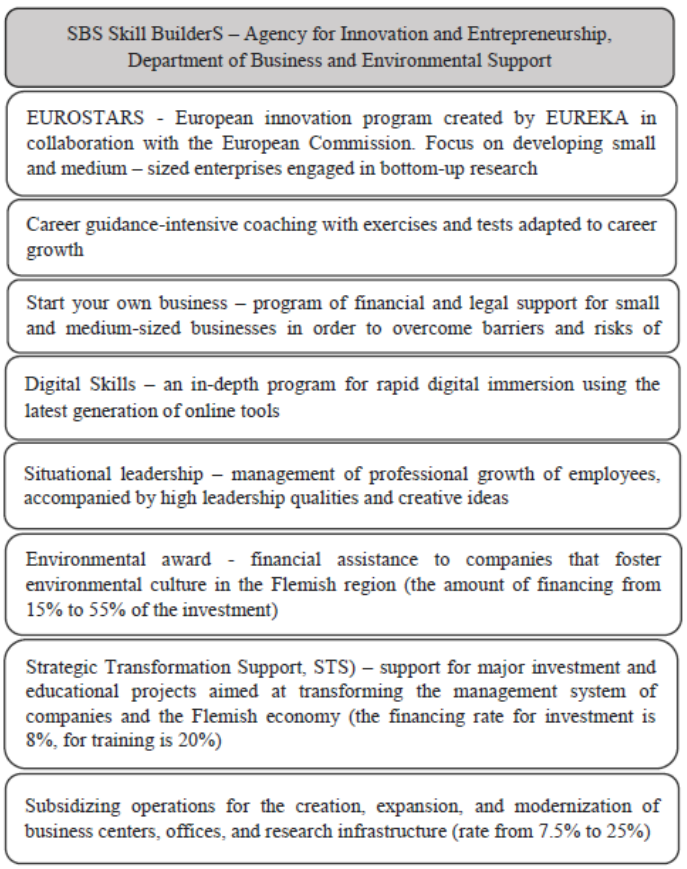

Figure 7. Strategic human resource development programs of SBS Skill BuilderS, Belgium ("Vérder Met Ieders Talent," n.d.).

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Chapter 3

Long-Term Budget Planning Based on Simulation Models in the Context of Digital Transformation of Global Markets

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Abstract

The purpose of this article is to consider the problems of creating long-term budget plans at the subnational level in Russia (budget projection), which are determined by the complexity of forecasting mandatory budget expenditures for the social sphere which are most often financed from incoming inter-budget transfers. In conditions of financial dependence, this long-term bodget plans leads to a reduction in budget planning horizon. The authors propose to apply the method of simulation modeling using the program of Russian development «Any Logic» for modeling mandatory budget expenditures of the social sphere. This approach, based on official statistics, allows us to create a projection model of mandatory budget expenditures for the social sphere, depending on various factors with an increase in planning horizon at the subnational level. Shifting the time horizon for 50 years or more will make it possible to review modern social programs and model the forecast of the necessary inter-budget transfers amount for a longer period in the context of territories. The inclusion of the obtained data in the budget projection will strengthen the information interaction of all levels of government in long-term budget planning and reduce the risk of non-fulfillment of priority expenditure obligations. Simulation modeling allows us to increase the time horizons of budget projection digital transformation of global markets. Long-term budget planning based on simulation models can adjust current social programs, which will improve the quality of life.

Keywords: long-term budgetary plan, digital transformation, global markets, inter-budget transfers, simulation modeling, public sector, public budgeting

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1. Introduction

In modern economic conditions, the main task for Russia in the field of public finance management is to ensure a balanced budget not only in the medium term but also in the long term. The issues of reducing the risks of non-fulfillment of priority expenditure obligations are especially acute at the moment. In this regard, it is necessary to update issues of interaction between different levels of government (mass collaboration), which will help to reduce time and give more opportunities for the creation, exchange and use of budget information to solve social problems (Pilemalm, Lindgren, and Ramsell 2016).

Many researches of foreign authors consider the development of the digital economy as project management in the conditions of state digitalization (Lappi, Aaltonen, and Kujala 2019), local government planning (Abdullah 2019), transparency of budget planning at the municipal level (Adiputra, Utama, and Rossieta 2018), creation of projection models (Kolkman 2020), simulation modeling (Secchi 2015), public administration of project planning (Volden and Andersen 2018) long-term budgetary projection (Anderson and Sheppard 2009), development problems of regional economics (Alekhina et al. 2019), development projection of various social spheres (Sataloff, Johns, and Kost, n.d.), (Ray 2012), fiscal policy (Bui 2018), budget analysis (Kasperskaya and Xifré 2020), financial productivity (Omondi-Ochieng 2019), process modeling in the public sector (El Araby and Ayaad 2020), digitalization of the smart city economy (Hasbini, Eldabi, and Aldallal 2018), the role of education in urban planning (Maruna, Milovanovic Rodic, and Colic 2018), participation of municipalities in national planning (Moghaieb 2019). In the researches of Russian authors, issues of long-term budget planning and forecasting in modern conditions are considered quite widely, for example, the project approach in budget planning (Seleznev et al. 2016) and (Kudryashova 2014), analysis of the development of budgetary federalism and problems of budgetary decentralization (Ivanova et al. 2019), programming socio-economic processes (V. V. Okrepilov et al. 2015; Vladimir Okrepilov, Kuzmina, and Kuznetsov 2019) etc. However, there are still some problems that require further research (Barykin, Bochkarev, Dobronravin, et al. 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al. 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al. 2021).

Strategic (long-term) planning is regulated by the Federal Law “On Strategic Planning in the Russian Federation” (No. 172-FZ) (Galazova, Karepina, and Romanova 2019; Dickenson, Rogerson, and Azarov 2000). The development and implementation of strategic planning documents are assigned exclusively to the powers of the constituent entities of the Russian Federation and local government of the Federation subjects. The principles of strategic planning consist the principle of balance of the strategic planning system, the principle of resourcing, the principle of purpose-oriented programs, and etc. The main document of long-term budget planning is the budget projection, which is compiled for all levels of the budget. The budget projection of the constituent entity of the Russian Federation for a long-term period is developed every six years for twelve years or more. The budget projection of the municipality for a long-term period is developed every three years for six years or more.

1.1. Long-Term Budget Planning in Conditions of High Financial Dependence

1.1.1. Federal Budget – Regional Budget

It seems obvious that long-term budget planning of lower-level budgets in conditions of high financial dependence cannot be carried out by the lower-level budget in the absence of information on the volume and timing of inter-budget transfers in the forecast period. Analysis of gratuitous receipts from other budgets, i.e., inter-budget transfers in the total revenues of the consolidated budgets of the constituent entities of the Russian Federation in the context of Federal districts, showed that more than half of the districts share of inter-budget transfers as of 01.01.2020 exceeds 20% and reaches 60% (Figure 1).

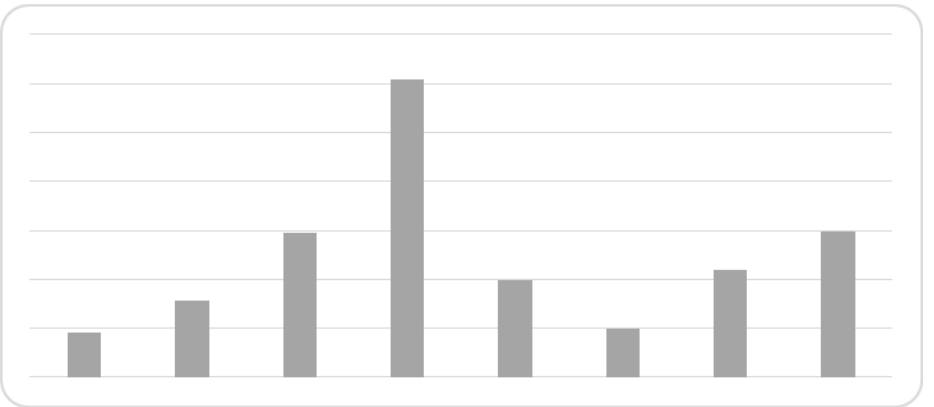


Figure 1. Share of gratuitous receipts from other budgets of the Russian Federation in total revenues of the constituent entities of the Russian Federation in the context of Federal districts as of 01.01.2020.

At the same time, it can be seen that the share of subsidies in inter-budget transfers from the Federal budget to the regions by 2020 is slightly reduced relative to 2018, while revenues in the form of subsidies and subventions, i.e., targeted inter-budget transfers, tend to increase (Table 1).

Table 1. Inter-budget transfers from the Federal budget to regional budgets in 2018-2021

Criteria	**2018 <*>**	**2019**	**2020**	**2021**
Inter-budget transfers	1 719.6	2 095.3	2 153.9	2 013.9
%% GDP	1.7	2.0	1.9	1.7
Grant-in-aid	832.0	887.7	875.1	893.4
as % of inter-budget transfers (total)	48.4	42.4	40.6	44.4
Subsidies	397.0	569.2	626.5	481.8
as % of inter-budget transfers (total)	23.1	27.2	29.1	23.9
Subventions	309.3	376.6	388.7	394.1
as % of inter-budget transfers (total)	18.0	18.0	18.0	19.6
Other inter-budget transfers	181.4	261.8	263.6	244.5
as % of inter-budget transfers (total)	10.5	12.5	12.2	12.1

It is obvious that regions with a high share of inter-budget transfers in revenues (Figure 1) are not able to form a budget projection on their own without the necessary information about the volume of inter-budget transfers in the long-term budget plan. However, the Budget

projection of the Russian Federation, which is currently compiled until 2036, does not contain the values of expenditures of inter-budget transfers, including their details by type or territory. Constituent entities can "see" the volume of inter-budget transfers only for three years – the budget planning horizon.

1.1.2. Problems In Long-Term Budget Planning: Constituent Entity – Municipality

It should be noted that that, the methodological recommendations of the Ministry of Finance of the Russian Federation in the budget forecasts of the constituent entities of the country and municipalities suggest reflecting inter-budget transfers, while separately taking into account the main types of inter-budget transfers, based on their predictability, stability and "mandatory" in terms of performing the function of a source of budget revenue for the relevant constituent entity of the Russian Federation or municipality.

In most regions, subventions are reflected as elements of the long-term budget projection. In this case, it is recommended to reflect the identical amount of these funds in the revenue and expenditure parts of the budget with the corresponding adjustment for deflator indices of the forecast period. Subsidies are inter-budget transfers, targeted financial assistance to achieve a specific goal (quality, volume or other parameters for the implementation of specific powers of authorities of the constituent entities of the Russian Federation or local government bodies). Subsidies are funds provided for the implementation of certain projects that are limited in time. The most reliable estimate of the volume of such financial resources will be the gradual reduction (up to zero) of this type of revenue to the budgets of constituent entities of the Russian Federation and local budgets at a different pace. The methodology of the Ministry of Finance of the Russian Federation recommends that these funds should not be included in the budget projection but with the exception of those directly indicated in the relevant strategic planning documents. However, due to the fact that the share of targeted inter-budget transfers (table 1) is not decreasing, we believe that these recommendations require further development.

The calculation of grants is proposed to coordinate with long-term strategic planning documents. At the same time, it is assumed that the amount of this type of financial assistance will be inversely proportional to the rate of socio-economic development of the corresponding administrative-territorial entity (their excess over the average for constituent entities of the Russian Federation or for municipalities of this type of indicators).

The Methodology of the Ministry of Finance of the Russian Federation also recommends taking into account other important parameters of inter-budget regulation, such as the norms for the distribution of taxes and fees between the budgets of the budget system of the Russian Federation, the value of which, and etc.. It is also necessary to evaluate and include in the budget projection ongoing and planned reforms in the field of inter-budgetary regulation, prospects for changes in the volume and quality of debt to other budgets of the budget system of the Russian Federation.

Taking into account that the share of inter-budget transfers in the total volume of local budget revenues is more than 60%, and subventions and subsidies are the main ones, about 80%, it is reasonable to include it in the budget projections of subjects data on planned expenditures and inter-budget transfers with details of types.

Analysis of regional budget projections showed that most of them contain a forecast for inter-budget transfers, but without detail. For example, in the budget projection of the Leningrad Region, it is planned to share inter-budget transfers in the structure of the total

expenditures of the regional budget, but without revealing the types of inter-budget transfers (Table 2), which is not informative for lower budgets.

Table 2. Structure and dynamics of the expenditure part of the regional budget of the Leningrad region for the period 2017-2018 (thousand rubles)

Criteria	2017	Share of total expenses	2018	Share of total expenses	Dynamics for the period 2017-2018 (%)
Expenses	99256776.0	100.0	171817891.6	100.0	173.1
1. Inter-budget transfers	37599884.4	37.9	64929056.9	37.8	172.7
2. Expenses excluding inter-budget transfers	61656891.6	62.1	106888834.7	62.2	173.4

In our opinion, this problem can be solved using modern methods of medium-and long-term planning (forecasting) and developing technologies for coordinating long-term budget plans.

1.1.3. Analysis of Foreign Experience

Considering the foreign experience of developing a methodology for a long-term budget forecasting, we can conclude that it is at an early stage, since it began to spread rapidly only in 2000-2010. Currently, there is still no unified analytical approach, and the most acceptable budget rules for sustainable development have not been developed. Each state chooses its own way of developing long-term budget projections, which is determined by the goals of the analysis, available statistics, and the specifics of socio-economic development, including the specifics of the public sector organization. However, in methodological approaches to the long-term budget forecasting, which are implemented in different countries, it is possible to identify common critical issues.

Long-term budget projections abroad, as well as in Russia, are based on assumptions about the specifics of socio-economic development (scenario conditions), characterized by promising values of macroeconomic indicators. Therefore, their development is preceded by a detailed analysis of the economic and financial situation of the country in order to identify long-term trends in the dynamics of macroeconomic indicators. On this basis, conclusions are made about the specifics of socio-economic development in the future. During the development of a long-term budget projection, the growth rate of real gross domestic product in previous years is analyzed and the factors that caused this growth are determined. Assumptions about long-term fiscal policy are established because current legislation defines policies only for certain types of expenditures, mainly social ones. The amount of such mandatory expenditures for the long term is calculated in accordance with existing legislation and then adjusted accordingly to macroeconomic assumptions. For the remaining (so-called discretionary) expenditures and the law sets annual allocations which does not provide any guidance on long-term policy. According to the most acceptable assumptions, discretionary spending in the long term is defined either as a constant amount in monetary units, or as a share of output.

To get initial data for comparing budget policy options, basic modeling is performed based on the assumption that the current budget policy will remain unchanged in the future. Given budget rules and assumptions about exogenous variables, basic modeling is performed in two stages: for the first ten-year period and further. For the first ten-year period, equations are

adjusted so that the simulated variables correspond to their values in the 10-year baseline designs derived from medium-term models. This adjustment is necessary because medium-term projections embody detailed information about the budget and economic development in the medium term, while the long-term model only defines the overall relationship in the long term. In the second stage of the simulation, years after the first ten-year period, no adjustment is made to the economic equations. Therefore, the basic modeling corresponds to the basic designs of the medium-term period and then extends them according to the equations of the model. The base budget modeling serves as a reference point for other options that use the same budget rules but different assumptions about exogenous variables. In this alternative modeling, each equation is also subject to adjustments that are necessary to ensure that planning for the first decade meets the medium-term baseline parameters approved by the official authorities.

This budget modeling is considered more formalized and allows us to form a fairly long forecast horizon. This approach of long-term budget planning has become widespread at the present stage in many countries. Especially noteworthy is the tendency to extend the time horizon of budget modeling, the wide spread of long-term projections for 50-75 years, and even for an infinite time horizon. While at the beginning of 2000 long-term financial projections were published only in a limited number of countries (New Zealand, Norway, the United Kingdom and the United States), in 2009 they were published by 27 member countries of the Organization for Economic Cooperation and Development (OECD).

The time horizon for such projections varies between countries, from 25 years in Korea to 75 years in the United States, and approximately 100 years in the Netherlands. The most common period is 41-50 years. In addition, some countries extend their calculations to a hypothetically infinite time horizon. At the same time, half of all OECD member countries annually analyze the long-term state of public finances, five countries on a regular periodic basis (every three to five years), and four countries on a special schedule. International organizations (the European Commission, the International monetary Fund, the International chamber of public sector accounting standards, and the OECD) also pay attention to long-term budget forecasting. In long-term projections, it is important to determine the length of the period that they should cover. The time horizon for projects depends in part on the nature of the problems being analyzed. According to some views, if the purpose of the projection is to show a financial imbalance in the public sector, then even the time perspective of 75 years is too short.

The main reasons for analyzing such a long-term perspective are that long-term projections in the development of a budget strategy make it possible to prepare for the problems that are bound to come. Moving beyond 50 years can provide information that will help review modern social programs. The simulation does not predict what will happen, but only what would happen under a given set of budget rules and assumptions about exogenous variables. Thus, modeling provides a way to evaluate current fiscal policy and compare it with other options. Planning of inter-budget transfers depends on their forms and grounds for granting, and their significance depends on the level of centralization of the country's budget system and the need to provide inter-budget transfers from the central government's budget to subnational budgets, primarily to equalize budget security.

In modern research, budgetary decentralization is considered as a factor that stimulates economic growth in addition to traditional directions. Although there are no unambiguously confirmed results of the existence of a direct relationship, some authors indicate its existence. The thesis of a constant increase in the decentralization of budgetary systems is confirmed in

practice only for individual states. The dynamics of the share of subnational government revenues in the general government revenues for the period 2009-2018 is shown in Figure 2.

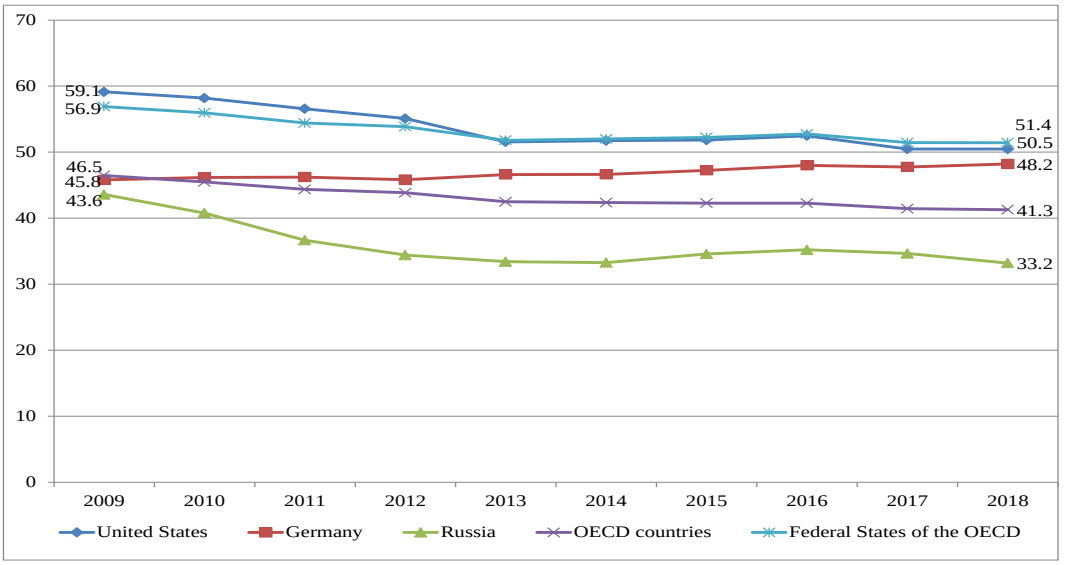


Figure 2. Subnational government revenues of the OECD countries and the Russian Federation for 2009-2018, as a percentage of general government revenues. Source: data of the OECD, Treasury of Russia, authors ' calculations.

As can be seen in Figure 3, the decentralization of sub-national budget revenues decreased from 46.5% in 2009 to 41.3% in 2018 across all OECD countries although these countries are very different from each other. Among them there are both unitary and federal states. Due to the fact that Russia is a federal state, the dynamics of the indicator for similar OECD countries in general were analyzed separately, as well as for the United States and Germany in particular. It is obvious that budget systems in federal states are on average more decentralized due to the presence of another level of governance - regional. The share of subnational government revenues in the general government revenues for the OECD federal states for the period under review predictably exceeds the average, but it fell even more – by 5.5% (from 56.9% to 51.4%). At the same time, different countries show different trends. If in the United States the level of decentralization of the budget system decreased very seriously for the period of 2009-2018 by 8.6 p.p., in Germany it increased by 2.4 p.p.

The level of decentralization of the budget system in Russia in 2018 was 33.2%, which is significantly lower than not only the level of this indicator for federal states, but also for the OECD countries as a whole. At the same time, we can observe a negative dynamics of the indicator, which shows a decrease of 10.5 p.p. for the analyzed period. A comparison of the decentralization of budget relations across the OECD countries and Russia is shown in Figure 3.

Despite the relatively small fiscal burden on the Russian economy, the level of its centralization is higher than in all the OECD federal states. It can also be noted that most of the OECD countries are unitary. Some of them have a quite centralized budget system.

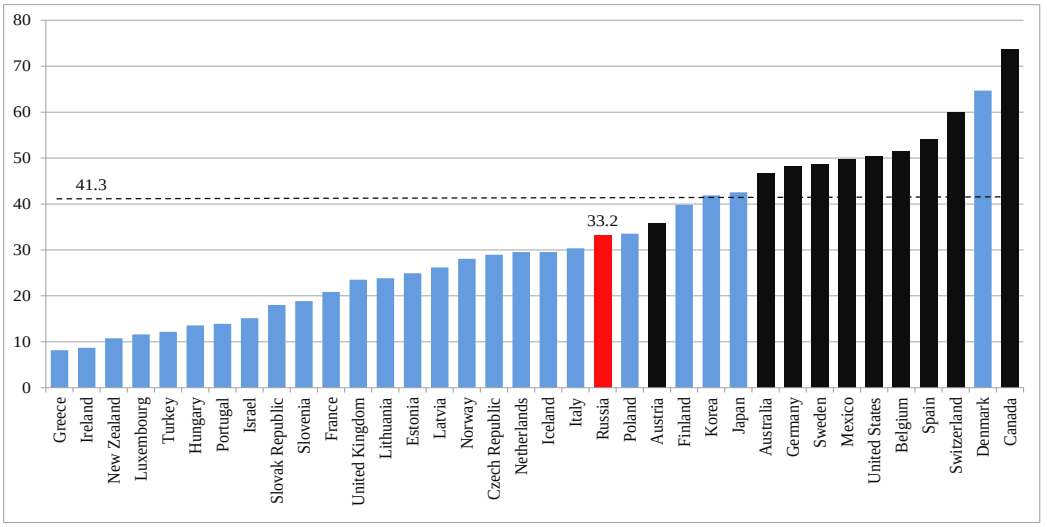


Figure 3. Subnational government revenues of the OECD countries and the Russian Federation for 2018, as a percentage of general government revenues. Source: data of the OECD, Treasury of Russia, authors ' calculations.

In most countries, inter-budget transfers play a significant role in equalizing the budgetary supportability of subnational budgets practice states use approximately the same forms of inter-budget transfers, only their proportions differ due to the peculiarities and priorities of national development. Let's analyze inter-budget transfers in the OECD countries and Russia (Figure 4).

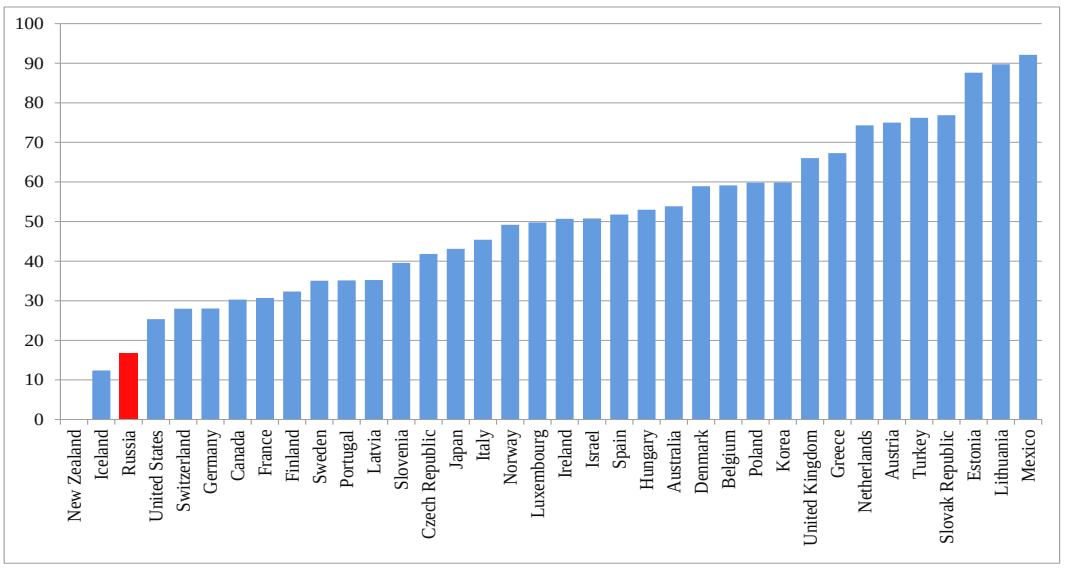


Figure 4. Share of inter-budget transfers in subnational government revenues for the OECD countries and the Russian Federation in 2018, %. Information: data of the OECD, Treasury of Russia, authors ' calculations; data for New Zealand for 2018 is not available.

As we can see, the high level of centralization of the budget system of the Russian Federation, especially in comparison with federal states, is also due to the fact that most of the expenditures are carried out from the federal budget, and not directed through inter-budget transfers to the subnational level. The share of inter-budget transfers in the subnational government revenues at the end of 2018 was only 16.8%, which is less than the same indicator for all the countries under consideration, with the exception of Iceland.

Budget planning horizons differ in foreign countries. In the United States, the long-term budget projection at the federal level is made for 10 years. A number of indicators are projected for a period of 25 years, and some parameters are projected for 75 years.

In the UK, budget planning at the state level is carried out for 5 years. For individual indicators, data is provided for a period up to 30 years. There are no separate long-term inter-budget transfers planned.

The federal budget in Germany is drawn up for 3 years. A number of indicators are projected for a longer period, but inter-budget transfers are also not projected in the long term.

Analysis of the OECD countries showed that they carry out budget projection for a long period of time, but according to consolidated budget indicators. Inter-budget transfers provided from the central government budget to subnational budgets have a high level of volatility. The grounds and methods for providing them change over time. Therefore, they are usually planned for a medium-term period of time.

Thus, the foreign experience of building budget projections up to 10 years with detailed indicators and forecasting for a period of 20 years or more on exogenous indicators using simulation can be applied in Russia.

2. Materials and Methods

Let's consider the possibility of using simulation modeling for long-term planning of municipal budget expenditures on the example of the Leningrad region.

In the structure of expenditures of the Leningrad region municipality, about half of them are spent on education, a large share of which is provided by subventions and subsidies from the regional budget, so further when considering the issues of strategic planning of expenditures and needs for inter-budget transfers, it will be considered the costs of education.

According to article 15 of Federal law No. 131-FZ, the organization of providing public and free education in basic General education programs in municipal educational organizations are referred to the issues of the municipal district. However, the authority to provide financial support for the implementation of basic General education programs in accordance with Federal state educational standards is attributed to the authority of the state and comes from inter-budget transfers from higher budgets, accordingly.

Let's consider the construction of such a model using the example of the dependence of education expenditures on the demographic component, since these expenditures account for more than 50% of all expenditures in the budgets of municipal districts and urban districts of the Leningrad region.

Building a simulation model for forecasting inter-budget transfers for the implementation of basic general education programs consists of the following stages:

- Formation of a statistical base with a forecast of the student population;
- Calculation of expenditure standards per student by levels and sublevels of education in the forecast period;
- Choosing an adequate simulation model;
- Entering source data and getting results.

Taking into account the identified problems of long-term planning of inter-budget transfers as an alternative to the existing method of their planning, a method for constructing a forecast of expenditures based on simulation modeling of the dynamics of factors that determine changes in expenditures for the corresponding items of municipal budgets is proposed. According to the authors, the introduction of a demographic component in the simulation model may allow us to more accurately forecast the need for inter-budget transfers in the long term.

Let's consider the application of the proposed approach on the example of building a model of education expenditures based on the demographic component.

Statistical and econometric methods were used in the process of building the model. To build a simulation model, the authors used data on expenditures per student for the past period (Table 3).

Table 3. Expenditures of the municipal budget for general education per 1 student in municipal general education institutions, rubles

Municipaldistrict (city district)	**2013**	**2014**	**2015**
Boksitogorsky	98.17	95.7	102.7
Volosovsky	96.4	111.7	136.9
Volkhovsky	83.6	114,4	102,9
Vsevolozhsky	97.3	80.6	94
Vyborgsky	93.31	88	89.1
Gatchinsky	86.4	85.3	92.87
Kingiseppsky	117.9	84.8	89.5
Kirishsky	75.1	86.6	91.3
Kirovsky	104.5	93.8	96
Lodeynopolsky	93.6	105.9	115
Lomonosovsky	111.03	113	117.5
Luzhsky	93.3	98	124.2
Podporozhsky	143.8	129.8	158.5
Priozersky	138.4	141.4	129
Slantsevsky	100.23	100.3	111.3
Tikhvinsky	83.1	90.8	93.8
Tosnensky	78.6	84.8	92.3
Sosnovoborsky	89.3	97.7	103.3

Statistical data on the distribution of the population by gender was required to make a forecast of the number of students and age for each municipal district. The corresponding data for the region as a whole are shown in table 4. In addition, the authors used data on the natural movement of the population by the corresponding age groups.

Table 4. Population by gender and age at the beginning of 2015, Leningrad region

Age (years)	Year of birth	All population		
		Men and women	men	women
0	2014	16802	8584	8218
1	2013	16543	8582	7961
2	2012	16866	8610	8256
3	2011	16215	8381	7834
4	2010	16707	8528	8179
0-4	**-**	**83133**	**42685**	**40448**
5	2009	17739	9076	8663
6	2008	17038	8654	8384
7	2007	16436	8320	8116
8	2006	15606	8038	7568
9	2005	15569	8037	7532
5-9	**-**	**82388**	**42125**	**40263**
10	2004	16126	8234	7892
11	2003	15925	8069	7856
12	2002	15379	7940	7439
13	2001	14486	7407	7079
14	2000	14277	7374	6903
10-14	**-**	**76193**	**39024**	**37169**
15	1999	13540	6916	6624
16	1998	13968	7081	6887
17	1997	13818	7132	6686

After forming the research information base, the following requirements for the created model were determined.

The main task is to develop a simulation model for research and analysis of the dynamics of education expenditures determined by the demographic component.

To obtain adequate modeling results, it is necessary to:

- take into account the specifics of financing the education system, its structure;
- be based on statistical data on the demographic situation in the region for the analyzed period, and know the dynamics of the educational system contingent.

The model should allow us to get a forecast of the dynamics of the contingent and financial costs. The simulation model is intended to be used as a decision support tool in municipal finance management. After defining the main requirements for the model, we will go on to describe the main stages of its development.

At the stage that is associated with the financing of the educational services sector at the municipal level, we can distinguish: pre-school education; general education; additional educational services.

General education can be obtained in schools and educational institutions equated to them (lycées, gymnasiums, etc.). According to the law on education in the Russian Federation, there are two major levels. The first is general education. It includes pre-school and school sublevels. The second level is divided into primary, basic and complete (secondary) education. Our research is limited to the preschool and school sublevel. School sublevel is divided into two

blocks from 1st to 9th grade (primary and basic) and from 10th to 11th grade (complete secondary education). The corresponding cost standards are entered or read from the corresponding data file. The developed system does not provide for changing the value of standards in accordance with a certain rule or a specified algorithm.

Following the consideration of the subject area was the stage of choosing the architecture of the developed model and the tool for its creation. In order to perform scenario analysis in the field of budget planning, as a rule, simulation models are developed, on the basis of which a simulation experiment is conducted, which allows us to better understand the dynamics of the system's behavior and improve the quality of made decisions. Currently, discrete event modeling, system dynamics, and agent modeling are widely used in simulation modeling. The most universal approach is agent-based modeling, which can be applied at any level of the model at any scale. An agent model consists of a set of interacting agents and their environment. The system behavior is described on an individual level. Global behavior is considered as the result of the combined activity of agents.

To create the model, the authors chose a combined approach that involves a combination of agent-based and discrete-event-based. This led to the choice of a development tool – AnyLogic. The analysis of publications has shown that the topic of using software products for strategic modeling is relevant.

Let's consider the methodology for building a model for forecasting budget expenditures on education. The algorithm of actions for building a simulation model is shown in Figure 5.

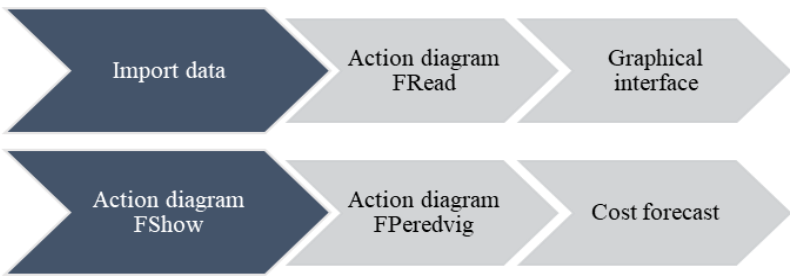


Figure 5. The simulation algorithm.

For the most complete correspondence to reality, we will decompose the model into functional blocks, each of which will describe a separate process.

The first block "Population" is a block of the model that describes the dynamics of the population as a whole and by age, as well as responsible for the step-by-step movement of the population from one age group to another. The input data for this block is data on the birth rate and mortality rates by age.

The second block is "Education". This section of the model describes the dynamics of the population in kindergartens and schools. This part of the model should take into account the specifics of school education and the distribution of school graduates for further education or entering the labor market. This section should describe the gradual transition from one class to another, take into account statistics on the distribution of graduates after school, and calculate financial costs.

The main method used in the first block of the model is the age movement method (component method).

The essence of the component method is to "track" the age movement of the agent over time in accordance with the specified (forecast) parameters. If these parameters are fixed at some initial point in time t0, and then remain unchanged for a period of time Δ_t, then this uniquely determines the number and structure of the population at the time $(t_0 + \Delta_t)$.

The procedure is repeated for each year of the forecast period. This determines the size of the population of each age and gender, the total population, the total fertility and mortality rates, as well as the overall and natural growth rates. At the same time, forecast calculations can be performed both for one-year age intervals and for other time intervals. This procedure is repeated as many times as the forecast period covers. An agent of each age "moves" to the next, older age or drops out of the system.

This transition is described according to Eq. 1:

$$P_{n+1}^{k+1} = P_n^k(1 - f(k)) \tag{1}$$

The number of births (number of age group 0 years) is defined as the product of the number of women of fertile age on the corresponding birth rates for age cohorts obtained from the birth tables. The calculation of the number of newborns can be represented by Eq. 2:

$$B_x = \sum_i F_x^i r_x^i, \tag{2}$$

where B_x is the annual number of births; r_x^i is the age-specific birth rate; F_x^i is the number of women in the i-thage group.

To model the gradual transition from class to class, from one level of education to another, the method of moving ages is used in combination with the analysis of the receipt of services of the corresponding educational level by the software agent. It should be noted that in this functional block, it is possible to consider the transition by age and by class. The formula for moving through classes looks like Eq. 3:

$$S_{n+1}^{c+1} = S_n^c(1 - f(c + 6)) \tag{3}$$

where S_n^c is the number of school children, n is the simulated year, c is the class, f(c+6) is the coefficient that includes natural decline and migration growth.

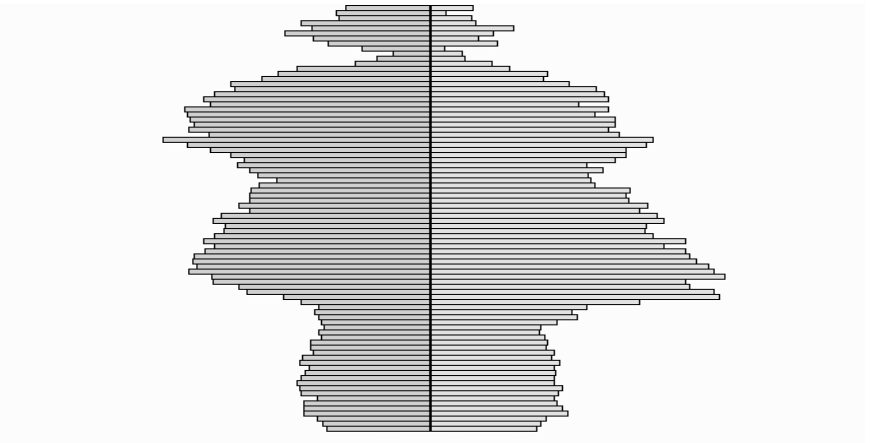
Taking into account the features of the modern education system, it should be noted that this formula is used for calculating the number of students in classes from the second to the ninth and for the eleventh grade, since the number in these classes depends on the number in the previous class at the previous stage. Eq. 4 is used to model dynamics in the tenth grade:

$$S_{n+1}^{10} = (S_n^9 - Out_n) \cdot (1 - f(15)) \tag{4}$$

Having received a forecast of the contingent of educational institutions (volume, structure, etc.), having data on the standard of expenditures per 1 student, using a combined approach that assumes a combination of agent-based and a discrete event forecasting method in the AnyLogic program, as a result, we get a forecast of expenditures on education in the context of sublevels.

By setting the forecast of various factors, we calculate the volume of inter-budget transfers for the period of specified changes in the context of municipalities. The method described above is implemented in a decision support system (DSS) software with a visual user interface. The start window allows you to select a municipal district and start running a simulation experiment.

After selecting a municipality, a demographic pyramid is displayed on the screen to get an idea about the demographic situation in the relevant education and to get possibility to "look" for several years ahead (Figure 6).



Vyborg municipal district of the Leningrad region

Figure 6. The result of applying the age shifting method for the selected municipal area.

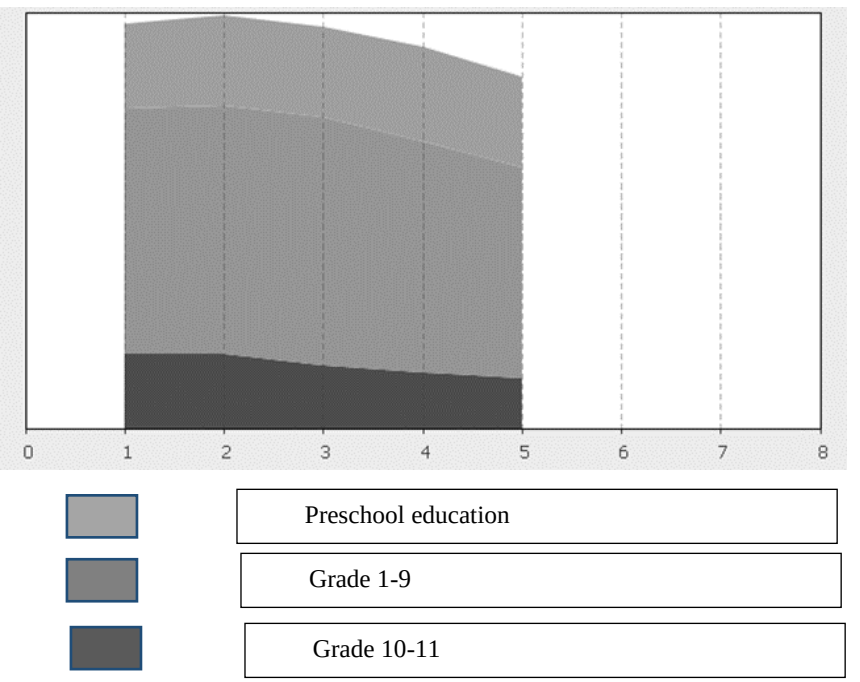


Figure 7. Forecast of budget expenditures on education in the long term.

By clicking the "Forecast" button, it goes to the window for forecasting budget expenditures for education. The window that opens allows you to set the main parameters of the model and displays the dynamics of the population in kindergartens and schools in the municipal district, as well as the costs of the municipal budget for education in the context of preschool, secondary and additional. Building a simulation model allows to forecast the volume of expenditures more accurately for the long term (Figure 7). The simulation results are saved in an external Excel file.

3. Results

In the AnyLogic modeling environment, the authors built and tested a simulation model for forecasting the volume of municipal district budget expenditures on education for the long-term period on the example of the Leningrad region.

As a result, the quantitative relationship of statistical data on the dynamics and structure of the student population and the amount of budget funds is mathematically determined. This, allows us using the expenditure standard to forecast budget expenditures, determine the need for inter-budget transfers with details by type.

4. Discussion

The authors consider it appropriate to use simulation in the development of budget projections for the long term. Modeling in the AnyLogic environment allows us to build a model of long-term budget expenditures in the social sphere (education, health, social policy, etc.), which are mostly financed by inter-budget transfers. The inclusion of inter-budget transfers in the budget projection with details by type and territory will allow subnational budgets to generate a budget projection by its own efforts in conditions of financial dependence. In addition, the use of the proposed simulation model for long-term budget planning allows us to increase the time horizon of planning for more than 20 or even 50 years. Such modeling will help to evaluate the decisions made and create a real basis for the implementation of long-term socio-economic programs.

Conclusion

A study of long-term projection problems of inter-budget transfers abroad and in Russia made it possible to draw the following conclusions. In general, long-term projection of budgets for a period of 50 years and more is actively developing in the world. However, it is at the initial stage of implementation in Russia. Currently in Russia, in conditions of high financial dependence of subnational budgets, the horizon of their budget projections does not actually exceed six - twenty years, while in the federal budget projection there is no information on inter-budget transfers to the constituent entities of the Russian Federation. –Respectively, regional budget projections have data on inter-budget transfers, but without details on their types and recipients and the structural method is mainly used for forecasting. In the absence of

a long-term projection of mandatory budget expenditures and information on inter-budget transfers for these purposes, the lower budget is experiencing difficulties with long-term budget planning. Simulation modeling in AnyLogic environment allows us to expand the horizons for projection mandatory budget expenditures and build a forecast for inter-budget transfers, i.e., provide long-term budget planning. Methodological recommendations that are used in Russia for strategic budget planning require improvement in terms of increasing the forecasting horizon. For this, it is necessary to develop simulation modeling of budget projection at all levels of the budget system of the Russian Federation.

In our opinion, it is important to continue research in the field of determining the optimal time horizon for long-term projection of inter-budget transfers as well as the use of simulation modeling in overcoming the risk of reducing state social programs in the long-term budget projection.

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Chapter 4

Utility Management Functions Generated by Choice of Attitudes of Citizens in the Digital Age

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Abstract

In this chapter, we construct a foundation for utility functions and models of consumer behavior which are based on a model of attitude choice. The model provides justification for the use of neoclassical utility functions dependent on the characteristics of goods. The key idea of our approach is that the consumer's decision in any situation of choice has a dual nature since it relates both (1) a choice of a bundle of characteristics of goods from a set of choice which characterizes the particular situation, and (2) a choice of an attitude (i.e., a vector of weights of characteristics) from a behavior menu. The same behavior menu may serve in various potential situations of choice. The individual behavior menu is a subject of external influence as well as emotional fluctuations.

Our approach can serve as a tool for models of identity economics and chosen preferences. This can be extremely useful for setting values in HR management. We also discuss potential applications of this approach to other models of decision-making and behavioral economics.

Keywords: Chosen Preferences, Endogenous Preferences, Endowment Effect

1. Introduction

This paper suggests a new representation of utility functions. We consider utility functions on the characteristics of goods. Our model is based on the concept of individual behavior menu which consists of attitudes vectors. Each attitude vector is a bundle of characteristics' weights

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of goods. This can be extremely useful for setting values in HR management (Barykin, Bochkarev, Dobronravin, et al., 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al., 2021; Barykin, Smirnova, Sharapaev, and Mottaeva, 2021; Barykin, Bochkarev, Sergeev, et al., 2021).

The key idea of our approach is that the consumer's decision in a situation of choice has a dual nature since it relates both (1) a choice of a bundle of characteristics of good which characterizes this particular situation of choice, and (2) a choice of an attitude vector from the behavior menu.

The idea that agents have some degree of freedom in choosing their preferences is presented in the economic literature (Akerlof and Kranton, 2000; Bernheim et al., 2021). As well as the idea of choosing beliefs (Augias and Barreto 2020; Brunnermeier and Parker, 2004).

The same behavior menu may serve in various potential situations of choice, though the menu is a subject of external influence as well as of emotional fluctuations. Each individual's behavior menu is formed under influence of the individual's environment, in particular, their community, family, leaders and experts, media, government, etc. This makes formation modeling of the individual menu under the external influence and studying the formation of interdependent menus of members of a network important. In particular, cross-country differences in institutions can be explained in the frame of this approach by different behavior menus prevailing in different countries. In particular, it is most revealing in the work Lily K. Hawkins, Claire Farrow, Jason M. Thomas «Do the perceived norms of social media users' eating habits and preferences predict our own food consumption and BMI?» (Hawkins, Farrow, and Thomas, 2020).

The model seems to be a good complement to current literature in which the authors concentrate mostly on how the situation of choice affects the choice (Bordalo, Gennaioli, and Shleifer, 2013; Koszegi and Szeidl, 2013).

Our model suggests that one should concentrate not on the results of the choice in a particular situation of choice but on the possible changes in the behavior menu. For example, the changes may happen because of the actions of the seller in marketing cases. The proposed approach can also be used as a foundation for several behavioral economic theories. Habit formation is an example of such a theory (Fuhrer, 2000).

2. Materials and Methods

2.1. Literature Review

The issue of behavioral economics, considered at the intersection of sociology and mathematics, is combined precisely in works on management since this discipline collects the most basic and significant of the basic ones and tries to consider them in a more applied sense. In more practical terms, this issue is considered in the works of (Bril, Kalinina, and Ilin, 2017), (Valebnikova, Kalinina, and Vilken, 2018) and Kalinina, O. V., Zaychenko, I. M., Gutman, S. S. (Kalinina, Zaychenko, and Gutman, 2017).

The range of works closest to the one under consideration is articles on considering the choice of citizens in given conditions, these include works by (Plotnikova, 2018) and (Mikheev et al., 2019).

At the same time, consideration of this issue is often a whole layer of economic theory, which includes the works of (Zaychenko, Ilin, and Dubgorn, 2018) and (Kozlov et al., 2017). Of particular interest within the framework of the topic under consideration are works on game theory, as applied to the economic component. In particular, these are the works of (Chernogorskiy, Kozlov, and Teslya, 2020), (Shirokova and Naidenysheva, 2017), and (Mednikov et al., 2017).

2.2. Mathematical Background: Representation of Increasing Positively Homo Generous Functions

As a basis of utility functions, we consider functions defined on characteristics of goods introduced by (Lancaster, 1966). We will assume that such functions possess constant returns to scale (CRS) property; such an assumption can be substantiated by empirical studies such as (Ackerberg et al., 2007). It follows from the results of (Rubinov and Glover, 1998) and (Rubinov, 2001) that any increasing positively homogeneous function G(x1; x2;…;xn) of n positive arguments which is not identically +∞ has the following representation:

$$G(x1;\ x2;\ \dots;\ xn) = \underbrace{\max}_{l\in\Lambda}\ \underbrace{\min}_{i=1,2,\dots,n}\ l_i x_i \tag{2}$$

where Λ is a support set (defined in a natural way) of function G: In the present paper we apply this approach to utility functions on characteristics of goods. Sidestepping, let us mention briefly some earlier successful attempts to apply representation in macroeconomics and growth theory. Examples of the recent papers that use the representation (1) in macroeconomics and growth theory are (León-Ledesma and Satchi, 2019) and (Growiec, 2018).

Matveenko (1997) and, independently, (Jones, 2005) propose a way of representation of production functions. In case of two inputs, capital K and labor L; this representation is

$$F(K, L) = \underbrace{\max}_{l\in\Lambda} \min\{l_k K, l_L L\} \tag{3}$$

where, Λ is the technological menu, lK and lL are the efficiency coefficients of the factors ("local" technology), and $\min\{l_k K, l_L L\}$ is a "local" Leontief production function.

Representation is interpreted in the following way. A firm (or a country) has an available set of Leontief technologies - a technological menu. Given production factors K;L. The firm (country) chooses from the technological menu such Leontief technology which provides the maximal output. As a result of using the technological menu, the production function standing on the left-hand side of the equation is obtained.

Thus, the production function appears to be a result of a choice of Leontief technology from a corresponding technological menu. In such a manner, the Leontief function is found to be an elementary brick forming the foundation of any neoclassical production function.

Representation is different from the classical understanding of production function, in which the (global) production function is per set of a primary object, a recipe of utilized inputs. In the max-min model, we can think that a firm possesses a set of local production technologies - the technological menu Λ - and chooses the best one at each point (K; L).

2.3. Representation of Utility Functions

We will use the mathematical structure proposed by (Rubinov and Glover, 1998) and (Rubinov, 2001) for the representation of CRS utility functions on the characteristics of goods. Though the mathematical analysis is not very different, from the economic point of view as this representation of utility functions assumes a new model of the agent's behavior.

We begin with a brief recall of what is understood under utility function on the characteristics of goods. Those characteristics include both accurately measurable physical properties of goods, and, as noted by (McClean and Postlewaite, 2004), more subjective characteristics such as public prestige achieved through consumption of certain goods - the so-called status symbols.

Three main assumptions of Lancaster theory of utility functions on characteristics are the following (Lancaster, 1966):

1. The consumer does not obtain utility from goods themselves, but goods possess characteristics and consumer enjoys characteristics.
2. Each good can have several characteristics and the same characteristics can be shared by different goods.
3. Goods in combination can have different characteristics than the same goods but are consumed separately.

Utility functions on characteristics of goods are broadly used in empirical economicanalysis and marketing. The empirical researchers consider CRS as a merit of the functional forms used in such analysis. For this class of functions, an important fact described by the following mathematicaltheorem takes place which is a specification of more general mathematical results due to (Rubinov and Glover, 1998) and (Rubinov, 2001).

2.3.1. Theorem 1

Let $\{1,2,\dots,n\}$ be the set of characteristics under consideration, and $z = (z_1, z_2, \dots, z_n)$ - any vector of quantities of characteristics corresponding to the consumed products. For each increasing CRS utility function $U(z_1, z_2, \dots, z_n)$ there exists a set of vectors of weights of characteristics (behavior menu) Λ such that

$$U(z_1, z_2, \dots, z_n) = \underbrace{max}_{(l_1, l_2, \dots, l_n) \in \Lambda} min\{l_1 z_1, l_2 z_2, \dots, l_n z_n\} \quad (4)$$

Representation may be interpreted as the following model of consumer choice. The agent possesses a feasible set of attitudes -behavior menu Λ; each attitudel $= (l_1, l_2, \dots, l_n) \in \Lambda$ is the vector of the weights of the characteristics. A smaller weight increases priority to the corresponding characteristic.

The agent obtains the utility from consuming a bundle of goods $z = (z_1, z_2, \dots, z_n)$; how much utility she will obtain of this bundle depends on how much weight does she put on characteristics.

Another possible interpretation of representation (3) is the following. Behavior menu Λ is a set of feasible consumption technologies. Each consumption $l = (l_1, l_2, \dots, l_n) \in \Lambda$ is the vector of the efficiencies of the characteristics.

A smaller efficiency translates into smaller marginal utility with respect to the corresponding characteristic. The agent obtains the utility from consuming a bundle of goods $z = (z_1, z_2, \dots, z_n)$; how much utility she will obtain of this bundle depends on how efficiently she uses the characteristics. For the sake of definiteness, let us think of vector l as of an attitude till the end of the paper.

In each situation of choice, the agent chooses simultaneously a bundle of goods $z \in Z$and an attitude $l \in \Lambda$ to obtain the maximal utility U. Thus, in a particular situation of choice, facing a choice set Z, the agent solves the following problem

$$\max_{(z_1,z_2,\dots,z_n)\in Z} \max_{(l_1,l_2,\dots,l_n)\in\Lambda} \min\{l_1 z_1, l_2 z_2, \dots, l_n z_n\} \tag{5}$$

Thus, the new approach to utility function and consumer behavior implies that the agent's problem includes not only the choice in a particular situation of choice of some set of goods which are feasible for her due to her budget constraint, their personal characteristics, and market conditions, but also the choice of an attitude vector, i.e., a vector of weights of characteristics from a set Λ - behavior menu.

The menu Λ is formed by the individual under influence of the their environment, in particular, their community, family, media, government, etc. The menu is destined to serve in all potential situations of choice, even in those that are not known a priori when the menu is formed.

An important moment is that the choice of attitude $l \in \Lambda$ takes place even when the choice set Z consists of a unique item. In other words, the agent may change her attitude each time when she possesses a new object. This fact explains the phenomena of self-justification, such as in “The fox and the grapes” situation, and the endowment effect.

3. Results

Theorem 1 states that there is a mapping from neoclassical utility functions to the set of behavioral menus. In this section, we will discuss how the mapping operates in the opposite direction, from the behavioral menu to choice. Namely, we will discuss how different processes of formation of the menu (costly change of attitude, or external influence) determine the consumer's choice.

3.1. Endowment Effect

The endowment effect is a behavioral finding that people tend to value the objects which they're possessing more than the objects which they do not possess.

Let us assume that there is a single good. The good is described by the values of characteristics: The agent's behavior menu Λ consists of three vectors $l_{1,1}, l_{1,2} = \left(\frac{3}{2}, \frac{3}{2}\right)$, $l_{2,1}, l_{2,2} = (2,1)$, $l_{3,1}, l_{3,2} = (1,2)$. The cost of switching from attitude i to attitude j is

$$c(l_i, l_i) = \sqrt{(l_{i,1} - l_{j,1})^2 + (l_{i,2} - l_{j,2})^2} \quad (6)$$

The agent initially uses a vector of attitudes $\left(\frac{3}{2}, \frac{3}{2}\right)$ and has nothing to consume, so her utility level is zero.

If the agent is offered to buy the good, the agent finds it optimal to pay the adjustment cost $\frac{\sqrt{2}}{2}$. The net utility gain is$2 - \frac{\sqrt{2}}{2}$ - it is the maximal price for which the agent will buy the good. If we assume that the agent is possessing the good, the net loss in utility level if she sells it, is 2.

That is, the introduction of cost for switching between the attitudes can lead to the endowment effect. Similar arguments can be used to obtain justification for the model of habit formation and justify the experience effects.

3.2. Mood Induction

There is literature on mood induction (Conte, Levati, and Nardi, 2018), (Hu et al., 2015), (Tan and Forgas, 2010). One example of experiments of such kind is the following. The experimenter shows to groups of students fragments of movies of definite content (patriotic, amusing, neutral, etc.) After watching the fragment the students play one or another game taken from the standard toolbox of experimental game theory. The experiments show that behavior in the game (economic behavior) depends on what kind of fragment was watched before the game. From the point of view of our model, such experiments can confirm the change of the individual's behavior menu under external influence.

4. Discussion

When considering this work, of course, it should be understood that there are a number of nuances for such a research experience:

1. Basically, the work describes the theoretical and methodological part of the research, which may not always be correct for all practical practices.
2. Even though the authors carried out a number of practical actions on personnel management, while conducting the research, it is still the collective empirical component.
3. Generalized works on the subject of consumer choice are very difficult for application and applicability in small enterprises because despite their scientific significance and depth, when applied in practice, they often need serious advisory

support which is especially important in communities that especially significant in communities that need serious advisory support, especially a fairly close-knit team with internal problems and goals.

Conclusion

The present paper provides a new representation of a consumer's choice problem. The new representation accommodates neoclassical utility functions as well as, under some adjustments, several behavioral phenomena. The key object of consideration in our model is a behavioral menu. The agent's choice includes both choices of a basket of goods and a vector from the behavioral menu. The latter choice is interpreted either as a choice of an attitude or a choice of how to use the purchased basket of goods.

The new representation implies that agents have some degree of freedom in choosing what to like and sometimes are willing to pay some cost for changing the attitude. As a motivating example, one can think of a person who decides to learn about wines and tries to develop her taste for various wine characteristics and sometimes is willing to pay for a special course in wine-tasting.

Our model can serve as a tool, for instance, for the economics of identity. Moreover, our model can be used in modeling of consumption habits transmission in society. In the framework of our model we can talk about the formation of the individual's behavior menu in her environment, and about the formation of the common behavior menu in the network (the collective). Another possible direction of research can be in the introduction of uncertainty about the available vectors in the technological menu. For instance, the situation can be modeled as a discrete choice problem of a rationally inattentive agent (Matêjka and McKay, 2015) and (Fosgerau et al., 2017) in which the agent is uncertain about her preferences, not the values of characteristics of goods (Koszegi and Matejka, 2018).

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Chapter 5

Transformation of HR Branding in the Digital Era

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Abstract

Forming of HR brand includes complex actions of a company directed to attraction, development and retention of human capital on the basis of unified system of values. HR branding gained the greatest development in intellect-intensive business spheres (IT, banks, pharmaceutics, and consultancy services) where a hyper competitive employment market and a necessity to generate innovations exist. During the Covid-19 pandemic, the rates of commercial digitalization considerably exceeded the experts' forecasts. Today HR branding forms a "digital" mentality of employees, shows empathy to modern generation (Y, Z), uses diversity-recruiting, adapts Employee Value Proposition for the local markets, projects and develops employee experience. On the one hand, process of HR brand forming demands costs, on the other hand, the existing HR branding itself becomes subsequently a resource of the enterprise. Digitalization demands a restructuring of organization's business processes, including HR brand forming. For example, there is a need for additional investments to improve visual content, skills and competences of online gamification, as well as to attract the intranet leaders inside the company to support internal social networks, switching to online formats and mobile training. This research covers the algorithm of HR brand forming process by means of modern digital communication tools that includes a full range of HR branding tasks and possesses cyclic character. The study describes application possibilities of various digital communications in the context of direct and indirect HR branding forming results, also depending on the stage of company lifecycle.

Keywords: HR, digitalization, personnel loyalty, HR brand forming process, digital communications

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1. Introduction

The HR brand is one of strategic business priorities without reference to the size and the scale of company activity. HR branding gained the greatest development within innovation and intellect-intensive spheres of business where there is a hyper competitive employment market (such as IT, banks, pharmaceutics, consultancy services and others). In the conditions of digitalization and media space convergence, the employees themselves become a resource for promoting corporate brands, including HR brand. Visual content (video, pictures, feedback, opinions) and storytelling with real people create the live atmosphere around the organization. Forming of HR brand should correspond to the modern digitalization trends of enterprise activity (Bataev, Gorovoy, and Mottaeva, 2018), be empathic to present-day generation (Y, Z), use diversity-recruiting, adapt Employee Value Proposition for the local markets (Rudskaia, 2018), project and develop employee experience, create a "digital" mentality of employees (Deepa and Baral, 2017). Mobile applications are turning into essential platforms for HR tools. There is an accelerated development of corporate social networks and cognitive technologies (Barykin, Bochkarev, Dobronravin, et al., 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al., 2021; Barykin, Smirnova, Sharapaev, and Mottaeva, 2021; Barykin, Bochkarev, Sergeev, et al., 2021). Intellectualization, robotics and personal approach become an integral part of HR branding. In the eye of researchers (Dubgorn, A., Abdelwahab, M.N., Borremans, A., Zaychenko, 2019), the HR branding digital transformation serves as prerequisite to ensure future competitiveness through transforming the business from traditional to technological company.

2. Materials and Methods

As a result of introducing remote forms of activity amid the pandemic, companies in various industries considerably exceeded expert forecasts over the digitalization rates. According to the research "Actions of HR in a Pandemic Situation" in 2020, 43% of the companies in Russia transferred internal interviews to online. Avito service has been testing video interviews since April, 2020; 52% of the companies transferred employment process to online. A number of measures is planned to be turned into a permanent basis after the pandemic. Figure1 demonstrates the statistical data on new personnel management model implementation (remote employment, flexitime, and online recruitment).

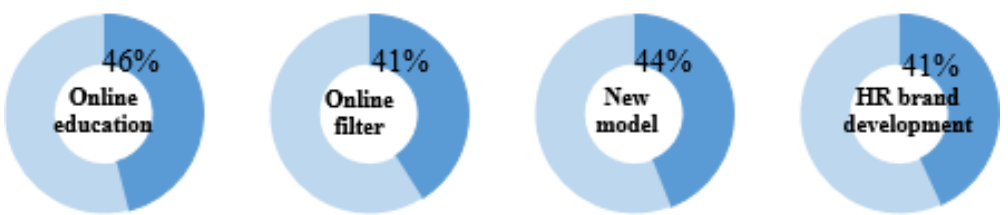

Figure 1. Planned measures on a permanent basis ("Actions of HR in a Pandemic Situation" 2020).

Thus, HR branding endures digitalization of communications with the potential and existing employees (Holzer, 2019; Bejtkovský, Rózsa, and Mulyaningsih, 2018). Communication technologies become the defining instrument for employee loyalty forming. These daysit seems necessary to have theoretical and practical research concerning the use of digital tools on each stage of HR brand forming process (Sorko, Rabel, and Richter, 2016).

The study made use of general scientific methods: deductions and inductions, analysis and synthesis, comparisons, ascent from abstract to specific. The knowledge base of the research is compiled by information from periodical print media, specialized Internet resources, and marketing research results issued by leading Russian companies (KPMG, Expert RA).

3. Results

In this research we consider HR brand forming as the process that includes a complex of the company actions directed to attraction, development, and retention of human capital by developing loyal relation to corporate brand and creating unified system of values. HR branding, as any enterprise process, is connected with transformation of resources into results by the means of certain “technology” (Kim and Sturman, 2012). HR brand forming can be characterized by three interconnected blocks and the availability of functional dependences (Figure 2) is supposed between these blocks. The enterprise possesses various resources: labour, financial, organizational, material, temporary, information, intellectual and many others. Intangible assets along with information and methodical providing can be considered both as a resource and result of HR branding. Loyalty of personnel and consumers, the relations in branches, popularity and other aspects is possible to be used in the course of HR brandforming, that is why it is considered as a resource. The HR brand can be created in the course of enterprise activity, thus it is considered as a result (Fejling et al., 2019).

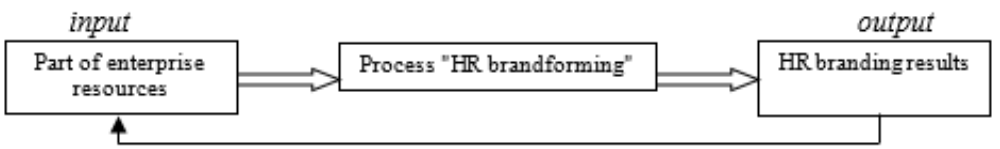

Figure 2. Interrelation of resources and results in the course of HR brand forming.

It is possible to allocate two main approaches to understand the HR branding result:

- as the direct result connected with realization of HR branding functions; examples of absolute measures: the number of attracted qualified personnel, level of personnel turnover, the number of R&D made by personnel, personnel loyalty and satisfaction, reputation, etc., and also examples of relative indicators: index of personnel satisfaction, index of HR branddevelopment, relative growth of awareness, and others;
- as indirect (sidewise) result, as a certain contribution to the final results of the enterprise, to the cost of the company, creation of intangible assets, forming the competitive advantages, chains of value creation, to the financial results of company: sales volume, profit, market value of the firm.

There are various noteworthy concepts and models (Backhaus and Tikoo, 2004; Macioschek, Katoen, and Nilsson, 2007; Rucci, Kirn, and Quinn, 1998) that describe connection of HR brand with final indicators of the organization. In this research we want not only to represent connection between resources and results under the HR branding forming, but mainly to describe digital communication tools which can be useful to achieve both direct and indirect results (Figure 3).

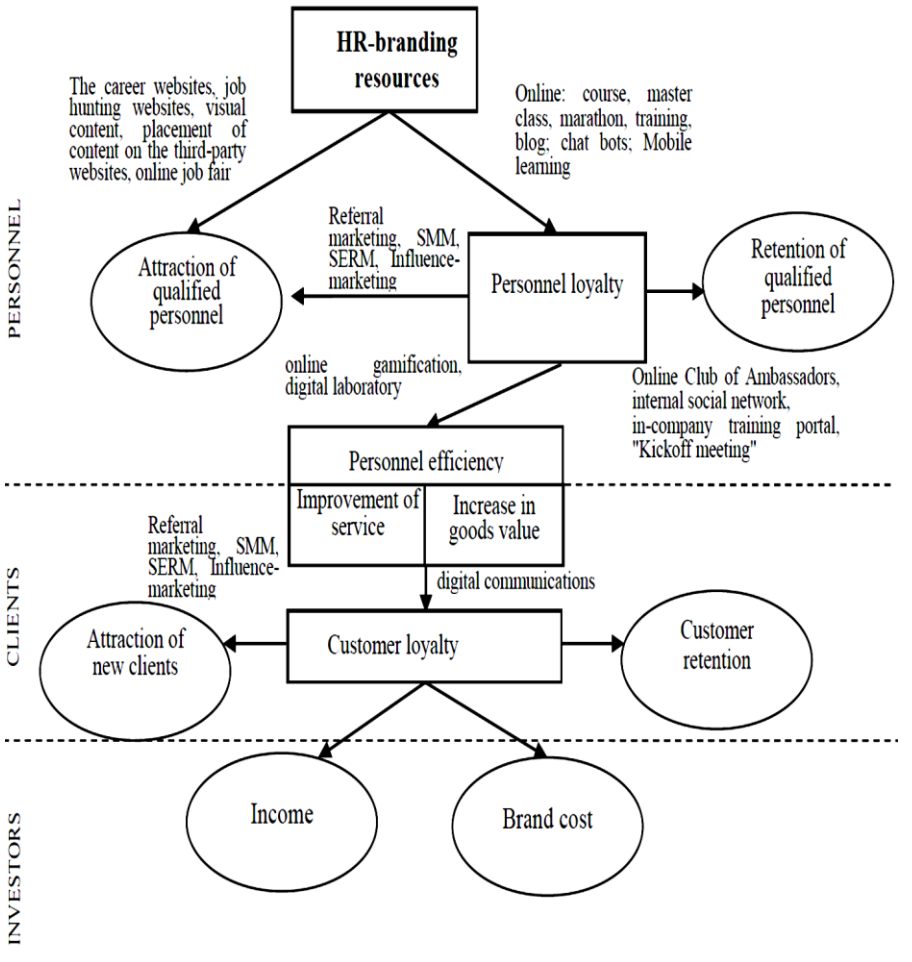

Figure 3. Application of digital communications by forming the results of HR branding.

In the conditions of economy digital transformation, it seems insufficient to turn some offline HR branding affairs into online format. Conscious approach to introduction of digital communications and technologies means fundamental changes in corporate culture. Successful transformation and cultivation of personnel digital competences require a synergistic introduction of digital communications based on digital platforms for the purpose of digital culture forming. By using digital communications new employees are attracted, the loyalty of personnel is formed, and employees acquire digital skills through different online-education formats (Pulyaeva et al., 2019; Evseeva, Evseeva, and Kalinina, 2020). Digital services give the chance to estimate a human capital of the company, to manage the development of each

employee and to effectively distribute competences in the key directions of the organization (Rasskazova et al., 2019). Digitalization demands restructuring of organization business processes, including HR brand forming process. For example, there is a need to invest additionally into improvement of visual content, skills and online gamification competences to attract the intranet leaders inside the company, to support internal social networks, and to switch to online formats and mobile training (Mitrofanova, 2019; Strohmeier, 2014).

Figure 3 shows the examples of digital communications designed to form both direct HR branding results (attraction and retention of qualified personnel, personnel loyalty), and indirect: customer loyalty with possible attraction of new and retention of the available clients, contribution to company income (through increase in average purchase size, the number of primary and repeated purchases), brand total cost, and intangible assets."HR brand forming" process has a certain sequence, consists of subprocesses and transactions. In each of them it is possible to use various digital era tools (Figure 4).

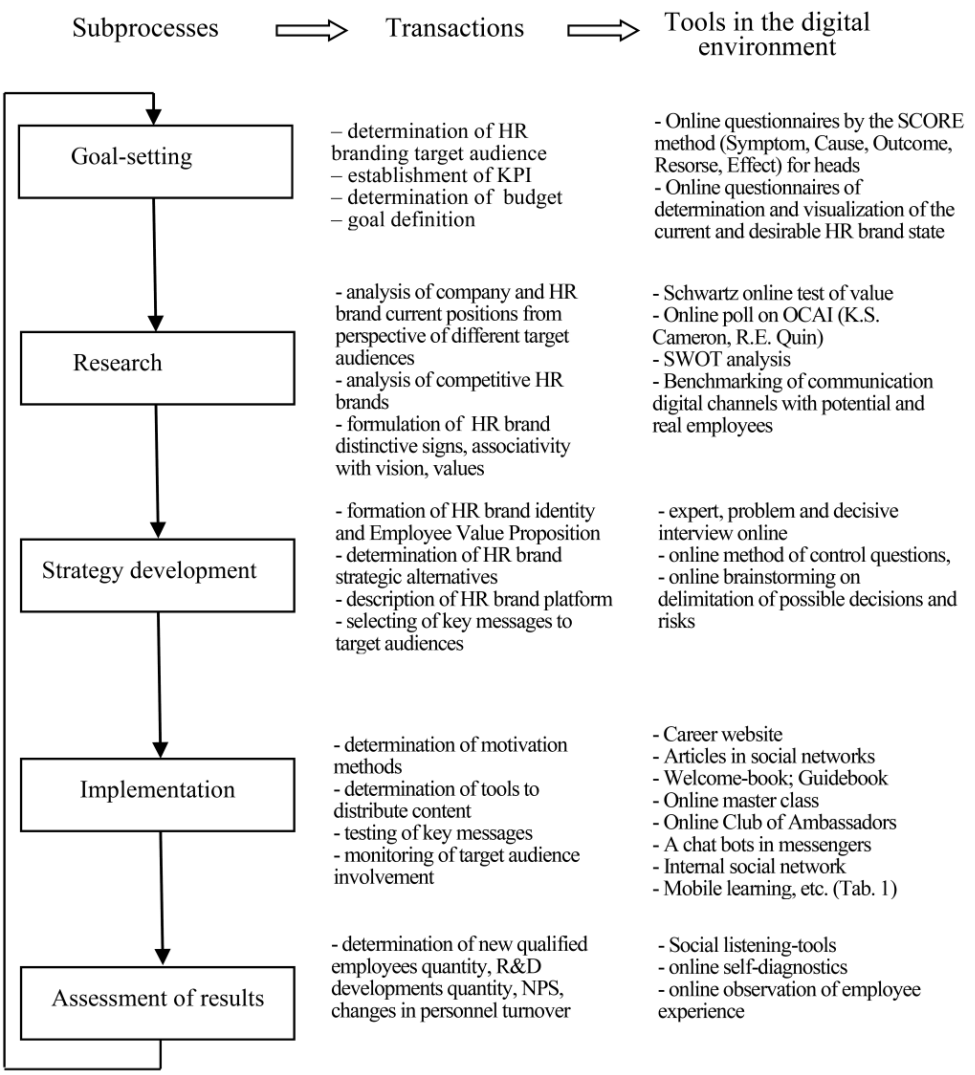

Figure 4. The algorithm of HR brand forming process by means of digital communications tools.

Table 1 represents the instruments for digitalization of HR branding communications in details with separation into target groups in the light of company lifecycle. According to Table 1 we may conclude that considerable investments into HR brandare required at the stages of introduction and growth (costs, resources), while at HR mature stage the brand itself will become a resource for the company and work through the staff of the organization. The represented tool kit has a secondary character since the tools can differ depending on industry, company size, scale and field of work. This table is recommended to be developed individually with orientation to the own purposes, resources, and needs of target groups.

Table 1. Digital instruments of HR branding depending on the stage of company lifecycle

Digitaltool	**Introduction**	**Growth**	**Maturity**	**Recession**
Purpose of digital tool application	**Vision of a brand, identity, positioning.**	**Awareness of brandand its attributes**	**Awareness of brand through employees**	**Transition to a new stage of development and growth**
Target audience: personnel (heads, employees, trainees)				
Online master class	+	-	-	-
Microlearning	+	+	+	-
Online course	-	+	+	-
Online Club of Ambassadors	-	+	+	-
Welcome-book on the corporate website	+	+	+	-
Guidebook	+	+	+	-
Chat bots in messengers	-	+	+	-
Virtual game “Kickoff meeting” with Google Hangouts	-	+	+	+
Blog	+	+	+	+
Internal social network	+	+	+	+
Online marathon	+	+	+	+
Online Training	-	+	+	-
E-Mailing	-	+	+	+
Enterprise training portal	+	+	+	+
Mobile learning	+	+	+	-
Target audience: potential employees				
Career website	+	+	+	-
Articles on social networks	+	+	+	-
Job hunting websites	+	+	+	-
Placement of content on the third-party websites	+	+	+	-
Visual content (a video interview about employees progress)	+	+	+	-
Welcome-book on the corporate website	+	+	+	-
Online job fair	+	+	+	-
Target audience: clients and all participants of branded events				
Articles on social networks	+	+	+	-
Video	-	+	+	-
Training events	+	+	+	+
Online hackathon	-	+	+	-
Online simulators	-	+	+	-
Target audience: investors, shareholders, partners, media				
The annual report on the corporate website	-	+	+	+
Meetups-online	-	+	+	-
Online conference	-	+	+	-

4. Discussion

According to Figure 4, at the first stage of goal-setting the heads and top managers provide assessment of the purposes, desires and opportunities of the company within HR brand forming (Fernandez and Gallardo-Gallardo, 2020). One of the visualization-convenient tools is the model for determination HR brand desirable and current state (Figure 5) that is formed after online questionnaire data analysis. In this example, the model is formed based on 6 key measurements of HR brand condition. The main thing is to provide honesty and perhaps anonymity of answers. The respondent should put down a point from 1 to 10 for each statement, average rates are visualized on the chart.

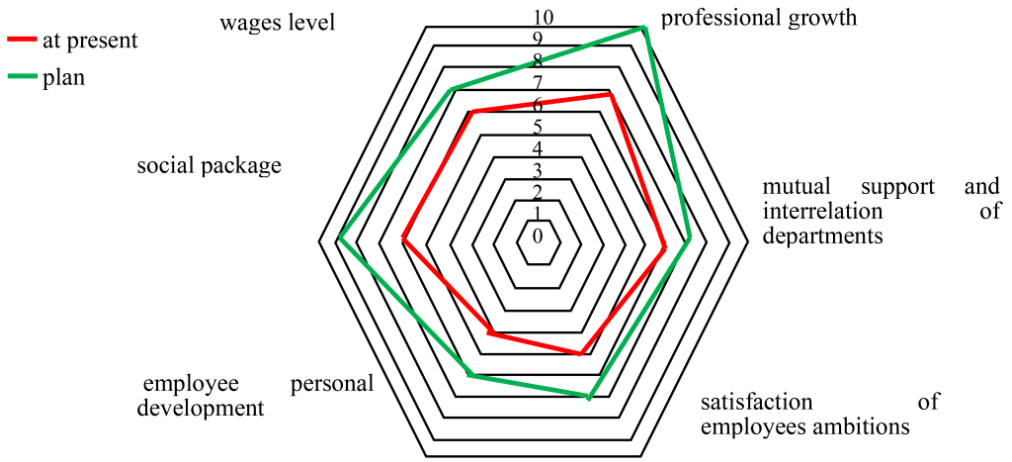

Figure 5. Model of determining the desirable and current HR brand perception by target audiences.

At the second stage of the research it is important not only to define how the potential and available employees see the company, but also to compare images of the competing companies among themselves and opinions among the industries. There are digital tools, quantitative and qualitative, for HR brand measurement: online ratings of recognition and attractiveness, online research about the importance of various factors when choosing the employer (professional growth, training possibilities, social package, personal development, etc.) (Sagiri, 2008).

After receiving estimates on the condition of the studied HR brand, the positioning of company as employer at labour market is built at the third stage. It is important to create a clear idea: what is the company HR brand from the viewpoint of target audience; what is the Employee Value Proposition, based on self-determination of the company. It becomes necessary to develop several strategic alternatives of HR brand realization in the conditions of the available resources (Canedo et al., 2017; Halliday and Trott, 2010; Parmar, 2014; Baykal, 2019). It seems possible to start forming HR brand promotion strategy by means of digital communications after drawing up a portrait of professionals target audience, measurement of the organization perception at labour market, comparisons with competitive HR brands, and comparisons with perception of the available employees and forming of Employee Value Proposition. Introduction of HR brand at the fourth stage is occurred on the principle of marketing funnel: FORMING OF HR-BRAND RECOGNITION − INTERACTION AND ATTRACTIVENESS −READINESS TO BECOME THE EMPLOYEE −MANIFESTATION

OF LOYALTY. However, one algorithm of HR brand forming seems insufficient. Consequently, it becomes appropriate to construct the creative atmosphere where talented personnel will mature. Digitalization of communications stimulates strengthening of personnel involvement into decision-making process, contributes to forming the command relations among the staff of different divisions, stimulates manifestation of competence, mentoring, trust, mutual support and paves the way for creating the "smart company".

Conclusion

Success of the intellect-intensive and innovation companies is directly connected with human capital. Attraction and retention of professional staff at hyper competitive market is possible by means of HR branding. In the modern conditions of pandemic and post-pandemic, the digital communications stay as relevant instruments of HR brand forming. This research represents the application possibilities of various digital communications in terms of forming direct and indirect HR branding results depending on the stage of company lifecycle and in the frames of the process approach. The process when HR brand broadcasts its values is not always clear to the audience due to the inconsistency and weak concentration of key messages. This research proposes the algorithm of HR brand forming process through the modern digital communication tools and online training formats taking into the account a set of external and internal environment factors.

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Chapter 6

Demand for Innovations in Logistic Systems under Digitalization

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Abstract

This article focuses on research of demand for innovation in systems of logistics. This article contains a review of the existing methods of evaluation of innovation potential and innovation progress in Russia and the world. The conclusions concerning the diversity of approaches to evaluate the innovative activities worldwide and in certain regions. We offered a classification of innovation sources. The options for achieving them were described. The strategies of innovation and territorial development of Russia, a row of regional legal acts were analyzed and the conclusion was made that the state supports the demand for innovations in the acting legal acts but does not contribute to its development, there is a transition from the state interest only in innovations to entrepreneurs' interest. Evaluation of the effectiveness of the regional logistic systems showed stagnation of Russia in the field of customs administration, global transport, and traceability of the supply chains. Weak development of the Russian logistic systems assumes the development of digital innovations not at the level of start-ups only but also at the global level, e.g., platforming of the logistic systems, the introduction of digital twins, digital technologies of traceability, etc.

Keywords: demand for innovations, innovation activities, innovation potential, innovation progress, innovation policies, logistic systems

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1. Introduction

Based on the report of McKinsey Digital Russia: New Reality, the optimization of production and logistic operations will be the main source of the GDP growth due to digitalization until 2025. The consulting group noted two growth directions of the digital economy share at the GDP: online monitoring of the production lines and optimization of logistic ways and determination of priority order of dispatches. The experts believe that the effect of digitalization of production and logistic operations shall amount to 1.4–4.0 billion rubles (Veselovsky et al. 2019; Semyachkov 2018; Kudryavtseva, Skhvediani, and Bondarev 2018; Afonasova et al. 2019; Semenyuta et al. 2019).

Conditions for digitalization of logistic systems are the necessity of economic entities to exchange articles subject to transition between towns; competition between transport companies; diversity of customers and freights, requirements' specifics of service providers and users, functional possibilities and diversities of the capitalization levels, the complexity of acting rules and restrictions, differences of administrative interests, the imperfection of legislative basis.

The innovative technologies of Industry 4.0, in particular IoT, Big Data, AI, digital twins, and others (Barykin, Bochkarev, Dobronravin, et al. 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al. 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al. 2021), also serve as accelerators of digital transformation, enabling the construction of a sequence of dominating paradigms pf industrial revolution: mechanization – technologization – digitalization – intellectualization (Zinchik et al. 2020; Kapustina et al. 2020; Korchagina, Bochkarev, et al. 2019; Dmitriev 2019). Therefore, a transition into the digital medium creates a need for studying the demand for innovations in transportation logistics systems.

2. Materials and Methods

2.1. Problem Statement

The research of the demand for innovations in the logistic systems under digitalization arises a row of both scientific and practical problems. In particular:

- absence of unified methods of evaluation of innovation activities;
- no sufficient amount of open data for comparative analysis of the demand for innovations;
- insufficient analysis of branch possibilities of development of digital technologies;
- insufficient elaboration of legal acts in stimulating demand for innovations.

We will consider these problems in more detail in the following sections.

2.1.1. Subsection Sample

Nowadays, the development dynamics and research of demand for innovations rise actively worldwide. Currently, there are different methods of formation of innovation indices of

different levels. Governmental authorities of statistics and independent analytical centers evaluate the ratings of countries and certain regions. The main task of forming the innovation indices is evaluating the innovation potential and innovation activities at the selected level (macro-, micro – or meso-levels), which enables evaluation of the effectiveness of the state and regional innovation policies and elaboration of recommendations on its harmonization. However, the administrative borders are no restrictions for innovative development, it should be taken into account in calculating the indices. Therefore, it assumes to be actual to identify the territories with high potential for innovation development and evaluate their effectiveness under conditions of dynamically developing innovative eco-system.

2.1.2. No Sufficient Amount of Open Data for Comparative Analysis of the Demand for Innovations

The data presented on the official statistic and rating sites are of general character, not permitting to determine the share of the digital innovations. However, the digital management technologies of logistic processes are innovative as they are. By now, the administrative legal barriers block their implementation. However, they definitely will become an accelerator of radical changes in the economy, organization and coordination of freight delivery, changing of technical regulations of authorization of rolling stock for transportation of loads and passengers. They also will transform rules and practices indirectly coupled with logistics, in particular, ecological requirements, rules of transportation and freight insurance, the practice of regulation of sequences of road traffic incidents, specifics of customs control.

2.1.3. No Sufficient Amount of Open Data for Comparative Analysis of the Demand for Innovations

Nowadays Russia deals tasks of improving the general level of digitalization to gain economic independence. The distribution of governmental finance under these conditions occurs by the trend principle. The analysis of the branch possibilities becomes a relatively unimportant task that the branches deal with.

2.1.4. No Sufficient Amount of Open Data for Comparative Analysis of the Demand for Innovations

The applicable legal acts of Russia in the field of the innovational development of the digital economy are directed to supporting innovative development more than the development of demand from small and medium-size enterprises; these have significant entrance barriers for the innovation market.

2.2. Research Questions

The following questions were formulated for researching the demand for innovations in logistic systems:

- How to determine innovation activities of regions under digitalization?
- What factors restrict the development of demand for innovations in the logistic systems?

- What will contribute to innovation demand growth in the logistic systems of Russia under digitalization?

2.3. Purpose of the Study

It is assumed that the answers to the above-mentioned questions will help to elaborate approaches for maintenance and activation of demand for innovations in logistic systems under conditions of development of the digital economy, which will contribute to improving the competitiveness of the Russian logistic systems.

2.4. Research Methods

2.4.1. The Global Innovation Index (GII)

The research of the international experience showed the commonest index to be the Global Innovation Index (GII) (Andrade, Nigel, John Bell, Suma Athreye, Aravind S. Bharadwaj 2016; Dutta 2015), calculated based on 80 parameters. Since 2007, the Index has been published annually considering the level of education, development of infrastructure and political issues in the country/region. The report on the GII of 2019 included data on 129 countries.

The European Union estimated the innovation activity based on the Oslo Manual Guidelines for Collecting, Reporting and Using Data on Innovation. In it, the definition of innovation and their classification were given: production, process, organizational and marketing. The evaluation results were reflected in the Innovation Union Scoreboard and Regional Innovation Scoreboard [Regional Innovation Scoreboard (Hollanders 2020). The participating countries were rated based on 25 indices including human resources, economic effects, and open, superior, and attractive research systems.

Compared to the GII using expert evaluations, the EU used to apply statistic data of the national statistic bodies of the EU members as the base for calculation of the parameters.

In England, the data were collected by the financial support of the Department of Business, Innovation and Skills. The enterprises with personnel over 10 employees received questionnaires with the questions concerning incomes and outcomes coupled with scientific research, market research, factors contributing and hindering the innovative development of enterprises. The Office for National Statistics (Rammer 2019) collected and proceeded the results. The methods for evaluating innovative activities are similar in Canada .

Especial attention was paid to the calculation method of the development index of the regional innovation systems. The University of Madrid offered to apply a row of statistic instruments. The method was created based on correlation, factor, and multi-choice analyses. The approach assumed that 6 groups of variables with different weighting factors were determined. For example, the index group of the grade of demand correspondence in the total value contributed 8.43% compared to the regional production economic environment with its weight of 34.43% (Pellitero, Buesa, and Heijs 2008).

The wide range of ratings of innovation activities was developed in the USA. Governmental and private brain centers evaluate states and counties there.

The U.S. Department of Commerce used to calculate the Portfolio Innovation Index, including 17 parameters in those directions as human resources, economic progress,

productivity and employment, welfare, as an average weighted value ("Methodology for the Innovation Index," n.d.).

The following ratings represented the tools of the brain centers:

- Index of the new economy of the state demonstrating how the state economy structure complied with the term of the new economy;
- Index of the state technology and science development;
- Southern Innovation Index for the group of the neighbor states;
- Index of Innovation Economy of the State of Massachusetts, the center of the biggest higher schools in the USA;
- Innovation index of New York City;
- Other authorial indices.

The method for evaluating innovative activities in Russia was peculiar because of being restricted. The legal entities from the field of extraction of commercial minerals, their processing, production and distribution of electric energy, gas and water, communication, application of information technologies, and others submit annually the report No. 4 Innovations, and the small and medium-size enterprises submit the report 2 MP.It was noteworthy that the report about the SMEs did not consider those directions of innovation activities as non-commercial services and marketing and process innovations.

The following players very well presented the evaluation methods of innovation activities of the Russian regions:

- Higher School of Economics;
- Association of innovation regions in Russia;
- National Association of innovations and development of information technologies and others.

The rating system of innovative regions was similar to the European system; however, the innovation activities of SMEs were underrepresented in Russian indices. Implementing foreign experiences, for example, weighting factors and reporting on results, the Russian methods solved current tasks of the subjects of the Russian Federation.

2.4.2. The Rating of Logistics' Efficiency LPI

The rating of logistics' efficiency LPI 2018 (Transportation, 2018), composed by the World Bank in 2018 (World Bank 2018), was used for evaluation of the efficiency of logistic systems of regions in different countries of the world. LPI is an interactive tool for comparing 160 countries created to help countries to determine their problems and opportunities, which they have been facing in their commercial logistics and what they could do to improve their efficiency. The method for determining the position in the rating (5-grade scale) considered the effectiveness of the operation of the customs authorities, condition of the logistic infrastructure, operational efficiency of international transportation, timeliness of delivery and possibility to trace loads.

2.4.3. A Classification of Demand for Innovations in Russia

The authors offered a classification of demand for innovations in Russia to determine its level. In our case, the optimal was the classification of demand from the state (and the companies with the state support or participation) and demand from the private business. The latter can also be divided into the demand from large corporations and demand from SMEs. The main sources of innovations to appear were determined and based on it the demand from the state and the private business was described briefly:

- During operation, when a company faces a necessity to start changes; this innovation shall be called an innovation by necessity. It has previously determined precise criteria for evaluation and understanding of tasks the innovation shall regulate.
- As a result of scientific research where the approximate results are often unpredictable. This innovation may be called an academic innovation or an innovation, which is created first and only then it is determined where this innovation may be applied.

2.4.4. Experimental Legal Statuses in Digital Innovations in the Russian Federation

Based on the draft On Experimental Legal Statuses in Digital Innovations in the Russian Federation, developed by the Ministry of Economic Development of Russia, the Skolkovo project, the Unified national system of digital labeling and traceability, developed by the Center of Development of Prospective Technologies, and the Roadmap of development of the end-to-end digital technologies, the legal acts concerning stimulation of demand for innovations were studied.

3. Results

3.1. The Global Innovation Index

Under the conditions of digitalization and globalization of economies, the evaluation of the innovation activities and demand for innovations in Russia is done in particular based on the world parameters, one of them is the Global Innovation Index. In the GII report for 2019, Russia kept the rating of the previous year and took the 46th place.

The GII indices may be divided into two groups:

- Input, i.e., conditions or terms of the development of innovations, describing innovation environment and tax policies;
- Output, i.e., results of innovations activities, commercialization of scientific research, the dependency of employment, economic growth, state development, investment activities on innovations.

In 2019, the expert board evaluated the conditions of innovation development in Russia much higher than the results of the innovation activities. In the list of 129, Russia ranked 41st in input and 59th in output sub-index. In other words, the innovative potential was much higher than the results of the innovation activities.

To evaluate the demand for innovations it was reasonable to analyze the sub-index 4 Grade of market development as per the following indices:

- Index 4.2.3. Risk capital deals/billion.
- Index 4.3. Trade, competition and market scale
- Index 4.3.2. Intensity of the local competition
- Index 4.3.3. Domestic market scale

The development grade of the innovation market put Russia in 2019 to 61st position with the following weaknesses:

- 69th in Financing, including 73rd in Gross amount of microfinancing
- 102nd in investments, including 77th in Risk capital deals.

However, the experts noted the strengths of innovative development in Russia, which were as follows. Position 11 in Index 4.3. Trade, competition and market scale, including position 6 in sub-index 4.3.3 Domestic market scale.

The Russian innovation market progress is presented in Figure 1.

The charts demonstrate a stable and wide scale of the internal innovation market. At the same time, the sub-index of Trade and Competition grew significantly despite the weak intensity of the local competition.

The sub-index of Trade and Competition shows growth although it is questionable how many competing enterprises and of which branches were considered in this case and how much interest these enterprises showed in innovations.

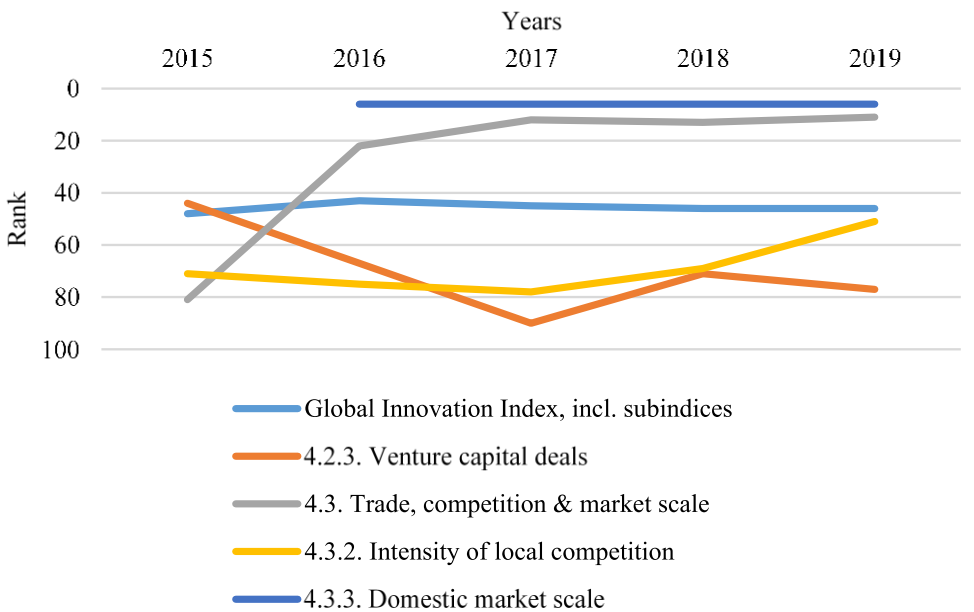

Figure 1. Dynamics of sub-indices of innovation activities in Russia, 2015-2019. Created by the authors based on (Dutta 2015).

3.2. The Logistics Efficiency Rating

In accordance with the logistics' efficiency rating for 2018, the leader was Germany with a significant gap over Sweden, Belgium, and other countries in the level of development of the logistic systems (See Table 1).

Table 1. World rating of logistics' efficiency, 2018

Indicators \ Country	Germany	Sweden	Belgium	Austria	Japan	Netherlands	Singapore	Denmark	United Kingdom	Finland
LPI Rank	1	2	3	4	5	6	7	8	9	10
LPI Score	4.2	4.05	4.04	4.03	4.03	4.02	4.00	3.99	3.99	3.97
Customs	1	2	14	12	3	5	6	4	11	8
Customs	4.09	4.05	3.66	3.71	3.99	3.92	3.89	3.92	3.77	3.82
Infrastructure	1	3	14	5	2	4	6	17	8	11
Infrastructure	4.37	4.24	3.98	4.18	4.25	4.21	4.06	3.96	4.03	4.00
International shipments	4	2	1	3	14	11	15	19	13	16
International shipments	3.86	3.92	3.99	3.88	3.59	3.68	3.58	3.53	3.67	3.56
Logistics competence	1	10	2	6	4	5	3	9	7	15
Logistics competence	4.31	3.98	4.13	4.08	4.09	4.09	4.10	4.01	4.05	3.89
Tracking & tracing	2	17	9	7	10	11	8	3	4	1
Tracking & tracing	4.24	3.88	4.05	4.09	4.05	4.02	4.08	4.01	4.11	4.32
Timeliness	3	7	1	12	10	11	6	2	5	8
Timeliness	4.39	4.28	4.41	4.25	4.25	4.25	4.32	4.41	4.33	4.28

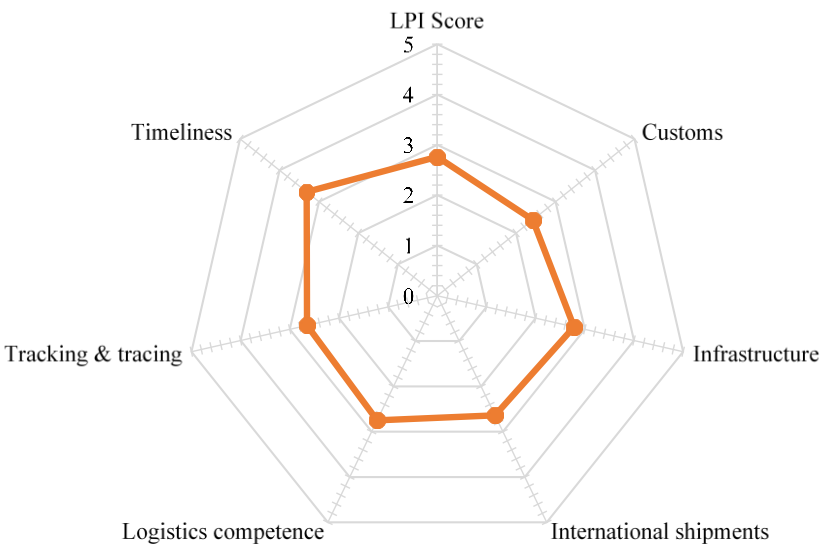

Figure 2. LPI 2018 (Russian rating in logistics' effectiveness, 2018).

Currently, Russia takes the 75th position in the rating of 160 countries after Costa Rica and Paraguay, being a bit above Benin and Montenegro. Oddly enough, our country has the lowest values (position 97) in the effectiveness of the customs administration (2.42 points) and traceability of supply chains (2.65 points). In the parameter of international shipment, Russia has the position of 96th (2.64 points). Provision of timeliness of delivery, infrastructural development and quality of logistics (3.31, 2.78 and 2.75 points and positions 66, 61 and 71, respectively) shall be harmonized too (Figure 2).

3.3. The Demand for Innovation

Studying the demand for innovation based on the subject (state or private business) demonstrates the interest of business in innovations by necessity. In the process of creation of academic innovations, the business takes part under certain conditions. For example, understanding that the innovation created today may be harmonized and applied in the operations, but much later, when the market is ready. The state shows high interest in the second type of research knowing that the decisions created may guarantee breakdowns in different activity fields, in particular in exclusively state areas. The state acts as a sort of guarantor of the innovation processes. The demand for new products, services and technologies is the main factor of the success of innovations. Therefore, the state, developing the innovation environment, financing fundamental developments, and rectifying complications for creating and implementing innovations contribute to stimulation of innovation activities. It must be admitted that, the demand for innovations from the state is generally high, for example, in military field and industry, oil and gas production, and mining (Korchagina and Desfonteines 2019; Korchagina, Naumova, et al. 2019). The state financing of research and development of these branches is quite high and effective. Usually, the innovations received in that manner are widely applied at the state level. This is about state enterprises with state supportfor the large companies. The demand for innovations finds support in actual legislation, Strategy of Innovation Development in the Russian Federation up to 2020, Strategy of Territorial Development of the Russian Federation up to 2025, and several other regional acts.

Now we consider the demand for innovations from the standpoint of business. For private companies, academic innovations are of much less importance. Although the innovations by necessity are desired and necessary for each company planning its continuous successful presence in the market. The range of innovations required by the private business is very wide from global breakdowns to tiny changes enabling the reduction of costs (Korchagina, Kalinina, et al. 2020; Fan and Zhou 2011; Molotkova, Khazanova, and Ivanova 2019). The price of these innovations varies also very wide from several thousand rubles to billions. Namely, the price or paying capacity of companies determines the demand for innovations. Therefore, business as consumer and creator of innovations is highly interested in innovations. But there are sometimes insufficient funds. As per GII, Russia has no good situation in the field of loans for innovations.

Although the demand for innovations is high enough, the enterprises try to satisfy it mostly on their own due to several reasons. Firstly, the price of the internal creation of innovation will be lower at the first glance than at outsourcing (effectiveness issues remain open). Secondly, there will be no necessity to broadcast confidential information to third parties. Thirdly, there is no common understanding of which service provider in innovations to apply. The

complications at the innovation market functioning in Russia explains it. Actually, the market of innovations with its driver of offer, not demand, is insufficiently developed in Russia. The offer and demand for innovations exist very often not corresponding to one another. On one hand, it is explainable, and on the other hand, the mechanism of interaction between the offer and demand on the Russian market of innovations is not well studied and developed. There are also complications for the participants of the market itself, for example, entrance barriers for SMEs in form of imperfect legal acts or insufficient financing. The system where large companies pay SMEs for creating innovations (after the fashion of the state support) seems rational. However, this global market remains not created yet.

3.4. Experimental Legal Statuses in Digital Innovations in the Russian Federation

On May 12, 2020, the State Duma approved in the first reading the draft On Experimental Legal Statuses in Digital Innovations in the Russian Federation, developed by the Ministry of Economic Development. The draft assumes creating legal conditions and terms for accelerated development and introduction of new products and services under the application of digital innovations. The key directions of testing new technologies are medicine, transport, finance, education, construction and industry, state administration.

Thank to construction, industry, transportation logistics systems, and the financial sector, there is a transition from the exclusive state interest in innovations to that of the companies. These are mostly large companies receiving better conditions for introducing innovations. Obviously, it is impossible to predict whether the offered project enables the introduction of innovations for even large companies. But, this legislative progress is a trial to eliminate obstacles for innovations in general. The legislative basis does not contribute much to the development of demand for innovations for SMEs too. Although the necessity to introduce amendments creating the basis for the development of innovation component of SMEs to the actual legal acts has been discussed since long ago, this issue has been postponed repeatedly.

The Skolkovo project was designed for the creation of special economic conditions for the companies in the preferred branches of the modernization of the Russian economy such as space research, nuclear technologies, biomedicine, and energetics(“Skolkovo Innovation Center,” n.d.). The SMEs receive the support of the state there. They can present their products in the market. Nevertheless, in case they fail their existence is somehow provided or guaranteed by the state support. Therefore, the state, being a consumer, customer and creator of innovations, is both interested in innovations and capable of paying for them.

One of the directions of the state regulation of the transport logistic processes is the implementation of the digital traceability technologies as a unified national system of digital labeling and traceability, developed by the Center of Development of Prospective Technologies. In December 2017, President V.V. Putin approved the decision of the government on the creation of a Unified National System of the complete labeling of goods before 2024. The Center of Development of Prospective Technologies was assigned as an operator; it is a joint project of the USM Technologies (50%), state corporation Rostech (25%), and firm Elvis-Plus Group (25%), founded based on the state-private partnership and acts as an authorized operator assigning a unique code to each article (DataMatrix or labeling of a different type).Therefore, the manufacturer or importer could place it on the package. It is

assumed that this system shall include most of the industrial branches before 2024, above all production of tobacco, pharmaceuticals, clothes, shoes, infant food, etc.

The Ministry of Digital Development, Communication and Mass Media of Russia has developed a Roadmap of development of the end-to-end digital technologies. Among the main sub-technologies assumed for implementation at the industrial enterprises, there is the Smart Design environment (PLM-systems, digital twins, MES-systems). It is considered for implementation in the automotive industry, shipbuilding, engine building, engineering (atomic, heavy engineering, railway transport). The target codes are as follows: 25-50% of enterprises use Smart Design before 2021; 50-100% before 2024. Furthermore, up to 2021, the period spent on the development of high tech products should be reduced by 15%, and up to 2024 by 25%.

Under the conditions of the global strengthening of competition the capability to change innovatively becomes a new factor of development of logistic infrastructure and an effective way to overcome crisis trends.

4. Discussion

The low level of economy digitalization in Russia in the common GDP structure remains open (Karapetyants et al. 2017; Bataev 2018; Afonasova et al. 2019). Russia still has quite a serious lag in this index compared to the industrially developed countries (Korchagina, Bochkarev, et al. 2020; 2019). Based on the BCG data, the share of the digital economy in the Russian GDP amounts to 4%, which is 2-3 times less than the same parameters of the leading European countries. It means a difference in the structure of the demand for innovations in the logistic systems of different regions.

5. Conclusion

5.1. Tools for Evaluation of the Innovation Activities

Nowadays there are many tools for evaluation of the innovation activities of the countries and regions. In Russia, different methods and approaches considering goal designation are applied. Calculating GII, the world community assesses the engagement of Russia into the process of globalization of the economy under digitalization.

The GII rating showed the high potential of Russia in the sub-index of trade and competition, which has grown rapidly due to the enlargement of the index list and introduction of the domestic market scale.

In 2019, the general development of the innovation market put Russia into position 61. The experts noted Financing (position 69), including Gross amount of microfinancing (position 73), and Investments (position 102), including Risk capital deals (position 77) as weaknesses.

5.2. Factors Limiting Demand on Innovations in the Field of Logistics

Nowadays, there is a row of factors limiting demand on innovations in the field of logistics:

- The state demand and support in innovations are mostly directed to large enterprises and support of breakdowns.
- Obviously, the legal basis contributes not much to the development of innovation demand for and from SMEs.
- SMEs (even if capable of more) are interested in small innovations as they are cheaper.
- The creation of innovations is a very expensive process.Considering insufficiently developed innovation infrastructure, the main reason for innovative SMEs to exist is the state support in the form of technology parks, business incubators, and subsidies.
- The world rating of countries in logistics efficiency for 2018 ranked Russia 75th. The experts noted “Effectiveness of the customs administration”, “Traceability of supply chains”, and “International transportation” as weaknesses.

5.3. Demand for Innovations in the Logistic System of Russia under Digitalization

The study indicates that the following factors will contribute to the growth of demand for innovations in the logistic system of Russia under digitalization:

- The state demonstrates its interest in the creation of innovative economy.
- Implementation of global innovations in the logistics sector at the state level shall contribute to the reduction of the gray market and improvement of the labor efficiency factors, improvement of tax and customs collections, saving of budgetary funds spent for control of product markets.
- Development and provision of stable functioning of the innovation market in Russia is necessary.

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Chapter 7

Analysis of Risks of Migrants on the Labor Market

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Abstract

Modern migration processes are probably one of the main factors of social changes in various societies. In 2020, the world society faced coronavirus pandemic that affected all processes without exception and put world economies at risk. At the same time, one of the most unprotected groups of the society, which is mostly marginalized and poses a threat to the security of society without a pandemic, is at special risk - migrants. In this article we focus on risks on migrants in the labor market in St. Petersburg in according to the public opinion as it forms the environment where migrants work. We found out a lot of negative attitudes towards migrants and defined risks that are common in the host society. Despite the attempts of government to form a favorable environment for the adaptation and integration of migrants, current efforts are not enough to overcome the risks of migrants on the labor market.

Keywords: migration, migrants, risks, management, integration

1. Introduction

1.1. Migrants as a Category

Migration processes are drivers of various changes in societies. The transformation of spatial social relations is carried out under the influence of migration processes ("Encyclopedia of Sociology" 2001; Lo 2015). Migration also influences internal labor market (Vertovec and Wessendorf 2021; Park, S. H., & Ungson, G. R. (1997), national culture, organizational complementarity, and economic motivation on joint venture dissolution (Academy of Management Journal, 40(2) et al. 2016; Chauvet, Gubert, and Mesplé-Somps 2016; Mouhoud and Oudinet 2010; Beine, Docquier, and Schiff 2013). The goal of our research is to analyze

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risks of migrants on the labor market according to the public opinion. Our conclusions are based on our sociological research data.

Firstly, we would like to make the understanding of "migrant" more specific. Sociological research in recent years doubts the possibility of generalizing migrants as a separate group with its characteristics. Thus, Brubaker focuses on the following: "group" seems to be a problem-free, self-evident concept that does not require special analysis or explanation. As a result, we begin to take for granted not only the concept of a group, but also "groups" — the imaginary things-in-the-world to which this concept refers (Brubaker 2004). This opinion is also shared by other researchers. This can be interpreted as requiring a critical rethink of the concept of a group, especially in the context of migration study (Rudskaia 2018).

Tatiana Yudina et al. defines migrants as social groups in which all of them "perceive themselves as an integral subject of behavior in their new place of residence and have a sense of group solidarity" (Osadchaya, Leskova, and Yudina 2018). Brubaker's comment is as follows: "if by group we mean an internally interacting, mutually and collectively recognizing, shared, effectively communicating limited collective that has a sense of solidarity, corporate identity and the ability to act in concert, and even if we adhere to a less rigid understanding of "group," it should be clear that the category is not a group. It is the basis for the formation of a group or "gang" (Brubaker 2004).

Taking into account the contradiction between theory and empiricism, in our study, we examine migrants as a category, not a group. A migrant in this case is a person who can be classified as a "migrant" by certain characteristics. This will allow us to focus our research attention on ongoing processes and relationships.

The problem of analyzing risks of migrants on the labor market is reflected in the works of modern sociologists and economists. Thus, Gurieva and Dzhioev in their research have established that the improvement of migration policy is necessary in order to reduce the dependence of the labor market on foreign labor and increase its rational filling at the expense of their own labor resources (Gurieva and Dzhioev 2015). They came to a conclusion that in the current situation on the labor market, taking into account migration, as well as on the basis of the correlation analysis (using the Pearson coefficient) the further implementation of migration policy in the same direction will only worsen the situation on the labor market.

A similar point of view is expressed by Elvira Nica that continuous outstanding degree of migration unavoidably has an influence on employment (Nica 2015). She also gives another point of view, that migration may also be an opportunity for economic initiative, where the reciprocity of high and low skilled employees supplies employment and income benefits of the low skilled. She also notices the important trend, that the global deficit of qualified employees and the significance of circulation for the attainment and allotment of human capital have advanced substantially.

1.2. Specifics of Migrant Management System: Global Trends

The report of the International Organization for Migration (IOM)-2020 cites the concept of "international migrant" as any person who has changed their country of habitual residence (IOM 2020). At the same time, there are "short-term migrants" (those who have changed their country of habitual residence from three months to a year) and "long-term migrants" (migrants from a year or more). However, not all countries use this definition in practice. Some countries

use different criteria for identifying international migrants such as applying different minimum residence periods. Differences in concepts and definitions, as well as in the methodology of data collection between countries, prevent full comparability of national statistics on international migrants. In 2019, a historically important event took place in the field of migration studies: the United Nations completed work on two global treaties on the international manifestations of migration and displacement: the Global Compact on Safe, Orderly and Regular migration and the Global Compact on Refugees. The finalization of these treaties is the result of efforts by international organizations, civil society organizations and other actors (such as private sector organizations) to improve migration management at the international level (Brail and Sinatti 2018; Cholewinski 2005; Chauvet, Gubert, and Mesplé-Somps 2016).

In 2018-2019 there were major developments in the field of migration and population movement; we are talking about moving millions of people as a result of conflict (for example, inside the Syrian Arab Republic, as well as from other countries such as Yemen, Central African Republic, Democratic Republic of the Congo and South Sudan), brutal economic and political instability (e.g., Venezuela), effects of the environment and climate (large-scale displacement caused by climate and weather hazards, including in Mozambique, the Philippines, China, India and the United States of America). There is also an increase in international migration. It is estimated that the number of international migrants in the world is almost 272 million, with almost two-thirds of them being labor migrants (IOM 2020). This figure still represents a very small proportion of the world's population (3.5%), meaning that the vast majority of people worldwide (96.5%) are estimated to live in the country where they were born.

The European Union has developed a number of rules and mechanisms for managing legal migration flows for refugees, highly skilled workers, students and researchers, seasonal workers and family reunification. European countries are working on initiatives aimed to attract more highly skilled migrants.

The key features of the migration policy of the EU countries are the following:

1. Segmentation of migration policy by direction;
2. Migration flow management Mechanism: restriction of entry for certain categories of migrants, measures to simplify entry for highly qualified specialists;
3. The trend towards decentralization in the management of migrant integration;
4. Strengthening the requirements for internal integration into the host society for migrants.

Integration from the perspective of EU countries is a dynamic, two-way process of mutual accommodation of all migrants and residents of EU countries (Strumia 2016; Cholewinski 2005). One of the main principles of the integration policy of the EU countries is mutual action of migrants and the host society. On the part of migrants: respect for the EU's core values, employment, basic knowledge of the language and cultural norms. On the part of the host society: access of migrants to institutions, as well as to public and private goods and services on a non-discriminatory basis, efforts in the field of school education in terms of promoting diversity, organizing regular interaction between migrants and host society structures, preserving the practice of diversity of cultures and religions (development of constructive

intercultural dialogue and public discourse, promoting interfaith dialogue platforms) and encouraging the participation of migrants in the development of integration policies.

In Europe, the MIPEX integration policy index (Migrant Integration Policy Index) has been developed and adopted by 167 different indicators. These indicators are divided into eight areas, access to the labor market, education, participation in the life of the country, long-term stay, family reunification, citizenship, access to health care and protection from discrimination. The tool has already proven to be effective in assessing, comparing and improving integration policies of EU countries (as well as Norway, Switzerland, Canada and the United States).

It is worth noting that in the EU countries, the vector of migration policy is shifted from multiculturalism to the policy of social integration. We can take Sweden as an example. During the period of economic decline in the 1990s, the Swedish government changed its policy towards cultural pluralism. The new vector also meant the integration of all members into society as a whole. The course for integration continues to be maintained.

1.3. Local Specifics: Managing Migrants on the Labor Market in St. Petersburg

In Saint Petersburg, increasing attention is paid to the policy of harmonization of inter-ethnic relations and the problem of adaptation of migrants. In particular, the actions of the "Tolerance" program, which was in effect until 2015, and the development of social policy towards migrants were aimed at solving these problems. Saint Petersburg has a wide range of opportunities for migrants to adapt. The corresponding social infrastructure is being formed. More than a hundred national societies, non-governmental organizations, national cultural autonomies and communities have been established and are actively working.

During the period from 2006 to 2015, the "Tolerance" program was held in St. Petersburg, about 9 thousand various events were held annually in the city during that period. In the first years of the program, the main focus was on the formation of St. Petersburg self-awareness and identity among the indigenous population of different nationalities. The second part of the program, which ran from 2013 to 2015, was aimed directly at migrants themselves and their adaptation in the host community. The program indicates that "integration into a new society is a complex, long and sometimes painful process, involving the development of new models of interaction with the surrounding world that differ from those that took place in the previous life experience of a person." In this program, integration of migrants is understood as cultural assimilation into the host environment, which is a limited understanding from the point of view of modern sociological thought.

In 2014, the state program of "Promoting employment in Saint Petersburg" for 2015-2020 was adopted. The program highlights sub-program 4 "Labor migration." It is based on the Migration program (2012-2015). The goal of sub-program 4 is to optimize the volume and professional qualification structure of migrants in Saint Petersburg. It involves reducing the share of unskilled migrants from other countries and attracting internal migrants from Russian regions to Saint Petersburg. However, the program does not reflect specific prescribed tasks and measures to achieve this goal.

In 2014, Saint Petersburg adopted another program- "Creating conditions for ensuring public consent in Saint Petersburg" for 2015-2020. Among the five sub-programmes, migration policy is directly related to: "strengthening of civil unity and harmonization of interethnic relations in Saint Petersburg."

According to the report of the Committee on interethnic relations and implementation of migration policy in Saint Petersburg in 2018, it continues the support of digital resources for migrants, such as: migrantinfo.kmormp.gov.spb.ru.

The developing infrastructure of Saint Petersburg is a favorable environment for the successful adaptation of migrants. There are more than one hundred national societies, non-governmental organizations, national cultural autonomies and communities. In addition, the direction of providing social assistance to migrants is being developed. Improving the system of interdepartmental interaction between the Executive authorities of Saint Petersburg, public associations, national diasporas and communities will affect the positive outcome of the process of adaptation of migrants.

All this undoubtedly affects the formation of a favorable environment for the adaptation and integration of migrants (Bataev, Gorovoy, and Mottaeva 2018; Rytova and Gutman 2019). Although there are no special activities in 2020 with regards to the work with host society on the formation of non-discriminative environment. There is no special work with media. All the contradictions of migration policy at the federal level are reflected at the regional level. The migration policy of Saint Petersburg is essentially reduced to the implementation of state policy. It is necessary to implement integration policies at the local level, giving urban municipalities expanded powers to develop their own programs and actions.

2. Materials and Methods

2.1. Methods

Methodological basis for the study was selected on the basis of the analysis of the literature on the problem, research methodology, and based on the study of the work of the Committee on Interethnic Relations and Implementation of Migration Policy in Saint-Petersburg, consulting the sector of social structure study of department of sociology, innovation and social structure in the Sociological Institute of the Russian Academy of Sciences.

We used quantitative method and conducted the public opinion survey on the integration of migrants from 2 to 10 March 2020. Initial information was collected using a personal street interview based on a structured questionnaire. The interview was conducted using a tablet-based survey technology using Simple Forms software. The time period of the interview was from 9 a.m. to 10 p.m. The length of the interview varied from 4 to 19 minutes. The average survey time was 6.5 minutes.

2.2. Empirical Research

We interviewed 420 residents of Saint Petersburg. The purpose of the survey was to identify the attitude of the host population (residents of St. Petersburg) to migrants, which forms the uniqueness and peculiarity of the environment in which migrants find themselves. Gender and age distribution correspond to the characteristics of the general population according to official statistics of Petrostat and is represented in Figure 1: 44% of men and 56% of women.

Study of attitudes of the host population towards migrants was carried out according to the following categories of analysis: relevance to migrants (the unit of analysis: assessment of migration situation, attitudes towards migrants, the degree of xenophobia), social distance (the unit of analysis: attitudes towards migrants, the extent of permissible proximity with migrants), managing integration of migrants (the unit of analysis: degree of need for adaptation and integration of migrants, assess the environment, the priorities of migration policy). In this article we would like to focus only on risks on migrants in the public opinion.

Respondents were asked to assess whether Saint Petersburg needs migrants today. We used a scale with four expanded answer options. As a result, 71% agreed with the statement that migrants are still needed. At the same time, the majority of respondents were against increasing the number of migrants in the city (in total, 73% of respondents). Only 13% said that they are not against the growth of their number in St. Petersburg (Table 1). At the same time, almost every sixth citizen of St. Petersburg supports the liberation of the city from migrants (15%). Interestingly, there were only 6% who found it difficult to answer, which indicates that the citizens have a formed position in relation to migrants. 8% of respondents gave their answer to our question.

Based on the analysis of the conducted empirical research, we identified that a moderately tolerant attitude towards migrants prevails in Saint Petersburg. Most citizens agree that the city needs migrants. However, the attitude of St. Petersburg residents to the influx of migrants is clearly negative (in total, 73% of respondents opposed the increase in the number of migrants in the city).

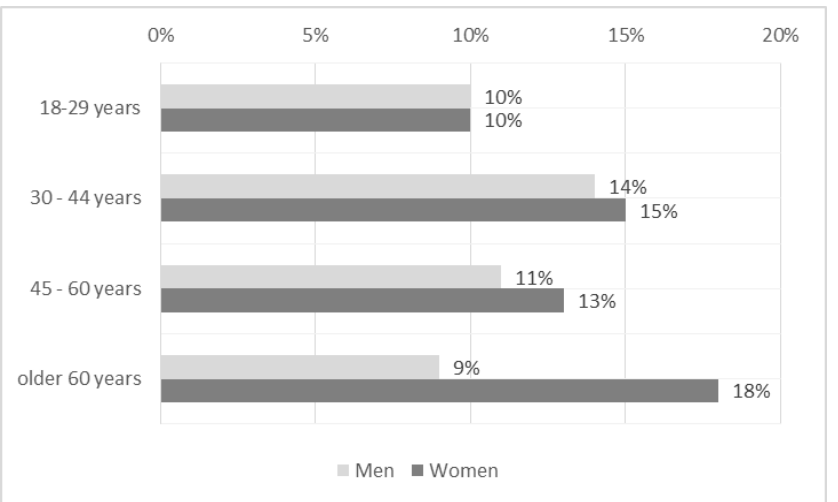

Figure 2. Gender and age distribution.

There is a tendency for local residents to form a discriminatory environment through their attitudes towards migrants. The majority of St. Petersburg residents positively assess the urban environment in relation to migrants (61%), agreeing that the city is dominated by a tolerant environment in relation to migrants. Successful adaptation of migrants is the basis for their integration into the host society. More than half of the respondents (55%) gave a positive assessment of the environment, agreeing with the statement that the urban environment of St. Petersburg favours the adaptation of migrants. At the same time, almost half of St. Petersburg

residents (47%) do not agree that migrants are important and useful participants in public life. Despite the fact that the majority of citizens believe that the urban environment of St. Petersburg is conducive to the adaptation of migrants, in fact, it turns out that the residents themselves form a discriminatory environment against migrants.

Table 1. Distribution of answers to the question

Do you think, do we need migrants in Saint-Petersburg?	**Gender**	
	Men	**Women**
Yes, I don't mind the growth of their number in the city	16%	10%
Yes, but only those who arealready here, not more	21%	23%
Yes, but less than no	29%	42%
The city does not need migrants, and those who have arrived should leave	16%	15%
Another variant	12%	5%
Difficult to say, I don`t know	7%	6%
Total	**100%**	**100%**

2.3. Public Opinion on Risks of Migrants in the Labor Market in St. Petersburg

We have selected six negative issues that are most often associated with migration and that are reflected in discussions and in the media. Respondents were asked to give their opinion on six statements concerned social risks caused by migration.

The first sentence stated that migrants cause political and social tensions. 62% of respondents agree with this (Figure 2). Most of them chose a more cautious answer rather than a radical one – 46% said they rather agreed with the statement. Every fifth respondent disagrees with the statement.

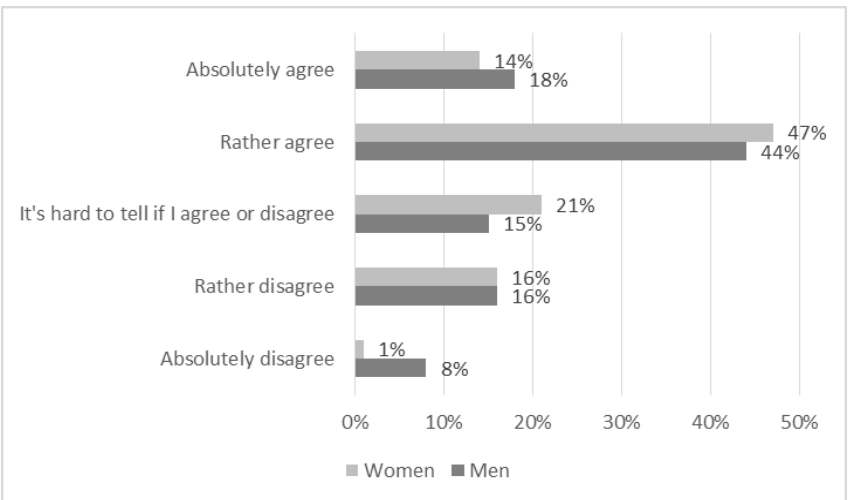

Figure 2. The attitude to the statement "Migrants cause political and social tension."

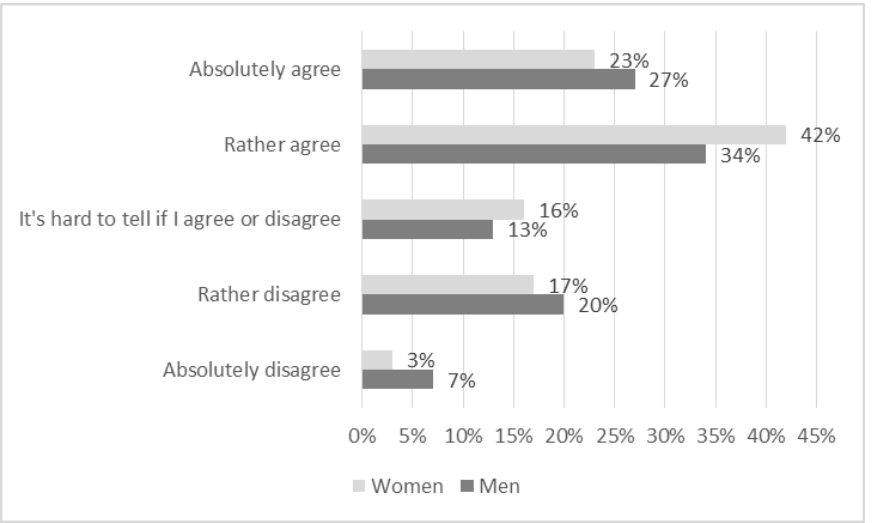

Figure 3. The attitude to the statement "Migrants hinder the normal development of the economy due to the overflow of the labor market with unskilled labor."

The next statement was concerned with the criminal aspects of migration. We asked respondents to express their agreement or disagreement with the statement "Migrants increase the criminal situation." In the media, when it comes to migrants, there are mostly reports of their violation of the law (Ebzeeva, Mitrofanova, and Dugalich 2017; Bakanov, Egorova, and Tumanov 2017). There is a belief in the self-consciousness of citizens that migrants increase the criminal situation – 70% of respondents agreed with this. Only 13% disagreed with the statement. Women are more categorical in their assessments. 73% of women agreed with the statement.

With the statement on the negative impact of migrants on the culture and moral standards the opinions of respondents were divided exactly in half: 38% believe that migrants contribute to the impoverishment of culture and moral standards, 39% do not agree with this. Almost one in four respondents found it difficult to answer, mostly it was difficult for women.

The next statement concerned the negative impact of migrants on the development of the economy due to the overflow of the labor market with unskilled labor. The absolute majority of citizens support the thesis that migrants hinder the normal development of the economy due to the overflow of the labor market with unskilled labor – 63% answered this (Figure 3), including every fourth citizen fully agrees with this thesis.

In the next statement, we asked respondents to assess their level of agreement with the thesis that migrants take jobs from Russians, because of them, salaries are reduced. Again, an absolute majority agreed with the thesis, 65%, with 28% expressing extreme agreement. However, every fourth citizen did not agree with the thesis. Only 10% of respondents found it difficult to answer.

The final thesis on the social risk of migration concerned the decrease in the quality of goods and services due to low skills of migrants. It was supported by an absolute majority - 67%. Men more often than women expressed their disagreement with the statement. Women have had more difficulty with the answer.

3. Results

The labor market itself is depended on the economic and social system in general. In our research we analyzed the sensitive topic of migrants and their presence on local labor market. We examined local society (St. Petersburg, Russia) as it shows the tendency.

In 2014, the State program "Promoting employment in Saint Petersburg" for 2015-2020 was adopted. The program highlights sub-program 4 "Labor migration," its goal is to optimize the volume and professional qualification structure of migrants in Saint Petersburg. The developing infrastructure of Saint Petersburg is a favorable environment for the successful adaptation of migrants.

Despite the implemented measures by the local government and efforts in the infrastructure, we found out that the attitude of St. Petersburg residents to the influx of migrants is clearly negative (in total, 73% of respondents opposed the increase in the number of migrants in the city). There is a tendency for local residents to form a discriminatory environment through their attitudes towards migrants. The majority of St. Petersburg residents positively assess the urban environment in relation to migrants (61%), agreeing that the city is dominated by a tolerant environment in relation to migrants. Successful adaptation of migrants is the basis for their integration into the host society. The host society forms a discriminatory environment against migrants through their negative attitudes.

4. Discussion

In our research we have found out that the residents themselves form a discriminatory environment against migrants through their negative attitudes. This factor significantly complicates the life of migrants and should be taken into account for further work with migrants and the host society (Vilkov and Kalinin 2016). In this research indicates that the problem of social rejection of migrants may consist in social inequality and a high level of social polarization.

We have also found out the influence of the age structure on the attitude towards migrants: young people under 30 are more loyal to migrants. At the same time, citizens of the older age group most often agreed with statements on the negative impact of migrants (Faist 2000; Portes and Zhou 2012; Akay, Constant, and Giulietti 2014). This information may be useful for further research with a deeper study of the impact of migrants on the host community and risks on the labor market. Also, the mechanisms of forming those negative attitudes may be studied more deeply, e.g., media influence on public opinion, the influence of social polarization in the host society towards forming the environment for migrants. The features of digitalization could be a topic for future research (Barykin, Bochkarev, Dobronravin, et al. 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al. 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al. 2021).

Conclusion

The society supports the following ideas about the social risks caused by migration: migrants cause political and social tension (62% agree with the statement), migrants increase the criminal situation (70% agree), migrants hinder the normal development of the economy due to the overflow of the labor market with unskilled labor (63%), migrants take jobs from Russians and reduce salaries (65%), migrants reduces the quality of goods and services due to low skills (67%). Only the thesis about the influence of migrants on culture and moral norms remains a debatable idea of migration risk. The opinions of citizens here are divided exactly in half: 38% believe that migrants contribute to the impoverishment of culture and moral standards, 39% do not agree with this.

The host society itself forms a discriminatory environment against migrants through their negative attitudes towards them. This factor significantly complicates the process of integration of migrants and should be taken into account for further work with migrants and the host society.

Acknowledgments

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Chapter 8

Digital Tools to Support Market Interaction (The Case of CRM Systems)

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Abstract

The digital transformation of business is one of the main modern trends. It was found that currently there is no generally accepted approach to the definition of the digital economy. This complicates its quantitative and qualitative assessment. To solve this problem, it is proposed to distinguish two components of the digital sector of the economy: explicit and complementary. There are reliable statistics for the explicit component and strict quantitative estimates are possible. For the complementary component, only indirect estimates are possible. At the same time, the importance of digitalization for its development is more pronounced. But it is impossible to assess this impact at the macro level due to the lack of an adequate methodology. Micro-level evaluations are needed. In the article, the authors examined the processes of digitalization of marketing interaction based on the use of CRM systems. These systems are the backbone of digital marketing. Among the advantages of using CRM systems are highlighted: value proposition differentiation, increased labor productivity, sales growth, increased customer loyalty, growth of the company's value. It is expected that in the post-pandemic reality a powerful impetus will be given to the development of CRM systems and other digital marketing tools and business in general. Thanks to the pandemic, the digital revolution in business may enter a decisive phase, when digital changes will not occur gradually, but in an avalanche. And CRM systems will be at the forefront of these changes.

Keywords: digital economy, digitalization of the economy, marketing interaction, CRM systems

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1. Introduction

The modern economy is in the stage of digital transformation (Hinings, Gegenhuber, and Greenwood 2018; Marques and Ferreira 2020; Tolkachev et al., 2020; Vial 2019; Miklosik and Evans 2020). This transformation is associated with the active penetration of digital technologies into all spheres of the economy. As a result, a new term "digital economy" has appeared, which is actively used both in scientific literature and in practice (in companies' management systems, in public administration, UN documents, etc.) (Elder-Vass 2016; Polyanin et al., 2017; Rudskoy et al., 2019; Teece 2018; Y. V. Vertakova, Charochkina, and Leontyev 2019). Today, the significant contribution of digitalization to economic and social development is noted. This contribution is not only significant, but also differentiated by industry and type of activity. The impact of digitalization on different types of economic activity is specific.

The purpose of the article is to study digitalization as a systemic phenomenon and assess its impact on the technologies of interaction with customers used in marketing. The object of study was CRM systems.

2. Materials and Methods

The study is based on the analysis of scientific and business literature on the problems of the digital economy, as well as the use of digital technologies in business. Particular attention is paid to digital methods in marketing, in particular - CRM systems. Also, empirical data on the marketing activities of modern companies, its organization and information technology support were used as sources of information.

Methods of institutional, structural, functional, comparative, content analysis, as well as the methods of formal logic and the methodology of the system approach were used to process information in the research.

3. Results

3.1. The Essence of Digitalization as an Economic Phenomenon

The term "digital economy" does not have an unambiguous and generally accepted interpretation. Various researchers, private and government agencies classify different types of economic activities in this sector. This does not allow us to give an accurate assessment of the size and dynamics of the digital economy (it is more correct, according to the authors, to speak of the "digital sector of the economy"). Estimates of the share of GDP (global, national, regional) created in the digital economy sector sometimes differ several times.

"Measuring the digital economy and related value creation and capture is fraught with difficulties. Firstly, there is no widely accepted definition of the digital economy. Secondly, reliable statistics on its key components and dimensions, especially in developing countries, are lacking. Although several initiatives are under way to improve the situation, they remain insufficient, and are struggling to cope with the rapid pace of evolution of the digital economy.

Depending on the definition, estimates of the size of the digital economy range from 4.5 to 15.5 percent of world GDP" (United Nations 2019), p. 4.

This uncertainty creates problems for studying the digitalization of the economy and managing its development. These problems are determined by an objective circumstance. They are related to the structure of economic activities using digital technologies. Digital technologies used in the economy can be (1) explicit or (2) complementary.

First, independent "digital" types of economic activity can be attributed to the digital sector of the economy. This economic activity is recorded in official statistics and analyzed by researchers as "digital." This includes the production of computers and other similar equipment, telecommunications services, software, etc. These are the types of economic activities for which digital technologies are the main ones. These types of economic activities cannot be carried out without digitalization. Their progress is directly related to innovations in the field of digitalization (Tolkachev et al., 2020).

It should be noted that, despite the high importance of these industries (for example, the trend of globalization is associated by many specialists with the development of the Internet), their quantitative contribution to the economy is not yet decisive. For example: "Global employment in the ICT sector increased from 34 million in 2010 to 39 million in 2015 ... The share of the ICT sector in total employment rose over the same period, from 1.8 percent to 2 percent" (United Nations 2019). For comparison: employment in agriculture was 26.855 percent of total employment in the world in 2019 ("Employment in Agriculture (% of Total Employment) (Modeled ILO Estimate) | Data" n.d.).

Secondly, it should point to the types of economic activities where the use of digital technologies is complementary. Here are some examples: the use of digital navigation, control and other systems in cars (Tekin, Özkale, and Gültekin-Karakaş 2020); the use of digital equipment for diagnostics in medicine (Khezr et al., 2019); creation of smart cities in which various systems are equipped with electronic digital devices - transport, energy, water supply, etc. (Nagy and Simon 2018; O'Dwyer et al., 2019; Okrepilov, Kuzmina, and Kuznetsov 2019). There are many such examples.

In the types of economic activity under consideration, the main value for consumers is created during the implementation of traditional technological processes (production, marketing, logistics, etc.). The use of digital technologies radically improves the organization of these processes, gives them new properties. As a result, companies with traditional economic activities (construction and development, mining and processing industries, transport, trade, etc.) acquire new competencies and competitive advantages in the market. The quality of their human and intellectual capital is changing, as a result of which the value of such companies increases (Vladimir Plotnikov and Pirogova 2018; V. Plotnikov, Pirogova, and Vertakova 2019).

On the first component of the digital economy, you can collect statistical data, quantify it, and form a system of support and development measures. The second component is latent. Estimates for it are indirect. Such statistics are available. For example, according to Eurostat, in the EU-28 from 2014 to 2018, the number of enterprises using cloud services increased from 19% to 26%. Other facts can also be cited. "In 2018, more than 1 in 10 EU enterprises analyzed big data. During 2017, 1 in 5 EU enterprises made electronic sales (e-sales). Since 2011, the share of EU enterprises using internet connections of more than 100 Mb/s has tripled" ("Digital Economy and Society Statistics - Enterprises - Statistics Explained" n.d.).

At the same time, give a rigorous quantitative macroeconomic assessment of the impact of digitalization on output growth, improving product quality, reducing costs, improving the environmental friendliness of economic activities, etc., impossible. Direct assessments are difficult due to the latent nature of digital technologies used in traditional industries. In this regard, it is necessary either to move to indirect macro estimates, or to carry out an analysis at the micro level. In the latter case, it is necessary to study the impact of digitalization on specific activities, industries, enterprises, management functions, etc.

In this study, the second path is chosen. In the next section of the article, we will look at the processes of digitalizing marketing interaction.

3.2. Digitalization and Marketing Interaction

Marketing is a key function of today's businesses. Therefore, it is this function that is subject to the most rapid changes (Kumar 2018). In this regard, it is natural that in marketing, intellectualization and digitalization occur most intensively (Serova and Bagiev 2016). At the same time, in marketing practice, a significant number of digital tools are used, integrated with other elements of the enterprise information system and external information systems (Y. Vertakova, Kryzhanovskaya, and Plotnikov 2015).

As a result of this technological development, a new phenomenon has emerged - digital marketing. Digital marketing, like other areas of activity based on algorithms of digital and information technologies, is characterized by rapid development, which is accompanied by the continuous introduction of new tools and methods of work. This led to the emergence of numerous research works aimed at the theoretical understanding of digital marketing and the formation of its methodology (De Pelsmacker, van Tilburg, and Holthof 2018; Foroudi et al., 2017; Kannan and Li 2017; Wang et al., 2019; Alavi 2016). According to the authors of this article, digital marketing can be rightfully considered as classical marketing, the difference of which is the use of digital channels and tools.

Digital marketing can be defined as a set of activities, the main task of which is to inform a potential consumer about a product using digital channels and tools in order to subsequently purchase this product. In this regard, marketing interaction tools, in particular, CRM systems, are of paramount importance in digital marketing (Gronwald 2017).

Customer focus is essential in the activities of business units, especially in developed, saturated markets. Using traditional marketing tools allows it to be delivered. But in this case, we are not talking about focusing on specific customers with their requests and characteristics, but about focusing on the market as a whole or its target segment.

That is, in the traditional technological paradigm of doing business, "customer focus" means "market orientation." This approach eliminates direct and immediate customer involvement in the value chain. This reduces the company's performance in the market. The reason for this result is the inability to process the amount of information generated by tracking all individual customer contacts with traditional marketing tools.

The development of digital technologies and the emergence of digital platforms have solved this problem. Implementation of CRM systems enables online processing of significantly large volumes of marketing information. It concerns not only accounting and control of all single cases of interaction with customers, but the possibility of implementing a

proactive approach to marketing (forecasting and proactive and impact on the organization of the market and consumer behavior).

CRM systems are based on the customer focus paradigm. Their functionality allows you to give a customer focus a new quality. Due to the new digital services, companies can collect more information, more fully analyze its changes and build adequate multivariate forecasts. Due to the breadth of information coverage, CRM systems allow not only to consider the rational needs of customers, but also to identify their emotions, moods, inclinations, etc. Considering this additional information will allow the company's employees to comprehensively and effectively manage interactions with customers.

Among the advantages of using CRM systems, one can single out: differentiation of the value proposition (which is especially important in segmented markets of monopolistic competition), increased labor productivity, increased sales, increased customer loyalty (by maximizing customer value), and increased company value. The transition to the active use of CRM systems transforms the management model and the business model of the company, initiating the reengineering of internal business processes. That is, CRM is not just a technology, but an integrated approach to business organization.

The implementation of CRM systems acquired importance in 2020. This is due to the pandemic of the new coronavirus infection. The widespread introduction of restrictive measures by the authorities, as well as the adoption of social distancing rules, negatively affected traditional marketing (He and Harris 2020). New physical "coronavirus barriers" have emerged between companies and their customers (especially individual consumers). In these conditions, traditional marketing interaction in several cases was blocked. But the use of digital channels of interaction made it possible to partially remove these barriers.

4. Discussion

In our opinion, in the post-pandemic reality, a powerful impetus will be given to the development of CRM systems and other digital marketing tools and business in general. And this even though in recent years the CRM industry has shown rapid growth. According to available data for 2019, 91% of enterprises with more than 11 employees use CRM systems ("18 CRM Statistics You Need to Know for 2021" n.d.). And according to the trend, an increase in investments in CRM systems is expected. It is estimated that by the end of 2025, sales of CRM systems will reach $80 billion a year. Already now, the market for CRM systems has become the largest of all software markets. It is the fastest growing software market (Gartner Group 2018).

Thanks to the pandemic, the digital revolution in business may enter a decisive phase, when digital changes will not occur gradually, but in an avalanche. And CRM systems will be at the forefront of these changes. To do this, these systems themselves must change. In our estimation, the most likely changes may be: further migration to mobile devices and the expansion of the multiplatformity of existing systems; embedding of advanced digital technologies in CRM, such as Artificial Intelligence and Data Mining; simplification of user interfaces and their unification, tighter integration with existing marketing and digital tools; the formation of digital ecosystems; integration with social networks.

The outstripping growth of the CRM market and new business challenges are intensifying the competition between CRM solution providers. According to Gartner ("CRM Market

Statistics in Charts and Graphs" n.d.), in 2018 the concentration coefficient K5 (the sum of the market shares of the five largest companies in terms of sales) in this market was 0.412. This opens opportunities for new players to enter the market. Their success may be driven not only by new technological solutions, but also by new business models and a clearer understanding of customer needs in a post-pandemic world.

Conclusion

The modern period is the era of the digitalization of the economy. An additional impetus was given to it by a set of measures implemented by the official authorities of various countries and regions to counter the spread of the new coronavirus infection. As a result of digitalization, an independent sector of the economy is being formed - the "digital economy." It is possible to distinguish explicit and complementary components in it. The explicit component is based on digital technologies and cannot exist in isolation from them. It is with this component that ideas about the digital economy are usually associated.

An implicit component is formed by traditional industries and types of activities (functions), in which the implementation of digital technologies leads to the emergence of new opportunities and dramatic improvements. In particular, this applies to marketing, which is now being transformed into digital format. CRM systems play the most important role in digital marketing. According to the study, this class of marketing technologies will explode in the near future. It can result in almost complete coverage of business with CRM systems. But in order to obtain such a result, these systems themselves need to be developed and improved. The directions of this development and improvements are described in the article.

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Chapter 9

Gender Features of Purchasing Scripts in the Era of Digitalization

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Abstract

Traditional models of relationships with partners and consumers acquire new meaning and additional functions, and the emphasis and technology of sales are changing. However, the main goal of trading in any format remains the same – to make a profit from the successful sale of a necessary product or service to the buyer. On the one hand, the use of information technologies in trade minimizes direct communication between the buyer and the seller and focuses attention on the properties of the product, on the other hand, reduces the possibility of influencing the preferences and needs of the buyer, and makes it possible for the seller to adjust the buyer's choice in the sales process. Digitalization of sales is accompanied by an increase in the speed of changes in consumer preferences. Customer script used in online trading are based on the main characteristics of customers, i.e., gender and age. Collecting information about the buyer and online surveys do not always allow you to create an objective purchasing script. The article considers the possibility of forming purchasing scripts based on gender differences in the deep values of the individual. Structural analysis of the value orientations of women and men allows us to anticipate possible elections and differences in these elections. The article describes the psychological features of women's and men's models of making a decision about buying and choosing a product.

Keywords: value orientations, customer script, decision making, information technology

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1. Introduction

The development of information technologies in the trade was stable and grew every year. While the introduction of information technologies into the work of industrial enterprises has been developing for a long time and has become a prerequisite for sustainable development (Voronkova et al. 2017), commercial enterprises have started to use digitization relatively recently. Currently, all major retail chains used a variety of sales channels, including online trading, and tried various ways to interact with customers. The system of delivery of goods to customers was developed. The practice of trading enterprises has shown that the cost of implementing information technologies is paid off in the short term (Kapustina et al. 2017). The combination of various technologies in trade brings the greatest benefits and advantages (I.A. Krasyuk, Kirillova, and Kozlova 2017). Changes that occurred around the world at the end of 2019, the covid-19 epidemic forced almost all commercial enterprises to switch to online trading, to reconsider the possibility of delivering goods to customers, channels for promoting goods and interacting with customers. The process of mastering information technologies by commercial enterprises has been significantly accelerated (Barykin, Bochkarev, Dobronravin, et al. 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al. 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al. 2021).

Figure 1 compares the indicators of purchases and orders made by Russian customers using online stores and the indicators of changes in the number of active internet users. The number of completed online purchases increased by 11.6% from 23.1% in 2016 to 34.7% in 2018. It can be assumed that this figure will increase even more in 2020 due to the regime of self-isolation in the context of the pandemic. The percentage of active internet users in Russia is also increasing from 71.5% in 2016 to 79.3% in 2018 by 7.8% ("Official Website of the Federal State Service," n.d.). Comparing the percentage growth of online purchases with the growth of the number of active internet users shows that the growth rate of online shopping buyers over the past 3 years is higher than the growth rate of active internet users. Comparison of data on the growth of the percentage of active internet users and online purchases allows us to conclude that there are more customers in online stores who are seeking to purchase goods necessary to meet various needs (Korchagina and Desfonteines 2019). That is, online purchases are made not only by those who like to explore the internet space, but also by other buyers. The reasons for making a decision to buy the latter are poorly understood and are a mystery for commercial enterprises (Korchagina, Desfonteines, and Strekalova 2020). What internal personality factors influence the choice of an online store and the purchase of a product? This issue requires the creation of new purchasing scripts for those who are not active internet users, but make online purchases.

The new segment of buyers is potentially promising for online trade. A comparison of the degree of digitalization of trade in Russia with the Czech Republic shows a similar situation. According to Eurostat and the Czech statistical office ("CZSO Statistics," n.d.), 19.5% of firms in the EU used e-sales before the covid-19 pandemic. In the Czech Republic, online sales were used by 24% of retail enterprises according to the Czech statistical office until 2020. According to the monitoring of Czech households since 2013, 78% of Czech households in 2018 were equipped with computers (an increase of 10% compared to 2013) ("CZSO Statistics," n.d.). In 2018, 80% of Czech households use the internet at home. It can be assumed that in the context of the covid-19 pandemic, all 80% of households equipped with home internet made online purchases. Thus, the growth of online purchases in both the Czech Republic and Russia is

inevitable. Moreover, online purchases will be made not only by active internet users, but also by everyone who needs to buy a particular product. Women and men of working age will use online shopping more often. On the one hand, online stores will get new customers, on the other hand, gender differences in the purchasing script of newcomers to online shopping will be more pronounced than for active internet users. This leads to the need to modernize websites and information trading offers in accordance with the preferences of untrained users (Bozhuk et al. 2019).

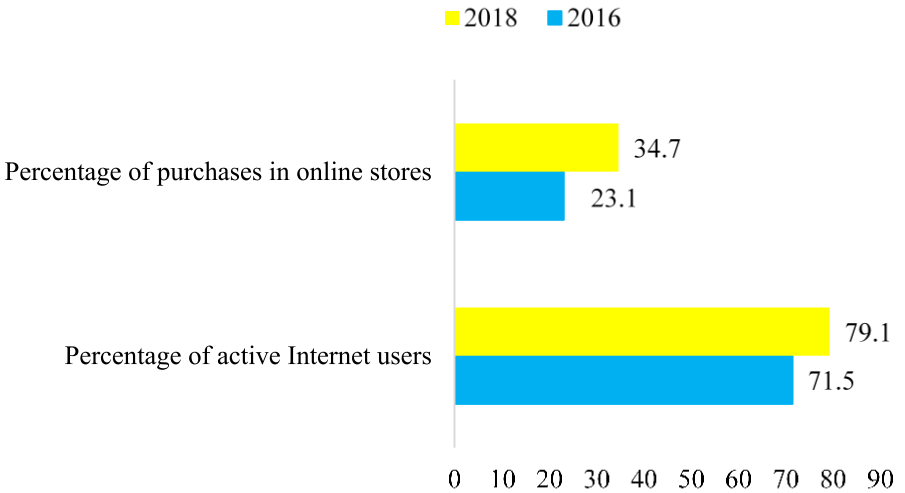

Figure 1. Percentage of the active internet users and purchases in online stores.

Creating customer script using information technologies will allow us to offer new customers products that may not be of interest to active and experienced internet users and do not meet the traditional requests of online buyers (Strekalova, Korchagina, and Desfonteines 2020). Customer scripts for new online store customers should use the possibilities of digitalization in combination with the study of hidden motives and needs of people making purchases (I. Krasyuk, Kirillova, et al. 2019).

The group of online buyers who are not active users of the internet can be very heterogeneous. This can be people of different gender and age or different social status. To increase sales, you need to develop a wide variety of customer script, taking into account all possible motives and values that are guided by customers. When offering and describing a product in an online channel, it is necessary to combine the capabilities of information technology and the psychological characteristics of various segments of buyers. The information collected through internet surveys does not reveal the hidden motives and orientation of the individual, which greatly determines the decision to purchase.

Most surveys are aimed at determining the factors of conscious product choice. At the same time, the decision to purchase is determined not only by a conscious need for a particular product, but also by a subconscious desire for a different lifestyle, a desire to change yourself and your inner world. Digitalization of trade allows you to advertise and sell not only individual products, but also the lifestyle that different groups of buyers strive for (Lukina, Kurochkina, and Karmanova 2020). For this purpose, potential buyers are grouped according to certain characteristics. The main characteristics by which customers are segmented are gender and age (Lukina, Kurochkina, and Karmanova 2020). Behind these characteristics are hidden

personality qualities that require further study. The present study attempts to identify the value orientations of women and men of different ages, which are the basis for the formation of different purchasing script.

2. Materials and Methods

The study of the digital technologies in creating purchasing scripts for various groups of buyers was based on data from a socio-logical study of the value orientations of employees of gas industry enterprises in Saint Petersburg and the southern Urals. The study of the structure of value orientations of employees of linear divisions of industrial enterprises allowed us to determine the structure of values that affect labor relations in the collective, but can also serve as a basis for the analysis of the purchasing script, taking into account gender differences in preferences. The presented analysis of the empirical material focuses on the differences in the value orientations of women and men of different ages in order to create a purchasing script with the use of digital technologies in trade (Desfonteines and Korchagina 2019).

V. M. Snetkov's questionnaire, including 68 questions, was used as the main methodological material (Nikiforov, Dmitrieva, and Snetkov 2003). The survey was conducted anonymously, individually, and in a group. The following 17 aspects were used as the main parameters of value orientations:

1. Creative, interesting work;
2. Good working conditions;
3. Positive relationships with staff;
4. Respect from colleagues;
5. Self-realization;
6. Monetary and social rewards;
7. Integrity and rigor in working relations;
8. Development of responsibility;
9. Active life position;
10. Rational organization of work;
11. Overall success in the work;
12. Achieving personal goals;
13. Recognition in society;
14. Ability to communicate with colleagues and boss;
15. Health;
16. Benefits for family members;
17. The differences in the views of colleagues.

As a result of statistical processing, the rank of each of the 17 value orientations in the groups of women and men who took part in the study was calculated.

The sample of subjects was selected randomly and proportionally reflected the composition of employees of enterprises. The study involved 512 people, including 307 men and 205 women. The entire sample was divided into two age groups. The first group consisted of men and women aged 20-35 years, the second group consisted of men and women aged 36-55 years.

The study involved 132 women aged 36-55 years and 73 women aged 20-35 years; 166 men aged 36-55 years and 141 men aged 20-35 years.

To implement the set goals and objectives, we used methods of cable research, the study of information sources. Methods of statistical analysis of data from official state statistical services of the Russian Federation (Federal state statistics service of the Russian Federation), data from Eurostat and the Czech Statistical Office were used to assess the use of online sales.

3. Results

Value orientations in the structure of personality are determined by historical, social and economic conditions of people's existence. It can be assumed that any value orientation has social significance and social conditionality, but the subjective significance of the value orientation is determined by what decision a person makes and what behavior he takes (Kurochkina et al. 2019). The functions of value orientations are to form the direction of behavior and preferences.

In the system of value orientations of an individual, their motives, needs and dynamics of ideals, constant attachments and the prevailing style of behavior are reflected. As an element of the personal structure, value orientations characterize the socio-typical for their time and their era and special, individual in the individual. Moving from the external environment to the structure of the personality, value orientations become significant for it and internal regulators of behavior and drivers of activity. The main purpose of value orientations is to consciously regulate the activity of a person's behavior in specific social conditions.

Modern trends in the deformation of gender roles in social life are reflected in changes in the structure of value orientations of men and women. Modern women have become more independent and prefer work activity or expect career growth at work comparing traditional female family roles. This is reflected in the system of value orientations and, as a result, in the choice of purchase channels and the choice of products. Demographic changes in society lead to the predominance of the number of women over the number of men from the age of 35. Thus, starting from the age of 35, women become an active social group of consumers of goods, a certain resource of trade enterprises of megacities that ensure their economic development (Sergey Sergeev, Kirillova, and Krasyuk 2019). Figure 2 shows the distribution of the population by gender and age as of January 1, 2019 ("Official Website of the Federal State Service," n.d.).

Figure 2 shows the predominance of women aged 35 and over. Purchases in online stores are made by both adults and teenagers. In recent years, the number of purchases made by teenagers has increased, and the most active buyers are adults who are able-bodied citizens. It can be assumed that in the future, working women will prevail among active buyers. Changes in the gender structure of the population will affect the preference of buyers both in goods and in the choice of purchase channels (Desfonteines et al. 2019). Differentiation of purchasing scripts is inevitable. You can predict customer preferences by studying the internal motivation and orientation of certain groups of the population. The structure of value orientations related to gender identity is considered as the basis for forming consumer preferences. New forms of marketing try to take into account changes in customer preferences (I. Krasyuk, Yanenko, and Nazarova 2020).

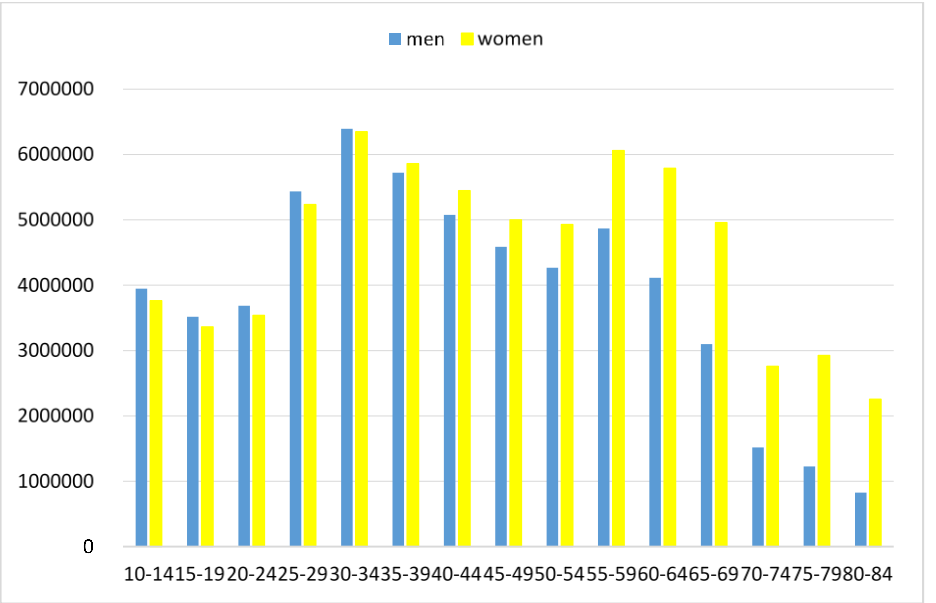

Figure 2. Distribution of the population of the Russian Federation by sex and age, at the January 1, 2019, number of persons.

Figure 3 shows the ranks of women's value orientations. Analysis of the structure of women's value orientations has shown that the following values have the greatest significance:

- monetary and social rewards;
- health;
- positive relationships with staff;
- good working conditions.

The last 4 ranks correspond to values such as:

- achieving personal goals;
- ability to communicate with colleagues and boss;
- development of responsibility;
- the differences in the views of colleagues.

The great importance of material security and the value of health does not require explanation. These fundamental values in every person's life are linked to the basic need for self-preservation. Therefore, they are always the most important for a person. The desire for a trusting relationship is based on emotional support. The value of good working conditions shows the desire for convenience and comfort. This distribution of ranks allows us to assume that women in any situation will prefer comfortable conditions and emotional support in the process of interaction. These value orientations will determine the decision making in any situation, including in the situation of choosing a purchase and a channel for purchasing a product. This fact should be used in business analytics when optimizing business processes in retail (Barbaruk, Krasyuk, and Medvedeva 2019).

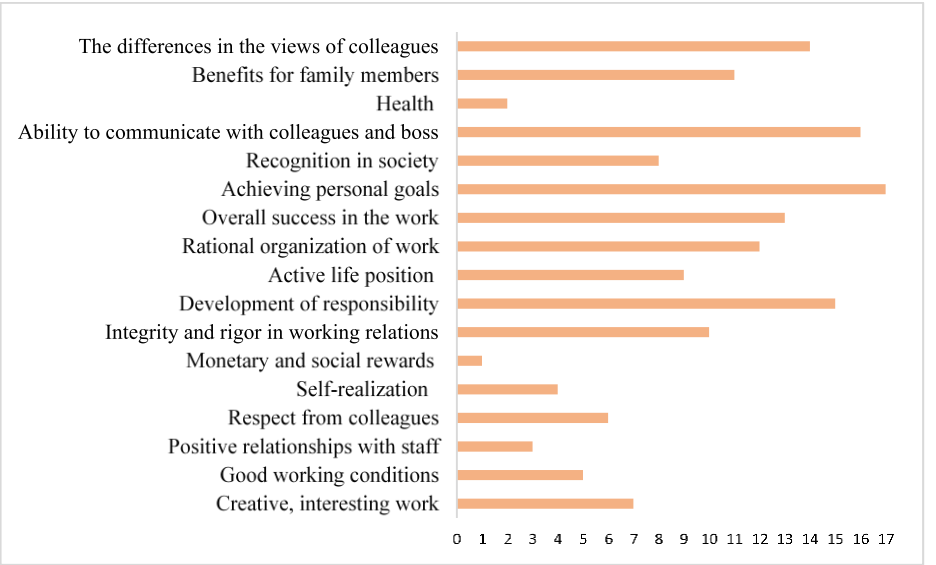

Figure 3. Ranks of women's value orientations.

Figure 4 shows the ranks of men's value orientations. Analysis of the structure of men's value orientations has shown that the following values are most important:

- monetary and social rewards;
- self-realization;
- creative and interesting work;
- health.

The last 4 ranks are occupied by values such as:

- achieving personal goals;
- ability to communicate with colleagues and boss;
- development of responsibility;
- the differences in the views of colleagues.

The qualitative analysis of the choices of value orientations shows that men strive for self-development and obtaining new information. The value of creative and interesting activities is more important than health. This proves the importance of professional activity in men's lives. The distribution of ranks of value orientations in men shows the importance of creativity and leadership in their lives. In the situation of making a purchase decision and choosing a sales channel, men can experiment and find new information sources. The purchasing script of men will always contain an element of creativity, independence in choosing and making a purchase decision, which provides a sense of superiority and leadership. Men began to buy food more often, paying less attention to their quality (Asfondiarova et al. 2019). Despite the fact that making food products continuously improves production technologies, men do not pay attention to the composition of products (Demchenko et al. 2020).

Both women and men place a low value on achieving personal goals in the process of working together. This indirectly proves that in a situation of cooperation with other people,

personal goals recede into the background, giving way to common, collective tasks. In the situation of buying a product, this fact indicates that it is possible to negotiate with the seller, make concessions and compromises. The buyer's script should take account the variability of trade-offs that satisfy both the buyer and the seller.

A comparative analysis of the ranks of value orientations of working men and women allowed us to identify differences in the indicators of the following value orientations. Women in comparison with men pay more attention to the following values in the work environment:

- good working conditions;
- positive relationships with staff;
- benefits for family members.

Men prefer such values as:

- self-realization;
- creative and interesting work;
- overall success in the work.

Despite the fact that value orientations characterize the attitude to the labor process, they remain relevant when making any decision, including those related to purchasing. The priority of favorable working conditions characterizes the value of comfort and convenience. Therefore, in the customer script, the convenience and comfort of the product and its purchase process will play a leading role in making a purchase decision. The importance of trusting relationships with people implies the use of traditional schemes and methods of purchasing goods that do not cause distrust and suspicion. The value of caring for family members is traditional in the women's purchasing script, since this value is characteristic of women's social role.

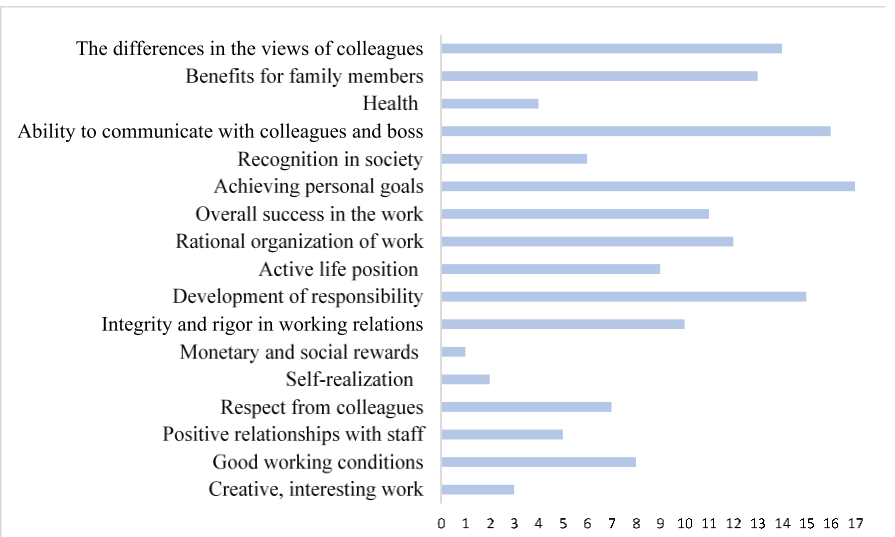

Figure 4. Ranks of men's value orientations.

All three value orientations of men, who have a higher rank than women, characterize the predominance of men's desire for leadership and obtaining new information. It can be concluded that the women's purchasing script should contain elements of convenience and comfort of both the product itself and the process of purchasing it without causing distrust and excluding exaggerations. A mandatory element of women's purchasing script is taking care of family members, both real and assumed.

The men's purchasing script must contain elements of success. advantages and opportunities for self-development through obtaining new, useful information. In online shopping channels, website design and digitalization, women will pay attention to convenience and comfort and attention to the family, while men will achieve to be the first discoverers of new opportunities. Differences in the ranks of value orientations of men and women are shown in Figure 5.

These differences are explained by traditional female and male roles performed by people in society. Women take more care of their families and need more emotional support. For men, personal success, leadership, and reference group affiliation are more important.

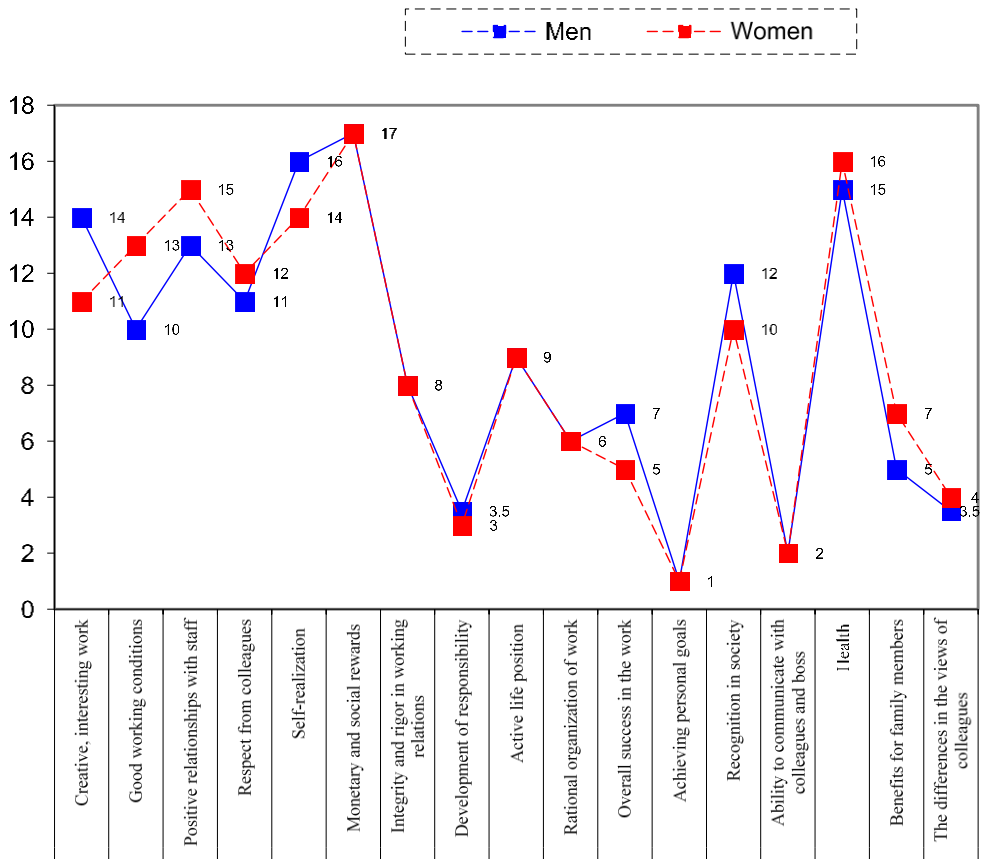

Figure 5. Ranks of men's and women's value orientations.

4. Discussion

The use of information technology for new sales offers can apply the basic values of women and men to attract customers and create a favorable basis for their loyalty. Gender differences in the structure of value orientations affect the decision to buy and choose a seller. Women are more likely to turn to sites and sellers that are convenient and reliable. Men will achieve to find something new, interesting, and useful for their own success. Convenience and comfort of purchase will not be a matter for men as much as women. The identified facts can give new directions for the development of marketing in the Russian retail trade and provide changes in the retail development strategy (Irina A. Krasyuk and Medvedeva 2019; I. Krasyuk, Medvedeva, et al. 2019).

Comparing the ranks of value orientations of women and men allows us to conclude that there are differences in purchasing scripts and that it is necessary to develop sales information models taking into account gender characteristics of making a purchase decision. A set of related products and additional offers in online sales is usually selected from saved product views. New technologies must be used to improve sales (S. Sergeev and Kirillova 2019). At the same time, information technologies allow us to expand the range of products offered based on the basic values of buyers that determine their choice. For example, when buying construction products, women are mistakenly offered beautiful, bright accessories, while they value the convenience and comfort of using the product more. Men can choose a new, creative product, but they must make the choice themselves, having reviewed many options. The design of online store sites should also considering the gender characteristics of customers value orientations. If men prefer to search for information and products on their own, women choose convenience in site design and reliable store characteristics.

The possibilities of digitalization of trade have not yet been fully disclosed and provide broad prospects in the field of product offerings based on differences in the value preferences of buyers of different genders.

Conclusion

The results of a comparative analysis of the value orientations of working women and men allow us to draw the following conclusions:

- the structure of value orientations of working men and women are different. Values that have high ranks differ. At the same time, both women and men highly value material and social security, as these are fundamental values in the life of every person, related to the function of life support;
- the structure of value orientations related to gender can be considered as the basis for the formation of consumers preferences;
- the revealed differences in the structure of value orientations are explained by the traditional female and male roles performed by people in society. Women take more care of their families and need more emotional support. For men, professional success, leadership and social values are more important;

- the convenience and comfort of the product and its purchase process will play a leading role in making the purchase decision in the women's purchasing script;
- the importance for women of trusting relationships with people assume to use of traditional schemes and methods of purchasing goods that do not cause distrust and suspicion;
- the value of caring for family members is traditional in the women's purchasing script, as it is characteristic of women's social role;
- the women's purchasing script should contain elements that emphasize the convenience and comfort of both the product itself and the purchasing process, without causing distrust and excluding exaggerations. A necessary element of women's purchasing script is taking care of family members, both real and perceived;
- the men's purchasing script must contain elements of success. leadership and self-development opportunities through obtaining new, useful information;
- women will pay attention to convenience and comfort, reliability and attention to the family in choosing an online shopping channel, organizing and designing websites, and digitalizing the sales pitch; men will strive to be the discoverers of new opportunities;
- comparison of online sales activity in Russia and the Czech Republic shows a similar situation. The number of online sales in Russian society and in Czech society grew steadily until the covid-19 pandemic. We can assume that in the new situation, this growth will be rapid. Both Russian and Czech online stores will have to consider the gender differences in the purchasing scripts of untrained internet users.

Information technology allows you to expand the range of products offered based on the basic values of customers that determine their choice. Using differentiation in the purchasing scripts of women and men will enrich and expand online sales schemes and models. The results of the research will help to change investment strategies in innovative projects of modern retail (Lyamin and Krasyuk 2019). The combination of differences in purchasing decisions from women and men with information technology in trade will allow to concretize the purchasing script and ensure the variability of sales.

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Chapter 10

Methodology for Assessing the Indicators of the Labor Component of Sugar Production Organizations

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Abstract

The digitalization of the economic activity of business entities leads to the actualization of the analytical toolkit, which makes it possible to identify and assess the level of unused and underutilized opportunities that ensure organizational development. The purpose of the presented study is to substantiate the system of key indicators reflecting the effectiveness and efficiency of the implementation of the involvement of the labor sphere of economic activity of processing organizations, eliminating the shortcomings of traditional analytical complexes and sets. From a methodological point of view, substantiate the assessment procedures that ensure the realization of the advantages of the process cost analysis. The proposed system of key indicators contains three indicators known to economic science - the specific labor intensity of the production of a ton of products, the level of external labor motivation, the ratio between the rates of dynamics of productivity and labor remuneration. Approbation of the proposed assessment procedures was carried out on the example of eight organizations of sugar production in the Voronezh region over a seven-year period. Based on the comparison of the values of key indicators, the ranking was carried out in statics and in dynamics, which made it possible to carry out the rating of the surveyed organizations, to identify general and particular trends in their development. The conclusion is made about the presence of underutilized possibilities of the made management decisions and the need to implement a systematic approach to the indication of the level of use of labor, material and technical components.

Keywords: economic analysis, appraisal procedures, resource potential, labor component, system of key indicators, ranking and rating

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1. Introduction

Processing organizations operate and develop in difficult socio-economic conditions, overcoming many obstacles to a competitive business. The processes of functioning and development of domestic organizations show that the most vulnerable side of management is an excessive concentration of attention on the technological side of production, while the social and labor component of the resource potential in achieving the required profitability and ensuring competitiveness is underestimated. Methods and techniques that realize the advantages of process-oriented management technologies that provide intensification of the processes of using the labor component of the resource potential are of predominant importance in the digital economy to achieve the goals of business value growth (Voskresenskaya, Vorona-Slivinskaya, and Achba 2020; Malenkov et al. 2019). The lower the extensiveness of labor costs and the higher the creative return of labor resources, the greater the added value of the final products of processing organizations, in particular, produced sugar (Almeida and Carneiro 2009; Evseeva, Evseeva, and Kalinina 2020; Mičiak 2019; Mitrofanova 2019; Bril, Kalinina, and Rasskazova 2018).

To establish the level of realization of the organization's resource potential, it is necessary not only to apply analytical indicators covering all aspects of economic activity, but also to choose adequate tools from the accumulated analytical practice, as well as to update them or create new ones that have no equivalents but contribute to strengthening objectivity of evaluative conclusions. Traditionally, analysts use as tools (simple and informationally accessible "analytical units") a set of indicators such as natural, labor, cost, absolute and relative. The configurations of relative indicators are well known and are considered to be the preferred analytical methods (Rostova, Shirokova, and Sokolitsyna 2019), however, the ratio of value indicators with natural and labor indicators that implement the economic approach in research related to the rating are still insufficiently applied. In addition, as noted by the authors, from the methodological and methodological points of view, the procedures for establishing ratings have significant drawbacks - suboptimal validity or lack of key indicators, under-consideration of consistency in their choice, use of outdated and uninformative formulas, narrowly focused procedural presentation that does not recognize the priority of the mobile component of the resource potential of the business, including the labor one (Aleksandrov and Fedorova 2020; Rasskazova et al. 2019; Elena and Gerasimova 2019; E. N. Bykowa 2019; Aleksandrov, Fedorova, and Parshukov 2020; E. Bykowa and Sishchuk 2015).

The purpose of the study is to develop and substantiate a system of key indicators (Vladimir Plotnikov and Pirogova 2018) for assessing the labor component of the economic activity of processing organizations, which ensures the leveling of the shortcomings of traditional methodological approaches and analytical complexes; evaluation procedures that increase the analytical purity of key indicators; the algorithm for generalized ranking of indicators of the use of labor resources by object, in space, in time and, in general, by organizations for the analyzed period.

2. Materials and Methods

Based on the well-known theoretical principles substantiated by Klaas, Klimchak, Semadeni, Holmes, Castillo, Pacheco, Hernández-Fernández, Manotas, Silva (Klaas et al. 2010; Castillo et al. 2019), as well as realizing our own views, when justifying the analysis and assessment procedures, we adopted the following definitions, which will serve as the basis for subsequent theoretical developments and practical illustrations (Gomes and Kuehn 2017; Prys et al. 2018).

The methodological approach used in this study is based on the rating procedure, which consists in building a hierarchical sequence of key indicators based on their priority (Jacobs 2007; Holland 2017) (Figure 1).

Let's consider each iteration of the developed algorithm on a specific example.

1. We analyzed 8 sugar enterprises of the Voronezh region, which are part of the PRODIMEX Group of Companies, were selected, which makes it possible with a sufficient degree of confidence to make an assumption about comparable approaches and tools used in the management process. Moreover, the management company PRODIMEK-Sugar LLC carries out the main management functions. In this context, the transparency and objectivity of analytical results and conclusions is increased.
2. The study period is a seven-year period of 2012-2018, which includes three years before and three years after the 2015 currency crisis in Russia and provides a reasonable judgment on the analytical results obtained and the directions of their changes.
3. Table 1 shows the system of key indicators of the labor component of the economic activity of processing organizations, developed by us, that are purposefully suitable for the desired assessment (rating). The proposed system of key indicators contains three known to economic science (indicators 1, 3, 4) and two are proposed for the first time (indicators 2 and 5).

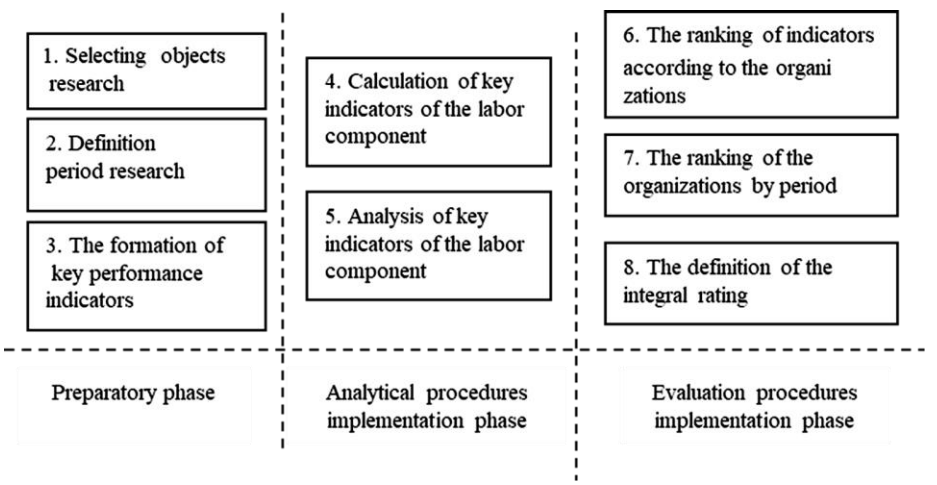

Figure 1. Algorithm for evaluating key indicators of the labor component.

Table 1. The system of key indicators of the labor component of the economic activity of processing organizations

Index	**Content and essence (analytical suitability)**
1. Specific labor intensity of production of a ton of products, person per hour/tonn (Y_t)	Characterizes the role of labor costs in the production of basic products. Shows how many man-hours were spent to produce a ton of finished products
2. Added value per person per hour, thousand rubles/person per hour (D_t)	Characterizes the role of the labor component in the process of adding value. Shows how much added value falls on one hour of labor intensity of the shipped product
3. The level of external motivation for work, units. (M_t)	Characterizes the role of the external motivation of labor in the process of using material resources. Shows how much material costs are stimulated by the wages of workers
4. The ratio between the rates of dynamics of productivity and wages, units (C_{pw})	Characterizes the features of the ratio of the return of labor to its remuneration. Shows how the dynamic processes of productivity and remuneration are balanced
5. Resource compliance coefficient (in terms of labor costs), rub./rub. (K_{lc})	Characterizes the role of the relationship between labor and technical components of the main production. Shows how much labor costs fall on the ruble of fixed assets

The system of key indicators should be formed in such a way that in the future it would be possible to build an integral indicator by ranking the results obtained and determining the rating using the "sum of places" method. In essence, this approach is similar to the special case of additive convolution, when the weights used for all criteria are the same. Appealing to the above assumption, the following principles were used in the selection of key indicators, which are traditionally used in the selection of indicators for additive convolution:

- key indicators systematically reflect the effectiveness of the use of the labor component (the principle of completeness);
- all key indicators are measurable and unambiguously interpreted (the principle of effectiveness);
- key indicators do not duplicate each other (the principle of non-excess);
- the number of indicators is not more than seven units (the principle of minimum dimension).

In addition, since the ranking and ranking procedures for the total number of places are carried out in the next stages, the key indicators should not be linearly dependent on each other. For this purpose, the pair correlation coefficients were calculated for each organization. The obtained results allowed us to state that 86.25% of all observations (69 cases out of 80) have no significant collinearity since the correlation coefficient values are less than 0.7.

3. Results

The calculation of key indicators of the labor component was performed according to the accounting financial and statistical reports of sugar factories in the Voronezh region for 2012-2018 (Table 2).

Table 2. Characteristics of key indicators of the labor component of the economic activity of the surveyed organizations

Indicators	2012	2013	2014	2015	2016	2017	2018
	Enterprise C1						
Y_t	8.34	9.62	6.08	6.7	6.66	7.59	7.02
D_t	0.76	0.62	2.01	2.99	3.05	1.6	1.65
M_t	16.28	14.69	9.87	13.45	18.13	17.67	17.95
C_{pw}	1.03	0.91	0.82	1.69	1.23	0.77	1.04
K_{lc}	0.135	0.136	0.134	0.136	0.128	0.157	0.142
	Enterprise C2						
Y_t	11.77	18.44	12.82	11.44	9.91	8.48	13.02
D_t	0.52	0.36	1.02	1.88	2.23	1.13	1.08
M_t	6.33	8.3	4.72	7.58	10.05	10.9	7.67
C_{pw}	1.11	1.27	0.75	2.03	1.23	0.78	0.78
K_{lc}	0.28	0.174	0.2	0.289	0.335	0.373	0.554
	Enterprise C3						
Y_t	8.9	8.43	6.08	7.36	7.46	7.28	7.1
D_t	0.75	0.9	1.97	2.46	2.28	1.3	1.68
M_t	12.76	16.57	17.51	16.45	10.27	10.27	8.16
C_{pw}	1.16	1.3	1.17	1.05	0.68	0.8	0.9
K_{lc}	0.381	0.38	0.374	0.406	0.448	0.699	0.622
	Enterprise C4						
Y_t	6.57	7.21	5.67	7.03	5.9	5.35	5.98
D_t	1.09	0.77	2.33	2.65	2.91	1.53	1.45
M_t	17.26	16.2	14.37	15.96	21.03	16.96	20.01
C_{pw}	0.83	0.9	1.3	1.1	1.22	0.62	1.19
K_{lc}	0.094	0.082	0.082	0.081	0.109	0.183	0.14
	Enterprise C5						
Y_t	14.54	11.5	9.56	10.66	11.11	7.44	5.38
D_t	0.49	0.52	0.77	1.77	1.2	1.07	2.6
M_t	10.37	10.44	8.39	14.08	13.28	16.5	7.18
C_{pw}	0.93	1	0.88	2.12	0.82	0.97	0.68
K_{lc}	0.273	0.22	0.229	0.194	0.097	0.06	0.059
	Enterprise C6						
Y_t	15.68	22.32	20.44	16.01	14.63	14.39	18.51
D_t	0.5	0.22	0.99	0.88	0.9	0.39	0.48
M_t	7.06	8.02	4.24	6.01	11.69	11.47	8.09
C_{pw}	1.22	1.08	0.74	1.34	1.77	0.81	0.8
K_{lc}	1.985	1.416	1.926	2.655	2.808	2.603	2.829
	Enterprise C7						
Y_t	11.49	11.35	8.89	9.81	9.32	7.72	6.87
D_t	0.52	0.51	0.86	2.96	1.96	1.07	1.91
M_t	9.46	8.51	7.24	10.32	15.39	15.29	10.11
C_{pw}	0.91	0.98	0.87	2.04	1.29	0.75	0.84
K_{lc}	1.302	0.937	0.964	0.788	0.609	0.287	0.195
	Enterprise C8						
Y_t	12.48	15.27	12.32	8.83	11.59	10.73	12.04
D_t	0.4	0.44	0.75	2.23	1.46	0.8	1.23
M_t	9.58	9.01	7.52	8.93	13.23	14.26	8
C_{pw}	1.02	1	0.96	1.58	1.29	0.82	0.73
K_{lc}	0.433	0.364	0.395	0.463	0.493	0.439	0.332

Table 3. Aggregated results of the analysis of key indicators of the labor component of the surveyed enterprises

Indicators	Y_t	D_t	M_t	C_{pw}	K_{lc}
Minimum value	5.35	0.22	4.24	0.62	0.059
Maximum value	22.32	3.05	21.03	2.12	2.829
The average value (level)	10.27	1.34	11.80	1.07	0.58
Deviation of the minimum value from the average level	4.92	1.12	7.56	0.45	0.52
Deviation of the maximum value from the average level	17.40	1.93	13.47	1.67	2.31
Percentage of values above the average level, %	24	23	24	22	14

A significant range of variations in all key indicators, both for organizations in one year and for organizations in general during the analyzed period (Table 3), confirmed the feasibility of using the proposed approach (in contrast to the traditional additive convolution) to determine the integral indicator.

A very significant spread in the values of indicators, which can be conditionally considered one-class, since in the calculations of each, the number of personnel of organizations acted as the basic element directly or indirectly, testifies, firstly, to the different level of labor relations in a particular business, and secondly, about a certain influence on labor activity of factors of the external and internal environment, both positive and negative; thirdly, about a very significant variety of characteristics of human capital, the motivation for its disclosure and the development of personnel creativity; fourthly, about the presence of some managerial decisions regarding the use of labor of a reactive rather than proactive nature.

It should be noted that for all key indicators, without exception, the size of deviations of the maximum values from the average level exceeded the logical deviations of the minimum values. At the same time, only 22-24% of all cases (for indicators 1-4) and 14% (for indicator 5) exceeded the average level, which also indicates that there are significant underutilized opportunities for the development of the labor component.

The ranking of the obtained values of key indicators by year was carried out using the “sum of places” method for each organization separately: the best place = 1 point, the worst-7 points (based on the number of years of the analyzed period).

The best values of the indicators are the specific labor intensity of production per ton of products and the coefficient of resource compliance (in terms of labor costs) were considered to be the lowest values. The opposite approach was used in relation to the key indicators of the value added per 1 person per hour, the level of external labor motivation, and the ratio between the rate of productivity dynamics and wages. Further, the ranking was carried out, respectively, in the first group of indicators in ascending order, in the second - by decreasing the arithmetic value of the indicator (Table 4).

Table 5 shows the results of calculating dynamic ratings, which give grounds to recognize organizations C2, C1, C5, C6, C8 as increasing the efficiency of using the labor component; organizations C3, C4 lacked a pronounced dynamics of positive changes in economic activity, which indicates insufficient attention to the development of the labor component on the part of the management of the company.

Table 4. Interim results of rating key indicators of the labor component of the economic activity of the surveyed organizations, place

Organization code	Year	Y_t	D_t	M_t	C_{pw}	K_{lc}
C1	2012	6	6	4	4	3
	2013	7	7	5	5	5
	2014	1	3	7	6	2
	2015	3	2	6	1	4
	2016	2	1	1	2	1
	2017	5	5	3	7	7
	2018	4	4	2	3	6
C2	2012	4	6	6	4	3
	2013	7	7	3	2	1
	2014	5	5	7	7	2
	2015	3	2	5	1	4
	2016	2	1	2	3	5
	2017	1	3	1	6	6
	2018	6	4	4	5	7
C3	2012	7	7	4	3	3
	2013	6	6	2	1	2
	2014	1	3	1	2	1
	2015	4	1	3	4	4
	2016	5	2	5	7	5
	2017	3	5	6	6	7
	2018	2	4	7	5	6
C4	2012	5	6	3	6	4
	2013	7	7	5	5	2
	2014	2	3	7	1	3
	2015	6	2	6	4	1
	2016	3	1	1	2	5
	2017	1	4	4	7	7
	2018	4	5	2	3	6
C5	2012	7	7	5	4	7
	2013	6	6	4	2	5
	2014	3	5	6	5	6
	2015	4	2	2	1	4
	2016	5	3	3	6	3
	2017	2	4	1	3	2
	2018	1	1	7	7	1
C6	2012	3	4	5	3	3
	2013	7	7	4	4	1
	2014	6	1	7	7	2
	2015	4	3	6	2	5
	2016	2	2	1	1	6
	2017	1	6	2	5	4
	2018	5	5	3	6	7
C7	2012	7	6	5	4	7
	2013	6	7	6	3	5
	2014	3	5	7	5	6
	2015	5	1	3	1	4
	2016	4	2	1	2	3
	2017	2	4	2	7	2
	2018	1	3	4	6	1
C8	2012	6	7	3	3	4
	2013	7	6	4	4	2
	2014	5	5	7	5	3
	2015	1	1	5	1	6
	2016	3	2	2	2	7
	2017	2	4	1	6	5
	2018	4	3	6	7	1

Table 5. Dynamic ratings of the labor component of the economic activity of the surveyed organizations, place

Organization code	Year	Amount of places, number	Ranking of the year, place
C1	2012	23	5
	2013	29	7
	2014	19	3
	2015	16	2
	2016	7	1
	2017	27	6
	2018	19	3
C2	2012	23	5
	2013	20	4
	2014	26	6
	2015	15	2
	2016	13	1
	2017	17	3
	2018	26	6
C3	2012	24	4
	2013	17	3
	2014	8	1
	2015	16	2
	2016	24	4
	2017	27	7
	2018	24	4
C4	2012	24	6
	2013	26	7
	2014	16	2
	2015	19	3
	2016	12	1
	2017	23	5
	2018	20	4
C5	2012	30	7
	2013	23	5
	2014	25	6
	2015	13	2
	2016	20	4
	2017	12	1
	2018	17	3
C6	2012	18	2
	2013	23	5
	2014	23	5
	2015	20	4
	2016	12	1
	2017	18	2
	2018	26	7
C7	2012	29	7
	2013	27	6
	2014	26	5
	2015	14	2
	2016	12	1
	2017	17	4
	2018	15	3
C8	2012	23	5
	2013	23	5
	2014	25	7
	2015	14	1
	2016	16	2
	2017	18	3
	2018	21	4

Table 6. Integrated rating assessment of key indicators of the labor component of the economic activity of the surveyed organizations, place

Indicator	Year	Organization code							
		C1	C2	C3	C4	C5	C6	C7	C8
Specific labor intensity of production of a ton of products, person per hour/t	2012	2	5	3	1	7	8	4	6
	2013	3	7	2	1	5	8	4	6
	2014	3	7	2	1	5	8	4	6
	2015	1	7	3	2	6	8	5	4
	2016	2	5	3	1	6	8	4	7
	2017	4	6	2	1	3	8	5	7
	2018	4	7	5	2	1	8	3	6
Added value per person per hour, thousand rubles/person per hour	2012	2	4	3	1	7	6	5	8
	2013	3	7	1	2	4	8	5	6
	2014	2	4	3	1	7	5	6	8
	2015	1	6	4	3	7	8	2	5
	2016	1	4	3	2	7	8	5	6
	2017	1	4	3	2	6	8	5	7
	2018	4	7	3	5	1	8	2	6
The level of external motivation for work, units	2012	2	8	3	1	4	7	6	5
	2013	3	7	1	2	4	8	6	5
	2014	3	7	1	2	4	8	6	5
	2015	4	7	1	2	3	8	5	6
	2016	2	8	7	1	4	6	3	5
	2017	1	7	8	2	3	6	4	5
	2018	2	7	4	1	8	5	3	6
Ratio between the rates of dynamics of productivity and wages, units	2012	4	3	2	8	6	1	7	5
	2013	7	2	1	8	4	3	6	5
	2014	6	7	2	1	4	8	5	3
	2015	4	3	8	7	1	6	2	5
	2016	5	4	8	6	7	1	2	3
	2017	6	5	4	8	1	3	7	2
	2018	2	6	3	1	8	5	4	7
Resource compliance coefficient (in terms of labor costs), rub./rub.	2012	2	4	5	1	3	8	7	6
	2013	2	3	6	1	4	8	7	5
	2014	2	3	5	1	4	8	7	6
	2015	3	4	5	2	1	8	7	6
	2016	3	4	5	2	1	8	7	6
	2017	2	5	7	3	1	8	4	6
	2018	3	6	7	2	1	8	4	5

The ranking of organizations by period was similar to the approach described in the previous iteration: each organization was assigned places from 1 to 8 (according to the number of organizations surveyed) (Table 6).

The integral rating of organizations as a whole over a seven-year period was determined by the number of places: the minimum number of places was the first place, the maximum the eighth place (Table 7).

For each year of the seven-year period, the best places were occupied by organizations C1 and C4 (first, second or third), the worst place was taken by organization C6 (stable last - eighth). In other organizations, an unstable state of the labor component was observed, which indicates the existing opportunities for its activation.

Table 7. Integrated rating assessment of key indicators of the labor component of the economic activity of the surveyed organizations, place

Indicator	Year	Organization code							
		C1	C2	C3	C4	C5	C6	C7	C8
Amount of places, number	2012	12	24	16	12	27	30	29	30
	2013	18	26	11	14	21	35	28	27
	2014	16	28	13	6	24	37	28	28
	2015	12	27	21	15	20	38	21	26
	2016	13	25	26	12	25	31	21	27
	2017	14	27	24	16	14	33	25	27
	2018	15	33	22	11	19	34	16	30
Rating, place	2012	1	4	3	1	5	7	6	8
	2013	3	5	1	2	4	8	7	6
	2014	3	6	2	1	4	8	7	5
	2015	1	7	5	2	3	8	4	6
	2016	2	4	6	1	5	8	3	7
	2017	1	7	4	3	2	8	5	6
	2018	2	7	5	1	4	8	3	6
The integral sum of places as a whole for the period for all key indicators		100	190	133	86	150	238	168	195
Integral rating on average for the period		2	6	3	1	4	8	5	7

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4. Discussion

The performed evaluation procedures of the methodology for rating the labor component developed by us and tested using information about the surveyed organizations, gave grounds to draw the following (Christiansen, Joensen, and Nielsen 2007; V. Plotnikov, Pirogova, and Vertakova 2019; Klaas et al. 2010; Prys et al. 2018; Gomes and Kuehn 2017).

1. a significant range of variations in the level of key indicators selected for the rating assessment, made it possible to recognize the insufficiently effective personnel policy in organizations, especially in terms of the choice of tools for external and internal motivation of personnel labor;

2. suboptimal level of some key indicators (in beet-processing organizations - the ratio between the rate of dynamics of productivity and wages ≤ 1 unit in 48% of observations; the specific labor intensity of the production of a ton of sugar is more than 10 person per hour/t in 80% of observations; a decrease in the value added per person per hour compared to the previous year in 43% of observations; the level of external labor motivation is less than 10 units in 39% of observations; the coefficient of resource compliance (in terms of labor costs) is greater than 0, 3 rub./rub. in 52% of observations) indicates unused opportunities to enhance the labor component of economic activity;
3. The C6 organization, which has been in the last place for the past six years, was closed in early 2019. The main reason was the lack of opportunities for the effective development of the technical component of the resource potential. The data obtained during the analysis indicate, firstly, the need for a comprehensive assessment of all components of the resource potential; secondly, the company's management's reduced attention to the development of the labor component of the C6 organization, the liquidation of which was previously provided for in long-term strategic documents;4) despite the profitable activities of the surveyed organizations, in the overwhelming majority of observations (except for the organization C6 in 2013), there are multidirectional deviations in the negative direction of key indicators, both statically (by organization) and in dynamics (by years), testify to some omissions of organizations in the use of labor potential and insufficient manifestation of personnel creativity, which makes it necessary to consider the existing personnel management toolkit in need of certain improvement.

Conclusion

The effectiveness of developing and making management decisions is associated with the need to use adequate analytical tools, including to assess the level of use of the labor component of the organization's resource potential and determine the vector of its development. Updating and adaptation of analytical tools is based on the selection of a limited (no more than seven) number of key indicators that meet certain methodological requirements (principles) and correspond to specific conditions of the external and internal business environment. The proposed key indicators, as shown by the results of the study, meet the criterion of the absence of significant collinearity and are reasonably used in the formation of an integral rating. The use of ranking procedures at the last stage made it possible to avoid the difficulties associated with the establishment of weighting coefficients for indicators (especially for those proposed for the first time), as well as their synthesis, characteristic of traditional additive convolution.

The relationship between the production capacity and the high level of the labor component assessment results revealed in the study is interpreted by us as confirmation of the need for a comprehensive and one-time assessment of all components of the resource potential: labor, material and technical (Sevilir 2010).

The results of testing the proposed methodological approach allowed us to establish the presence of unused and underutilized opportunities for the development of the labor component of economic activity in all the organizations surveyed, without exception, despite comparable, but in some cases multidirectional measures implemented by a single management company

for them. At the same time, the achieved results indicate a piecemeal implementation of a proactive approach to the development of the labor component and can be used as reference values for benchmarking within the group of companies.

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Chapter 11

Digital Transformation Challenges in Logistics and Supply Chain Management

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Abstract

The priority focus of economic development today is the integrated logistics concept based on the consolidation of logistic chain members to ensure consistency, reduce the combined costs incurred at every link of the logistic chain to satisfy the customer in terms of the quality of goods and services, and maximize the overall economic effect. This creates the need for conducting further research on the matters involving supply chain management in the climate of international business and determining the prospects for further development. One of the key promising trends is the supply chain digitalization. The goal of this article is to identify features, problems, and prospects of introducing digital technologies when creating supply chains and their suitable rearrangement according to the specifics of logistics solutions in the context of globalization and competition. The following research methods are applied: systematization and generalization of theoretical and practical aspects of supply chain digitalization, logics and systematic approach to identifying the issues involved with the processes under study and company case analysis related to the introduction of digital logistics. The research findings allowed to describe the specifics of supply chain development in the new digital business environment and to define problems and prospects of introducing new technologies in supply chain management.

Keywords: supply chain, digitalization, electronic logistics, supply chain management, logistics infrastructure, new technologies

1. Introduction

Digital technologies represent the most significant factor of modern development, whose essence, in particular, is the promotion of companies and their products using various digital

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means and communication channels (Korchagina, Naumova, et al., 2019). It can be suggested that the supply chain digitalization reduces the time between the consumer exposure and its decision to make a purchase, compared to traditional marketing (Barykin, Bochkarev, Dobronravin, et al., 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al., 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al., 2021). If the product is digital and represents a file or a file archive (e.g., electronic books, songs, movies or programs, etc.), it is delivered to the consumer (more specifically, to the location of the consumer's data storage) almost instantly. However, if a product represents a physical object, it requires physical (real) delivery by using different modes of transport, which can be accomplished today after a certain interval of time (Balashova and Maiorova 2020).

The time can be reduced and the quality of delivering the product to the consumer can be improved, by using different digital technologies, for example (Korchagina et al., 2020). Therefore, the goal of the article focused on investigating problems and prospects of implementing digital transformation of delivery chains, which is primarily applied in international activities, represents great interest. The following objectives were addressed to achieve the set goal: examining the essence of digital supply chain transformation; studying the prevalence of digital technologies in logistics based on different functional areas; analyzing the most common digital technologies applied in logistics and supply chain management, related to logistics information flows.

2. Materials and Methods

Academic papers of national and foreign scientists, which addressed the problems of digital transformation and delivery chain management in the modern economy, represented the theoretical and methodological basis of the research. General scientific methods of data systematization and classification, methods of their logical handling, systematic approach, and information analysis and generalization were applied during the research. In addition, the case study method was applied to analyze the practice of using digital technologies in logistics and supply chains.

New digital technologies emerge and the existing ones improve every year, among which the following technologies can be mentioned according to their time of origination and application (Serdyukova, Bashirzade, and Pakhomova 2020; Tyapukhin 2020; Tyapukhin, Matveeva, and Tasmaganbetov 2019; et al., 2018):

1. digital technologies of the past representing the trend before 2015 but still remaining essential nowadays, such as high-speed internet; smartphones, tablet computers, laptops, ultra-fast electronic computing machines, servers, large data storage media; cloud computing; social networks and messengers, etc;
2. modern digital technologies that were also used previously but rapidly grew in recent times, such as virtual and augmented reality; individual gadgets for different applications; quadcopters, UAVs; smart home; various detectors and sensors; big data; nanotechnologies and blockchain;
3. digital technologies that are already applied today but are expected to be widely used in the nearest future, such as artificial intelligence; cognitive computing; robotics; 3D

printing; distributed computing; driverless cars; new power engineering technologies and implant technologies.

3. Results

The term "digital technologies" has lately become widely used, specifically, in the terms "digital economy" and "digital transformation." Digital technology includes all kinds of electronic equipment and programs that use information represented as a numerical code (usually, binary) with "0" and "1" symbols. Digital technologies include mobile internet of Things-based devices (smartphones, tablet computers and gadgets); pin-down technologies; innovative human-electronic device interfaces; authentication (using passwords and biometric user data); anti-fraud tools; complex multilevel user interaction and personalization; augmented and virtual reality; 3D printing; smart sensors; Big data; Cloud computing (services) (Trifonov and Seryshev 2018). Digital technologies mainly constitute innovations developed by large international companies whose concentration in the respective countries makes them the digital economy leaders almost automatically. Legally constituted initiatives and strategies of their transformation as part of the digital economy in the coming years exist in many countries, aimed at improving their competitiveness in the global economy (A. Bril, Kalinina, and Valebnikova 2016; Kalinina et al., 2020; A. R. Bril, Kalinina, and Ilin 2017; Trifonov and Seryshev 2018).

Due to the meaningful use of modern digital technologies in business, companies can greatly improve their performance efficiency. However, these technologies can cause changes in the existing business processes and the formation of new ones (Korovin 2018; Uskova et al., 2017). Digital technologies, first of all, refer to innovations whose implementation and application require the presence of appropriate specialists at the company who can constantly learn and acquire new skills. According to the research, almost every logistics (supply chain) company manager agrees that digital logistics will dramatically change the logistics processes in the nearest future. However, more than half of them state that the company's development strategy has not yet been formed based on both existing and new digital technologies (Götz 2019). The lack of such a strategy makes the use of digital technologies less effective both for a particular company and the economy as a whole. Besides, the concepts of globalization and glocalization in the digital economy are becoming even more essential both for the digital and for the physical worlds. The harmonic combination of digital and physical worlds can be considered as one of the objectives of world economy logistics, which, particularly, provides for effective use of a wide range of digital technologies in logistics and supply chain management.

The sources that are used in preparing this article can be divided into those that examine the existing implementations of digital technologies in logistics and supply chain management, and those that describe the potential future changes in logistics processes depending on the use of digital technologies. For instance, T. Yudina and V. Panyukov (Yudina 2019; Eremeeva and Panyukova 2020) believe that the ability of digital technologies to change the well-established logistics processes fundamentally is particularly evidenced by the replacement of the existing linear structure of supply chains with a network structure. We can agree with the opinion of certain researchers that linear supply chains are already being transformed into dynamic

interdependent open-type supply systems (digital supply networks) where information flows continuously and is available to all the interested network members at the same time, which allows avoiding different problems and delays during the work, which are inherent in traditional supply chains (Kapustina et al., 2020; Korchagina, Bochkarev, et al., 2019). Information flows existing in digital supply networks have a digital form and the information can flow as follows (Grusho, Zatsarinny, and Timonina 2019):

1. from the physical world into digital (data is recorded on digital information media corresponding to the real world);
2. information circulation within the digital world (data exchange, comprehensive data analysis and mathematical modeling in economics, specifically through the use of artificial intelligence);
3. from the digital world into physical (the results of analysis and data modeling affect the decisions realized in the physical world).

As we can see, the use of digital technologies is very common in supply management and logistics. We can agree that the digital economy is driving out the traditional economy by transforming the daily routine and the business, and offering significant benefits to those economic sectors where digital technologies are meaningfully used and rapidly implemented (Korchagina and Desfonteines 2019).

4. Discussion

We shall examine some of these digital technologies in detail: the Internet (including the Internet of Things - IoT) can be regarded as the basis of the digital economy. The IoT allows physical devices (objects) to connect and interact (exchange data) without any human intervention. Common physical objects whose basic existence, use and performance have nothing to do with a computer (electronic computing machine) in terms of data generation, storage and processing will be connected to the IoT. For example, certain innovative devices (detectors, sensors and controllers) can be connected to pallets for product storage and transportation, which are used in warehouse logistics. These devices can exchange information via the IoT to improve the overall efficiency of the warehouse. The number of these physical devices (objects) is growing every year (Gviliya, Parfyonov, and Shulzhenko 2019).

First, only the large companies started working in this field. For example, Walmart obtained a patent recently, which is designed to improve last mile logistics improvement by connecting delivery RPVs to the blockchain. Such IoT devices connected to the blockchain can also be provided with digital currency. This allows them to interact with other parties independently and - by means of smart contracts - to pay fees and duties on their own (e.g., for having priority access to restricted air corridors). The biggest car manufacturer Volkswagen uses the technology for monitoring special goods holders and recyclable packages across the entire supply chain, which is based on RFID-technology where sensors are integrated into the pallets that transport products/spare parts and RFID gates are installed at production lines to ensure clear identification. Every movement is recorded and as soon as the pallet with the product is delivered to the production line, it gives a signal on the next production process required. If the process is not completed properly or the component is damaged, the pallet is

forwarded to the designated station where operators automatically receive information on what they need to process before the component can be returned to the normal production process. The delivery of containers with components to special locations from the zone where goods enter the production cycle is monitored by suppliers at their own factories, and vice versa. Such comprehensive visibility allows easy tracking of the components and serves as a basis for further optimization of logistical flows (Apte and Petrovsky 2016). Volkswagen also created its own private cloud that offers applications for clients, suppliers, marketing organizations and internal transactions. By using this approach, the company is ahead of its competitors that focus exclusively on vehicle buyers by integrating data from IoT devices, saving them as big data, and analyzing them through the use of artificial intelligence (Mackey and Nayyar 2017).

Due to the various government initiatives in China that are focused on "intellectual logistics," application of IoT technologies, automated logistic facilities and equipment and intellectual decision support systems, companies are motivated to introduce innovative supply chain technologies in the climate of digital transformation (Hooi Lean, Huang, and Hong 2014; Lau and Wang 2009; Goh and Ling 2003). Logistics innovations represent great importance to the biggest Chinese companies engaged in electronic commerce, such as Alibaba. Over a few years, this company managed to integrate all the retail-related functions into an expanding online network of manufacturers, logistics companies, service providers, sellers and marketing specialists. For this purpose, electronic catalog data were unified and information systems were integrated. Supply chain monitoring, real-time planning of activities, administering data on products and events, data handling and predictive analytics based on big data are continuously achieved based on logistics innovations. Alibaba developed and implemented the smart business model by using machine learning technologies based on real-time data.

An interesting example is Taobao, the online store of the Alibaba Group, which performs trading operations in the domestic market based on continuous algorithmization of selling processes. Wangwang messenger can be referred to as one of the first major software tools used by Taobao, which allows online communication between sellers and buyers where sellers can greet buyers, describe their goods and make arrangements regarding the final product price. Alibaba developed software tools that allow sellers to create original online window displays directly.

In China, logistics innovations are not only used in electronic commerce in so much as the largest Chinese shipping company China Shipping (Group) Company automatically searches for suppliers, performs e-procurement and synchronizes supply chain processes by ensuring transparency and connection between all the supply chain elements. In addition, logistics innovations assist China Shipping (Group) Company in online monitoring of key performance indicators for transportation and logistics services, which became feasible due to the creation of a digital platform covering the whole organization from the external interface to internal and incorporating such functions as route design and development and so on.

At the same time, foreign companies based in China do not want to implement certain technologies such as cloud computing because local regulations require to store data on servers located in mainland China where they can be easily accessed by local authorities (Zhang and Wen 2017).

Conducted research showed that the IoT represents the unique lifeblood of supply chains (networks) existing in the digital economy with a large amount of circulating data that can be efficiently processed and stored using the Big data technology and cloud computing. Blockchain technology allows improving the accuracy and reliability of storing large data

arrays in logistics and supply chain management to a significant degree. Artificial intelligence and self-contained robots can replace humans in performing a large number of logistics operations, particularly in production, transportation and warehouse logistics and form the basis of cyber-physical systems and systems that are capable of self-teaching and teaching other machines. Artificial intelligence can be regarded as an element of intelligent decision support systems (man-machines), interactive systems that allow the responsible person to make decisions, are capable of acquiring new knowledge and learning based on the prior knowledge analysis and the experience gained, taking into account the volatility of economic environment, etc.

Augmented and virtual reality uses technologies that can closely unite the real world and the virtual world together, which allows a significant improvement of the supply chain efficiency. The wide use of 3D printers can fundamentally change the existing production and procurement system, which will have a significant impact on the form of economic relations. Detectors and sensors represent independent digital technologies although they are closely associated with other technologies. Digital technologies that represent a particular interest to logistics companies are the technologies that are associated with logistical information flows (Korchagina, Bochkarev, et al., 2019).

Therefore, information attains special status in the digital economy and its appropriate use can give considerable competitive advantages to companies. These digital technologies include the IoT, Big data, Cloud computing, Blockchain, and Artificial intelligence, which can be used in any functional area of logistics. Production, warehouse and transportation logistics represent the functional areas of logistics where most digital technologies are, or can be, applied.

However, digital technologies also have downsides. This is particularly caused by continuous changes in the field of digital technologies, their rapid growth and the challenge of adapting modern business processes to these rapid changes. At the early stage of implementation, it is hard to identify the technologies that are crucially important and can have a significant influence on the performance of logistical processes and the technologies that are transient and unessential. At the same time, the interaction between devices and the provision of various digital economy services require powerful channels of mobile and fixed broadband communication as well as wireless and hard-wired local connections securing high-quality and stable data exchange.

Thus, digital information represents the foundation of digital technologies and the full use of digital technologies is complicated and unpractical without it. For instance, Big data technology loses its meaning without a large array of data, and the IOT becomes pointless when there is no need to transmit information without human involvement. All this results in a different attitude towards the concept of privacy and confidentiality, both in personal day-to-day life and in business.

Conclusion

By generalizing the above, we can conclude that digital transformations require detailed research because they change the established system of economic relations fundamentally. As we can see, the most popular digital technology that will be widely used in supply chain management in the near future is the IoT, which represents digital technology integrating all physical objects into a single network. One of the debatable issues related to the use of digital

technologies is the standardization of various aspects of their performance, which is particularly relevant in supply chain management due to the great number of parties involved, execution of numerous logistics operations, and so on. The number of confidential information and trade secret users (people and machines) in supply chains will also be increased.

In addition, it is important to examine the application of digital technologies for each type of logistics and supply chain element in detail. The available research findings reflect the current condition of using digital technologies in logistics and supply chain management that mainly exists in developed countries. This explains why it is necessary to conduct similar research on a national scale. The application of digital technologies in logistics and supply chain management requires highly-qualified personnel, which, in turn, results in the adaptation of education and science in so far as training of new generation specialists is concerned.

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Chapter 12

Problems of Artificial Intelligence Application in Forming Innovative Strategies of Retail Development

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Abstract

In recent years, artificial intelligence (AI) has become one of the key trends in economic development. It is increasingly being used to solve applied problems in business, medicine, automotive, education and other industries. Information about successful application of AI in trade management and marketing is becoming more and more common. The purpose of this paper is to study the practice of AI application and assess changes in the marketing of trade enterprises that are under the influence of AI. The main objectives of the study are to determine what AI technologies are used in the marketing of modern retail and assess the impact of AI on marketing activities. It is shown, that having passed in short terms a way from the first experiments to practical application in business processes, AI is more and more widely introduced in trade. The analysis of modern research has shown that AI influences all aspects of marketing of the trade enterprise defining creation of consumer values, and also on the organization and marketing management. Proposals were formulated for the introduction of artificial intelligence in the development of innovations, the development of new approaches to marketing activities of the trade enterprise based on AI technology.

Keywords: artificial intelligence, AI, marketing, AI application, meaning of AI, AI in trade marketing

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1. Introduction

One of the key trends in building the digital economy in recent years is the use of artificial intelligence in various industries. Smart systems are based on innovative tools and technologies for data collection and analysis, forecasting, preparation and decision making (Barykin, Bochkarev, Dobronravin, et al. 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al. 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al. 2021). Increasingly, there are reports that such systems are able to independently receive and analyze information about the environment, intelligently act in changing conditions, replacing or imitating the thinking processes of man. Rapid development of AI in recent years has become possible due to the promotion of cognitive mechanisms, the ability of computer systems to learn from the data obtained, the ability to create previously non-existent information. The advantages of AI also include the possibility of processing different data formats - numerical data, text, images, sound, etc.

As a result, AI goes beyond the limits of theoretical researches and experiments, rendering more and more influence on innovative development of the economy.

Growing interest to the problems of AI applications in the field of management and marketing of trade enterprise is caused by the appearance of various commercial AI applications, which have shown the potential and opportunities of these technologies in business.

As a result, AI goes beyond theoretical research and experiments and has an increasing impact on the innovative development of the economy.

Growing interest to the problems of AI applications in the field of management and marketing of trade enterprises is caused by the appearance of various commercial AI applications, which have shown the potential and opportunities of these technologies in business.

Marketing in retail is based on the collection and processing of large volumes of various data (market and competition analysis, customer research, etc.), designed to organize and conduct events in various distribution and communication channels, as well as to measure the results and effectiveness of decisions (Ianenko, Ianenko, Mironova, et al. 2020).

Prospects of AI application in marketing activities of a trade enterprise are determined by the development of technologies for processing large data (Big Data, Data Science), natural language (Natural language processing, Audio/speech analytics, Machine translation) and images (Image analytics, Visualization), etc. The integration of these technologies with the Internet of Things, online interaction with the client with the help of mobile devices opens up new opportunities for improving marketing activity (Ianenko, Stepanov, et al. 2019).

At the same time, the emerging practice of artificial intelligence technologies is not sufficiently studied; there are very few works on the theoretical aspects of AI application in marketing activities, and especially in the marketing activities of a trade enterprise. The purpose of the article is to study the practice of AI application in economics and assess the changes that occur under the influence of AI in the activities of a trade enterprise. The main objectives of the study are to determine what AI technologies are used in the activities of the trade enterprise and assess the impact of AI on marketing activities.

The work consists of four blocks. The first block contains key definitions of AI and marketing in trade. The second discusses examples of the use of AI in business, demonstrating the use of these technologies to solve the problems faced by the enterprise. In the third block,

based on the analysis of the examples collected, the impact of AI on elements of the marketing complex in the trade enterprise is described. The final block is devoted to the opportunities and risks of AI application in modern business.

2. Methods and Methods

Methods of general scientific knowledge, such as observation, analysis, comparison, description, as well as systematization, classification, deduction, and analogy are used to achieve this goal.

Retail as a branch of the national economy, has a number of characteristic economic, social, organizational, technical and other features, which determine the specifics of its development.

Economic transformations, scientific and technical progress contributed to the change of the economic, informational and legal environment of trade sphere. The share of wholesale and retail trade in the formation of GDP of the Russian Federation was about 20% in basic prices (Barbaruk, Krasyuk, and Medvedeva 2019; I. A. Krasyuk and Medvedeva 2019).

Trade has turned from the sphere of industry service into the leading market participant. It carries out a wide range of activities and performs many functions that differ in terms of their contribution to the sale of goods, while the forms of trade organization may vary. Retail trade, in turn, has always been an important part of the economic activity of society and today its role is growing.

It is now clear that new strategic solutions are needed to maintain or increase turnover (I. Krasyuk et al. 2019; I. Krasyuk, Yanenko, and Nazarova 2020). One of such solutions, with the help of which it is possible to attract customers to the trade enterprise, is the use of innovative digital trading technologies (Ianenko, Ianenko, Kirillova, et al. 2020; Ianenko, Stepanov, and Mironova 2020).

It should also be taken into account that with changes in the monetary incomes of the population demand is very unstable. Growth in turnover can be achieved through the competence of retailers to use innovative digital solutions.

Russia's retail trade network is rapidly developing today. However, it should be noted that both in quantity and quality, it has not yet reached the level of developed European countries.

In recent years, the structure of trade turnover has changed significantly. The consumer market is characterized by a saturation corresponding to the solvent demand of the population.

The changes that have taken place in the country have affected all aspects of trade enterprise activity and have affected its position in the system of public production. The following trends are among the most significant:

- the goals and objectives of the enterprise have changed;
- changes have affected the nature of the enterprise activity;
- radically changed the external conditions of trade enterprises' functioning, their connections and relations among themselves and with other market subjects.

As a result, the significance of the main priorities of trade enterprises' activity has changed. Being dynamic, the processes of development of the branch require the formation of innovative strategies for the effective management of trade enterprises.

Current and future trends in the organizational and economic support of the process of providing services by a trade entity are that today trade is one of the most important areas of life support for the population, as it is not only a source of income, thus forming the financial basis for the stability of the state, but also performs a major social function (Ianenko, Stepanov, et al. 2019).

3. Results

3.1. Application of AI Technologies in Business Processes of Trade Enterprise

The procedure for collecting and analyzing information on AI applications was carried out in two stages.

At the first stage, in order to collect information on the use of AI in the marketing of the trade enterprise were studied materials posted on marketing portals. Then, in the second stage, the analysis of found examples of AI application by their description on the corporate sites of companies developers and users of such systems.

To answer the first question of the study (what application are the main AI technologies found in the marketing of the trade enterprise), the authors grouped the found examples of application in business on the five most frequently mentioned technologies of artificial intelligence (Table 1). For each mentioned AI technology (image, text and voice recognition, decision-making) the authors have formulated the tasks to be solved in the marketing of a trade enterprise.

Table 1. Examples of AI application in business

AI Technologies	Example	Examples of business applications
Image recognition and processing technologies	– Search for goods by photo on the Internet. The search engine also offers similar or additional products (eBay). – Electronic mirrors in the clothing store, picking up samples from the collection that match the appearance, style and taste of the customer (FashionAI). – Using the customer's facial image for individual color selection of cosmetics during online shopping (Estée Lauder). – Recognition of facial skin condition followed by an individual selection of facial cream type based on the analysis of his photo and data, including information about the current weather (Shiseido). – Facial recognition when making payments (KFC). – Self-service stores where video cameras analyze images of selected products for automatic payment (Amazon). – Identification of customers prior to video consultation by comparing the video image with a photo previously provided by the customer (BBVA).	Innovative services, offering new products, expanding opportunities to interact with customers, personalizing offers
Voice processing technologies	– Voice purchase requests made through a device or application (Amazon, Alexa) Virtual assistants support task execution (Alice, Siri, Google Home, Kortana).	Improvement of interaction with customers

AI Technologies	Example	Examples of business applications
Text Processing Technologies	– GPS navigation system, which in addition to displaying the route to the selected destination, indicates the sights found nearby and objects related to the selected destination (Naver). – Using a virtual assistant - a guidebook to help you navigate through shopping malls (Alpine.AI). – The virtual assistant embedded in the mobile banking application, taking advantage of NLP, processes and responds to customer requests. – Development and launch of new beer recipes, modification of existing products thanks to information collected by chatboat (Intelligentx Brew). – Development of a marketing campaign to launch a new model of Toyota Mirai car. Using the data provided by the selected target group, computers performed text and video analysis on YouTube. Then, in a few iterations, they developed the project of the advertising campaign. The final advertisement texts were approved by Facebook (Toyota) management.	Innovative services, expanding the product line, expanding the possibilities of interaction with customers, personalization of offers, development of an advertising campaign
Decision making	– Chatbot prepares a cocktail recipe based on consumer preferences and using ingredients that the consumer has at home. Chatbot analyses 300 recipes and offers the best solution (Diageo Simi Bartender). – Based on the user's cell phone data (location, time in the sun), the application shows the correct level of protection from ultraviolet rays (Monteloeder). – Dynamic pricing based on user purchases through websites or cell phone (iperfumy.pl, kontigo.pl). – Comparison of advertising with the characteristics of the user based on the history of his search on the Internet (ING Bank Slönski). – Recommendations for new products (Amazon, Netflix). – ZozoSuit helps to order clothes that perfectly fit the figure of the customer. Thanks to the built-in 150 sensors, ZozoSuit can take 150,000 measurements (StretchSense, Start Today). – A platform for managing online marketing campaigns. In the first weeks, the AI learns the specifics of the company, based on data analysis, gives recommendations on the campaign strategy (Albert AI, Harley Davidson). – Detects product malfunctions and errors and forecasts the occurrence of malfunctions. If necessary, the technical group responsible for monitoring and repairing the device (KONE, IBM Watson IoT, Salesforce Einstein) is connected. – Synchronization of data about all possible points of contact between the customer and the brand (social networks, website, e-mail, telephone conversation). To improve customer service, all interactions are aggregated and presented in one place (Salesforce, Adidas).	Innovative services, Expanding the product line, expanding the possibilities of interaction with customers, personalizing offers, adaptive pricing, improved service

Source: Authors' data (Jarek and Mazurek 2019).

At the same time, the table has not included the technological areas of AI, which are still at the stage of research and have not found wide application in business, as well as those that will not reach the plateau productivity according to the Gartner curve for artificial intelligence in the coming years (Dirican 2015; Brynjolfsson and Mcafee 2017).

3.2. Influence of AI on Marketing Complex

To answer the second question of the study (what effect does AI have on marketing activities), the authors analyzed the collected examples and generalized how the examples affected the marketing mix. The results are presented in Table 2.

These examples show how AI affects each element of the marketing mix. This result is particularly important for practitioners responsible for developing marketing innovation in the trade enterprise.

Using AI technology, retailers based on an individual consumer profile can select or modify the goods, forming personalized offers for their customers (Ianenko, Stepanov, et al. 2019; Ianenko, Ianenko, Mironova, et al. 2020). As a result, AI technologies make it possible to develop innovative marketing programs for the development of new product lines.

The use of AI in the systems of adaptive pricing based on a dialogue with the customer allows to reduce consumers' costs, to select the most advantageous offers taking into account discounts and bonuses provided.

Table 2. Influence of AI on marketing complex elements

Element of marketing complex	**Influence of AI on the marketing complex element**
Product	– Creation of new "smart" products and services based on interaction with consumers – Selection of products and services based on the customer's personal profile – Automatic references – Create additional value – Offer product from other categories
Price	– Adaptive pricing based on customer value preferences and competitors' offers – Variety of payment methods in electronic payment systems
Promotion (Brand)	– The possibility of information interaction in the digital environment at any time and in any place; – Personalized interaction – Create a unique experience – Learning process as part of personalized interaction – Intelligent support service without consultants – 24/7 customer service with chat bots
Location (sales and distribution)	– Fast and convenient shopping due to "smart" interaction in cyberspace, virtual and augmented reality. – Purchase Automation – Self-service stores – New distribution channels – Availability of complete product information at any time and place; – Delivery at a time and place specified by the consumer.

The appearance of virtual assistants, which expand the possibilities of personalized interaction, radically changes the strategies of promotion of goods and services both in the traditional (off-line) trade space and on-line (mobile communication, free Wi-Fi, multi-channel contact centers, etc.).

At the same time, it is reasonable to replace the element of the marketing complex "Place" with the element "Place, cyberspace and time." Electronic trading platforms, online stores,

platforms and other means of interaction between consumers and suppliers, provide availability of detailed information about a product at any time and in any place. AI, virtual and augmented reality technologies allow, for example, in a dialogue with a customer to select a product by size, color, style, pay for it, and ensure delivery. At the same time, chains of innovations cover all business processes of an enterprise (Ianenko, Ianenko, et al. 2019).

The analysis of cases presented in Table 2 shows that AI has a two-way impact on the marketing activities of the trade enterprise. On the one hand, the consumer benefits from the changes and on the other hand, new solutions influence innovations in marketing activities.

3.3. Influence of AI on Consumers

The development of digital technologies, primarily the internet, mobile communications, has led to significant changes in consumer behavior. It allows to make the buying process more convenient and quick by personalizing the service, automatic recommendations when choosing a product, online payments. AI also creates new benefits for customers. The analysis of collected examples of AI application in marketing shows a whole range of benefits that AI offers to consumers:

- more convenient and faster time of shopping thanks to improved processes (for example, automatic payments, quality of search engines, 24/7 customer service);
- new consumer experience through personalization, continuous (24/7) online after-sales service;
- creates additional value beyond the core product;
- allows building a new relationship between the consumer and the brand;
- -discontinues post-purchase frustrations thanks to the ability to virtually test and evaluate the product in question, to make comparisons, to learn the opinions of other users.

3.4. Influence of AI on Trade Enterprise Marketing Management

By implementing innovative approaches that provide a competitive advantage for the company, AI has a significant impact on modern marketing management practices:

- elimination of laborious and time-consuming activities. AI automates routine and repetitive tasks (for example, data collection and analysis, image search and adaptation/processing);
- greater importance of creative and strategic activities. Opportunities for in-depth analysis with AI increase the role of creative and strategic factors in creating competitive advantage;
- design innovation. AI changes the way value is delivered to the client, increasing the role of finding new design solutions;
- developing new competencies in the marketing team. AI requires an understanding of new technological opportunities, data skills and innovative tools;

The above considerations show that the transformation of the marketing management process of a trade enterprise is complex and requires an in-depth analysis of the practice of applying AI technologies, rethinking some key theoretical provisions of marketing.

4. Discussion

4.1. Key Ideas of Artificial Intelligence

Artificial intelligence is part of information technology. Currently, there are many definitions devoted to artificial intelligence. A generally accepted definition for this concept has not yet been worked out. It is often used in conjunction with concepts such as automation or robotics, machine learning or the application of algorithms.

The history of artificial intelligence dates back to the 50s of XX century. One of the first definitions, formulated in the early 1980s, defined artificial intelligence as the field of computer science, which is engaged in the development of intelligent computer systems, that is, systems that have the capabilities that we traditionally associated with the human mind - understanding language, learning, ability to reason, solve problems, etc. ("SAS: Analytics, Artificial Intelligence and Data Management | SAS," n.d.).

Later on, AI began to include a number of algorithms and software systems, the distinctive feature of which was that they could solve some problems in the same way as a person who was thinking about their solution. At the same time, understanding of natural language, the ability to learn, and the ability to act meaningfully in a changing environment were recognized as the main properties of AI ("Artificial Intelligence," n.d.).

At present, the most common view of AI is the theory of developing computer systems capable of performing tasks usually requiring the application of human intelligence, such as visual perception, speech recognition, decision-making and translation between languages (Ghahramani 2015; "What Is Artificial Intelligence? | Computerworld," n.d.; Entwistle 1988).

The definitions of artificial intelligence vary according to the goals that it tries to achieve:

- to create systems that simulate human thinking (general, strong or broad AI). In this case, the results can be used not only to create systems working in several areas, but also to explain how the human brain works;
- development of systems designed to solve specific problems in a selected area (weak or narrow AI). Such systems, as a rule, cannot work in other areas. For example, IBM's Deep Blue system can beat a person in chess, but cannot be used in other games;
- using human reasoning as a guide to provide quality services or create quality products. Thus the purpose is not put precisely to copy the work of the human mind. So the creators of IBM Watson were guided by the observation that people can come to conclusions without having strict and fast rules, and then collect evidence. As a result, IBM Watson justifies its decisions by looking through thousands of text fragments (Marr 2018).

Traditionally, AI is regarded as a set of technologies, processes, program systems, and algorithms that differ in that they allow humans to solve some tasks in the same way as a human

being does. Thus, the National Strategy for the Development of Artificial Intelligence (Russian Federation) for the period up to 2030 includes technologies of computer vision, natural language processing, speech recognition and synthesis, intellectual support for decision-making and advanced methods of artificial intelligence.

The accelerated development of artificial intelligence technologies in recent years is due to the following factors:

- a high degree of influence on the performance of organizations and individuals, including those related to management decision-making;
- increased availability of computing resources for the development of technological solutions based on artificial intelligence;
- the growing need to process large volumes of data created both by humans and technical devices.
- In general, the use of artificial intelligence technologies in various industries contributes to the creation of conditions for improving efficiency and the formation of fundamentally new directions of business entities, including at the expense of:
- increase of efficiency of processes of planning, forecasting and management decision making;
- automation of routine (recurring) operations;
- use of autonomous intellectual equipment and robotic complexes, intellectual systems of logistics management;
- increasing customer loyalty and satisfaction (including sending them personalized offers and recommendations, which contain essential information);

The use of AI technologies in the social sphere contributes to the creation of conditions for improving the living standards of the population, including by: improving the quality of services in health care and education; improving the quality of state and municipal services, as well as reducing costs for their provision.

Development of methods and technologies of natural language processing (NLP), computer vision (CV), data analysis (Data Science) allowed to significantly expand the practice of AI application for solving various business tasks.

Text and voice recognition solutions are used as virtual assistants providing quick answers (for example, IBM Watson) and are also available on smartphones (for example, Alice, Siri, Google Assistant).

Along with systems of access control by face image, image recognition technology allows you to make payments (for example, KFC network).

In addition, AI is increasingly being used to solve logistical problems (for example, autonomous robots and vehicles in the Amazon Kiva system).

Retail as a branch of the national economy, has a number of characteristic economic, social, organizational, technical and other features, which determine the specifics of its development.

Economic transformations, scientific and technical progress contributed to the change of the economic, informational and legal environment of trade sphere. The share of wholesale and retail trade in the formation of GDP of the Russian Federation was about 20% in basic prices (Barbaruk, Krasyuk, and Medvedeva 2019; I. Krasyuk et al. 2019).

4.2. The Need to Transform the Marketing Complex of the Trade Enterprise

There are many different definitions of marketing, considering it both as a type of human activity aimed at meeting needs through exchange; and as a social and management process aimed at meeting needs and requirements; and as a market concept of the management of the enterprise's value-added activities, aimed at studying the market and specific consumer needs (Chaston and Chaston 2014; P. & A. G. Kotler 2006; Grönroos 2007; P. Kotler and Keller 2016).

As defined by the American Marketing Association in 2017, "marketing is an activity, a set of institutions and processes for creating, communicating, delivering and exchanging proposals that have value for customers, partners and society as a whole" (American Marketing Association 2012).

Marketing management is based on a marketing complex, or "4P" or "marketing-mix": the product, price, sales and promotion offered by J. McCarthy for the classification of marketing tools.

The above four elements of the marketing mix are a classic formula that is actually universal and applicable in various fields of activity. At the same time, for the sphere of services, in particular, trade, in marketing practice it is recommended to apply the "7P" model, when the marketing complex includes three additional elements: personnel (Regpanel or People or "P5"), the purchasing process (Process or "6P") and the material environment or physical attributes (Regpanel or "7P") (Shankar et al. 2011; Wang et al. 2020; Geldes and Felzensztein 2013; Ianenko, Ianenko, Mironova, et al. 2020).

The marketing complex toolkit helps to develop both long-term strategies and short-term tactical marketing programs. Therefore, the marketing complex can be considered as a set of controllable variable marketing factors, the set of which is used by an enterprise in an effort to cause a desired response from the target market.

In connection with new trends in the use of artificial intelligence in the commercial business, the purpose of this paper is to analyze practical examples of AI application in business to solve marketing problems and assess the use of AI technologies in the transformation of the marketing complex.

The study of these problems will provide answers to the following questions:

1. What application do the basic AI technologies (image recognition and image processing, voice and text processing, decision making) find in marketing of the trade enterprise;
2. What are the consequences of AI for marketing activities of a trade enterprise.

To answer these questions, the authors have collected and analyzed data on the experience of using AI systems.

Conclusion

The research and subsequent analysis confirmed that AI is used in many business areas. It is especially relevant for trade business. Commercial solutions based on AI most often use such

technologies as image recognition and processing, text and voice recognition, decision-making. Nowadays, AI in trade business is usually implemented at the operational level, usually in the form of experiments, one-time initiatives or actions. In some cases, we are dealing with the first experiences of practical application of AI.

The costs associated with the development of new AI technologies and the uncertainty of their results force us to be cautious in applying these innovations in practice. At the same time, the growing popularity of some AI systems increases confidence in AI solutions and companies are beginning to understand their competitive advantages.

Analysis of the examples collected shows that AI offers the consumer a new quality of life. Round-the-clock customer service, personalized solutions, more convenient purchases, or the possibility to avoid wrong choices - all this contributes to the innovative development of trade.

These innovative changes have an impact on marketing departments and the organization as a whole. They require the acquisition of new knowledge and skills from marketing teams; the preparation and selection of people with the necessary knowledge of artificial intelligence, skills to design and implement innovations. The marketing strategies of the trade enterprise must incorporate a new model of collaboration with organizations that offer advanced AI solutions that create synergies between AI and business processes.

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Chapter 13

Predictors of Employee's Proactive Behavior in Terms of Digital Transformation

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Abstract

This paper presents the research on proactive behavior identification problems. This kind of behavior can be the critical point of the recruitment process in digital transformation. Employee ability to work as an active subject about the environment and adapt it to emerging needs without loss of productivity becomes more and more relevant in times of remote work with the use of digital technologies. Automatization and digitalization of business processes, including Human Resource Management, define the need for adaptation to modern technologies and digital-life methodologies for identifying proactive behavior. Dispositional characteristics have been determined as potential predictors of proactivity: extraversion, openness to experience, conscientiousness, agreeableness, emotional stability, general proactivity, personal initiative, personal life position. The hypothesis has been tested with correlation and regression analyses of dispositional characteristics and job crafting dimensions based on such methods as the short Five Factor Personality Questionnaire, Personal Life Position scale, Personal initiative scale, General proactivity scale, Job crafting scale. The most significant correlation with proactive behavior was identified for extraversion, conscientiousness, general proactivity, and personal initiative. The practical application of research results is essential for the initial recruitment process or selection of candidates for a specific project in digital format.

Keywords: proactive behavior, job crafting dimensions, dispositional characteristics, digital transformation

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1. Introduction

Digitalization has transformed the communication capabilities of companies and influenced organizational business processes. The essence of this transformation is the integration of business processes and digital technologies, such as social media, mobile applications, analytics software and cloud services, to ensure the high competitiveness and survival of enterprises (Kane et al., 2015). Nowadays, working conditions change at a high speed, which entails accelerating the pace of work. This requires the use of digital resources and channels to achieve goals and objectives, automation and robotization of various organizational processes, including recruitment and personnel management processes (Barykin, Bochkarev, Dobronravin, et al., 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al., 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al., 2021). These processes play a vital role in the company because they aim to form and increase human capital, realizing its potential. Hence, they create the value of a company and affect its competitiveness in the market. They are part of Human Resource Management (HRM).

Due to the complex organization of human nature and its characteristics, the specifics of working context in any organization and the influence of independent external factors (sociological, economic and technological), there is no universal way of human management and, accordingly, there is no clear definition of HRM (Beardwell and Thompson 2014). Generally, HRM is defined as «practiced, is concerned with the employment, development and reward of people in organizations and the conduct of relationships between management and the workforce» (Leatherbarrow and Fletcher 2018).

Over the past 20 years, HRM has also undergone a digital transformation, like the other business processes of companies. Automation and digital trends are gradually becoming an integral part of all HRM components: from the initial «cold» contact with the candidate using a robotic call to training using virtual technologies (Novikov et al., 2019; Torosyan et al., 2020; Pulyaeva et al., 2019). It turns out to be beneficial because it reduces total HRM expenses and allows to establish the process of employee training and adaptation at the lowest cost in the shortest time. Artificial intelligence is now actively used to improve the effectiveness of the cognitive and analytical skills of employees. The combination of artificial intelligence with machine learning and natural language processing (NLP) technologies is transforming the essence of HRM. Automation has the most significant impact because it changes the design of work and the requirements for employees. With the given points, organizations need active employees who can work in uncertain conditions and lack constant control over their performance, ready to take responsibility for results. The employee's initiative is placed above strict adherence to their instructions (Griffin, Neal, and Parker 2007). Indeed, such conditions are rich soil for the discdisclosingn's creative potential. They also require him not only to have an unusual approach to solving problems but also to have stable performance, the ability to adapt, and the desire to achieve the set goals (Cangiano and Parker 2015). These characteristics of potential employees are described as proactive behavior.

In the digital era, there is a particular lack of personnel with developed cognitive and socio-behavioral abilities. Adaptability and creativity are becoming the main characteristics of modern knowledge workers (Korn and Pine 2011). Their assessment and development are not easy tasks for employees and HR managers. Therefore, testing with the ability to process results using artificial intelligence to identify specific personality traits in the future can be a valuable tool for selecting people for the correct position or for a project within the company itself.

However, if you robotize not only routine tasks in the form of paperwork but also direct communication with candidates, it becomes difficult to assess their disposition to types of activities, as well as to determine how proactive and responsible for quality and results they are. In this regard, the methodology for identifying proactive behavior predictors that can be integrated into a digital environment is becoming more and more relevant.

2. Materials and Methods

The purpose of our research is to study dispositional characteristics of proactivity and evaluate their significance as possible predictors of proactive workplace behavior in modern job design.

The research methodology consists of

- analysis of proactive behavior identification problem;
- identification of dispositional characteristics that influence job crafting dimensions;
- correlation and regression analysis of job crafting dimensions and dispositional characteristics.

The research involves the use of the following methods:

- short Five Factor Personality Questionnaire (TIPI-RU) (Sergeeva, Kirillov, and Dzhumagulova 2016). This method explores such individual personality traits as extraversion, openness to new experiences, emotional stability, agreeableness, and conscientiousness. In this study, a short version of this questionnaire was used;
- personal life position scale (Leontiev and Shilmanskaya 2019). This questionnaire serves to determine the attitude of a person to his life. The life position of a person in this interpretation consists of three components. The names of the scales in this questionnaire are similar to the model's features: «harmony with life», «awareness, or the reflexivity of a life position», «the activity of a life position, or agency». The last aspect is decisive. It allows to assess how a person regulates their existence;
- personal initiative scale (Frese et al., 1997). This scale measures the self-assessment of private initiative in the workplace. In this study, we consider private initiative as a predictor of proactive behavior, since using a self-assessment questionnaire, it is possible to evaluate only the predisposition to this behavior;
- general proactivity scale (Siu, Bakker, and Jiang 2014; Bakker and Derks 2010). This method examines the employee's attitude to their motivation. The methodology consists of eight statements. Each respondent rated each of the 1 to 7, expressing the degree of his agreement (1 - completely disagree; 7 – agree entirely).
- job crafting scale (Tims, Bakker, and Derks 2012). This methodology is necessary to identify the employee's preferred strategies for overcoming difficulties in the workplace. It has good reliability and converged validity scores for all four factors, corresponding to job crafting dimensions. Job crafting dimensions act as dependent variables.

3. Results and Discussions

3.1. Analysis of Proactive Behavior Identification Problem

Proactivity is defined by employees' actions to influence their environment and performance. These actions include a proactive decision-making process: instead of passively accepting the situation or just solving the current problem, workers try to prevent recurrence and make changes in organizational business processes. In this context, the employee is seen as an active subject which constantly experiences a need to impact the environment and initiate changes.

In psychology, one of the first people to study the concept of proactivity was Alfred Bandura. He described the person's desire to oppose their environment and actively create and shape it (Bandura 1986). Some researchers suggest that there are people who have a predisposition to proactive behavior, in which they will engage regardless of circumstances and their current state of productiveness. Such behavior is possibly connected with individual values, beliefs, and inclinations (Parker and Bindl 2016). Empirical data shows that people with high rates of proactive personality are more likely to perform better, have a glorious career, and tend to be more creative and innovative (Parker, Williams, and Turner 2006). Proactivity frequently depends on resources and conditions provided by the company, but these factors are not a guarantee of proactive behavior of its staff.

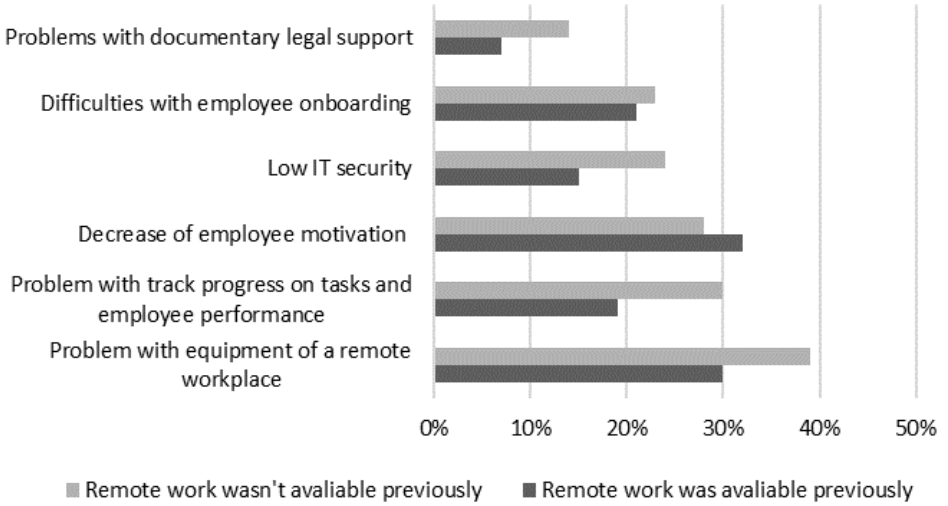
In modern remote workplaces and innovative-creation mind prevalence conditions, proactive employees who are self-sufficient and can work under uncertain conditions of the boundaryless job and maintain the rising amount of responsibilities are in demand. If in the past time's employees were treated as emotionless elements of the extensive system, which dictated them to work continuously and follow strict instructions, the modern world encourages creativity and innovative thinking. Accordintheg to Future of Job report by 2022 such skills as analytical thinking and innovation, active learning, creativity, originality and initiative will be in demand and surpass the leading skills of 2018 – complex problem solving, critical thinking and analysis (Leopold, Ratcheva, and Zahid 2018).

Moreover, after the compelled experience of remote work, numerous companies are planning to switch to fully or partially remote work regularly. For example, in Russia the percentage of these companies is up to 68% (Degotkova, n.d.). However, lead directors of IT-corporations, which are considered the most prepared for this type of work process, note that the greatest difficulties arise with the installation of equipment in the workplace, tracking the effectiveness of employees, their motivation, and the adaptation of workers to the new conditions (see Figure 1).

In this regard, the issues of recruitment of employees, which means acting proactively, are becoming increasingly important. Nevertheless, described conditions on the one hand determine the need for proactive employees; on the other hand, they complicate the process of identifying them.

Traditionally, proactive behavior was evaluated by assessment - a long procedure during which employees are asked to solve cases and do tasks connected with their field of work. During observation specialists find out the professional and psychological qualities of workers. This method is the most effective, but rather laborious due to many factors. It is impossible to conduct it at the recruitment stage or in terms of a deadline. Proactivity cannot be accurately

and objectively assessed outside of the workflow, which causes the complexity of its identifying.



Resource: research of HABR Career, 23.04.2020.

Figure 1. Main problems faced by IT companies with remote work.

Thus, the main problem is that developed methods for identifying proactivity based on face-to-face interviewing and observation become ineffective in conditions of social distancing and large-scale digitalization of business and social processes.

3.2. Identification of Dispositional Characteristics Effecting Job Crafting Dimensions

Job crafting is chosen to study proactive behavior. Job crafting is the cognitive and physical changes that people make in the course of completing tasks or in the boundaries of their job responsibilities (Tims, Bakker, and Derks 2012). This form of proactivity perfectly reflects self-initiated and change-oriented behaviors. In our study job crafting is studied based on job demands-resources theory (Bakker and Demerouti 2017). This theory states that job characteristics can be divided into classes: job demands, which include emotionally and physically draining tasks; and job resources, which imply things that decrease job demands, stimulate personal growth, and the need for achievements. Job crafting is defined as proactive changes made to demands and resources.

There are four dimensions (sometimes referred as strategies) of job crafting:

1. Increasing structural job resources – the use of an organization's resources in order to professionally develop gain new knowledge;
2. Increasing social job resources – striving to make connections with colleagues and superiors in order to receive feedback and support;

3. Increasing challenging job demands – the desire to complicate the work, if the employee feels a lack of opportunities for the full implementation of his skills and abilities in work;
4. Decreasing hindering job demands – striving to decrease the influence or the number of factors that provoke discomfort and stress.

Based on the study of meta-analyzes devoted to the problem of proactivity and proactive behavior (Thomas, Whitman, and Viswesvaran 2010; Tornau and Frese 2013), we hypothesized that Big Five factors could be the main predictors of proactive behavior. This dispositional model is considered the gold standard for research into psychological characteristics. The short version of Five Factor Personality Questionnaire is used for studying such polar dispositional features as extraversion-introversion, openness to experience-consistency, conscientiousness-aimlessness, agreeableness-callousness, emotional stability-neuroticism.

As a result of theoretical research on the topic, we made a conclusion to study personal initiative as a predictor on a Russian sample, because this form of proactive disposition in previous foreign studies was frequently described as the core factor of proactive behavior (Tornau and Frese 2013). It reflects the self-starting nature of the employee's actions and the proactive focus of them, as well as the consistency in overcoming obstacles which interfere with goals (Frese et al., 1997).

To verify the assumption that motivation for proactive behavior requires a meaningful cause for such action or a «reason to» motivation, we use Personal Life Position (PLP) scale (Leontiev and Shilmanskaya 2019). This psychological model defines the person's relation to his or her life. PLP encompasses in its concept the possibility of a distant, active relation to the processes that occur involuntarily in life. While the person is a consciously self-determining subject in relation to these processes (Leontiev and Shilmanskaya 2019).

To test the hypothesis, correlations between dispositional characteristics and job crafting dimensions were evaluated.

3.3. Correlation and Regression Analysis of Job Crafting Dimensions and Dispositional Characteristics

The objects of the research are employees of various organizations. Since this study is conducted in order to identify general trends, a specific work sphere for employees has not been highlighted. This study involves 100 people. The percentage of female respondents is 81%, male – 19%. The influence of the gender factor on the primary means for the variables is not found, except for the "friendliness" factor, which is higher in women at the 0.05 significance level. Consequently, the predominance in the choice of women has not significant impact on the final results. The empirical part of the research is carried out on the Internet platforms Google and Microsoft Forms.

The results of the correlation analysis reflecting the relationship between the choice of strategies for changes in work and personal characteristics are given in Table 1.

Table 1. Correlation between job crafting dimensions and dispositional characteristics

Predictors	**Increasing structural job resources**	**Decreasing hindering job demands**	**Increasing social job resources**	**Increasing challenging job demands**
Extraversion	0.325**	-0.315**		
Conscientiousness	0.252*	-0.376**		
Agreeableness			0.300**	
Agency	0.252*			
General proactivity	0.447**	0.253*	0.208*	0.458**
Personal initiative	0.333**			0.576**

Notes: * - correlation is significant at the level 0.05; ** - correlation is significant at the level 0.01.

Correlation analysis reveals a link between increasing structural job resources and such Big Five factors as extraversion and conscientiousness. This means that confident, adaptive, organized and efficient people are more likely to modernize their work tasks by obtaining knowledge and rethinking their work responsibilities. Same Big Five factors negatively correlate with decreasing job demands. Particularly this job-crafting strategy is ambiguous and, in some cases, can reduce employee productivity because it generally implies that he or she may avoid difficulties and will not participate in problem solving. Obtained negative correlations are not contradictory. This relation can be interpreted as statistically significant. Respondents with low levels of extraversion are less likely to participate in social interactions that are necessary for facilitating proactive behavior. People with a pronounced tendency to feel and act like introverts are prone to be detached and to be avoidant of difficult tasks, which is counterproductive for job crafting. Low rates of conscientiousness can be the indicator of a predisposition to be in peace about not achieving professional goals.

Increasing social job resources correlates with agreeability. Empathy and the need for cooperation which are included in this Big Five factor, can stimulate proactive behavior. Attention paid to colleagues can be the turning point for job crafting because it is almost always facilitated by social contacts. A significant correlation between increasing structural job resources and agency is found. This dimension of personal life position is the main one. It reflects how fulfilled is a person's life and at what level he or she controls it. Allegedly, respondents with high rates of agency involvement are likely to be more responsible for their work and try to develop their professional skills through a use of the organization's resources. Personal initiative correlates with increasing structural job resources and challenging the job demands. With the analysis of job crafting scale and the description of each job crafting dimension, found correlations are explained by the assumption, that independence is the factor of personal skills development. Finally, the complication of tasks in order to fulfill the desire to make work interesting lies in personal initiative. This predictor might be the center of attention for our future research because it is possibly the main component of proactive behavior. It is not studied in detail on Russian samples.

General proactivity relates to all job crafting dimensions. All correlations are positive except for decreasing hindering job demands. High levels of general proactivity usually mean a positive and inspired attitude towards work and the ability to motivate oneself. Employees with such rates might be aspired to perfect their skills and to challenge themselves at work at times when it seemingly becomes a routine.

The results of the regression analysis of job crafting predictors are shown in Table 2.

As a result of this analysis, these regression models are designed. Numerical values of factors differ from correlation analysis because a step-by-step method is used in which variables are added in the model one after another. In this case, added factor influences the impact of previous variables. This data is not valuable for this study. The use of increasing structural job resources as a strategy are predicted by general proactivity, extraversion, and low levels of harmony with life. Antecedents to decreasing hindering job demands are aimlessness (the antipole of conscientiousness), low levels of general proactivity, and mindfulness. Agreeableness is found to be the predictor of increasing social job resources. Employees who frequently choose to increase challenging job demands are more likely to be high in personal initiative, general proactivity, and neuroticism (the antipole of emotional stability).

Table 2. Regression analysis of job crafting predictors

Regression analysis indicators	**Increasing structural job resources**	**Decreasing hindering job demands**	**Increasing social job recourses**	**Increasing challenging job demands**
Predictors (β, p)	General proactivity (0.474; $p < 0.0001$) Extraversion (0.237; $p = 0.013$) Harmony with life (-0.212; p=0.039)	Conscientiousness (-0.332; $p = 0.001$) General proactivity (-0.213; $p = 0.025$) Mindfulness (0.185; $p = 0.046$)	Agreeableness (0.300; $p = 0.002$)	Personal initiative (0.437; $p < 0.0001$) General proactivity (0.311; $p = 0.001$) Emotional stability (-0.176; $p = 0.037$)
$R^2_{adj.}$	0.247	0.184	0.090	0.387
R	0.520	0.457	0.300	0.637

Conclusion

Proactive behavior is one of the key factors for recruiting personnel in modern conditions of digital transformation and social remoteness. Determination of the personal prerequisites for such behavior is one of the tasks of HR managers, since this allows to preliminary find out employees' psychological characteristics.

As a result of an empirical study predictors of proactivity are found. The obtained data indicate the relationship between proactive behavior and such factors as extraversion, conscientiousness, general proactivity and personal initiative. Although the results are based on self-assessment, regression analysis suggests that an employee with similar characteristics will be more proactive.

These aspects are issues of practical significance in the context of digitalization. The results can be used in the process of recruitment for a position. The collection and processing of data on proactive predictors using these methods in digital format will reduce time-consuming work and improve the effectiveness of HRM. The automation of testing and analyzing employees' personality traits and entering collected data into the database will allow HR managers to evaluate the candidates faster and more efficiently, to develop their career strategy; especially, the employer has specific requests about soft skills.

Moreover, it is possible to use techniques for the selection of personnel within the company for specific projects. In the case the team is formed from previously unacquainted people HR managers should take into account not only the personal relationships of employees with each other, but also their psychological traits. Running a small test will allow HR managers to narrow the circle of candidates if the company has several employees with a similar set of hard skills.

In addition, based on the analysis of these predictors, it is possible to identify employees who can be primarily transferred to remote work. Choosing certain job crafting strategies is suggests self-starting behavior and high levels of independence. Hence, in modern conditions it is important to understand which employees are capable of remote working and do not need the source of constant motivation from their bosses and colleagues. Use of the described methodology will improve the processes of HR management through the era of digitalization.

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Chapter 14

How Does Digital Transformation in Logistics Challenge Poverty Alleviation During Global Crisis?

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Abstract

Poverty has never been a serious crime thought 90% of the human population at the bottom of the pyramid hardly enjoys the fruits of the economy. The paper is a serious study on the foundations of poverty, traps and the roots of serious disasters which frequently take away the single most rice from the mouth of the poor, leaving 60% of the earth with infantile deaths and widespread epidemics. Recent COVID pandemic has further necessitated the urgency of this study conducted in various villages of India as well as Russia gathering live reports through interviews conducted with humanitarian agencies, fieldworkers as well as HSCM firms dealing with various forms of crisis. The question is very huge. Why few people choose to be in poverty trap? What is the trap? What happens when a crisis hits the trap? How firms can better manage disruption in logistics decision making working in clusters? Serious evidences were collected in difficult times with firms during COVID to gather real-time data related to crisis management, logistics importance in deciphering poverty-stricken population The research work further brings in importance of humanitarian work to create smiles in billions of undernourishment children globally fostered with cooperation among donors and logistics operations with future implications in block chain technology, agility and lean network management. The strength of this paper is on white paper field reports from rural regions like Sunderban area in West Bengal India, having humanitarian crisis and subsequent relief measures.

Keywords: humanitarian logistics, supply chain management, poverty, digital transformation

1. Introduction

"The most deadly killer in any humanitarian emergency is not dehydration, measles, malnutrition or the weather; it is bad management" (Sourdaine et al., 1994). Suddenly you wake

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up one day in the midst of a dream! You find yourself locked out in a huge traffic jam without getting to your destination. You have recently lost your job due to closure of your workplace, are depressed due to long sustainability without work, are overloaded with bank repayments of loans due to your home and car loans, and, more importantly, a roaring cry of a pandemic! An illness which bore the fruits of death! In such circumstances it is impossible to imagine yourself stranded without relocation or even repatriation. This paper addresses a genuine concern during these pandemic days where the issue of sustainability in all sectors of science is a big question. We all have heard about logistics and supply chain management. Though such an issue has till the year 2000 was not a much cited debate, but its importance rose drastically as companies moved from being local to being global. The urge to do more studies and research work pertaining to logistics rose and various superspecialised companies came into being as major drivers of economy (Barykin, Bochkarev, Dobronravin, et al., 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al., 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al., 2021). The paper tries to address keen issues of human logistics in a digital framework which can address primary concerns of human psychology, behavioral economics, and aid in positive shifts in macro economic factors. Of course such actions are destined to be falsified as per Popper's overview, which in itself carries the message of scientific development and matters of established facts and figures.

The recent developments in the global economy concerning Corona virus and its subsequent effects on various sectors of the economy have not left logistics alone. The culpable effect has affected logistics and has fastened new innovation in disruption and digital transformation required to address human suffering in a vibrant way; thus the need for human logistics in the form of new disruption was unavoidable. It is of course not difficult to analyze that digital transformation is indeed a boon for speedy logistics strategy and moving aid to relief centers. Main research question hovers over:

- Speedy coordination efforts of humanitarian logistics.
- Behavioral perspectives of humanitarian relief organizations.
- Digital fallout to relief recovery and sustainable development goals.
- Why Poverty Trap?

In the year 1960, per capita incomes with respect to countries like Burundi, Haiti as well as Nicaragua were at a fixed proportion of $347, $1,512, and $2,491, respectively. If someone looks at the curve after 60 years, there lies negligible change in per capita income in these countries, which is grossly a mere proportion of the daily income levels in the US population or military budget expenditure. Such figures relate to the fact that the human development index is at a fixed level without growth in these countries for generations. According to Chris Barrett and Michael Carter, the 2013 poverty trap is better defined as a self-culpability mechanism where individuals are engrossed in poverty for generations (Barrett and Carter 2013).

The most challenging aspect is not only poverty reduction, but there are many sub-facets to mere management terms like logistics and supply chain management in this research work. The groundwork was made strong based on facts and figures as well as interviews of personnel in selected regions as very critical subjects like poverty, crisis, logistics, digitalization, agility needed to be addressed in times of another great health casualty like COVID. Results of the multifaceted study of this paper are especially beneficial in creating a sustainable roadmap for

development economists as well as healthcare workers learning from earlier mistakes during crisis periods like Tsunami in India.

The paper tries to work out a sustainable research work which takes into concern development economics like addressing migration labors, repatriation, global humanitarian logistics, pandemic and its probable solution which can be beneficial to poverty alleviation by in cooperating novel methodology pertaining to logistics and poverty integration into its domains for upliftment of society.

The paper generally devotes itself to qualitative research conducted on segments and regions across global territories targeting bottom of the pyramid to address concerns related to human logistics and its digital transformation for fastening global delivery chains. The research is based on strong theoretical literature which tries to unearth specific null criteria in social choices and the rationale behind such actions in poverty integration policies. This research work has tried to develop a new paradigm in development work globally with deep concerns for being poor and how to overcome poverty through fast digitalized logistics in digital platforms and subsequent integration. A new terminology is proposed as "Human logistics" with a spice of concern for human development globally during pandemic. The World Food Programme has so far analyzed reports citing the need for strengthening the logistic backbone during times of pandemics; nevertheless, a humanitarian crisis is in foresight in the backbone of the global economy.

The logistics network is an important study and partner in the Zero Hunger programme of the World Food Programme of the United Nations (World Food Programme 2014; FSIN Food Security Information Network 2018). This programme is quite unique in the sense that it aids in agricultural product sustainability as well as creating food security. Food security is in turn an important paradox in logistics network management, which can facilitate productivity as well as consumption ratios.

2. Materials and Methods

"No Vehicles means no Aid" (Pedraza-Martinez and Van Wassenhove 2013).

The paper is based on theoretical foundations in disruptions due to pandemic, digitalization as well as agility in logistics industry and new technologies in supply chain management coupled with strong literature reviews supporting facts which can eradicate poverty from its roots. The main indicator is ground interviews of individuals from companies involved in logistics working in critical regions globally for sustainable improvement in livelihood development.

SCM-based risk factors, though multifaceted, can be better categorized into two parts as disruptive as well as operational risks (T. C. H. John, Prakash, and Chaudhari 2006; Tomlin 2006). Shyamsunder observes further that natural disasters and incumbent losses result in nearly 1, 50,000 losses of life between 2003-2011 and subsequent economic loss weight age is US$1.3 Billion every year. A humanitarian logistics primarily deals with a few stakeholders (Kovács and Spens 2007) which are:

- Academic groups;
- Government institutions as well as disaster response institutions;
- Donor network.

Gurnasekaran defined SCM as "an integration of key business processes from end user through original suppliers that provides products, services, information and hence, and value for customers and other stakeholders." HSCM is further a subspecialty involved in mitigating disaster on human lives through efficient management of aid materials (L. John, Ramesh, and Sridharan 2012). Effective communication technology platform usage is also important within actors in SCM (Long 1995).

Four drastic affects on capacity building can be transportation, warehousing, human resource solution as well as material handling.

The paper highly focuses on various leading research work done not only on humanitarian logistics but also the story behind pandemics as well as development economics. It is essential to know what drives pandemic. Why do people choose to be poor? What is the poverty trap? From opinion based studies, it is evident that unless proper analysis is done about the reasons behind rational choices of poverty, it is impossible to drive solutions for quick recovery as well as aid for poverty alleviation. Designing with respect to target oriented audience of third world countries has been a much debated topic as of now. The 'Design paradigm targeted Real World' and 'Appropriate Technology' utilization mobility and interest (Papanek 1972; Schumacher 1973). In his mammoth work, 'Design for the Real World,' Papenek urged designers who were henceforth involved in designing targeted towards affluent sectors to focus more on bottom of the pyramid. Economist by the name of E.F. Schumacher is credited with the coinage of the term "Appropriate Technology" which also has foundations based on Gandhian innovation model targeting designing towards small and rural based industries. In his work, "Small is beautiful" Schumacher is credited with developing sustainable actions towards productivity targeting poverty alleviation. Lack of cooperation between humanitarian institutions and private logistics bodies coupled with negative institutional knowledge (Thomas and Kopczak 2005) rise to failure in humanitarian logistic operations.

Harvard humanitarian related paper is related to ethical issues in humanitarian responses (Raymond 2017; Raymond, Scarnecchia, and Campo 2017).The ecosystem for humanitarian preparedness in logistics is laid down in five steps:

- Data usage as well as risk analysis;
- Stress testing;
- Capacity building;
- Evaluation neural network.

A crisis may be further defined as being a serious threat to ecosystem as well as social structure and require serious decision making (Rosnow and Rosenthal 1989b; 1989a).

Specific questions arise and are to be filled up for future research work:

Why and how can humanitarian agencies cooperate with logistics firm to create effective disaster relief logistic solutions?

2.1. For the Purpose of Research a Specific Humanitarian Group Working in Kolkata, India Was Selected and Was Interviewed

Case Study of Amphan Cyclone hit Sunderban.

Humanitarian Logistics Organisation: Kolkata Society for Cultural Heritage

Brief Profile of the humanitarian logistics firm:

Kolkata Society for Cultural Heritage: The organization is a leading livelihood development firm specializing in logistics, humanitarian aid, mangrove cultivation working across rural villages integrating bottom of the pyramid for welfare economics.

Interviewee: Director of Operations, Mr. Sourav Mukherjee, erstwhile engineer instrumental in logistics operations, spoke about the nuances of the disaster and how logistics aided in bringing smile to the poverty-stricken area.

2.2. What? Why? How of Humanitarian Logistics?

Sunderban is primarily a delta region of vast mangrove forests in West Bengal India, formed by three rivers like Brahmaputra, Ganga as well as Meghna. The region is ecologically sustainable and rich in natural resources and Tiger conservation. Rural livelihood is based on fishing, agricultural paddy as well as cultivation of mangrove. It is primarily a UNESCO heritage site.

Reportedly, 98 people were dead due to the amphan cyclone in May 2020. 40% of the rural population suffered job loss as well as forced to migrate to nearby regions.60% of the bottom of pyramid moving out of poverty trap suffered restricted living and loss in livelihood with catastrophic 20% increase in daily price rise 40% infrastructural loss was imminent with basic necessities reaching null. Single earning families were witness to null income due to water-stricken paddy fields, with total destruction amounting to 40% of the agriculturally viable regions. 40,000 basic clothing including mosquito nets, medicines amounting to 30,000 aspirins and other sustainable medicines were supplied. Military logistics for old age support and relocation to nearby shelters were provided by Border Security Forces on an urgent basis. Total deployment was 20 30 ratio of military expenditure (Ngonghala et al., 2014).

Boats and shipping are the main strategic logistics channel in Sunderban. Apart from military logistics, Kolkata Society for cultural heritage involved in digital transformation technology as well as block chain to build blocks facilitating in funding distress-prone areas. There were 460 shipping boats involved in fishing, among which 30 boats have been destroyed by a cyclone. After the last Ayla wave, there were many migrant labor populations. but most of the employment here is fishing as well as agriculture. This sector saw huge losses and migration of labors to o The yearly wage and expenditure is lower than one day investment of military budget in USA. Thereafter savings are nearly zero with a high mortality rate. The humanitarian logistics agency tied up digitally with international logistics and financial aid sectors for advancement of infrastructure and provision of basic utility in the region 90% of the labor population is severely hit, among which evacuation plans have been fostered for 60% of the migrant labors. Clothes, rice, pulses have been supplied to worst-hit regions and digital aid platforms coupled with international logistics aid has helped in creating delivery responses.

2.3. AID Is Not Only the Minimum Criteria

According to KSCH, aid is only beneficial where 80% thrust is given on advanced transformation of supply chain measures. Past mistakes during Tsunami have taught the necessity of digital logistics platform and neural networks. Aid from humanitarian agencies like the WHO, WMF can only be sustainable but cannot help move people out of poverty trap. Past sources and research confirm work in rural Kerala that 60% of aid merely reaches the mass due to bureaucratic failures and if it reaches 70% of population is illiterate enough to handle aid. Deployment of logistics is also a conflicting measure with collisions of interest among logistics firms and aid agencies. The donor should be more humane and strategically impulsive in psychology. Aid can only aid in near terms, but integration of poverty population into the economic cycle is necessary for upliftment of society as a whole.

2.4. Why Some People Choose to Be Poor?

It is still a debatable topic that poverty is a disease! In his mammoth work by Nobel Prize winner Abhijit Banerjee on Poor Economics; debate is on why some people choose to be poor? Lack of infrastructure as well as hunger resulting in cumulative poverty trap is reason behind poverty which cannot be only reflected or eradicated by aid as envisioned by Jeffrey Sachs. Hunger has been the primary driving force behind poverty. According to the work of "The Real Reason There's World Hunger: Food Waste, Not Food Shortages," logistics play a critical role in deciphering hunger 50% loss in food is envisioned at consumption stage of the value chain according to reports from World Food Organisation." To further analyze the effect on hunger, a robust logistics network should be strategized to implement a transformation in network of agricultural supplies which needs to be properly managed during crisis management (Korchagina, Kalinina, et al., 2020; Vilken et al., 2019; Korchagina, Bochkarev, et al., 2020).

3. Results

One of the critical analysis of data gathered from various literature reviews as well as ground reporting suggests developmental needs as well as integration of advanced technological innovation, data driven as well as trustworthy. Oxfam, a renowned humanitarian agency carried out such experiments by employing blockchain and advanced cash transfer technologies digitally in Cambodia which saw drastic improvements in operations and logistics.

Driven by such passion as well as research interest, a group in West Bengal India. has employed blockchain technology in humanitarian logistics while serving the BOP industry involved in mangrove cultivation to go global and gain trust amid rising interest in employing blocks to individuals.

4. Discussion

Where there is poverty, the world has a lot of further work to be done to take those trapped in poverty traps to jump up the ladder of the economy. The future of humanitarian logistics cannot deny the integration of agility and lean technology in process innovation. Hunger has no name, so the work may be steeper. but has a lot of future opportunities. COVID itself has taught us a manifold of innovation which has brought in drastic shifts to digital platforms and digital cash transfers. Recent repatriation efforts by various Government bodies during the pandemic have itself bolstered logistics and humanitarian aid initiatives in not only poverty stricken places but all over the world.

Crowd sourcing is also a challenging episode in humanitarian logistics supported by SMS, mobile phone technology (usage by US marines in AID relief operations). Social media has an active role in such operations with tweeting too. Crisis mapping via geospatial initiative is underway in World Bank supported operations with employment of drones as well as 3D mapping at the disaster location helps in quick transfer of adapt related to disaster and crisis. IOT operations in disaster management is also playing vital role in accelerating the response frame work in humanitarian logistics. A drastic case study is a rural Burdwan, West Bengal, India. based humanitarian logistics institute is employing sensor based mapping to facilitate health informatics in severe epidemic situations amounting to 60% retrieval rates in villages with near approximation of 75% death rate in childbirth as well as infantile deaths. Sensors as well as cargo drones were applied for fast relief operations. Technological disruption can better facilitate logistics financing gaps.

The following policy implications for future researchers as well as government body can be postulated as:

Agenda-based Digital transformation in logistics fostered by political will Addressing the issue of “Should we collaborate?” “How can we collaborate?” Issues relating to protection platforms for the vulnerable in society via joint coordination groups in disruptive logistics Information should be made a right in humanitarian assistance .Fast implementation of smart city approach to demand driven humanitarian needs to foster disruptive SCM.

Conclusion

Digital transformation is a boon for modern day logistics during disasters like COVID. which has shook the bottom-line of health economics. Poverty has been long vigilant globally which can be studied and given relief thanks to agility and modern day AI and block chain technology which can foster development of warehousing and relief center mapping. Advanced software technologies have been proven to reduce timeframes as well as give a quality perspective to humanitarian logistics in calamities like Sunderban. Recent repatriation goals by governments have further strengthened the belief during COVID times. Digitalization has been a boon to disaster management groups. Future research imperatives lie in better cluster approaches and integrated missions.

Future questions unanswered: When to employ predictive analytics in humanitarian logistics operations?

How to use big analytics, digital transformation in designing and inventory planning mechanism?

After all. a joint coordination and disruption in agile technology in SCM is a hugely needed mechanism as the world doesn't wish to repeat the 2004 Indian Tsunami logistics failure.

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Chapter 15

Developing the Effective User Interface for Online Food Store Websites

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Abstract

The success of e-commerce depends on attracting and retaining the consumer, gradually expanding the scope of his purchases. Individual interaction with the consumer and the study of his preferences create the possibility of cross-selling and additional sales of new products and services. Using the example of the online food trade, the article discusses the issues of increasing the efficiency of the consumer interface to expand the shopping area and attract new consumers. Based on the content analysis of the websites of online stores, it was found that the system is not very effective, offering consumers a choice of food products based on the analysis of previous transactions and the purchase of promotional products. To expand the sales of food products, additional functionality of the recommender system is offered, transferring the consumer to other product groups. The possibilities of the recommender system of an online food store increase with the expansion of the functionality of the service due to recommenders to the consumer of food products based on their compatibility when used with the basic (selected for purchase) and recipes for cooking. The "digital shadow" of the consumer and the generalized reactions of consumer groups have created a dynamic model of the "digital consumer profile." which can form the basis of recommenders for food purchases in an online food store.

Keywords: consumer, food products, websites, e-commerce, digital consumer profile, shopping range

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1. Introduction

The fastest-growing e-commerce market segment is online trade. The unstable epidemiological situation (COVID–19) has led to the rapid growth of the business-to-consumer (B2C) market through such sales channels as online stores and aggregators companies and social networks. During this period, the most popular products were food products, sales of which through e-commerce in Russia increased 2.5 times compared to the same period in 2019, and the number of orders increased by 155%. Online services have proven their worth and advantage over the sale of goods in traditional trade (Wagner, Schramm-Klein, and Steinmann 2020), creating not only an opportunity to save time for choosing goods on the website of an online store using a computer or through a mobile application (McLean et al. 2020; Akram et al. 2020), but also address and mobile communication with the consumer. Feedback using intelligent systems can compensate for the lack of information about the product (Liang, Liang, and Tseng 2019). Improvement of Internet services and technologies Web 2.000 allows consumers to more easily navigate in the Internet space when choosing a product, comparing brands, prices, and good offers (Ali Abumalloh, Ibrahim, and Nilashi 2020). The consumer is increasingly willing to pay money to simplify the problem of choosing a particular solution for himself. With an increase in the number of successful orders in the online store, consumer confidence in the selected website (Sullivan and Kim 2018; Kim, Urunov, and Kim 2016) and the security of the transaction grows (Akhter, Hobbs, and Maamar 2005; Krasyuk, Kirillova, and Amakhina 2019). At the same time, external factors such as national culture (Kim, Urunov, and Kim 2016), region of residence, income level (Xie and He 2020), opinions of others (Mainardes, de Souza, and Correia 2020), etc. continue to be felt the influence on purchasing on the websites of Internet shops.

The online food trade has its characteristics. The shelf life of food products the minimum delivery time (on the same day or the next day) form a system of commodity relations and relations in the market (regional market), which is dominated by well-known retailers (Oncini et al. 2020). The assortment profile of food products on the websites of large retailers is represented by all product groups, which include the same brands of the leading market players. The choice of an Internet retailer by a consumer to make a purchase will depend not only on retail prices and the quality of the information provided (Malenkov et al. 2019; Lal 2017), but also on the seller's brand image (Fejling et al. 2019), especially if such food products were previously purchased in a traditional format. Completing the order of food products from the sales area increases consumer confidence in receiving fresh and high-quality food products (Kapustina et al. 2019; Yang et al. 2020).

Nevertheless, many consumers still prefer the traditional format of purchasing food products due to unsuccessful orders on the Internet (Mainardes, de Souza, and Correia 2020), substitution of protected denomination origin (PDO) products by other names (Di Pinto et al. 2019), risks of getting stale goods and difficulties in returning them (Nilova and Malyutenkova 2020). A restriction on the purchase of food products is imposed by a mandatory minimum order amount, for which the consumer may not be ready for various reasons. One of them may be the need to purchase a narrow range of food products. The consumer's choice is individual (Ehgartner 2018), but the recommender system of an online store can help him expand the area of purchase (Barykin, Bochkarev, Dobronravin, et al. 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al. 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al. 2021).

The success of e-commerce depends on its ability to attract and retain a consumer, gradually expanding the area of his purchases. Individual interaction with the consumer and the study of his consumer preferences creates the possibility of cross-selling and additional sales of new products and services (Teo 2005). Creating a behavioral digital twin requires more than a vast base data (Big data), but data mining to understand consumer characteristics (Vijayakumar 2020). Collaborative filtering recommender systems (Gazdar and Hidri 2020; Feng et al. 2020) are the most common method of building recommenders when purchasing goods on websites (Gazdar and Hidri 2020; Feng et al. 2020), sequentially analyzing a large amount of data and recommending selected goods to the consumer. The number of product recommenders when choosing the main one usually does not exceed five, and a new consumer who has not previously made transactions cannot receive recommenders for 2020 products) (Natarajan et al. 2020). A recommender system may not determine the list of products that will appeal to the new consumer.

The work aims to improve the practical user interface to expand the range and the number of consumer purchases and attract new customers.

2. Materials and Methods

A content analysis of the own websites of Internet retailers was carried out: Walmart, USA, TESCO, Great Britain, as well as Metro, Auchan, and Perekrestok, who sell food products to consumers in St. Petersburg and the Leningrad Region and through the online delivery system Sbermarket.ru of the Internet retail "Lenta." To assess the effectiveness of the user interface of online food store websites, we analyzed search engines combined with filtering methods and recommendation systems. Recommender systems were analyzed based on similarities in user profiles and food descriptions; collaborative filtering of food information and content based on system data on stored previous transactions; systems and connections arising from the massive use of e-commerce in plans for accumulating knowledge about trades and goods. The consumer's digital profile was formed using artificial intelligence methods and algorithms for analyzing sizeable BIG DATA arrays.

3. Results

3.1. Content Analysis of Websites of Online Food Stores

Mainly large retailers, through their websites or online delivery systems (iGooods.ru, Sbermarket.ru), carry out the sale of food products in Internet trade. They offer a wide range of food products to suit all tastes and needs. The choice of food products by the consumer is based on information about him and depends on the quality of the website. The content analysis results of Internet retailers' websites are presented in Table 1.

Traditional models for analyzing website performance include Information, Communication, E-Commerce, and Additional Functions (Li and Li 2011; Cristobal-Fransi et al. 2020; Lal 2017), which can be assessed using the 7C Framework software. In this paper, to

evaluate effectiveness, the possibilities of the website functions to expand the area of consumer purchase of food products were examined.

The content of Internet retailers' websites is identical, including food search (quick sequential), product description (description), delivery terms, customer feedback, and all semantic textual patterns that ensure its success (Thorleuchter and Van Den Poel 2012). Websites differ in design, the logic of solving consumer requests, special offers.

The consumer can search for food products on websites in two ways - quick (by keyword or phrase) using the search string and sequential (catalog search), provided by the search filtering system. When forming an associative query, a quick search is limited on all websites and allows you to search only for the name and brand of the food, for example, pasta Barilla. Web sites working for St. Petersburg will enable you to find a food product not only of a particular brand but also of a certain weight or volume. Broader requests and requests for multiple food products are not available. In this case, the formation of the request must be precise; otherwise, the system may not perform the search. For example, an associative query for spinach pasta does not find anything on the Perekrestok website, even though spinach pasta is on sale. With a quick question for a keyword, several sentences similar to food products of various brands (Walmart, Sbermarket.ru) can be formulated. Sequential search in the catalog provides a system of filters with inherent classification features, price, and brands.

The product information contains all the necessary characteristics provided by the manufacturer of the product. At the same time, only the TESCO website informs the consumer about it, disclaiming responsibility for the information provided. On the same website, there can be presented options for cooking food products recommended by the manufacturer (conditions for cooking, frying, baking; on fire, in an oven or microwave oven). No additional information on products' properties, distinctive features, and health benefits that could interest a consumer in a purchase (Nilova et al. 2019; Lin et al. 2020) are not provided on the websites.

Table 1. Content analysis of e-commerce websites

Indicators	**Walmart**	**TESCO**	**Russian Federation, St. Petersburg**			
			Lenta	**METRO**	**Auchan**	**Perekrestok**
1. Food Information	+	+	+	+	+	+
2. Services and conditions	+	+	+	+	+	+
2.1. Minimum order amount, delivery	+	+	+	+	+	+
2.2.Additional services	+	+	+	+	+	+
Cooking Instructions	-	+	-	-	-	-
Recipes	-	+	-	-	-	+
Product promotions	+	+	+	+	+	+
Special Offers	+	+	+	+	+	+
3. Filtration system	+	+	+	+	+	+
3.1. Quick search	+ / -	+ / -	+	+	+	+
3.2. Search in the food catalog (sequential search)	+	+	+	+	+	+
Classification signs	+	+	+	+	+	+
Price	+	+	+	+	+	+
Weight, volume	+	+	+	+	+	+
4. Customer feedback	+	+	+	+	+	+

When choosing a food product, additional services are formed, offering other food products based on an analysis of purchases by other consumers (Walmart, TESCO, Sbermarket.ru, METRO). Online retail Walmart conducts a more thorough research of purchase analogs, formulating the service: customers also considered; customers also bought these products; customers also viewed these products and sponsored Products. Online retail Perekrestok offers only similar food products of the same group, and Online retail Auchan - only a transition to the product groups of food products in the catalog.

Food products can be bought personally for the consumer or for all family members for direct use in food or the preparation of various dishes, taking into account gastronomic tastes. For these purposes, some websites (TESCO, Perekrestok) offer original recipes for cooking. The consumer can order a set of food products for a specific new recipe if he is interested in new recipes. On the TESCO website, the recipes are presented on the main page and have no connection with the food product selected by the consumer. On the Perekrestok website, cooking recipes are offered when choosing a specific food product and ordering all the necessary food products. Still, they do not transition consumers to other product groups.

3.2. Opportunities for Online Stores to Expand the Range of Food Purchases by the Consumer

Buying food products over the Internet consists of forming a whole range of food products associated with both the terms of free delivery and the diet. The consumer begins searching for the necessary food products with a request or searches sequentially through the catalog. The absence or insufficiency of associative search forces the consumer to use the catalog search, spending a more extended period due to the vast amount of information on the website. Therefore, the simplicity and ease of use of the website interface and the search for a food product become essential factors in making the required set of food products, regardless of the type of consumer (regular or new consumer of online retail service) (Kang and Namkung 2019; Lal 2017). Ilbahar et al. (Ilbahar and Cebi 2017) have shown that the more user-friendly a website's interface, the more consumers choose to shop.

There are two options for finding food on a website (Figure 1).

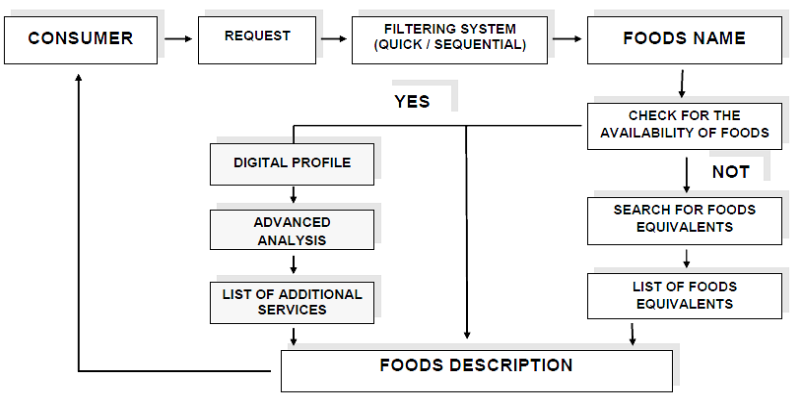

Figure 1. The structure of options for food sourcing solutions on the website of online stores.

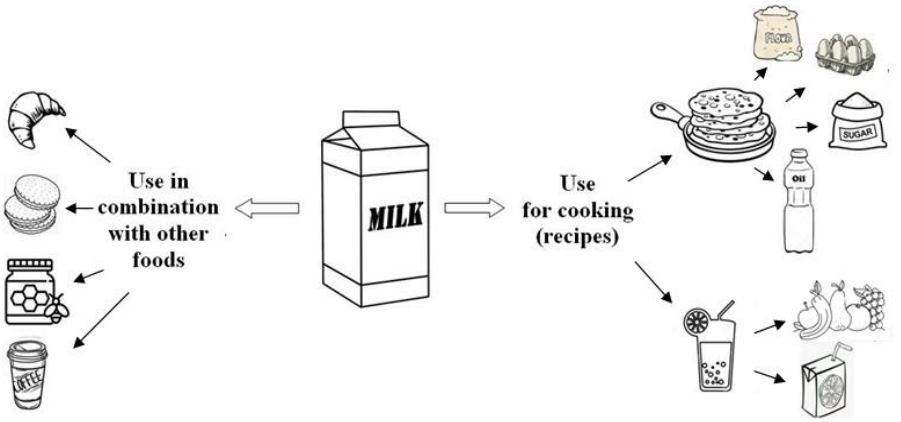

Figure 2. Example of expanding the consumer's purchase range when choosing "milk" essential food product.

First, the consumer finds the required food product, selects it, and orders. The second option is that the consumer does not find a food product that meets his requirements and is offered similar food products from which he chooses. To expand the consumer's shopping area, the recommender system offers him similar food products or choices of other consumers when buying a similar outcome. This is how the leading websites of online stores work.

We propose a different model to expand the area of consumer purchases: food→description→use cases. All use cases need to be considered, especially the daily primary foods. It must be assumed that the consumer can use food products personally or for family members for consumption in natural form or as an ingredient for cooking. Moreover, cooking options should be considered from simple (potatoes with dill, potatoes with butter) to complex (original recipes). Eating an essential food product can occur alone or in combination with other food products, for example, a bun with tea or milk, wine with fruit, toast bread with nut butter, etc. For example, the primary food product "milk" options for expanding consumer purchases are presented (Figure 2).

In Figure 2 presents two options for simple recipes for using milk: making pancakes and cocktails. If the consumer wants to buy milk for cooking, he needs other food products - flour, eggs, sugar, and vegetable oil in the variant of making pancakes. When they are selected, the system transfers it to other food products, where it offers, for example, wheat flour and its different types. The second use case covers making cocktails or smoothies. The need for their preparation of fruits or berries and juices when switching to another group of food products creates the opportunity (to remind) that you can buy fruits not only for smoothies but also for direct consumption.

Such options for the proposals of the recommender system will be of interest to both a permanent and a new consumer. After the order package has been formed in full, the system remembers the positive and negative reactions of the consumer to the suggestions of the recommender system, gradually developing his "Digital Shadow."

4. Discussion

Technologies of "Digital Shadow" (DS) and "Digital Twin" (DT) are widely used in physical models of data management and decision-making analytics (Jones et al. 2020; Adamenko et al. 2020; Shao and Helu 2020). They are just beginning to develop in modeling consumer choice in offline and online trade (Vijayakumar 2020). Context-Aware Computing allows the use of the DT model by dynamically analyzing and predicting new consumer needs and creating his "Digital Profile."

4.1. The "Digital Shadow" of the Consumer

The DS technology in the marketing analysis of consumer behavior allows his previous choice of food products and transactions stored in his account to offer purchase food products that correspond to earlier transactions (Figure 3). It is based on three principles: proximity, influence, and popularity (Ahn 2008).

DS model of the food consumed is a system of connections and dependencies that describe consumer behavior using digital analysis technologies for actual transactions of an electronic trading platform. Some tasks of monitoring consumer behavior (and, consequently, the formation of commercial proposals for expanding the area of purchases) can be solved using predictive analytics, which is used to sufficiently stable consumer behavior. Collaborative filtering applied in recommender systems based on DS and matrix factorization (Feng et al. 2020) provides a slow sequential expansion of the consumer's offer area (purchase profile). However, when a new client appears, the recommender system cannot pick up offers to purchase goods that match his interests. Thus, with the help of DS, it is possible to predict behavior similar to what has already been observed. Still, this model does not apply to a new consumer and also does not allow predicting a change in consumer behavior if it has never happened before on an electronic trading platform.

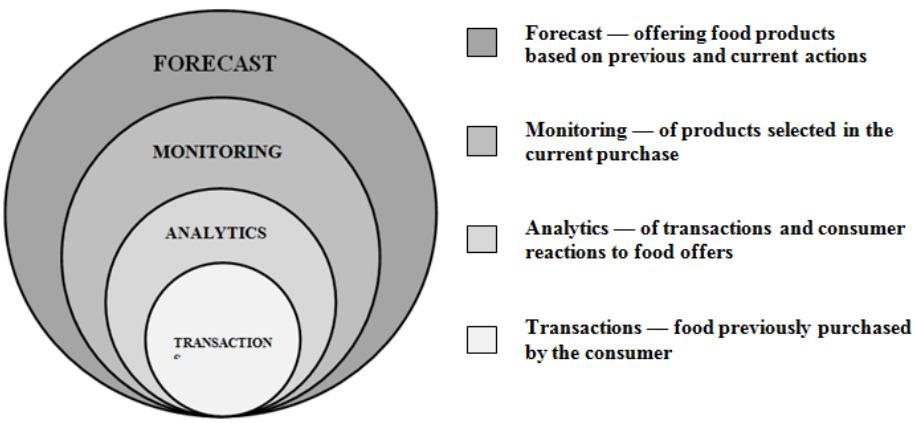

Figure 3. The model of "Digital Shadow" of the food product consumer.

To solve the problems associated with expanding the range and number of purchases of food products that meet the consumer's interests, it is proposed to use the methods and

algorithms for using artificial intelligence, based on the analysis of Big Data transactions of an electronic trading platform. In the absence or insufficient amount of data on perfect transactions, Feng et al. (Feng et al. 2020) propose to improve the performance of the recommender system by using a multifactor similarity measure, which captures linear and nonlinear correlations between users arising from extreme behavior (multi-factor similarity measure that captures linear and nonlinear correlations between users resulting from extreme behavior). It is also possible to use in these conditions the fusion method that simultaneously considers the multi-factor similarity and the global rating information in a probability matrix factorization framework is proposed. Natarajan et al. (Natarajan et al. 2020) suggest using open user data generated by other search engines. To solve this problem, form recommenders corresponding to the buyer of the goods, it is necessary to change the algorithm for processing the information array formed on the trading floor. Move from analyzing past Digital Shadow events to deploying the Digital Twins algorithm, making it possible to predict events unrelated to purchase history.

4.2. Consumer's Digital Twin

Online commerce has excellent opportunities to form a database (Big Data) of all reactions to purchases by various consumers, which creates the possibility of dynamic modeling of the "digital consumer profile" based on its own "digital shadow" and generalized reactions of the DT to predict purchases. Information about food purchase transactions is recorded, stored, processed, and applied to the current consumer request, forming proposals to expand the investment. According to the theory of Greaves (Jones et al. 2020), this process essentially allows a well-described, data-driven approach to monitor, manage, and improve recommenders for complimentary food choices (the buying process) throughout the entire life cycle of the DT model.

Each online store forms a virtual space (generalized DT) based on the behavioral analysis of all consumers and transactions. Based on the data of the consumer's request for food products from the virtual space, a subspace is allocated that corresponds to his previous purchases and similar purchases of other consumers. The size of the consumer group for analysis is determined by the criteria of the matrix of requirements/targets and resource constraints of the online store, which is a critical element of the DT development technology. This analysis is most effective on global trading platforms (such as Ali Express, Walmart); it is possible to obtain volumes of information that meet the criteria of WG 02 "Big Data." The more target indicators there are, the more in detail and more accurately it will be possible to describe the properties of the "consumer behavior" system at all stages of his activity in the online store.

Subspace information is used to optimize recommender system decisions. The system processes the consumer's response to the recommended foods to refine the consumer's behavioral model. Each subsequent request or purchase happens, forming a dynamic DT model. The use of recipes for the preparation of food products or combined with the consumption of food products with the requested product transfers the consumer to other groups of goods and, according to his reaction to the offered goods, expands the database of the generalized model DT.

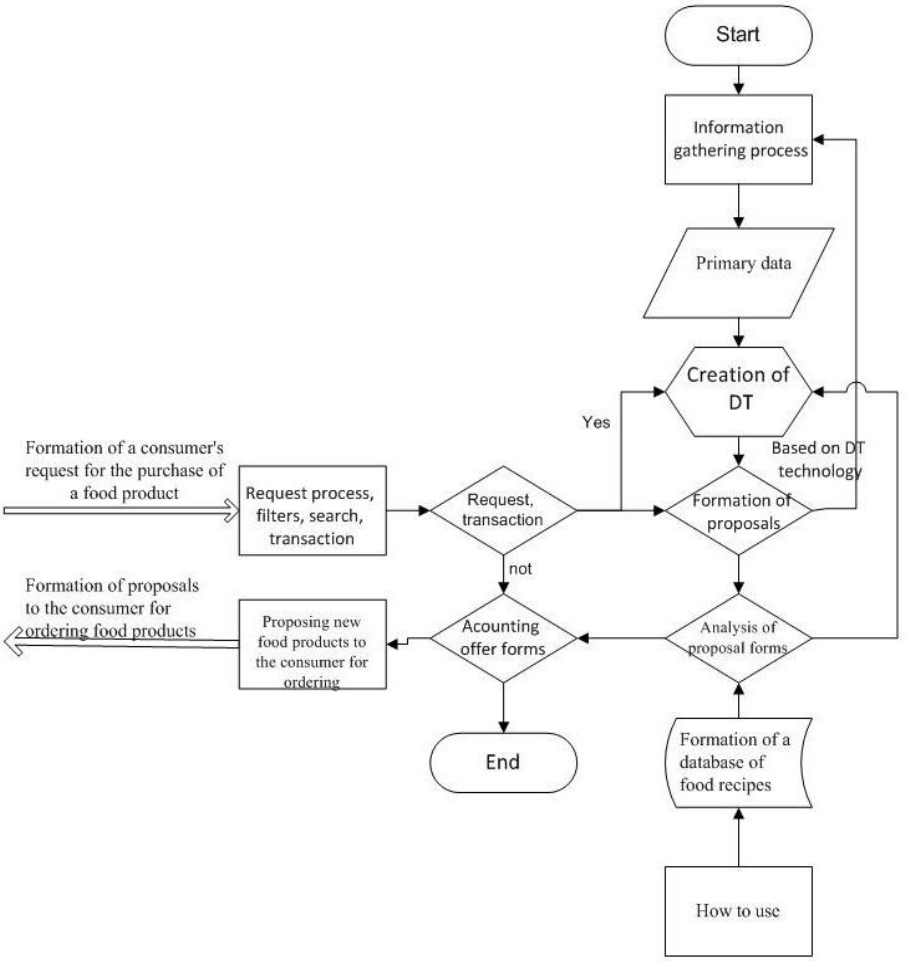

Figure 4. DT-based recommender system functioning algorithm.

Figure 4 shows the algorithm for the functioning of a recommender system based on a DT with the inclusion of a database on using food products.

The first stage is collecting primary information, creating a database, storing, adding, updating. Primary information includes:

- information about services and product groups, the range of food products sold in the online store;
- descriptions of goods, their use according to the manufacturer's data;
- options for using food products: essential and original culinary recipes; combined food products when consumed in their natural form.

Primary information serves as the basis for forming a database of food products, their properties (description), and interchangeability. An additional service base is formed for the consumer based on the accepted product offers (actual transactions) and rejected proposals. An electronic trading platform is launched.

Each transaction made by a consumer, a consumer's catalogs of food products, and reactions to food products (viewed, rejected) of the recommender system fall into the primary base, supplementing and refining it. At the next contact of any consumer with a request for commercial products, an updated database of the entire digital profile of the online store is used, which provides a dynamic change in the primary data for decision-making.

Conclusion

The online food trade has enormous potential, carrying out regular targeted sales to consumers and attracting new consumers. Keeping consumers with an online store and expanding the area of their purchases are relevant.

On the websites of online stores, recommender systems work according to different algorithms because they form various offers to the consumer when requesting a food product. The work considered the proposals of the recommender systems of six electronic platforms selling food products. Based on the analysis of previous transactions, offers to the consumer are formed by the recommender system of Walmart, TESCO, Perekrestok, Sbermarket.ru, offering food products from a group of goods that the consumer considers when requested. The offer of recipes for the preparation of culinary dishes is limited to original recipes and is implemented only on two websites: TESCO as an independent element not related to consumer requests; Crossroads - when requesting a specific food product, it allows ordering the necessary components but does not offer the consumer a transition to other product groups.

To improve the efficiency of the website of online stores and expand the sales of food products, we propose to use additional services that transfer the consumer to other product groups. For this purpose, you can use primary and original recipes to prepare culinary dishes based on the primary product chosen by the consumer and other food products, combined with the base one when consumed in natural form. This will attract and retain new consumers and expand the consumer shopping area.

The basis of recommenders for purchases of food products in an online store is the "Digital Shadow" of the consumer and generalized reactions of consumer groups, which is dynamic due to additions to consumer actions during purchases. We have proposed an algorithm for the functioning of the recommender system based on the construction of a digital user profile ("Digital Twin").

Acknowledgment

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Chapter 16

Implementation of Smart Contract Technology in Transport Chains: Methodological Aspects of Business Process Reengineering

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Abstract

The article is devoted to the methodological justification of the digital transformation of logistics processes in transport chains formed by transport and logistics companies of national and TRANS-national level, which own their own infrastructure, when switching to the technology of smart contracts. The research methodology is based on the theory of logistics and supply chain management, the theory of process management and the design and technological concept of organizational culture formation. Based on the results of the established principles of transition to smart contract technology and digital transformation of processes, a logical and time structure of the methodology of engineering/reengineering of logistics business processes in transport chains was formed during the transition to smart contract technology, which provides the most complete coverage of methodological tasks solved in the process of reengineering. The paper presents methodological tools and results of semantic modeling of logistics processes, which form the necessary basis for further algorithmization of procedures for fulfilling the contractual conditions of a smart contract. Based on the systematization of approaches to establishing the essential characteristics of smart contracts, their models are established, as well as the necessary conditions for the successful implementation of various smart contract models and possible transition scenarios are identified. The article is largely the result of close cooperation with JSC "RZD" (Russian Railways) in the preparation of the methodological basis of transition to the smart contracts in the transport chains, logistical processes which are implemented with the use of the railway infrastructure of JSC "RZD".

Keywords: smart contract, transport chain, digital logistics, reengineering, digital transformation, logistics digitalization, trigger of logistics business process

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1. Introduction

The first attempts to use digital economy tools in various industries, including in the transport and logistics complex, required researchers and practitioners to understand the content of the principles of the digital economy and to assess the potential of digital technologies in the professional sphere. As the experience of the first successful projects of digitalization of processes in transport and logistics systems accumulates, and ideas are formed about the potential effectiveness of the use of digital technologies in the implementation of individual logistics processes, there is an understanding of the need for large-scale revolutionary changes in business processes, which, in turn, determines the direction of scientific research in the context of the essential applied issues of the digital transformation of business processes: what is the depth of business process reengineering in preparation for digitalization? what are the necessary conditions for successfully implementing business processes in the digital environment? what is the sequence of this transition to digital processes? can we evaluate the effectiveness of digitalization? Large-scale changes in any economic system in general, and in particular in transport chains, involve significant risks for all participants; then what aspects should be taken into account when making a decision about digital transformation? Summarizing all these issues, we can conclude that today we are talking about the need to form a comprehensive methodological approach focused on solving the applied problem of engineering and reengineering logistics business processes when implementing digital technologies.

The relevance of this task increases when the object of research is considered transport chains formed with the participation of large transport and logistics companies that own their own infrastructure, for example, railway companies, sea lines, etc. The functioning of modern transport chains is associated with a high level of transport costs due to the presence of a large number of intermediaries, high transaction costs, and penalties for violating the terms of the contract, which in General creates negative effects both at the level of macroeconomic indicators (in particular, a high share of logistics costs in the structure of GDP) and at the micro-level, significantly increasing consumer prices for products moved.

The introduction of smart contract technology is considered as one of the most promising directions of digitalization of logistics processes in transport chains, which has a significant potential to solve the presented problems, which is noted by G. Yu. Silkina, V. V. Shcherbakov (Scherbakov and Silkina 2019), V. P. Kupriyanovsky, S. A. Sinyagov, A. A. Klimov, A.V. Petrov, D. E. Namiot, when implementing a smart contract on the blockchain platform – by R. M. Nureev, O. V. Karapaev (Klimov et al. 2018; Kupriyanovsky, Sinyagov, et al. 2016; Kupriyanovsky, Namiot, et al. 2016). At the same time, carrying out large-scale changes in the system, in particular, the transport chain under consideration, is associated with significant risks for all participants, so it is necessary to pay attention to the formation of a conceptual and methodological basis for future changes at the initial stages of decision-making on re-engineering of logistics business processes.

2. Material and Methods

2.1. General Principles for Reengineering Logistics Processes in Transport Chains in the Implementation of Smart Contract Technology

The main goal of reengineering logistics business processes for managing the interaction of transport chain participants in the implementation of smart contract technology is holistic, system-based modeling and reorganization of service, financial and information flows aimed at improving its stability, competitiveness and customer orientation. Then, when developing a methodology for such reorganization based on smart contract technology, the implementation of the following principles is of particular importance:

1. the principle of the categorical uniqueness. The introduction of digital technologies into logistics processes in General, and especially the management of logistics processes in the performance of contractual obligations, provides unambiguous certainty of concepts, categories and terms used in the development of algorithms and software solutions for smart contracts. This means that at the initial stages of development, object-categorical relationships must be established between the physical objects of the supply chain and the terminology used;
2. the principle of congruence of goals of supply chain participants. A necessary condition for achieving this goal of increasing the stability, competitiveness and customer-orientation of the supply chain at the present stage of the evolutionary process of developing forms of interaction between economic entities is the development of mechanisms aimed at achieving the agreed goals of participants;
3. the principle of variability of development. The scale of modern supply chains and the amount of investment required for the implementation of smart contract technology require the development of several alternative scenarios for the transition to smart contract technology using various comparative criteria;
4. the principle of priority development of private methodology. The implementation of procedures for reengineering logical business processes should be based on the provisions of the General methodology (principles of consistency, de-terminism, dialectics, etc.) and a special methodology for managing logistics systems (principles of hierarchy, minimum logistics costs, General quality management, etc.). However, when switching to the smart contract technology, it is particularly important to develop a private methodology that provides for the formation of a research apparatus that meets the goal, as well as taking into account the specifics of promising forms of interaction between supply chain participants and the features of the algorithm for the conditions of the Contracting system.

Let us consider the presented principles in more detail.

2.1.1. The Principle of the Categorical Uniqueness

Solving the problems of algorithmization of contract terms in the framework of the smart contract system involves a description of their participants, as well as ways of interaction between them in the implementation of logistics processes that ensure the fulfillment of contract

terms. From these positions, it is important to identify the boundaries of the transport chain, as well as to identify the logistics business processes that are most subject to transformation when implementing smart contract technology.

In the course of the study, the following categories of transport chains were considered: "elementary transport chain", "basic transport chain", "extended transport chain", "full transport and logistics chain". When forming the structure of transport chains at all levels, it is proposed to take into account only the elements involved in the implementation of transport and logistics operations at the level of technological logistics. The exclusion from the consideration of intermediary structures is justified by the manifestation of one of the potential advantages of smart contract technology, noted in the works of R. Casado-Vara, A. Gonzalez-Briones, J. Prieto, J. Corchado (Casado-Vara et al. 2020), H. Baharmand, T. Comes (Baharmand and Comes 2019), X. Li (Li 2020) – simplification of interaction between partners, increasing the reliability of performance of contractual obligations, consequently, reducing the total logistics costs.

It should also be noted that the task of detailed identification of the structure of transport chains is of independent significance, forming a vector for the development of the smart Contracting system in the implementation of transport and logistics processes.

At the same time, from the standpoint of developing a smart contract system, determining the structure of the transport chain is a necessary but auxiliary element of the methodological apparatus; the following issues are more important when developing application solutions:

a) establishing logistics processes in transport chains that are subject to reengineering when switching to smart contract technology. A logistics business process is an interconnected set of logistics operations that translate resources into a key indicator (parameter) set by an internal or external consumer. In this case, as logistics operations, we will understand any elementary action (or set of actions) that leads to the transformation of the parameters of the material and (or) related information, financial and other flows, which is not subject to further decommissioning within the framework of the task. The main logistics business processes implemented in transport chains are customer relationship management; customer service management; demand management; order fulfillment management; and new product/service development management.

   As a result of the analysis, it was found that the greatest transformation when implementing the technology of a smart contract is subject to the process of "order execution management", since its sequential decomposition allows you to identify elementary events (hereinafter referred to as"triggers"), the occurrence of which potentially initiates the financial flow, and, therefore, is subject to use in smart contract algorithms.

b) defining the configuration of the contracting system. Taking into account the presented structure of transport chains, it is advisable to consider a system-forming contract of carriage, the subjects of which are the focus company of the transport chain (the carrier) and the client. For example, in transport chains where Russian Railways is the focal company, a contract for the carriage of goods by rail acquires the status of a Central one. As the structural complexity of the transport chain increases, the composition of contracts that ensure the implementation of the logistics process of servicing the application, hereinafter referred to as "auxiliary contracts", also expands.

The application of the presented approach provides grounds for establishing the scope of rational application of smart contract technology in transport chains. In particular, the analysis of the claim work, as well as the technological process of transportation using the railway infrastructure of JSC "Russian Railways" indicates the impracticability of using smart contract technology in the framework of the element transport chain. The initial level of implementation of smart contract technology in the implementation of structurally complex logistics business processes "order fulfillment management" is associated with the"basic transport chain" level, since it allows you to identify the initiator of a risk situation, assign responsibility for possible violation of the terms of the contract and, accordingly, fairly distribute risks in the transport chain.

2.1.2. The Principle of Congruence of Goals of Participants in the Transport Chain

A necessary condition for maintaining the stability of the transport chain and further development of the transport chain as a whole, as well as its individual participants, is to focus on the development of mechanisms that ensure the congruence of interests of participants in the transport chain. The analysis of strategic goals and the economic performance of participants in the transport chain, conflict areas in the interaction of parties in implementing the transport and logistics process allowed to specify the interests, the achievement of which the potential but technology provided by the smart contract, which, in turn, reveals the prospects of applying smart technology-contract in the implementation of transport and logistics processes.

2.1.3. The Principle of Development Variability

In the course of the research, it was revealed that the variability of the development of the smart contracting system, in general, is provided by the manifestation of the following factors: the target setting of reengineering of business processes in the transport chain when implementing smart contract technology; the focus on the level of the transport chain; a meaningful interpretation of the concept of "smart contract".

The manifestation of the factor "meaningful interpretation of the concept of"smart contract" largely determines the nature of the transition scenario to the technology in question, as well as the content of a set of measures that ensure the formation of the necessary conditions for a successful transition. At the same time, the essential characteristics of a smart contract cause a lively discussion, in which two fundamentally different positions are highlighted. According to a number of researchers, in particular, the authors (Prause 2019; Thakre et al. 2019; Somova 2018), the distinctive feature of a smart contract is its self-execution. So, G. Prause (Prause 2019) defines a smart contract as an electronic transaction Protocol intended for digital verification or enforcement of the terms of a basic legal contract, in other words, the execution of General contractual conditions, including payments, legal obligations, and enforcement without the participation of third parties. Developed by A. Takre, F. Thabtah, S. R. Shahamiri, S. the Hammoud model of smart contracts for regulating the relationship of parties in the process of publishing activities, described in (Thakre et al. 2019), potentially provides for the possibility of holding interested parties responsible for violating the terms of the contract or their remuneration for successfully fulfilling the conditions pre-configured in the smart contract. This point of view is supported by representatives of the Russian scientific

school. In particular, E. V. Somov, summarizing the provisions of the existing Russian Federation laws concerning smart contracts and foreign experience of legal regulation, proposes to understand under smart contract performance of duties, as well as the implementation, amendment and termination rights, the obligations that occur automatically based on an electronic algorithm agreed upon by the parties by prior agreement with the terms of the contract (Somova 2018). The oppositional point of view is expressed by O. S. Grin, E. S. Grin, and A.V. Solovyov (Grin, Grin, and Solovyov 2019). The authors proposed the definition of a smart contract as "a standard (special) contract design – a contract concluded using electronic or other technical means", and in (Grin, Grin, and Solovyov 2019) it is clearly stated that "a smart contract cannot be qualified as an independent method of ensuring the performance of obligations". A close position is held by V. Yu. Karpychev, M. V. Karpychev (Karpychev and Karpychev 2019), and other authors.

Taking into account the presented positions, in the further study it is accepted that the content interpretation of the concept of "smart contract" is determined by the type of smart contract model used, which include:

- a "hybrid" smart contract model that considers the smart contract as an element that complements the traditional contract system. In this case, the smart contract can: a) act as a means of verifying the fulfillment of contract terms, confirming the occurrence of significant events for further recording in the distributed registry blocks; b) be considered as a set of automatically executed blocks within the traditional contract system, i.e., used on separate sections of the transport chain;
- an "ideal" smart contract model that describes a smart contract as a self-executing contract using computer algorithms.

The effectiveness of implementing any of the presented smart contract models is ensured by the presence of the appropriate infrastructure that records events that are significant from the standpoint of the terms of the agreement (or agreements). The research shows that there is a high potential for combining two digital technological concepts-smart contracts and the Internet of Things (IoT). For example, to track and monitor the fulfillment of delivery conditions related to compliance with temperature conditions, geographical position, humidity, pressure, and unsanctioned access to the internal volume of the container, it is advisable to use smart containers equipped with IoT sensors, while smart contracts are used to manage shipment conditions, automate payments, and legitimize the recipient. The presented set of technologies is justified by H. Hasan, E. AlHadhrami, A. AlDhaheri, K. Salah, R. Jayaraman (Hasan et al. 2019), G. Schmitt, A. Mladenow, C. Strauss, M. Schaffhauser-Linzat (Schmitt et al. 2019).

The study of the essence of smart contracts points to the need for preliminary preparation of business processes for their digitalization.in other words, the introduction of a smart contract as a self-executing contract for immature logistics processes will inevitably lead to significant financial losses for one of the participants in the Contracting system. Methods for assessing the level of maturity of logistics processes were the subject of research by S. H. Huan, S. K. Sheoran, G. Wan (Huan, Sheoran, and Wan 2004), A. Norta, P. Grefen, N. C. Narendra (Norta, Grefen, and Narendra 2014). In addition, it is important to note that the successful functioning of transport chains is determined by the level of technological compatibility of its participants, and when digitizing end-to-end processes in transport chains, "digital compatibility" acquires

special significance, the measure of which is proposed to consider the level of digital maturity of technological processes.

The practice of concluding smart contracts as self-executing contracts is not institutionally neutral and should be based on significant changes in the legal provision of contractual relations, as noted, in particular, by N. P. Ivashchenko, A. E. Shastitko, A. A. Shpakova (Ivashchenko, Shastitko, and Shpakova 2019), A.V. Dudchenko et al. (Dudchenko, Kolkareva, and Pseush 2019). This feature determines the special significance of the condition "Availability of a system of regulatory support for self-executing contracts" in the implementation of the" ideal " smart contract model, as well as the second form of the "hybrid" model.

As alternative scenarios for the transition to smart contract technology, it is proposed to consider the following:

Scenario 1 – Scenario of the "soft" transition – consists of a sequential increase in the functionality of the smart contract model, initially considered as a means of fixing events that confirm the fulfillment of contract terms (mainly temporary triggers) by automating the completion of individual blocks (subprocesses, sections of the transport chain, etc.) to further complete automation of the process in the transport chain. The scenario allows you to work out the technology of fixing events on the already existing information infrastructure of transport chain participants, and assess the possible risks from automatization of the fulfillment of conditions by time triggers.

Scenario 2 – "digital supply chain development Scenario". The main feature of the scenario is that the" ideal " smart contract model is adopted as a working option from the initial stages of the transition. However, to reduce the risks associated with switching to a smart contract, implementation should start with the most Mature sub-processes that were previously identified at the pre-project stage.

The following characteristics are recommended as the main criteria for selecting subprocesses:

- owners of the sub-process – various structural divisions of the focus company;
- possibility of algorithmic description of the owners' interaction during the implementation of the process under study;
- the possibility of sharing the responsibility between the owners of subprocesses;
- statistical parameters of the subprocess that correspond to the rules 6σ.

The lack of identification of the presented characteristics during the actual processes should be considered as a necessary condition for increasing the degree of maturity of the internal processes of the focus company (but not a reason for rejecting the technology).

In the future, the technology is scaled to the level of an expanded, then complete transport chain.

Scenario 3 – "Scenario of digital expansion" – is addressed to transport and logistics companies and is focused on outstripping the conquest of promising digital transport logistics markets. The logic of implementing the scenario is the widest coverage of the market space with the implementation of a simplified form of smart contract at the initial stages, followed by the complication of the terms of the smart contract.

The formation of its own information infrastructure in the entire market space is not a necessary condition; the means of recording events (triggers) can be owned by separate participants in the transport chain and used by mutual agreement.

2.1.4. The Principle of Priority Development of Private Methodology

The development of a methodology focused on solving the applied problem of reengineering logistics business processes of interaction between supply chain participants, in our opinion, is a necessary condition for the formation of tools for developing and making decisions that allow for the transition to smart contract and blockchain technologies, taking into account the necessary conditions and existing restrictions.

2.2. Structure of the Methodology for Preparing Logistics Processes inTransport Chains for the Implementation of Smart Contract Technology

The format for developing a methodology for reengineering logistics business processes of interaction between participants in the supply chain involves determining its logical and temporal structure (the approach proposed by A.M. Novikov and D. A. Novikov (Novikov and Novikov 2013) is taken as the basis). The choice of the format is determined by the desire for the most complete coverage of methodological problems solved in the process of reengineering, their logical ordering, as well as correlation with the time frame.

Table 1. Structure of the design phase of the methodology for reengineering logistics business processes in transport chains when switching to smart contract technology

Methodological tools	**Main stages of the methodology**	**Expected application result**
1. Stage of conceptualization		
Methods of structural analysis, in particular, the method of investigating cause-and-effect relationships (Ishikawa diagram)	1.1. Development of conceptual methodology for the engineering/reengineering	Formulation of general principles of the methodology
	1.2. Analysis and synthesis of alternative scenarios for engineering/reengineering of logistics business processes implemented using railway infrastructure	List of key performance indicators and their formalized description
	1.3. Formation of a system of factors that determine the configuration of the Contracting system when implementing smart contract and blockchain technologies in the management of logistics business processes of interaction	Diagram of factors of variability in logistics business processes of interaction of transport chain participants based on smart contracts and blockchain technology
2. Stage of modeling		
Semantic analysis: a) normative legal acts regulating the relationship of participants in the transport chain; b) texts of standard agreements between participants in the transport chain	2.1. Systematization and description of logistics business processes of interaction of transport chain participants	Identification of engineering/reengineering objects from the perspective of switching to smart-contracting and blockchain technologies

Methodological tools	**Main stages of the methodology**	**Expected application result**
Empirical survey of business processes of interaction of transport chain participants; internal business processes of participants in the process of providing basic and complex services		Certification of business processes in the "BY LAW" format"
		Certification of business processes in the "AS IS" format"
The cybernetic approach to the modeling of logistic processes	2.2. Development of a conceptual model for managing logistics business processes of interaction between transport chain participants based on smart contracts and blockchain technology	Conceptual model for managing logistics processes of interaction between transport chain participants (top-level model); business process architecture
Analytical tools for the digital transformation of logistics using quantitative estimates: a) digital maturity of the company's logistics activities; b) maturity of logistics processes	2.3. Study of the requirements and limitations of implementing a conceptual model for managing logistics business processes of interaction between transport chain participants based on smart contracts and blockchain technology	Methods for examining the conditions for optimizing logistics business processes of interaction between transport chain participants based on smart contracts and blockchain technology
3. Stage of design		
Subject-event approach to business system modeling	3.1. Modeling and detailing (decomposition) of business processes of interaction between transport chain participants based on smart contracts and blockchain technology	Methodology for creating detailed logistics business processes for interaction between transport chain participants based on smart contracts and blockchain technology
		Description of a set of process triggers for further algorithmization
		A set of basic flowcharts (algorithms) describing the logistics business processes of interaction between participants for various options for organizing the transport chain in the implementation of smart contract technology
Methods for analyzing the effectiveness of strategic decisions – the strategic profit model (the Dupon System analyzes model)	3.2. Preliminary assessment of the effectiveness of engineering/reengineering of business processes in the transition to smart contract and blockchain technologies	A set of methods for evaluating the effectiveness of digital transformation and engineering/reengineering of logistics business processes of interaction between transport chain participants based on smart contracts and blockchain technology
Methods of economic analysis: - integral method of economic analysis; - the method of chain substitutions		Methods for assessing the potential for changing (reducing) transaction and related costs by reducing intermediaries in the transport chain, as well as by optimizing the number of operational, financial, accounting, and legal personnel
		Methods of economic assessment of risks of full and/or partial non-fulfillment of contract terms when switching to smart contract technology

Structurally, the methodology includes 3 phases: the design phase, technological and reflexive phases. It should be noted that the tasks of the technological phase are related to the preparation for the implementation and implementation of the technology under consideration; the reflexive phase involves evaluating the results of implementation, in this regard, these phases are not considered in this paper and are the subject of a separate study. The design phase

covers a set of tasks focused on forming solutions for the configuration and content of a smart contract, evaluating the necessary conditions and standards, potential performance, as well as the risks of switching to blockchain and smart contract technology. The design phase includes stages of conceptualization, modeling, and construction, the content of which is determined by the transition from the most general (abstract) results to specific methodological solutions that determine the direction of the implementation process. The developed logical and time structure of the design phase of the engineering/reengineering methodology for logistics business processes in transport chains when switching to smart contract technology is shown in Table 1.

The presented principles and methodological developments based on them are further used in the formation of applied tools for engineering and reengineering of logistics business processes for managing the interaction of transport chain participants using smart contract technology.

3. Results

3.1. Semantic Modeling of Logistics Business Processes in Transport Chains When Switching to Smart Contract Technology

Modeling of logistics business processes of interaction between participants in the transport chain is considered as the main task in the development of smart-contracting systems, which can be solved using methodological tools developed for the stages of modeling and design of the project phase within the logical-time structure of the methodology.

The initial stage of modeling logistics business processes involves the development of a conceptual model for managing logistics business processes of interaction between participants in the transport chain based on smart contracts and blockchain technology.

The distinctive features of the conceptual model are:

- fragmentation of the studied processes into components in accordance with the rule of completion of a certain condition of the contract. The result of the completion of the contract term is the initiation of financial flow, the direction of which is related to the result of fulfilling the condition: if it is met, the payment for services rendered (work performed) is debited from the customer's account, otherwise, the amount of the penalty for violation of the contract terms is debited from the contractor's account;
- basic readiness for algorithmization of the process. When implementing smart contract technology, the possibility of algorithmization of processes becomes of particular importance, and therefore there is a need to record individual events that indicate the completion of the contract terms and initiate the emergence of financial flow in the chain. In this case, the task of identifying these events, hereinafter referred to as triggers, becomes particularly important;
- focus on system Contracting, including, in addition to the contract of carriage of goods, related (ancillary) contracts that allows you to assign responsibility for the fulfillment of contract terms and allocating risks between participants in the basic or extended (in the future – full) transport chain;

- availability of special accounts that allow you to accumulate financial assets and provide the necessary payments in the process of executing a smart contract.

Then the Central issue from the standpoint of forming applied solutions for the successful application of the smart contract technology in transport chains should be considered the development of a system of process triggers and the closely related task of unambiguously identifying the moments of occurrence of events belonging to this category.

In the course of the research, the method of cross-analysis of the compiled models "BY LAW" and "AS IS" was used to form a system of triggers for the transport process:

- "BY LAW" models are developed based on a sequential decomposition of each of the contracts presented in the contract system from the positions of existing legal documents regulating transport and auxiliary processes in transport chains;
- certification of logistics processes in transport chains in the framework of the model "AS IS" executed using the following methods: field observation of the structure of the process; system analysis of existing contracts, reflecting the real conditions of logistics processes and distribution of responsibility for their violation. In particular, the formation of "AS IS" models for transport chains with the participation of JSC "Russian Railways"required the use of a combined method: interviewing employees, familiarization with the functionality of the automated system"Electronic consignment note", internal instructional materials of JSC"Russian Railways", followed by the results of the analysis of existing contracts of JSC"Russian Railways" with participants in the basic transport chain, which allowed to specify the system of triggers within the existing model of processes, as well as to supplement their description with the characteristics of consequences.

The procedure of the cross-analysis method is based on a subject-event approach, which is characterized by assigning each element of the process (action) to the relevant parties within the framework of the current agreement (subjectivity), and fixing the result of performing individual actions (triggers) is regarded as an event that potentially initiates the financial flow in the smart contract system (eventfulness). The description of risks of violation of the rules of the process that occur due to the fault of the initiator and the approving party is an integral part of the description of the main process of providing a railway transportation service since it simplifies the further procedure for algorithmizing the terms of contracts in the smart contract system (linking to specific contracts allows you to create standard algorithms for individual sub-processes).

As a result of cross-analysis of the "BY LAW" and "AS IS" process models, a detailed description of the main process of providing transportation services via a system of triggers is formed.

As a result of the research, some discrepancy between the trigger systems in the "BY LAW" and "AS IS"models was found. In our opinion, the difference between trigger systems is due to the use of the automated system "ETRAN", however, a detailed analysis indicates a significant meaningful overlap. When forming the "TO BE" model, the requirements of the current legal framework and the existing form of electronic document management were taken

into account, but the most significant attention was paid to the completeness of individual sub-processes in the framework of the considered logistics process of servicing a consumer order.

The implementation of the "TO BE" model within the technological phase of the logistics business process reengineering methodology in existing transport chains, i.e., the actual implementation of smart contract technology, is preceded by the solution of a set of tasks related to the formation of the following subsystems: algorithmic support, infrastructure support, and security. At the same time, it is important to note that the success of the transition and subsequent functioning of the smart contract system largely depends on the decisions made regarding the supporting subsystems.

3.2. Conditions and Restrictions for Switching Transport Chains to Smart Contract and Blockchain Technology

Let us consider some recommendations and the problems of their formation in the production plan:

a) algorithmic support. It is recommended to use the presented methodological developments in terms of semantic modeling of logistics processes and sub-processes in transport chains of various configurations when creating libraries of typical sub-process algorithms when implementing smart contract technology. The recommended level of the transport chain when making a decision to switch to self-executing contracts is not lower than the basic transport chain. At the same time, when forming such libraries, one should pay attention to the high variability of combinations of factors that determine the features of smart contract algorithms. In addition, the problem of choosing functional and instrumental means of implementing smart contract algorithms remains relevant, which is actively discussed in the modern scientific literature (Bhargavan et al. 2016; Vilken et al. 2019; Bai et al. 2018; Hasan et al. 2019; Parizi, Amritraj, and Dehghantanha 2018; Shishkin 2018).

b) infrastructure support. The transition to smart contract technology is largely due to the requirements for both the composition of trigger events and the means of fixing them. A necessary condition for implementing smart contract technology is to create an information infrastructure that allows automatically, without human participation, to record the occurrence of trigger events using automated systems and digital means of data transmission. The composition of triggers should provide:
   - unambiguous determination of the fact of an event that is significant from the standpoint of fulfilling the terms of the agreement and fixing:
     - the end of a certain stage of service provision;
     - the end of the sub-process within the transport chain and the transfer of responsibility for compliance with the terms of cargo delivery to the next participant;
   - immediate payment for services rendered (works performed) or the collection of a fine (penalty) from a transport chain participant who violated the terms of the contract.

c) providing security. The security problems of smart contracts are highly specialized, and therefore were not considered in this study, but are actively studied by Russian and foreign experts in the field of information technology, in particular, A. A. Barinova and S. V. Zapechnikov (Barinova and Zapechnikov 2017), N. Mhaisen, N. Fetais, A. Massoud (Mhaisen, Fetais, and Massoud 2019).

A separate problem at the stage of preliminary preparation for the introduction of smart contract technology is the degree of readiness of transport and other technological processes. The effectiveness of applying the smart contract technology in the transport chain is significantly determined by the level of technological readiness of its participants for the joint implementation of logistics business processes. At the same time, it is important to take into account that in this case, the technological readiness of participants in the transport chain is manifested in two aspects:

- technological readiness to perform transport and logistics processes, which is manifested in the availability of technical means and their complexes that provide cargo handling and delivery with the specified (expected by the client) level of service;
- digital readiness of transport chain participants to implement smart contract technology, which is manifested in the availability of appropriate digital technologies for managing logistics processes and interaction of transport chain participants.

The principles of effective transportation management imply the inclusion of elements in the transport chain that have an equal (or similar) level of technological readiness, which ensures that the specified values of the speed of passage of the cargo flow are maintained. Methods for selecting logistics intermediaries are described in sufficient detail in the scientific literature on logistics and are applicable to the problem of evaluating participants in the transport chain. As mentioned above, in the context of the introduction of smart contract technology, issues of technological compatibility of participants are of particular importance, taking into account the digital maturity of technological processes. Then, as part of the General principles of building an effective transport chain, it is advisable to consider the principle of equality of digital maturity of potential participants, which inevitably actualizes the question of its quantitative assessment. The tools for forming such estimates are proposed in (Cichosz, Wallenburg, and Knemeyer 2020; Karapetyants et al. 2017; Shulzhenko 2021).

A preliminary assessment of the effectiveness of engineering/reengineering of business processes when switching to smart contract and blockchain technologies allows us to state the following:

- the feasibility of switching to the technology of smart contracts and blockchain is determined by the congruence of the goals of transport chain participants, which consist in a dynamic steady increase in economic indicators of their activities;
- the main factors for the growth of economic indicators of participants are the reduction of involuntary expenses (costs) and losses in the transport chain, as well as an increase in the scale of activities;
- the values of quantitative estimates of the effectiveness of business process engineering vary widely depending on the combination of factors “the degree of

maturity of business processes in the transport chain" and "the configuration of the transport chain".

Discussion

It is important to note that the developments made in the framework for forming the methodology of reengineering and require further verification and refinement with the involvement of empirical data, resolve application issues using techniques, performing generalization and systematization of individual elements of methodological tools. In this regard, a whole block of promising scientific and applied research is being formed, the main directions of which are defined by us as follows:

- conceptual modeling of a system for reengineering logistics business processes of interaction between transport chain participants based on smart contract technology:
- development of conceptual models for transitional forms of smart contracts;
- development of mechanisms for integration and consistent replacement of logistics business process management technologies of the current "AS IS" model with smart contract technologies within the framework of the "TO BE" model;
- development of risk management tools at certain stages of the transition to smart contract technology;
- specification of conditions and restrictions for implementing scenarios for switching to smart contract technology;
- detailed "road map" for the selected scenario of transition to smart contract technology;
- modeling and detailing business processes of interaction between transport chain participants based on smart contract technology:
- development of a set of basic algorithms for the interaction of transport chain participants (taking into account the variability of its configuration);
- specification of the composition and form of triggers, taking into account the technical capabilities and the selected transport chain scenario;
- research of the extended system of logistics processes of interaction of transport chain participants;
- survey of conditions for optimizing logistics business processes of interaction between transport chain participants based on smart contracts and blockchain technology:
- typification of the transport chain configuration (by type) and its potential participants;
- research of the current and forecast level of digital maturity of transport chain participants;
- development of requirements (normative values) for the level of digital maturity of transport chain participants, taking into account the variability of smart contract forms;
- formation of a system of statistical indicators for process control; development of procedures for their collection and analysis;
- assessment of the level of maturity of internal logistics processes;
- assessment of the level of maturity of logistics processes in the transport chain;

- development of recommendations for the formation of normative values of the level of maturity of logistics processes, taking into account the variability of smart contract forms.
- assessment of the effectiveness of reengineering of business processes during the transition to a smart contract:
- creation of a source database and verification of tools for evaluating the effectiveness of business process reengineering;
- assessing the sensitivity of key performance indicators;
- development of a set of methods for the economic assessment of risks of non-fulfillment of contract terms in the framework of smart contract technology.

Conclusion

The summarizing the main provisions of the research, we can draw the following conclusions:

- the objective prerequisites for the transformation of logistics business process management, caused by the differentiation of forms of interaction between key participants in the transport chain (network) that form added value, the development of digital technologies, more active use of virtual interaction, form the main directions of future changes: building relationships with customers on the principles of customer orientation, based on increasing the availability of transport chain (network) services, information transparency and high trust between participants; development of network forms of interaction; formation and development of a complex of subsystems that support the management of logistics business processes of interaction between participants in the transport chain using the potential of digital technologies;
- the decision-making on choosing the scenario and solving the tasks of individual stages of the transition to smart contract technology should be based on the provisions of the methodology for reengineering logistics business processes in the transport chain, which provides the most complete coverage of the methodological problems solved in the engineering/reengineering process, their logical ordering, as well as correlation with the time frame;
- the modeling of logistics business processes in the transport chain is advisable to start with the formation of top-level models (conceptual models), the principal requirements for which include: fragmentation of the studied processes into components in accordance with the rule of completion of a certain contract condition; fundamental readiness for algorithmization of the process; orientation to the system of Contracting, which includes, in addition to the contract for the railway transport of goods, also accompanying auxiliary contracts; availability of special accounts that allow you to accumulate financial assets and provide the necessary payments in the process of executing a smart contract;
- the ability to implement the conceptual model, as well as the effectiveness of using smart contract technology in the transport chain, is significantly determined by the level of technological readiness of its participants to jointly implement logistics business processes. At the same time, it is important to take into account that in this

case, the technological readiness of transport chain participants is manifested in two aspects – technological readiness to perform transport and logistics processes and digital readiness of transport chain participants to implement smart contract technology;

- the further modeling of business processes in the transport chain for the purpose of their subsequent optimization within the framework of smart contract technology is based on the principle of their sequential detailing to the level that allows unambiguously identifying triggers as elements of the logistics process, which also serve as nodal points of smart contract algorithms. The sequence of refining the steps recommended for forming the whole complex of models of logistical business processes (process model type "BY LAW" formed based on the current legislation and normative-legal acts; models such as "AS IS", reflecting the current state of the process"; the models of type "TO BE" representing the future (recommended) configuration of the logistic process);
- as a result of the analysis of the "BY LAW" and "AS IS" process models, it is recommended to form a detailed description of the main process of providing transportation services using a subject-event approach. The description of risks of violation of the rules of the process that occur due to the fault of the initiator and the approving party is an integral part of the description of the main process of providing transportation services since it simplifies the further procedure for algorithmizing the terms of contracts in the smart contract system (binding to specific contracts allows you to create standard algorithms for individual sub-processes);
- the transition to smart contract technology significantly changes the requirements for both the composition of trigger events and the means of fixing them. A necessary condition for the introduction of smart contract technology is to create an information infrastructure that allows you to independently, without human participation, detect the occurrence of trigger events using automated systems and digital means of data transmission. The composition of triggers should provide: a) unambiguous determination of the fact of an event that is significant from the standpoint of fulfilling the terms of the contract and fixing the end of a certain stage of service provision, the end of a sub-process within the transport chain and the transfer of responsibility for compliance with the terms of cargo delivery to the next participant in the transport chain; b) the possibility of immediate payment for services rendered (work performed) or collection of a fine (penalty) from a participant in the transport chain who violated the terms of the contract;
- a preliminary assessment of the effectiveness of reengineering of business processes during the transition to technology, smart contracts and blockchain based on the following axiomatic statements: the appropriateness of the transition is determined by the congruence of the goals of participants in a transport chain involving a dynamic steady increase of economic indicators of their activities; the main factors of the economic performance of the participants was the need to reduce unproductive expenditures (costs) and losses in the transport chain, as well as the increase of business scale; the values of quantitative estimates of the performance of business process engineering vary widely depending on the combination of factors "the degree

of maturity of business processes in the transport chain" and "the configuration of the transport chain".

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Chapter 17

Researching Methodological Basis for Assessing the Potential of Commercialization of the Results of Innovative Activities of the University

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Abstract

This chapter presents an analysis of methods for managing factors in order to stimulate the innovative activity of scientific and pedagogical personal. During the research, it was found that it is necessary to use incentive tools that most fully satisfy the needs of personnel with the least cost of resources, if the tasks are completed. To solve this problem, a conceptual model of stimulating the innovative activity of university employees was developed. As a result of using the developed conceptual model for stimulating innovation, it can be said that the effectiveness of employees' innovative activities will depend on four components: factors that influence innovative activities, tools to stimulate innovation, requirements for the results of innovation, systemic dynamics of innovation. On the basis of the proposed conceptual model, it is possible to develop a methodology for stimulating the innovative activity of a university employee, which takes into account material incentives, as well as non-material incentives and administrative incentives.

Keywords: stimulate innovation activity, university, conceptual model

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1. Introduction

Innovative activity is an integral part of a developing university, especially in the context of increasing competition in the educational services market. The source of implementation of innovative activities at the university is scientific and pedagogical personal (Boris Lyamin et al. 2020). A complex of factors determines the effectiveness of the teacher's innovative activity, such as:

- organizational and economic factors, include quantitative factors (the number of hours of study load, including classroom hours) and qualitative factors (the quality of lecturing, the quality of practical and laboratory classes);
- material and technical factors (quantity of laboratory equipment, technical level of laboratory equipment, availability of educational, methodological and scientific literature, etc.);
- scientific and innovative factors (quantity and importance of scientific articles published by teachers and students; the volume of funds allocated for R&D by external customers; obtaining academic degrees, etc.);
- social factors (the degree of dependence of the material remuneration of teachers on the quality of student training, the level of development of the social security system for teachers in the university);
- psychophysiological factors due to individual characteristics of a person.

The selected factors affect the effectiveness of the innovative activities of teachers. Effective factor management can lead to a significant increase in the effectiveness of scientific research activities of teachers. Consider the methods of factor management in order to stimulate scientific and pedagogical personal.

Scientists Blaskova and Trskova from University of Zilina from Slovakia (Blaskova and Trskova 2017) based on the study, the authors are sure that a high level of motivation was achieved by those employees for whom an atmosphere of trust and friendliness was created with the ability to implement their own ideas, that is, employees whose managers apply creative leadership. The authors note the existence of a multifactorial impact on the activities of scientific and pedagogical personal and consider one of the important factors that determine the effectiveness of innovative activities of university employees is this leadership style.

Thus, the authors conclude that the higher the motivation of the university leadership to implement creative leadership, the higher will be the motivation and creative potential of the teaching staff. This approach analyzes non-material factors, in particular the atmosphere of friendliness and mutual assistance among employees, as well as the style of leadership, which affect the effective activities of scientific and pedagogical personnel. The study does not take into account material factors and the analyzed non-material factors take into account only some aspects in relation to the teaching staff.

Scientists Chairunnisa and Kosasih (Chairunnisa and Kosasih 2019) conducted a study of academic culture at the university and found that a favorable academic culture has a positive impact on the innovativeness of scientific and pedagogical personal and their purposefulness.

Based on the results obtained, the authors propose to form an academic culture that would support the innovation of scientific and pedagogical personal, provide more freedom and

independence to the teaching staff in conducting academic activities. The authors emphasize the importance of the influence of the academic culture of the university on the innovative activity of the teaching staff, which is an important, but not a determining factor.

It is necessary to stimulate the innovative activity of university employees with both material and non-material tools (Zlate and Cucui 2015; Cucu-Ciuhan and Guită-Alexandru 2014; Rawung 2013). There are many ways to stimulate university staff, the use of which can significantly increase the results of the work of scientific and pedagogical personal, we will consider some of them.

One of the promising ways to stimulate the work of scientific and pedagogical workers is the effective contract described by Kurbatova and Levin (Kurbatova and Donova 2019).

An effective contract is a contract between a teacher and a university, which guarantees a high level of remuneration for meeting certain indicators required by the university. In particular, the labor contract with each employee must clarify and concretize labor duties, performance indicators and criteria, the amount of remuneration, the amount of incentives for achieving collective labor results, the conditions for receiving remuneration must be clear to the employer and employee and avoid double interpretation. Indicators and criteria must be measurable.

The authors propose to divide the existing research and teaching staff into four conditional categories, depending on which they will receive a reward. Thus, assistants and young teachers are encouraged to offer average academic and low monetary remuneration, while young teachers are charged with a high educational and administrative load. Teachers who are not involved in research activities are also invited to carry out a large amount of educational and administrative workload. The level of academic and financial reward for teachers is proposed to be set at the average level. Finally, research teachers need time for productive research activities, so their educational and administrative load is low, and academic and monetary rewards are high.

Now the system of effective contracts is used by several universities, such as Moscow Institute of Physics and Technology, National University of Science and Technology "MISiS," Higher School of Economics, National research nuclear university "MEPhI," Peter the Great St. Petersburg Polytechnic University (SPbPU), Ural Federal University, National research Tomsk State University, Novosibirsk State University, etc.

However, the introduction of an "effective contract" is associated with problems and risks. The main challenge is the development of measurable performance indicators for teacher staff. The main risk is imitation of indicators instead of achieving the desired result. Thus, the introduction of indicators and criteria for the quality of a teacher's work requires careful thought and testing with the participation of the entire team of interested employees of the university or a structural unit of the university.

The experience of stimulating scientific and pedagogical workers through the conclusion of a mutually beneficial contract with a teacher on the example of the Higher School of Economics is considered by the doctor of economic sciences Nazarova. Under the terms of the contract, the mutual obligations of the teacher and the university include (Balabanova et al. 2006): the obligations of the university to provide the scientific and pedagogical worker not only with financial support, but also to create the necessary conditions for effective work; requirements for educational, methodological, administrative and scientific research activities of the employee; for teachers who have publications in journals included in the international databases Scopus or Web of Science, the teaching load is reduced without loss of salary;

allowances of 10-50% for a PhD degree and for members of the university's personnel reserve if they have an administrative burden; the availability of paid creative leave for research and teaching staff who have worked for more than five years at the university.

The author identifies two main types of contracts for teachers who implement the track of the teacher and for those who are ready to choose the track of the teacher – "researcher":

- the contract of a teacher - "teacher" implies that a significant part of the working time will be devoted to teaching and achievements in this area (60-70% of employment). Such teachers can devote much less time to scientific work (10-30%) and devote approximately the same amount of effort to organizational, social work (10-20% of the time).

Within the framework of this contract, it is possible to include a list of requirements to be more engaged in teaching work and carry out relevant activities (first of all, to create educational and methodological materials, supervise diploma theses, supervise master's theses, prepare students for participation in Russian and foreign competitions of scientific works) ...

- contract of a teacher - "researcher": the emphasis is on research activities (60% -70% of the time), teaching is a smaller share of the total teacher workload (10-30% of the time), organizational, social work will be up to 10-20% of the time teacher at the university.

The teacher - "researcher" is less occupied with educational activities, but must prepare graduate students for defense, publish, for example, at least two articles in a journal peer-reviewed in WOS, SCOPUS and two articles indexed in the Russian Science Citation Base (RSCI) at two years old. As a teaching activity, a "researcher" teacher can have permanent courses, as well as master classes or individual lectures, depending on the employment in projects. A mandatory condition of the contract must be participation in competitions for internal and external grants for the implementation of scientific projects. And actually obligatory participation in a scientific fundamental or applied project.

Thus, each university, if necessary, has the opportunity to transfer its relations with employees to a contractual basis, forming the requirements for an employee when applying for a position and in the context of certification.

An employee can choose a university whose principles of formation of the variable part of salary in the form of possible grants in general or in an individual proposal are the most interesting.

Alaverdov considers new strategic approaches to stimulating scientific and pedagogical workers (Alaverdov 2019). Within the framework of property incentives, it is proposed to expand the list of factors affecting the amount of additional payments to scientific and pedagogical workers. The author identifies a number of conditions for the fulfillment of which scientific and pedagogical workers should be paid extra 10-25% of the base salary. Achievement of the citation index of the corresponding position, as well as for the creation and teaching of author's courses, it is proposed to pay extra up to 25%. Scientific and pedagogical workers teaching disciplines in a foreign language can receive an additional payment of 20%. If the scientific and pedagogical worker is a practicing specialist in the relevant field, then a

supplement of 15% is offered. Finally, a 10% surcharge is offered for the management of a student association and for the use of innovative educational technologies.

In addition, two groups of awards are offered. The first group is based on a competitive approach (for winning the competition "Best teacher of the year," "Young scientist of the year," "Author of the best teaching aid," etc.). The second group is based on the compensation approach, i.e., payment for quality work done, for example, the Award for the implementation of a scientific and technological project, the Award for the development of a course necessary for the international educational process, etc.

Within the framework of non-property incentives, it is proposed to implement two approaches: the first is to increase the efficiency of teachers by improving their qualifications (paid internships in the best foreign universities, medium-term retraining programs with obtaining a corresponding certificate and short-term training programs for the best specialists in the industry), the second is holding annual competitions.

Within the framework of the selected approaches, incentives are carried out on the basis of the results obtained and do not take into account the existing competencies of employees and do not take into account the age composition of the teaching staff. That can lead to a decrease in the activity of young teachers.

Thus, having considered the existing methods of stimulating the innovative activity of the teaching staff, several common features can be noted: the authors subdivide approaches to stimulation into material and non-material, which allows satisfying both the financial needs of scientific and pedagogical workers and psychological ones, which is important for employees. engaged in innovative activities, however, within the framework of the proposed methods, most of the incentives will be received by experienced teachers, at the same time, assistants and young teachers who do not have a sufficient level of competence will not be full participants in the developed system. In this regard, the question arises of the need to differentiate the scientific and pedagogical staff by age and professionalism, so that young specialists strive for self-education, improve their competencies and engage in innovative activities.

2. Materials and Methods

The aim of this research is to develop a conceptual model for stimulating the innovative activity of university employees, which takes into account the main factors that affect the effectiveness of innovative activities of scientific and pedagogical personnel. To achieve this aim it is necessary to solve a number of tasks:

- to identify the factors affecting the effectiveness of innovative activities of a university employee;
- to analyze the existing methods of factor management in order to stimulate scientific and pedagogical workers;
- to analyze promising ways to stimulate the work of scientific and pedagogical workers;
- to identify the features of the teacher's innovative activity;
- to develop a conceptual model for stimulating innovative activities of university employees.

To achieve the aim, general scientific research methods are applied that are focused on solving a set of scientific problems, such as analysis and synthesis, comparison, strategic analysis methods, systematic approach, structural-functional research method, as well as statistical data processing methods.

3. Results

The main difference between the teacher's innovative activity and the traditional one is the creation of appropriate conditions for the comprehensive development of the student's personality potential from all sides, so that he is ready for any, even unforeseen future and is able to adapt to new situations, while the scientific and pedagogical staff can also be engaged in innovations. not related to teaching activities. Innovation activity is a set of practical actions for updating products or services, organizing innovative training, innovative research and development, including the rationale for the creation and development of innovations (B. Lyamin, Shepeleva, and Krasyuk 2019; Bozhuk and Pletneva 2018; Bozhuk et al. 2019).

To assess the innovative activity of a university teacher include (E. A. Konnikov, Konnikova, Ivanov, et al. 2018; E. Konnikov, Konnikova, and Leventsov 2019; Nikolova, Rodionov, and Afanasyeva 2017; E. A. Konnikov, Konnikova, Negashev, et al. 2018; Evgenii A. Konnikov et al. 2018):

- relevance (compliance of innovation with the socio-cultural situation of the development of society);
- novelty (the degree of originality of innovative approaches, a kind of combination, a combination of the well-known, representing in the aggregate novelty);
- educational significance (the degree of influence of innovation on the development, upbringing and education of the individual);
- social significance (the impact of innovation on the development of the education system as a whole);
- utility (practical importance of innovation processes);
- feasibility (realism of innovation and controllability of innovation processes).

Thus, the innovative activity of the teaching staff is a complex intellectual activity, the effectiveness of which is influenced by many factors, both external (availability of a material and technical base, material incentives, research atmosphere in the team, etc.) and internal (desire engage in innovative activities, the presence of the necessary competencies, the ability to continuous self-education and self-improvement, etc.). In this regard, the stimulation of scientific and pedagogical workers should take into account the factors that influence the innovative activity of teachers. Accordingly, it is necessary to use incentive tools that fully meet the needs of staff with the least cost of resources, provided that the tasks are completed.

To solve this problem, a conceptual model was developed to stimulate the innovative activity of university teachers (Figure 1).

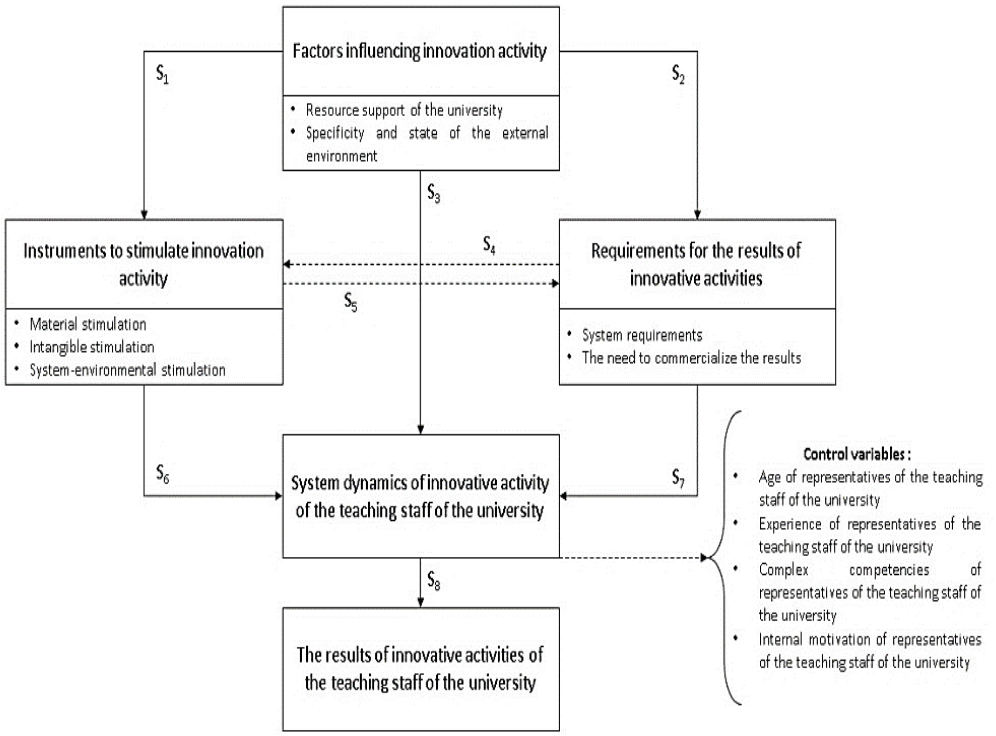

Figure 1. Conceptual model of stimulating innovative activity of university teachers.

To effectively stimulate the innovative activity of the teaching staff of the university, it is necessary to take into account the components, the correct interaction of which leads to obtaining the planned results of innovative activity. Let's highlight four main components.

"Factors influencing innovation activity" - will be the first component of the conceptual model for stimulating the innovation activity of university teachers. The factors relate to the environment surrounding the scientific and pedagogical worker. Thus, the specificity and state of the external environment will influence the systemic dynamics of the innovative activity of the teaching staff. The external environment can be attributed to the innovation potential of the region, operating large industrial enterprises that are consumers of the results of innovative activities, the economic state of the region, etc. Along with the external environment, the resource provision of the university will influence the dynamics of innovative activities of the teaching staff.

On the basis of the selected factors, "tools for stimulating innovation" are formed, which, due to the specifics of innovation, will have a number of features. Incentive instruments can be conditionally divided into material, intangible and systemic environmental incentives. Tangible instruments include the level of financial support for employees, the possibility of receiving additional payments for fulfilling certain requirements; intangible instruments include administrative impact on an employee, for example, reducing the workload, the possibility of career growth, advanced training, etc. System-environmental stimulation can be understood as the existing system of support for innovative ideas in the team and the academic culture within the team. So, if an atmosphere of mutual assistance and innovative activity reigns in the team,

then the effectiveness of the innovative activities of the teaching staff will be at a higher level than in teams where individualism is preferred.

Innovative developments that will be generated by employees taking into account the factors influencing them must meet "the requirements for the results of innovative activities". The requirements are based on system requirements, which are formed taking into account existing domestic and international rankings, in which the university wants to improve its performance and on the need to commercialize the results of innovative activities, which indicates the demand for the results obtained in the real sector of the economy.

The fourth component of the model will be the "system dynamics of the innovative activity of the teacher staff of university" which will depend on the following factors:

- age of representatives of the teaching staff of the university;
- experience of representatives of the teaching staff of the university;
- complex competences of representatives of the teaching staff of the university;
- internal motivation of representatives of the teaching staff of the university.

Thus, the systemic dynamics of the innovative activity of the teaching staff will depend on the factors influencing the innovation activity, the tools for stimulating innovation activity, the requirements for the results of innovation activity, as well as the internal factors of the representatives of the teaching staff themselves. As a result, we get the planned innovative developments.

Next, we will dwell in more detail on the identified links between the components of the model (S1-S8) and characterize the operation of the conceptual model.

To begin with, we determine the available resources of the university and identify the specifics and state of the external environment of the university. Based on the data obtained, we can identify the influence of factors on "incentive tools" (S1) and "requirements for the results of innovation (S2)." Incentive instruments are formed only after determining the available resources of the university, which can be directed to innovation and the state of the external environment as a whole. Accordingly, the selected factors will directly affect the formation of tools to stimulate innovation, since if the allocated university resources are insufficient, the list of tools will be significantly reduced, and vice versa.

Requirements for the results of innovation activity can also be set after determining the factors influencing innovation activity (S2). The fact is that system requirements are formed based on the availability of the necessary resources for their achievement, respectively, in the absence of the necessary resources, the requirements for the results of innovative activities will be completely different than in the presence of resources. The commercialization of the results of innovation activities will depend on market conditions. If the real sector of the economy cannot afford to introduce innovative developments, due to the lack of working capital and government support, then this will directly affect the potential for commercializing the results of innovative activities of the teaching staff.

Also, the resource provision of the university will directly affect the dynamics of innovative activities of the teaching staff (S3). If the university has a high-tech material and technical base, then the teaching staff will have the opportunity to create world-class innovative developments.

At the same time, "tools for stimulating innovation" and "requirements for the results of innovation" will influence each other (S4 and S5). The use of certain incentive instruments will be influenced by the requirements for results, since specific incentive instruments will be used for specific requirements for results. Accordingly, the requirements will also depend on the effectiveness of the use of tools to stimulate innovation.

Formed tools to stimulate innovation and the identified requirements for the results of innovation will affect the systemic dynamics of innovation activities of the teaching staff of a higher educational institution (S6 and S7). With the use of effective incentive tools that correctly combine material, non-material and systemic-environmental incentives, it is possible to achieve positive dynamics of the innovative activity of the teaching staff, the guidelines for this will be the identified requirements for the results. Accordingly, on the one hand, all the conditions for comfortable innovation are created for employees, on the other hand, they require results of activities that will have a high potential for commercialization.

Finally, the system dynamics of innovation is converted into the results of innovation activities of teacher staff of university(S8). The results of innovative activity will depend on how effectively the innovative activity of teachers will be built.

4. Discussion

In accordance with the developed conceptual model of stimulating the innovative activity of the teaching staff of the university, it can be noted that the effectiveness of the innovative activity of employees will depend on four components: factors that influence innovation, tools to stimulate innovation, requirements for the results of innovation, system dynamics of innovation activities (Alpeeva and Timohina 2018; et al. 2019; Nissen and Knudsen 2020; Sitnikova, Halo, and Polusmakova 2018; Razak and Murray 2017; Nikolova, Rodionov, and Afanasyeva 2017). This conceptual model can be a good basis for creating a universal methodology for stimulating innovation among university employees (Barykin, Bochkarev, Dobronravin, et al. 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al. 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al. 2021). The methodology involves stimulating the teacher based on the tasks set, factors affecting teachers and their internal qualities, combining material, non-material and administrative groups of incentives.

Conclusion

Researchers conducting scientific research in Russia and international rankings believe that the stimulation of innovation in Russian and international rankings. non-financial incentives for the teaching staff.

The analysis of methods of managing factors of stimulating innovative activity of scientific and pedagogical personnel was carried out. In the course of the study, it was found that it is necessary to use motivation tools that most fully satisfy the needs of personnel with the least cost of resources to solve the assigned tasks. The features of stimulating innovative activity are revealed. To solve this problem, a conceptual model for stimulating the innovative activity of

university staff was developed. As a result of using the developed conceptual model for stimulating innovation, it can be noted that the effectiveness of innovative activities of employees will depend on four components: factors influencing innovation, tools for stimulating innovation, requirements for innovation results, system dynamics of innovation. Based on the proposed conceptual model, it is possible to develop a methodology for stimulating the innovative activity of scientific and pedagogical workers.

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Chapter 18

The Digital Transformation of Organizational Communications: The Role of Support Functions in the New Economy

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Abstract

The exponential growth of innovations in all areas of human activity and especially communications leads to more complex tracking, analysis, and qualitative application of innovations with maximum results for specific areas within the business world. The ability to adapt to an ever-changing reality is critical in the communications industry but also in inter and intra-organizational communications. This is particularly true for internal corporate work and communication with staff, who need to be adjusted to adapt to the challenges of the external environment that organizations regularly face. The unpredictable situation with the COVID-19 epidemic has spurred change, forcing even the most conservative businessmen to resort to advanced technologies.

This chapter analyses the transformation of the structure and nature of business processes in enterprises that have occurred recently under the influence of digitalization, with the focus primarily on the nature of changes in communication with internal audiences. Particular attention is paid to how these changes have affected companies and how companies are trying to cope with these challenges. The survey and content analysis conducted in the course of the research allowed the authors to conclude what changes have occurred in internal communications under the influence of new challenges.

Keywords: intra-organizational communications, internal communications, business processes, crisis, digitalization, digital transformation

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1. Introduction

Today, society in general and business in particular are faced with the obvious need to review the existing and already familiar approaches to the process of communication. New challenges, both expected and forecasted (e.g., the implementation of digitalization in all spheres of life, the development of artificial intelligence and the Internet of Things) (Davenport et al. 2020; Huang and Rust 2018; 2017; 2013), as well as completely unexpected, but no less powerful (COVID-19 pandemic) are forcing society to look for new ways to solve emerging problems. In this context, organizations are faced with a communications and social crisis, in which the existing means and tools of achieving relations goals become inadequate, resulting in unpredictable situations and ineffective outcomes.

All the above-mentioned refers not only to external, but also inter and intra-organizational communications. Moreover, now properly constructed internal communications become not only a competitive advantage for this or that company but also a guarantee of its survival in the rapidly changing business environment.

Internal communications are an essential element of the human resource management system, as they ensure information exchange between employees and management. The task of management is to increase employee engagement. The employees involved want their organization to succeed because they feel that they are connected emotionally, socially, and even spiritually, sharing their mission and goals (Akhmetshin et al. 2019). In crisis situations, establishing such interrelationships becomes far more difficult, but also far more important, than in times of stability.

The digitalization undoubtedly imposes its misprints on the whole process of personnel management. Many scientists insist that now instead of using the acronym HRM, we should use e-HRM, while talking about digital human resource management, not just human resource management (Amladi 2017; Martini, Cavenago, and Marafioti 2020; Thite 2018). Vardarliernotes the main reason that in today's enterprises the traditional methods used for the management of business processes are no longer sufficient, is their complication, which makes it impossible to manage these processes without using modern technologies (Vardarlier 2020).

In contrast to the processes of digitalization, whose impact on the change of the management system has been studied for at least 20 years, the problems associated with the COVID-19 pandemic are relatively recent. However, several scientific studies have already paid sufficient attention to the impact that the pandemic may have on various areas of activity. In this context, the business sphere is one of the most important areas in this context (Alon, Farrell, and Li 2020; He and Harris 2020; Donthu and Gustafsson 2020; Ratten 2020). Under these circumstances, the objectives of this paper are twofold. First, we want to identify reactive and proactive changes in inter and intra-organizational communication patterns during crisis times and in the technologies used for these purposes. Second, we want to provide a technology framework and recommendations for business organizations that can be used in crisis communication for value co-creation purposes inside the organizational ecosystem.

2. The Organizational Ecosystem in Crisis

2.1. Impact of Digitalization on Business Processes

Digital transformation is a driving mechanism and a powerful leverage opportunity for deep transformations of organization business models with the help of breakthrough technologies that increase the efficiency and productivity of the company and allow to create fundamentally new value chains (Aleksandrov, Fedorova, and Parshukov 2020). The new role and place of man in reality, where the boundaries between the physical, digital and biological worlds are becoming less and less clear, began to be actively discussed since the concept of "digital economy, which was proposed by Negraponte in 1995, entered into scientific vocabulary (Negroponte 1995). This discussion became much more active with the introduction of the concept Industry 4.0, which was first proposed by the German Federal Government for an industry development strategic plan. The well-known promoter of this term was Klaus Schwab, the founder and chairman of the World Economic Forum in Davos. He pointed out that The Fourth Industrial Revolution would lead to a radical overhaul that would affect all industries, business models would be inevitably transformed, moreover, both the way we work and the way we communicate with each other would be changed (Schwab n.d.). The issues of changes in the management system as a whole within the framework of Industry 4.0, and in particular, the relationship with the personnel at enterprises, transformation of corporate culture are mentioned in several works (Hecklau et al. 2016; Mohelska and Sokolova 2018; Hauer, Harte, and Kacemi 2018; Flores, Xu, and Lu 2020).

The introduction of digital technologies (digitalization) in the business model of companies began in the 1960s when IBM announced System/360, the first family of computers designed to improve efficiency, as well as helps companies become faster and more competitive. However, digital transformation is not just the digitization of business processes, such as the introduction of production planning (ERP) systems, document management (ECM), customer relationship management system (CRM), and the introduction of modern technology, such as artificial intelligence, machine learning, and technology-to-technology communication (Yadav and Pavlou 2020; Huang and Rust 2018; 2017; Davenport et al. 2020) in all business processes without exception. In other words, it should not be only about and not so much about the installation of modern equipment or software, but also about fundamental changes in management approaches, corporate culture, communications. To achieve the goal of digital transformation, it is not enough to digitize one business process. In other words, digital transformation is a comprehensive approach to the use of information technologies in all business processes of the company, directly related to production, but also in interaction with the world around them, with all stakeholder groups. In most cases, the company needs to change processes, including those of its partners, for digital transformation.

Digital transformation is definitely a process that companies around the world use to improve their current business processes. Several works (Schwarzmüller et al. 2018; Cascio and Montealegre 2016; Shamim et al. 2016; Kidschun et al. 2020) are dedicated to different problems faced by companies that have embarked on the path of digital transformation and ways to solve them. Because the benefits of introducing new technologies to optimize business operations in most enterprises are obvious, digital transformation has become a top priority for most of them. Taking into account that digital transformation is a process of introduction and

use of digital technologies for the creation of new or optimization of existing business processes, corporate culture, the experience of clients or employees, one of the main directions of digitalization can be singled out as cultural and organizational transformation, the purpose of which is to restructure organizational thinking, processes of people management in the digital world.

Unfortunately, many enterprises, following the fashion of introducing new technologies, insist on digital transformation before they are ready for it. The issues of readiness of enterprises for digital transformation and ways of its implementation are analyzed in (Machado et al. 2019; Paulk et al. 2011; "Using Process Frameworks and Reference Models to Get Real Work Done (Best Practices Report) | APQC" n.d.). The Global Centre for Digital Business Transformation, an initiative of IMD and Cisco, has surveyed 1,200 respondents who are business leaders in 58 countries in 14 industries to understand attitudes towards digitalization. About 63% of respondents are company directors, and half of all respondents work in the B2B sector. According to the survey, the vast majority of respondents (almost 90% in the world and 83% in Russia) assess the impact of digitalization as strong and transforming. 64% of top managers believe that the process of digital transformation of business is necessary and inevitable, while only 35% in Russia support this initiative. Even though the digitalization of companies has increased from 54% in 2017 to 75% in 2019, most respondents admit that the use of digital strategies by businesses is fragmented: only 22% of CEOs say they have a coordinated digital strategy (Yokoi et al. 2019). Digital transformation must be in line with the real need of the business, its ability to use new solutions, and the teams that manage it.

2.2. Digital Transformation of Internal Communications

The way people communicate with each other has probably changed more in the last decade than in our entire history as a species. These changes are related to a transformation in thinking. While up until the mid-20th century an important element of communication activity was the quantitative evaluation of human intelligence (IQ), by the 1990s the focus of interest shifted to emotional intelligence and the ability of a person to be aware of his or her emotions and to be empathetic to other people (EQ). Convergent processes affecting communication have led to an understanding of the need to work effectively under the new digital reality, and thus freely use the virtual world, social networks, and other digital tools. This means using new formats for communication interaction and actively using new technologies.

In this regard, we can talk about the emergence of a new way of thinking and a new type of communication activity, which is based on such a concept as Digital Intellect (DQ), i.e., the ability to build network communication beyond all kinds of boundaries (age, cultural, geographical). If before the key skills were implemented in the form of receiving and processing information, now it is necessary to understand the information flows, identify the necessary, and assess the adequacy of the source.

Paradoxical as it may sound, the Industry 4.0 will require many communication skills, no application, no digital platform can handle the emotional side of human relations in the foreseeable future. Despite all the industrial revolutions, the emergence of the latest information technologies and telecommunications, communication skills still remain at the forefront of hiring even high-tech companies. Scientists from Harvard, Stanford, and the Carnegie Endowment have found that soft skills—sub-professional skills that help solve life's problems

and work with others—account for 85% of a person's success in the profession, the hard ones are only 15%. In 2013, Google decided to test its hiring hypothesis by crunching every bit and byte of hiring, firing, and promotion data accumulated since the company's incorporation in 1998. Project Oxygen shocked everyone by concluding that, among the eight most important qualities of Google's top employees, STEM expertise comes in dead last. The seven top characteristics of success at Google are all soft skills: being a good coach; communicating and listening well; possessing insights into others (including others different values and points of view); having empathy toward and being supportive of one's colleagues; being an excellent critical thinker and problem solver, and being able to make connections across complex ideas (Davidson 2017).

More and more digital media and channels of communication are emerging, but people still want trust, openness, and empathy when communicating within a team. While the Corporate Communications Department's activities are focused on the external environment: public relations and social media monitoring, one should not forget to develop and implement a communication plan for one of the organization's most influential audiences, employees. The internal communications departments play an essential role in engaging employees in the digital transformation process. At its core, internal communication refers to the way people in the organization exchange information with each other.

Enterprises must find effective ways to communicate about unanticipated events, especially those caused by various crises so that employees can understand what the new strategy is and adjust their work accordingly. After all, employees are the people who will help the company get out of difficult situations. The following works by A. Mazzei, S. Ravazzani, D. J. Valik, J. Lies, A. Colbert, N. Yee, G. George, M. Welch, P. Jackson are dedicated to transformations of internal communication processes caused not only by the crisis but also by any other changes, such as digitalization (Mazzei and Ravazzani 2011; Lies 2012; Colbert, Yee, and George 2016; Welch and Jackson 2007; "Innovation of Communication and Information Technologies | Packt Hub" n.d.).

Efficient and straightforward digital solutions are now available to facilitate corporate communications. Building internal communications systems using new technologies will play a key role in helping businesses respond to emerging external challenges. Modern technologies have facilitated the technical component of the communication process: company chat software, e.g., Microsoft Teams, Google Hangouts; cloud technology, e.g., Google Drive; various platforms for the integration of email, calendars, and various documents, e.g., Google, Apple, Microsoft; various tools for a decentralized communication system, creating a virtual workspace, e.g., MiroDesk, Trello.

However, any technology, even the most advanced one, has a downside. There are now a number of studies that acknowledge the problem that the emergence of new communication tools is not changing the schedule of employees for the better: it has become 24/7, there are new difficulties in finding a balance between work and family (Butts, Becker, and Boswell 2015; Boswell and Olson-Buchanan 2007; Diaz et al. 2012). At the same time, a drop in productivity, which everyone feared, practically has not happened. Some employers were surprised to find that their teams could still be as effective as they were offline when working remotely (Gontarev n.d.).

The world's leading corporations recognize that digital transformation requires flexible working methods, changes in business systems as a whole so that the enterprise effectively

responds to external challenges, it is about involving not half or even 80% of employees in the process of transformation, but all employees without exception.

Among the main recommendations for transforming internal communications that contribute to success are the following:

1. Instead of printing posters, many companies are switching to digital format: installing televisions in offices and using them to transmit a repetitive set of visual messages.
2. To avoid an information overload of employees when sending out internal correspondence, the information should be brief and straightforward.
3. It is vital to establish feedback channels within the company to exchange information about new ideas, products, or potential products, opportunities to improve customer service or relationships within the company as a whole. This can be a company forum on the Intranet, a board in the office, or a cloud service. The internal communications system should make it easier for any employee to contact another employee in the company, including senior management, which will not only build an open and honest relationship between employees but also eliminate gaps in communication.
4. If one of the goals of internal communication is to make employees learn from each other, then communication between different departments is critical. It prevents departments from feeling isolated from each other.
5. Most companies prohibit the use of social media in the workplace. Instead of spending resources on monitoring the implementation of resources, it can allow employees to share photos of their work and fun in the office on Facebook, Twitter, Instagram. This will increase employee engagement and morale and help clarify who employees are and what they do.

3. Methodology

In order to identify the changes that have occurred in connection with the pandemic and accelerate the digitalization of internal communications, we have conducted a survey of business leaders at various levels. The survey was attended by representatives of 27 organizations of different spheres of activity (6 enterprises of large business, ten medium business enterprises, and 11 small business enterprises). The survey was attended by 150 respondents who were representatives of top management and management positions (30 representatives of large companies, 50 representatives of the top management of medium businesses, and 60 representatives of small businesses). The questionnaire included 15 questions that allow to reveal the presence and specificity of internal communications in the companies under research, as well as to learn the opinion of the companies' representatives about the changes that take place in the companies in the conditions of external environmental challenges and how it affects communications with employees and the companies' activities in general.

First of all, the data on employees' involvement in companies' activities were analyzed, i.e., the very fact of internal communications in companies before and during the COVID-19 pandemic was considered. Respondents'answersshowed minor changes in the structure of internal communications. This is due, on the one hand, to already implemented communication components. (31%, i.e., one-third of the surveyed companies, actively use virtual

communications). Some respondents noted that some structures in enterprises are not ready for the virtualization of communication. Thus, 30% of respondents explained the position of the unwillingness of the company to move to virtual space because many issues are more convenient to solve in the framework of interpersonal or intergroup interaction due to the specifics of the industry. Such answers were most often given by representatives of small and medium businesses in the retail and services sector. The survey showed that of all types of communications managers spend most of their time on verbal communication. In addition, respondents noted the existence of communication barriers to gadget-mediated communication. This is about 23% of the respondents.

The survey showed that email and telephone calls were more commonly used before the pandemic, and other channels of communication were more active in the pandemic. For example, in remote or partially remote settings, email (31%) and messenger communications (WhatsApp 20%, Viber 5%, Skype 7%) were equally used by companies (see Figure 1). Also, new communication platforms, such as Zoom, are being introduced, but only in 3 companies among the surveyed companies.

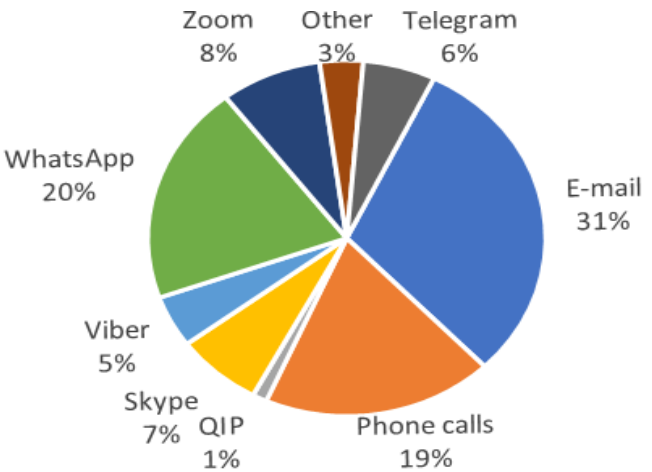

Figure 1. Use of digital communication platforms by companies.

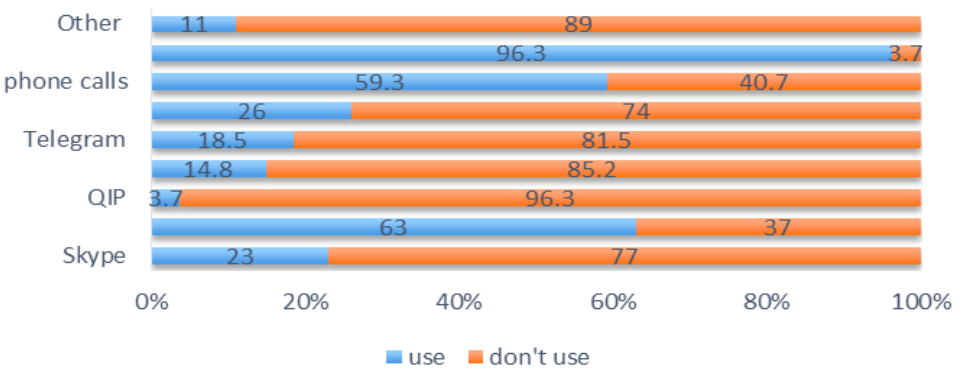

Figure 2. Survey results on the use of communication platforms (%).

The survey showed that information flows have moved to social networks, but communication principles have not changed. Email is still the main channel of interaction. In addition, the importance of communication in messengers has increased. However, sites that were not used by companies at all before the COVID-19 pandemic, such as zoom, telegram, have become more active (Figure 2).

One of the most vulnerable areas was retail. Many companies were simply not ready for the transition to digital space and losing customers, which affected the mood of employees. In order to detect the transformation of retailers' communications during regular times and the pandemic, monitoring of media publications was conducted on the platform "Medialogy" (https://www.mlg.ru). The analysis of publishing activity showed that external communications are fading and moving to social networks.

Monitoring of publications about retail companies (H&M, Uniqlo, Bershka, Sela, Ikea, Leroy Merlin, L'Etoile, Lush Russia, OBI, Gloria Jeans) in the Russian media showed that the number of publications declined significantly during the pandemic compared to earlier periods (Figure 3.). This includes mere company references (neutral publications), image articles and publications (positive publications), and publications related to problems in companies. In other words, the change in the news agenda and the focus on the COVID-19 pandemic has led to a reduction in the number of publications directly about company activities. The situation is similar in other areas related to direct interaction with people in all cases but education.

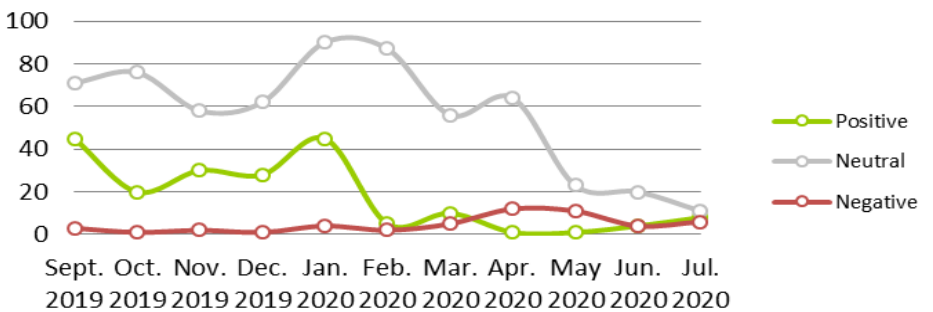

Figure 3. Tone of publications for the period September 2019-July 2020, % of publications.

To further study the transformation of internal communications, we conducted a comparative analysis of the number of publications in social networks for March-July 2020 and the same period a year earlier. We analyzed the communication platforms of popular brands in Russia, such as H&M, Uniqlo, Bershka, Sela, Ikea, Leroy Merlin, L'Etoile, Lush Russia, OBI, Gloria Jeans. We evaluated the communication asset of the platforms of these companies and identified the following trend (Figure 4).

Brands that prior to the pandemic operated only offline or used only official websites began to increase their communications on social networks and corporate portals. The structure of communications has also changed, resources and communication platforms aimed at collecting data on the work of companies from employees have been intensified. Content analysis of feedback showed high activity and a negative tone of messages. The frequency of the appearance of certain words and word combinations is presented in the semantic word cloud (Figure 5).

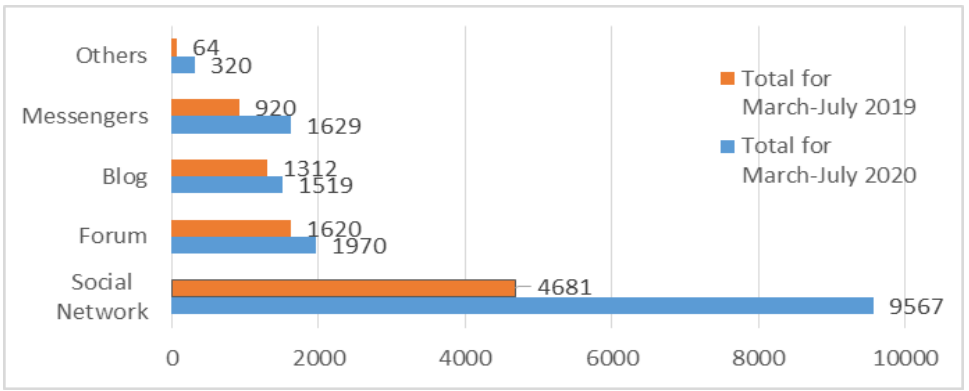

Figure 4. Analysis of activity on communication platforms of the largest retailers.

Figure 5. Visualization of the private analysis of the texts of employee feedback on the work of companies.

For the co-creation of a semantic word cloud, words to reveal the specificity of texts, their connotations, and emotional structure were analyzed in Russian and presented in the translation version for a better understanding of the situation. The analysis was conducted on the words cloud platform (https://wordscloud.pythonanywhere.com). For the analysis, 320 texts of reviews were used on the following platforms: Glassdoor (https://www.glassdoor.com), Prosotrudnika.ru, About Labor (https://otrude.net, https://pravda-sotrudnikov.ru), Employee Opinion (http://mnenie-sotrudnikov.ru), Employee Truth (https://pravda-sotrudnikov.ru), ReTWORK (https://retwork.com).

Thus, content analysis and frequency analysis of employer and company feedback have shown that, naturally, there is a strong presence of the pandemic theme. However, there has been a greater mention of human and team relationships, which have been exacerbated by the difficult economic situation around the world.

4. Discussion

The advantages of digital transformation are the implementation of activities aimed at understanding employees/client/customer based on social knowledge using cross-channel coherence and the implementation of predictive marketing. These trends lead to higher productivity of the company, where the priority is the involvement of employees, including through accelerated communications, operational transparency, which is based on digital globalization and digital integration. These trends have been described in detail not only in the works of the above-mentioned authors but also in those of Russian scientists (Voronova 2020; Rodionov and Rudskaia 2018).

Practice shows that medium and small businesses are quicker to digitize, because it is harder for them to stay afloat, and digitalization for them is also a challenge that they have to cope with and very actively. Large companies are in a better position because they have the financial resources, but they are sometimes not fully aware of their essential leadership role in implementing innovative solutions based on digital technologies. For instance, this problem has been shown widely on the example of enterprises in such industries as transportation and hospitality (hotel and restaurant business) (Verevka 2019; Torosyan et al. 2020).

The transformation of communication technologies and systems enables new ways of building social engagement, forms of interaction, management processes, and self-organization. The advent of the network, multi-sensor, unified, unified communications enables the formation of new experiences of human communication in companies, which is partially reflected in the following works by (Valebnikova, Valebnikova, and Kalinina 2019; Kniewska-Seba and Rogala 2013). However, the issue of the future of communication technologies transformation remains open and requires further research. Moreover, in the current conditions of the ongoing COVID-19 pandemic, we will all be not just observers, but also active participants in this process.

Conclusion

Digitalization and new knowledge are transforming all areas of activity, changing both communications and business processes. It should be understood that digitalization is not just the transition of communications and processes into virtual space. Digital transformation requires a review of all the principles of the company and a fundamental change in the infrastructure.

Under conditions of total informatization, there are transformations that change the structure and essence of social and business processes. In particular, the communication sphere is changing and replacing interpersonal, intergroup communication first comes the mediated communication, where the role of the person does not change, but the channels of communication are changing, which eventually can lead to the abolition of the role of the person in the communication process. Companies should aim at increasing the digital intelligence of their employees and intensify intra-company communication. That is why it is necessary not only to digitize communication channels but also to optimize and adapt them for business purposes.

Despite the active digitization of business, the problem of ineffective working communications is quite typical. Numerous messengers (Skype, WhatsApp, QIP, Viber, Telegram, ICQ, etc.), groups in chats, social networks, email, sms, calls, and personal communication have certainly become active, but information messages for a variety of reasons and business tasks are a continuous flow. Furthermore, the higher the status of the employee, the more numerous the messages are, the more diverse the communication channels, and the higher the value of getting clear and timely information for decision-making are. The situation is similar to ordinary employees, but only in smaller amounts.

Changes in the nature of communications and channels have been accelerated many times by the COVID-19 pandemic. The situation in which companies need to implement remote modes of operation has shown how helpless the panic coming from the outside world has been for companies that have not worked on their internal communications and have not implemented digital communications. They were forced to respond to circumstances that did not directly affect their business and work on the demotivating factors of the external environment challenges. In this situation, companies use so-called "patching" solutions, methods of "small optimization" and are not ready for new problems and, if the overall stability of their business allows them to stay in the game, they will be in a position of dependence on industry leaders who managed to move to the use of digital reality in time. Thus, social-economic uncertainty and communication barriers are the main constraints to digital transformation in the economy and society.

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Chapter 19

Communication Management in the Digital Educational Space

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Abstract

Communication management plays an important role in working life, especially with dispersed teams. In this paper, we considered the communication management practices used at Peter the Great St. Petersburg Polytechnic University within the pandemic period and the urgent transition to online working. The main aim of our research was to evaluate the effectiveness of these practices. Thus, we conducted two online surveys for the university staff, particularly professors who teach on the humanitarian educational programs. The first survey was at the beginning of the transition and the second after four months of adapting and implementing communication management practices. For the analysis descriptive statistics and pair-samples Students' t-test were used. The analysis of the surveys' results indicated a positive trend in employees' attitudes toward changes and online working and communicating. Therefore, it confirms the influence of communication management practices on employees' level of adaptability to changing conditions and affirms its importance for the organization's stability and competitiveness.

Keywords: communication management, real-time communication, digital educational space,·online communication

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1. Introduction

Due to the situation with COVID-19 almost all universities around the world were transferred to distance learning in March 2020, including Peter the Great St. Petersburg Polytechnic University (SPbPU). Before only 4% of all university's courses were online, 14% were partly online and 82% were in the face-to-face format, so urgent changes had to be done. Moreover, the habitual way of communication between professors and administration personnel was face-to-face. In this regard to maintain the efficiency of labor activity, different platforms were used for communication.

There is evidence that poor communication within the team leads to problems with project success, wasted time or budget, and general dissatisfaction with the end results and collaboration (Radujković and Sjekavica 2017; Baranova et al., 2020; Bubshait, Siddiqui, and Al-Buali 2015). Communication management plays an important role in working life, especially with dispersed teams. Limited physical contact, poor real-time communication, and non-verbal communication contribute to misunderstandings, lack of mutual trust, and decreased motivation. The entire educational process was controlled in a virtual environment (Ismagilova et al., 2017; Mir and Pinnington 2014; Henderson, Stackman, and Lindekilde 2016; Reed and Knight 2010; Shrnhur, Levy, and Dvir 1997). This environment presents additional challenges to communication among employees and managers (Lückmann and Färber 2016; Mullins 2016). Non-verbal communication is limited, despite its importance (Lückmann and Färber 2016). Cultural differences (Modi, Abbott, and Counsell 2012), misinterpretation of information and reduced personal interactions (Duarte and Snyder 2006), and the use of technology (Turner and Müller 2004) can all affect trust-building. Trust is built through communication (Binder 2016) and is vital to the success of working in a virtual environment (Rusman et al., 2010; Anawati and Craig 2006; Henderson, Stackman, and Lindekilde 2016). People adapt to these different communication environments in their methods of both oral and written communication (Köster 2009). Consent seems to take precedence over the need to develop joint standards, rules, guidelines, or protocols for team communication (Großer and Baumöl 2017; Ziek and Anderson 2015; Muszyńska 2017; Reed and Knight 2010). However, it is not the very existence of such norms that contributes to success, but their maintenance and agreement among the members of the team (Henderson, Stackman, and Lindekilde 2016). Ziek and Anderson (Ziek and Anderson 2015) argue that the concept of communication, which is centered on the transfer of messages, has shortcomings, and proposes a different approach to the transfer of meaning and interpretation. This approach requires a mentor and constant feedback. This practice has been recognized as effective by other authors (Mikhieieva and Waidmann 2017; Swacha et al., 2018).

Technology is another key driver of communication in global virtual teams. Technological mediation can have both positive and negative effects (Duarte and Snyder 2006). Since there are many tools and modes available, the choice should depend on the specific task. While fully virtual teams work entirely with technology, others improve their work through direct interaction. Face-to-face interaction is considered to be the preferred mode of communication (Mikhieieva and Waidmann 2017; Swacha et al., 2018) supporting trust-building. This can be explained by his wealth as a means of communication. Communication tools can be distinguished by their diversity, with rich multimedia providing multiple prompts, immediate feedback, personalization, and a variety of (Den Hartog et al., 2013; Huang, Kahai, and Jestice 2010). Multimedia wealth theory argues that complex, ambiguous tasks require multimedia

tools to achieve a common understanding. In virtual teams, rich media support the development of collaboration. However, in practice, the tools used are not always the best for this type of communication. Email, although one of the main tools used in virtual teams (Grisham 2009), is often misused to solve problems that require synchronous and versatile communication to achieve a common understanding, influencing communication outcomes that could be better if more suitable means have been used (Niinimäki et al., 2010).

Higher education institutions were forced to move to the online environment (Fowler, Lindahl, and Sköld 2015). It can be assumed that universities, as creators and disseminators of the theory, carefully apply the theory of communication management in practice. Nevertheless, the methods and tools of successful communication are rather viewed by administrative personnel as a forced necessity (Daim et al., 2012). The specific environment of a higher education institution requires its own communication solutions, which can be quickly and remotely implemented and available to all university staff.

The aim of this paper is to analyze the communication management in the digital education space through the attitude of professors to new channels of communication and their academic efficiency.

2. Materials and Methods

In March 2020, due to the coronavirus pandemic, all work activities at Peter the Great St. Petersburg Polytechnic University were transferred to a remote format. This decision was made quickly due to the sharp deterioration of the epidemiological situation in Russia. Thus, the formation and regulation of the educational process also took place in a remote format. University staff was informed about the transition to the remote mode of work through the issued order.

Table 1. Selected communication management practices

Communication management practice category	**Communication management practice**
strategic (connected with communication planning and working environment)	S1 – clear lines and responsibilities S2 – high-quality communication planning
informational (regarding generation, collection, dissemination, storage, and disposition of information)	I1 – shared virtual space/project knowledge center (Moodle platform) I2 – instant messenger, e-mail, MS Teams – used on a daily basis I3 – traditional phone calls – used in urgent situations I4 – communication time schedule (for training and consulting webinars) I5 – using various communication channels (for better convergence)
emotional (concerning the building of trust and relationships)	E1 – regular face-to-face communication, with the use of audio- or video conferencing E2 –review meetings with the use of audio- or E3 – asking team members for advice, opinions, feedback

During the first days, the structure of work in a new format was being built. The professors connected with the management exclusively via e-mail and mobile communications. During the first days of the distance mode, a regulation was developed that defines and controls the form of communication both between students and professors and between professors and management. The Education Quality Assessment Unit was responsible for the effectiveness of communication management. The department employees regularly conducted training seminars and consultations for teachers. All seminars were conducted online through the platform Microsoft Teams. With the help of this platform, online meetings of the Higher Schools of the University were held, where the necessary relevant information was provided to teachers, recommendations, and answers to their questions were given. Also, all regulations, orders, and instructions were placed in the free access for teachers on the Moodle platform. All regulations and instructions, as well as up-to-date information, were duplicated by the teachers' mail. A hotline was created for feedback from teachers, where professors could contact with any question. Table 1 shows the implemented practices of communication management at SPbPU.

For our research we have chosen professors who teach on the humanitarian educational programs (linguistics, PR and advertising, law). We conducted two online surveys to evaluate their' attitude to online communication channels.

Firstly, we surveyed the professors in the beginning of total transition to the online learning and teaching. Professors passed the survey in their personal accounts on the online platform of the University. The participation was voluntary. The response rate for online survey was around 71,6% (79 professors finished the survey). Four months later professors were asked to undergo the same survey again. The response rate rose up to 79,3% (87 professors completed the survey). The survey included 20 questions on 5 categories – the convenience of platforms for communication, the efficiency of digital communication, the clearness of working tasks, the reliability of online communication, the constant support.

The paper is based on the following research questions:

1. How do professors feel about the implemented communication management model during a pandemic?
2. Is there a significant influence of university communication management on professors' attitude to the conditions of working during a pandemic?

3. Results

Since the survey on attitude to online communication was conducted two times – at the beginning of the total transition to the online learning and teaching and after 4 months of practicing, it gave us the possibility to evaluate the impact of university administration communication management that directly reflects the attitude of professors to the current conditions of working. The results (measured by 5 points Likert scale) are presented in Figure 1.

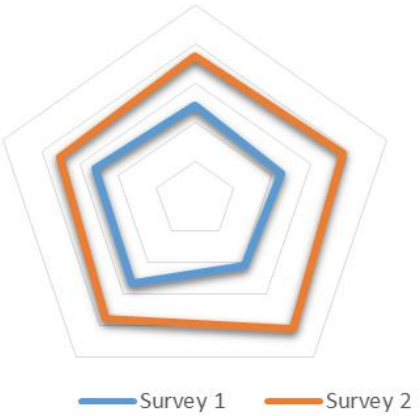

Figure 1. The results of first and second surveys.

Table 2. Selected communication management practices

Category	Survey	Results (average mean)	SD	t-value
the convenience of platforms for communication	Survey 1	3,7	0,71	4,89***
	Survey 2	2,43	0,67	
the efficiency of digital communication	Survey 1	3,85	0,83	5,3***
	Survey 2	2,23	0,68	
the clearness of working tasks	Survey 1	4,12	0,91	7,2***
	Survey 2	2,1	0,51	
the reliability of online communication	Survey 1	3,79	0,74	3,9***
	Survey 2	2,67	0,68	
the constant support	Survey 1	3,7	0,87	3,7***
	Survey 2	2,59	0,7	

Note: * p < 0,05; ** p < 0,01; ***p < 0,001.

Also, we conducted a Student's t-value test of the obtained results to reveal whether the difference between the first and second surveys is significant or not (Table 2).

According to the results, 5 categories of indicators increased significantly in 4 months of distant working. Thus, we can confirm that communication management of administration positively influenced the attitude of employees toward online working.

4. Discussion

Many scholars (Muszyńska 2017; Ziek and Anderson 2015; Mikhieieva and Waidmann 2017) have written about the potential challenges of using the digital environment in management. However, there are works (Okorokov, Timofeeva, and Kharlamova 2019; Ismagilova et al., 2017) indicating the modernization of technologies, allowing them to be applied to project management. In contrast to the researchers studied (Kudryavtseva, Skhvediani, and Bondarev 2018; Okorokov, Timofeeva, and Kharlamova 2019; Plotnikova and Kuratova 2019), in which the introduction of digital technologies into the management process occurs gradually, the

experience of St. Petersburg Polytechnic University is completely new. The novelty lies in the sharp transition to fully remote work. Thus, everyone learned to work in a digital environment already in a remote format. The transition to the remote mode took place in the shortest possible time and without a single possibility of face-to-face interaction.

Having analyzed all the statistics, we can assume that the appropriate communication management strategy positively influences the attitude of employees towards new changes in habitual way of working and help to maintain the same efficiency as it was before changes. Selected by the university communication management practices allowed to motivate scientific employees to adapt and accept new conditions instead of rejecting them. It also creates an opportunity for timely identification and resolution of communication problems and provides a higher level of feedback.

Thus, we can conclude that the construction of the online communication model, allows SPbPU high schools to achieve successful indicators in educational and scientific fields during the pandemic.

Conclusion

The study indicates the effectiveness of the university's communication management during the pandemic period when all working processes were transited to online tune. An analysis of the available researches showed that the effective communication helps in proper implementation of plans and policies of the management, makes possible the smooth and efficient working of an enterprise, increases managerial efficiency and creates mutual understanding and trust among the members of the organization.

In our research have analyzed the communication management practices at Peter the Great St. Petersburg Polytechnic University and conducted several online surveys among employees to determine their attitude toward online working and communicating. The considered indicators of employees' attitude showed that after four months of working online they successfully adapted and felt themselves comfortable within digital communication.

Thus, our study confirms that effective communication management plays a crucial role in the organization whether it is a commercial firm or an educational institute. Moreover, it is the only way to motivate and engage employees to adapt to changing conditions.

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Chapter 20

Managerial Human Capital in the Digital Economy: Definitions and Measurability for Innovative Enterprises

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Abstract

In the digital economy, every enterprise needs to manage financial capital and mostly non-financial forms of capital, e.g., human capital, structural capital, social capital, etc. All components of the non-financial capital should be managed on the base quantitative measurement to create and use a set of data about diverse aspects of the business. We consider data obtained from scientific publications and periodicals dedicated to the relatively new type of enterprise capital, managerial human capital. Modern scientific publications and periodicals do not represent operational definitions of these concepts and metrics for measuring these types of capital. All metrics offered by researchers are designed and suitable for top managers only and are not applied, e.g., for managers of innovation projects. We investigate the actual points of view concerning definitions and measurability of non-financial capital, in particular, the concept of managerial human capital, and propose to enlarge this concept from its use for not top managers only, but also for all employees of the company, who not only hold managerial position (permanently) but also carry out managerial roles (temporarily). We also propose the conceptual model and metrics for individual and corporate administrative, human capital using the competence approach. The proposed model and metrics are simply independent of financial indicators. They can be applied first of all to small and medium innovative enterprises or innovation domains of large enterprises.

Keywords: managerial human capital, human capital, managerial capital, concepts, measurability, metrics, HRM, SME, innovative enterprises

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1. Introduction

Every enterprise needs to manage financial capital and mostly non-financial forms of capital. In management science, these forms of capital are traditionally referred to as "intellectual capital" and in corporate finance theory - as "managerial capital." Different scientists highlight various components of non-financial capital, e.g., human capital, structural capital, social capital, etc. Like any enterprise resource, all components of non-financial capital should be managed.

According to the classic Peter Drucker quote: "you can't improve what you can't measure" (Baker and Drucker 1955). This means that any type of enterprise capital should be measurable to be managed; i.e., its value should be presented in a quantitative form. Only in this case can the objectives be set according to the SMART criteria (Doran T George 1981), and the degree of its achievement can be assessed. Measurements are becoming more and more critical in the digital economy to create and by modern information technologies to use a set of datum about diverse aspects of the business. Indeed, in the digital economy, based on actually unlimited capacities for processing information, data mining, etc., it becomes possible to measure indicators that were not previously measured and investigate their relationships with other indicators of enterprise activities. Thus, managers can enlarge their capabilities to manage those previously impossible capital types to manage. E.g., they can expand the key performance indicators used in enterprise performance management systems by using diverse indicators of non-financial capital.

In this paper, we consider the different points of view concerning definitions and measurability of non-financial capital, particularly the concept of managerial human capital. In recent research studies, though, there is a lack of metrics for this capital. Therefore, this study aimed to develop an operationalized model and metrics for innovative enterprises' individual and corporate managerial human capital.

2. Materials and Methods

We consider data obtained from scientific publications and periodicals dedicated to the definition of managerial capital and its measurement. In corporate finance theory, managerial capital is measured by financial metrics. E.g., A. A. Perfiliev and L. P. Bufetova point out in their review that economic theory is focused on cash flows and their assessment, primarily from investors' perspective. Human or managerial capital are represented in cash flows implicitly. To measure this capital, metrics of economic value added (EVA), return on assets (ROA), the standard deviation of return on assets (ROA), and other indicators based on the calculation of financial metrics can be used (Perfilyev and Bufetova 2017). A similar point of view is typical for practitioners; se,e for example (Vasyutin, n.d.). In the theory and practice of management, "managerial capital" is defined as the component of intellectual capital.

3. Results

3.1. Definitions of Managerial Capital

The scientific literature review highlighted that most researchers focus on the concept of "intellectual capital" and its components, such as human capital, structural capital, consumer capital (Stewart and Ruckdeschel 1998). In (Edvinsson 1997) L. Edvinsson represents a more detailed model of "intellectual capital," and notes that the key role of management is to transform human capital into structural capital, since human capital represents the competencies and abilities of the company's employees and, therefore, it cannot be owned, it can only be rented. At the same time, structural capital is an asset owned by the organization (shareholders) and can be used as leverage for financing corporate growth. It should be noted that "managerial capital" itself has not been considered an object of research in the cited and other papers.

The notion of managerial capital has no widely accepted definition. Several researchers consider the concept "managerial capital" in its relationship with various aspects of enterprise activity (Bruhn, Karlan, and Schoar 2018; Murphy and Zabojnik 2011; Bruhn and Zia 2013; Dinopoulos and Unel 2017). At the same time, all of the cited papers define "managerial capital" using metaphors. Thus, C. Syverson (Syverson 2011) compares managers with the "conductors of an input orchestra," that coordinates the application of labor, capital, and intermediate inputs. A. Demenet carries on with this analogy and proposes that "defining managerial capital then amounts to measuring the length of the conductor's baton; but it could also relate to the conductor's attitude and psychological traits." In his paper (Demenet 2016), A. Demenet defines managerial capital in a broad way as "all practices and traits of the enterprise operator that potentially influence the firms' efficiency."

Murphy and Zabojnik (Murphy and Zabojnik 2011) distinguish between general versus firm-specific managerial capital. General managerial capital is easily transferable across firms and even industries. Firm-specific managerial capital is reflected in capabilities valuable wholly or primarily within one firm, like information about its product markets, its suppliers, clients, and so forth.

Thus, the "general managerial capital" outlined by Murphy and Zabojnik is similar to "human capital" of Edvinsson's model, their "firm-specific managerial capital" – to Edvinsson's "structural capital."

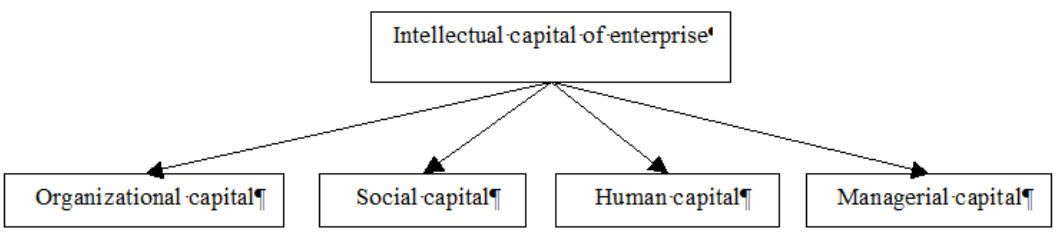

Figure 1. Intellectual capital components (Nikolaeva, Shubina, and Taydaev 2015).

In Russian scientific literature (In RussRussian), researchers identify a similar enterprise capital structure by highlighting financial capital and intellectual capital. In turn, intellectual capital is divided into human capital, relationship capital, and structural (organizational)

capital. Furthermore, Russian scientists Yu. Nikolaeva, E. Shubina, R. Taydayev distinguish managerial capital as a type of "intellectual capital that connects the individual components of "intellectual capital" (see Figure 1).

In this model:

1. Human capital, i.e., abilities, knowledge, skills of the company's personnel.
2. Social capital, i.e., flows of knowledge and information at the enterprise.
3. Organizational capital, i.e., institutionalized knowledge owned by the enterprise.
4. Managerial capital (combines all three aspects of intellectual capital mentioned above), i.e., a set of managerial abilities, knowledge, skills, and personal experience of managerial decisions that bring about future benefits.

3.2. Measurability of Managerial Capital

In the scientific literature on management, the issue of measuring non-financial capital at the enterprise is generally referred to as the intellectual capital evaluation. E.g., K. Sveiby suggested that measuring approaches for intellectual capital fall into at least four categories:

- Direct Intellectual Capital methods — DIC
- Market Capitalization Methods — MCM
- Return on Assets methods — ROA
- Scorecard Methods – SC (Sveiby 2010).

Concerning the measurability of separate components of intellectual capital most scientific papers are devoted to "human capital," e.g., (Kobzistaya 2018; Coleman 2009; Unger et al., 2011; Davidsson and Honig 2003). An interesting overview of methods for diagnostics and analysis of the management activity is given by V. I. Borsch, which includes 7 heuristic methods, 2 calculation methods, and 7 combined methods. All these methods are designed to measure not the "managerial capital," and for the evaluation of managerial personnel.

Although some recent studies are emphasizing the importance of managerial capital (Bruhn, Karlan, and Schoar 2010; Bloom and Reenen 2010; Bloom et al., 2013; Syverson 2011), methods of measuring managerial capital in the recent English-language literature, as well as in the Russian-language literature on management are practically not researched. In research studies is a lack of metrics, specified just for measuring the managerial capital. It means that research papers do not demonstrate any metrics to get a specific number that characterizes managerial capital for a particular enterprise.

In the context of measuring managerial capital, the most interesting is research, conducted by A. Demenet, that has been already mentioned above. It is provided with a multi-dimensional measure of MC, based on twelve variables. These are: the use of formal accounts, the use of advertisement means, the pricing method, wage determination mode, hiring mechanisms, the use of outside services, the location and type of suppliers, improvements attempts of products and services; innovation plans for the near future, and finally past innovation in terms of products or processes. A firm's managerial capital score is thus calculated by the weighted sum of these variables (Demenet 2016). The "Managerial capital score indicator" proposed by A.

Demenet can be used for the enterprise as a whole but not for categories of managers or individuals.

3.3. Digital Era and Managerial Human Capital Concept

Today, more and more scientists and practitioners are paying attention to diverse aspects of the digital economy (Vilken et al., 2019; Aleksandrov et al., 2019) incl. HRM in digital transformation of enterprises (S. Evseeva, Evseeva, and Kalinina 2020; Rasskazova et al., 2019a; O. Evseeva et al., 2019). In particular, researchers identified new types of enterprise capital - Information Technology Capital and Managerial Human Capital. E.g., Liu Yu and T. Ravichandran (Liu and Ravichandran 2007)) consider these types of capital in interrelation. Concerning the managerial capital concept, these authors refer to managerial human capital several characteristics of managers, that allow them to predict the strategic results of the enterprise: their abilities, knowledge, education, experience, age of managers.

Alongside this, more and more attention is being paid to the concept of managerial human capital in the context of dynamic managerial capabilities (Helfat and Peteraf 2015; Harris and Helfat 2016). E.g., Dawn Harris and Constance E. Helfat consider that dynamic managerial capabilities derive from managerial human capital, managerial social capital and managerial cognition (Harris and Helfat 2016).

As metrics for managerial human capital, Liu Yu and T. Ravichandran used only for the top manager of an enterprise his educational background, competence in the area of information technologies, and tenure as CEO (Liu and Ravichandran 2007). Japanese researchers Kenjiro Hirata et al., also mention the tenure as CEO as a characteristic of managerial human capital (Hirata, Suzuki, and Takii 2019).

Thus, in contrast to A. Demenet, these researchers focused not on the enterprise as a whole but only on CEOs and top managers.

3.4. Proposed Model of Human Capital for an Innovative Enterprise

In addition to the previously reviewed points of view, we propose a new approach to the concept of managerial human capital to develop a unified system of indicators to measure this capital for individuals, for any categories of managers, and for the enterprise as a whole.

Concerning HRM is useful to enlarge the concept of managerial human capital for all employees of the company who hold managerial positions (permanently) or carry out managerial roles (temporarily). We consider the following model of the human capital of the enterprise, first of all, for innovative enterprise:

1. Top managers.
2. Innovation project managers.
3. Department managers.
4. Professional staff members and workers (who do not have subordinates).

The first three levels are relevant to managerial human capital.

The competence approach, currently accepted for the assessment of managers, can be used for measuring managerial human capital. The use of this approach considers developing the system of competencies (or clusters of competencies) for the enterprise. These systems have to include both general and specific competencies for each of the above-mentioned categories of managers. E.g., a lot of competency models are represented in the scientific papers and standards for innovation project managers (Rasskazova et al., 2019b; 2019a). As shown in this overview, project manager competency models should be as simple as possible, especially for applying at small and medium-sized enterprises. Metrics for managerial human capital should also be simple. The proposed model and metrics are represented in the next sections.

3.5. Proposed Definitions and Conceptual Model of Managerial Human Capital for Innovation Project Managers

In contrast to the previously reviewed works, we focused not on staff who perform the duties of managers constantly (top managers and heads of departments), but also on those who perform the duties of managers temporarily, it means, on a person who carries out the role of project managers and other members of the project management team. Thus, the proposed approach will be mainly relevant to innovative enterprises.

To operationalize the concept of managerial human capital concerning innovation project managers and other project management team members, the following definition is proposed: managerial human capital for innovation enterprise is the set of capabilities of staff to manage innovative projects successfully.

Also, the following conceptual model can be used: the managerial human capital of an innovative enterprise depends on the main factors:

- The number of potential project managers.
- Diversity of competence of these persons.
- The level of every competence.

The more is the level of each factor, the more is the managerial human capital of an innovation enterprise.

3.6. Proposed Metrics

To measure managerial human capital based on described above conceptual model, we can use the factor-matched metrics:

1. The number of persons in the enterprise, who can be appointed to some managerial role in project management team (first of all to a key role project manager or product manager).
2. The number of different competencies (or clusters of them) these persons possess.
3. The level of every competence (or clusters of them) of each person.

If the number of persons is one, we obtain a metric of individual managerial capital imc:

$$imc = \sum_{i=1}^{C} l_i \tag{7}$$

In this metric C means, a number of competencies (or clusters of them) and l is possessed level for each competence or their clusters. Perhaps, competency model consists of the clusters of technical competencies, behavioral competencies and contextual competencies (ISO 2012), it means C = 3. If the levels in each cluster scale from 1 (minimum) to 8 (maximum) and the person has a level 5 in technical competencies, 4 in behavioral competencies and 2 in contextual competencies, their imc is 11.

To assess the level of competence for required corporate employees (first of all for actual or potential project managers), various methods can be used, e.g., self-assessment; assessment by manager and (or) experts; 360-degree feedback; assessment centers etc. All these methods are widely used in the practice of enterprises. We propose to use the 360-degree feedback method as the more unbiased than the self-assessment and assessment by manager or expert methods for one part, and more efficient than assessment centers for the other part.

To measure managerial human capital of the enterprise (MHC) for N person, we can use the simple metric:

$$MHC = \sum_{i=1}^{N} imc_j \tag{8}$$

To use proposed metrics, as a direction for further research, it is needed to develop a competence system for managers of innovation projects and to measure the level of possessed competence for each person (actual or potential project manager) in an equal for all competencies absolute scale.

4. Discussion

Like any enterprise resource, all components of the non-financial capital should be managed with high-performance to reach business success. Managerial human capital is the important component of the enterprise capital and the concepts of managerial capital and managerial human capital are becoming more and more relevant, especially in the modern digital economy (Pirogova and Makarevich 2020; Liu and Ravichandran 2007; Rasskazova et al., 2019a). Overall, though, modern scientific publications and periodicals do not represent operational definitions of these concepts and metrics for measuring these types of capital. An additional point is that all metrics offered by researchers are designed and suitable for top managers only and are not applied, e. g., for managers of innovation projects (Barykin, Bochkarev, Dobronravin, et al., 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al., 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al., 2021).

Comparing the actual points of view concerning the concept of managerial human capital (Vasyutin, n.d.; Stewart and Ruckdeschel 1998; Murphy and Zabojnik 2011; Dinopoulos and

Unel 2017; Bruhn and Zia 2013) with the definition we propose, the conceptual model and metrics have the following differences (they are advantages first of all for small and medium innovative enterprises):

- Our proposals enlarge the concept of managerial human capital from using it not only for top managers but also for all employees of the company, who not only hold managerial position (permanently) but also carry out managerial roles (temporarily). It means these metrics can be applied for innovative enterprises or innovation domains of all enterprises.
- Our metrics can be used in several levels of enterprise: for individuals; for permanent organizational units (departments); for the temporary organizational units (projects); and for the whole enterprise.
- The proposed metrics are independent of financial indicators. It means these metrics can be used for internal and non-commercial domains of the enterprise.

The proposed metrics are simple and can be developed by using the competence approach, well-known and currently accepted for the assessment of managers. It means these metrics can be applied at numerous small and medium-sized enterprises.

Therefore, these differences are advantages first of all for small and medium innovative enterprises.

At the same time, we accept the following challenges to implementing our proposals. The shortlist of scientific tasks is the following:

1. To develop the as simple as possible competency model for different categories of managers, incl. project managers.
2. To improve the proposed conceptual model and metrics and to design the system of metrics for managerial human capital of the enterprise.
3. To develop the absolute scale and to define the number of levels of all competences.

Further research includes a better understanding of the importance of managerial human capital. Measuring the managerial human capital indicators based on the proposed metrics will allow exploring managerial human capital relations with the success of innovative projects and by using the correlation, regression, and factor analysis methods to investigate the impact of this capital on the success of enterprises.

Conclusion

As a result of research, the main definitions and measurement possibilities of the concept “managerial human capital” of the enterprise were considered. For more successful human resource management based on quantitative measurement of managerial human capital, the definition, conceptual model and metrics for using the concept “managerial human capital” are proposed. The direction for further research is defined.

The researchers can use the proposed metrics to investigate the impact of managerial human capital on the success of innovative projects and the success of enterprises.

The top and HR managers can enlarge their capabilities to manage diverse types of non-financial capital that were previously impossible to manage. E.g., they can expand the key performance indicators used in the performance management system of an enterprise to increase the effectiveness and efficiency of enterprises.

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Chapter 21

Digital Instruments to Improve the Efficiency of the Logistics Processes in Non-Profit Sports Organizations

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Abstract

The digital transformation of the management of sports organizations has influenced the choice of communication instruments in non-profit sports organizations. Non-profit sports organizations must quickly adapt to new consumer demands and offer new opportunities for the development of mass sports. NSOs are already introducing digital logistics and marketing instruments to improve the quality and efficiency of communication and logistics processes. The article presents a study of digital tools in the management of logistic processes of non-profit sports organizations. A model of the logistic system of a non-profit sports organization is presented. The level of digital transformation of the logistics processes of non-commercial sports organizations has been investigated. The study describes the main digital tools that are necessary for the transfer of information flows of external and internal communication. The conclusion highlights the importance of research in logistics and supply chain management of a sports organization. The paper formulates the problems of logistics processes of non-profit sports organization and identifies the main digital instruments to communication with stakeholders.

Keywords: digitalization, non-profit sports organization, logistics management

1. Introduction

Management of sports activities is a young scientific discipline firstly identified as an independent discipline in the 70s and 80s (Parkhouse and Ulrich 1979). Nowadays sports management and marketing are the main factors of success for a sports organization. Over the past 40 years, the relationship between seller and consumer has evolved in line with marketing concepts (Parshukov, Aleksandrov, and Fedorova 2020). It contributed to the active

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development of theoretical and practical management and marketing of sports organizations all over the world (Shannon 1999). Russian research in the field of management of sports organizations became more popular later. In 1995 the importance of marketing in sports was discussed (Guskov S. I. 1995) and in 1997 the theory of management in sports was supplemented by Bratanovsky S. N. and Zyev V. N. Modern research doesn't have a unified concept in defining the services of Physical Culture and Sport (PC&S). In general, we could say that PC&S forms material and spiritual environment where physical and spiritual growing of a person is processing. PC&S, as an economic industry, is a type of useful activity for the public population of various kinds of services. Services are provided by organizations of various forms of ownership: commercial and non-commercial or non-profit sports organizations. The main difference between Non-profit Sports Organizations (NSOs) is that their activities are focused on meeting the socio-cultural needs of society, including the implementation of the state strategy for the development of the sports industry, and not on making large profits (Minikin 2012; Ratten and Ratten 2011; Ferrand and McCarthy 2008a; 2008b).

The management of a non-profit sports organization adheres to the principles of basic sports management. More and more Non-profit Sports Organizations seek to find sponsor support and be less dependent on government budgets. Unfortunately, even the largest Russian commercial sports clubs are unable to compete with their foreign counterparts (Lovett 2018; Beech 2010). Nevertheless, NSOs, in particular student and grassroots sports, are gaining popularity. Successful practice is underpinned by the latest theoretical research in student sports club management. Among the described management tools for a non-profit sports organization, the following stand out: marketing communications, business communication, labor motivation, etc. Business planning in the sports industry, as in any other organization of the service sector, is an important process, during which the leader must understand what resources he has, and what needs of the population with their help it can satisfy (Minikin 2012; Symonds and Tapps 2019; Kriemadis and Terzoudis 2007; DeSensi et al. 2016). However, resource management as a logistic process is practically not considered in any of the listed works. Most of the existing works describe the logistics of the sports industry only in terms of organizing mega-events, major sporting events or transporting sports equipment. Supply chain management of sports mega-events is not relevant for NSOs, and the main product, the provision of sports services, does not need warehousing and storage. This does not deprive the NSO of the need to manage logistics flows.

Nowadays there is no unified concept in the presentation of the logistics system of a non-profit sports organization. Based on the general concepts of the logistic system, this article shows the author's model of the logistic system of a non-profit sports organization (see Figure 1) (Bang, Ross, and Reio 2013; Christian 2009).

The model is a logistic system of 3 elements: supplier, organization, consumer. Logistic flows are distributed among the participants in the logistics processes, the efficient movement of which ensures the quality of the entire system, and, consequently, the efficiency of NSO management (Nowy et al. 2015; Minikin 2012; Eydi 2015; Symonds and Tapps 2019). Of greatest interest in this article are the logistics flows of the NSO: service flows related to the sale of PC&S services, and information flows. Information logistics flows mean internal and external information of the NSO. Inside information concerns the members of the NSO, it can be strategic and operational goals, objectives, etc. External information concerns the communication between the NSO and consumers. This is information about sports events,

athletes, match statistics, recordings of broadcasts and a media block. These are all information resources that the NSO can use to increase its awareness, image, retain consumers and attract new consumers and meet their needs for FC&S services. Personnel, financial and other flows are also subject to the introduction of digital tools, but the movement of these flows in the PC&S service sector is similar to any other service business.

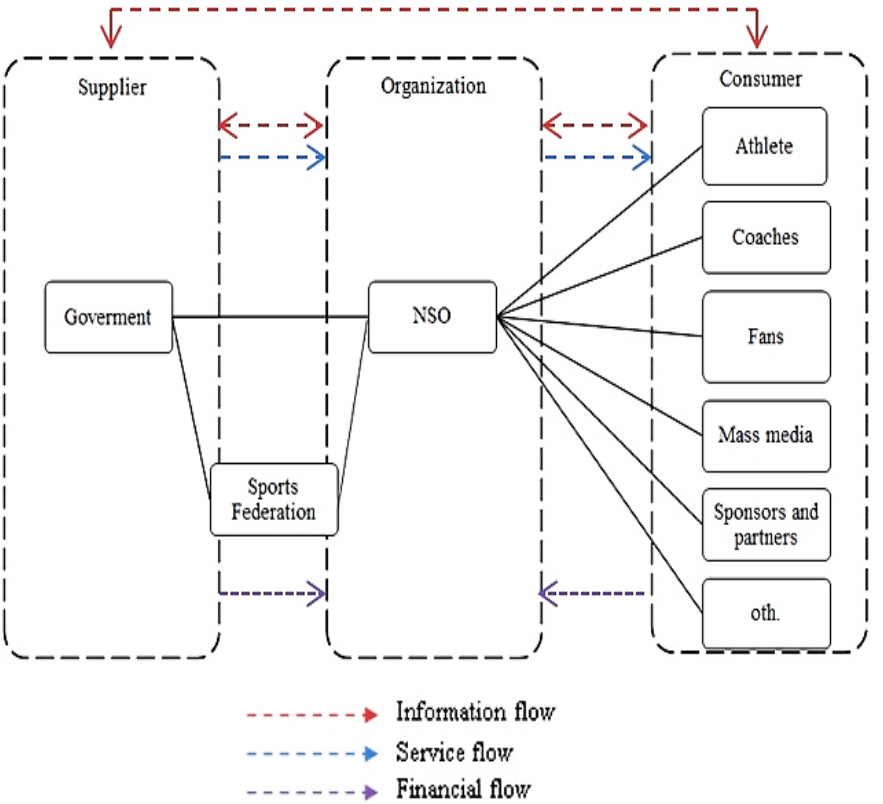

Figure 1. Logistic system model of a non-profit sports organization.

As a result of the fourth industrial revolution - Industry 4.0, the approach and methods of production and consumption of goods and services have changed (Korchagina, Kalinina, et al. 2020; Korchagina, Naumova, et al. 2019; Kapustina et al. 2020; Kotler, Harmawan, and Iwan 2017). A modern enterprise providing services to a consumer uses digital tools in management, communications, advertising, resource transportation, etc. Automation of business processes helps to reduce the consumed resources, increasing the productivity of the enterprise. The sports industry is also supporting the digital change in the world, thereby increasing its economic activity. According to PwC, the value of the global sports industry exceeds $ 150 billion and has a forecast for further growth (“PwC Russia” n.d.). The digital transformation of sports is a new stage in the development of the sports industry in Russia. The Digital Transformation Department of the Russian Ministry of Sports was founded in March 2020. Its main goal is to ensure the digital transformation of physical culture and sports, including the construction of all elements of collection, processing and interpretation of industry data, as well as the introduction of platform services that ensure effective interaction of the sports community, citizens, companies, specialized educational organizations and regulators, including

interdepartmental level. However, this fact does not prove that digital technologies were not relevant in the management of sports organizations until 2020. J. Beach and Sadwick (Simon and John 2007) describe the use of Internet resources in the marketing of sports organizations, Mangold and Fould write about interaction with consumers through social networks (Shannon 1999; Mangold and Faulds 2009). The development and influence of data sets and databases are changing the approach to marketing research in sports Neven Seric (Šerić and Ljubica 2018). Optimization of dynamic programming and planning of container transportation is investigated (Korchagina, Bochkarev, et al. 2019; Korchagina and Desfonteines 2019; Korchagina, Bochkarev, et al. 2020). The latest research combines the use of digital tools in the management of sports organizations into an independent process - digital transformation. As in the general theory of management of sports organizations, discussions of digital transformation in the academic Russian community began later, and at the moment this area has practically no research papers. However, the active development of special projects, the purpose of which is to launch and implement the use of digital tools in the work of sports organizations, makes it possible to make a forecast for an increase in scientific interest in this issue.

In addition, we could say, that first of all this paper is an overview of the current level of digitalization of the logistics processes of the NSO. Secondly, it describes the digital tools of the NSO in the management of logistics processes.

2. Materials and Methods

An empirical analysis was carried out using an online interview of NSOs representatives. In addition, a theoretical analysis of projects of the IT-company “SportSoft» providing its services for the automation and implementation of digital solutions for sports projects was carried out. “SportSoft» has been selected for the analysis and comparison of digital solutions because since 2013 it has regularly received awards for innovation in the sports industry and provides truly flagship projects. The online survey participants were representatives of 35 NSOs from 18 cities of Russia. Among 71 respondents: 4.2% are heads of the NSO, 23.9% are the general managers of the organization, 7% are assistant managers, and 64.8% are other members of the NSO: media managers, event managers, athletes, etc.

Since the movement of information flow depends on the quality of communication with consumers and suppliers, the task of the first stage of the online interview is to find out what means and tools, including digital ones, are used by respondents to transfer information logistics flows. The question: “What tools are used for interaction and communication with consumers and suppliers?” was asked in accordance with each category of consumers: members of their own club, representatives of the state/sports federations/universities, media, partners and sponsors, fans, representatives of other sports organizations. The task of the second stage of the online interview is to obtain from the respondents an assessment of the effectiveness of the tools used to move information flows of the logistics system. To do this, the respondents were asked questions, where they could assess from 0 to 10, how conveniently and fully the relevant tools to transmit information, and whether these tools accelerate the process of transmitting information flows or not.

This study cannot fully describe the level of digitalization of the logistics processes of all Russian NSOs, but it makes it possible to carry out some approximation between flagship

projects, which almost completely automated the movement of information and material resources, and ordinary NSOs using digital tools, only based on certain strategic objectives.

3. Results

3.1. Data of Flagship Projects

At this stage of the development sports industry, flagship projects of digital solutions in sports management through the IT-company "Sportsoft». Among the existing projects of the company there are CRM-systems of the Hockey Academy named after I. Vladimir Petrov (development in 2020), systems of processes for the Moscow Rugby Federation (2019), the School Volleyball League (2019), the St. Petersburg Student Football League (2016), the St. Petersburg Beach Football Association (2017), etc. Analysis of the content and the functionality of the developed systems confirms the novelty of the digital transformation process of NSO management, since the latest development dates back to 2012. Of course, these projects are not an exhaustive assessment of the level of logistics NSO, since some NSOs may use some services of other IT companies.

So, the flagship digital tools of large NSOs are CRM systems and process automation systems. CRM system, like an online office, allows to speed up the process of moving information flows between a sport organization and consumers. Sports teams, fans and other consumers have end-to-end access to game statistics, individual athlete ratings and media block. This transfer of information significantly simplifies and speeds up the process of communication between the NSO and the consumer, as a consumer does not need additionally to request information of interest. Automated systems also help in communication with consumers: media block, information about trainings, competitions, etc. By the way, automated systems accelerate the process of admitting teams and athletes to competitions. Some of these systems automate the process of issuing personal passports for athletes, accepting team applications, uniting entire regions. Collecting and processing this amount of data without digital tools would take much more time, more human resources. It slows down the movement of logistics flows and affects the efficiency of the NSO. Through the automation of the processes, the end-to-end application process and simplified control of information processing for system administrators, much more teams participate in competitions, the media block attracts more and more potential consumers. This kind of management of information resources increases the efficiency of NSO management, contributes to the execution of their major goal - the development of mass sports and the satisfaction of social and cultural needs.

Moreover, the portfolio of the IT company includes the City Football Moscow aggregator. This system contributes to a more efficient movement of logistics flows and allows to reduce the search time for sports playgrounds for an individual athlete or a sports team. Automation of logistics processes using the systems reduces the number of processes and the interaction time between the aggregator and the tenant of the sports ground. Besides, the aggregator does not need to communicate with customers in turn. So, the sports team does not need to wait for the landlord's response. Such processes can run in parallel, due to end-to-end access to records of visits, reservations, site workload, automated payment, etc.

3.2. First Stage Survey Results

Not all NSOs do not consider that using of automated systems mandatory and they use them pointwise, based on the operational goals of the organization (Ehnold et al. 2020). However, many NSOs have been using social media for external and internal communication for long time. The results of the first stage of the online survey are presented in the diagrams (Figures 2-7).

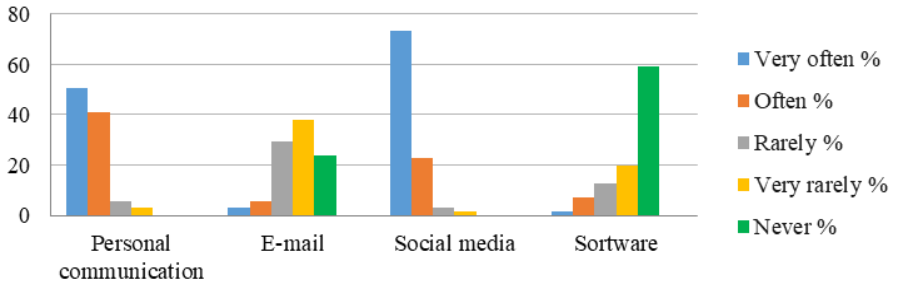

Figure 2. Use of internal communication instruments.

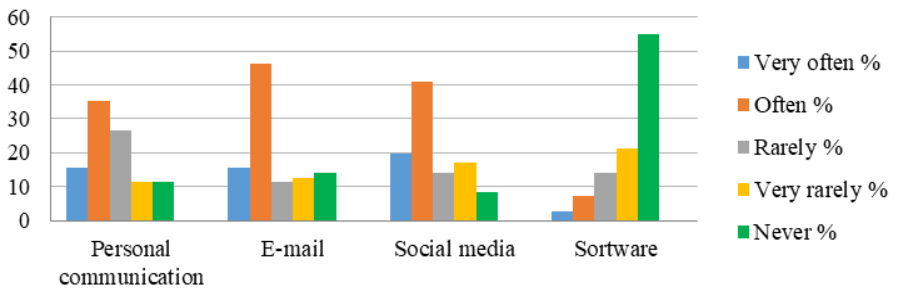

Figure 3. Use of instruments to communicate with suppliers.

The most popular internal communication tools are personal communication – 40.8% often and 50.7% very often use it, and social media – 22.5% often and 73.2% very often. E-mail is less popular: 23.9% never use it, and 39.4% and 28.1% use it rarely and very rarely. Only 8.4% of respondents often use e-mail. The transfer of information streams using software is used only in 40.8%, where 12.6% rarely and 19.7% very rarely. 59.1% never use it.

The selection of tools for moving logistics information flows between the NSO and suppliers has some differences compared to the internal communication of the NSO. The popularity of personal communication is decreasing: 11.5% and 35.2% use it very often and often, 26.8% - rarely, 11.3% and 11.3% - very rarely and never it. The using of e-mail has a completely different picture in comparison with the preceding diagram (Figure 2): 46.6% and 15.5% use this tool often and very often. 11.2% and 12.7% rarely and very rarely use e-mail for communication, 14% never use e-mail for communication with representatives of the state, sports federation, etc. Social media prevail over other tools for transmitting information: only 8.4% never use, 40.8% and 19.7% use often and very often. The software is never used by 54.9%, 14.1% and 21.1% rarely and very rarely use, and 7% and 2.8% often and very often.

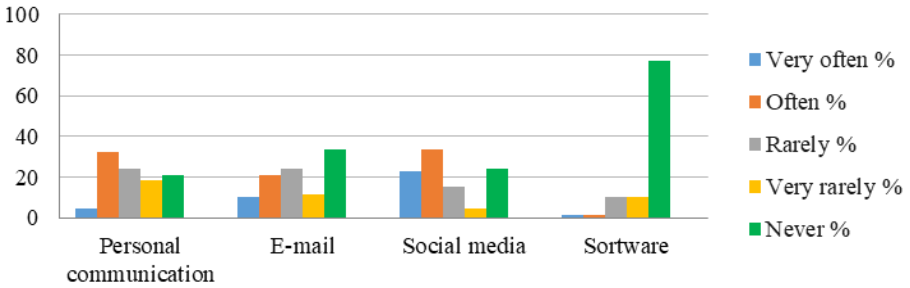

Figure 4. Use of instruments to communicate with mass-media.

Social media are a priority digital tool for transferring information flows between NSO and the mass-media: 33.8% and 22.5% use it often and very often. However, 33.8% never use e-mail for communication. For interaction with the mass-media, software is practically not used: 77.5% never use, 9.8% rarely and very rarely. Only 1.4% use the software often and very often.

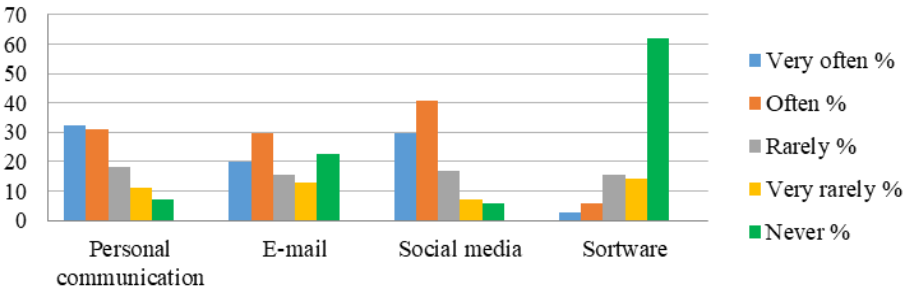

Figure 5. Use of instruments to communicate with partners and sponsors.

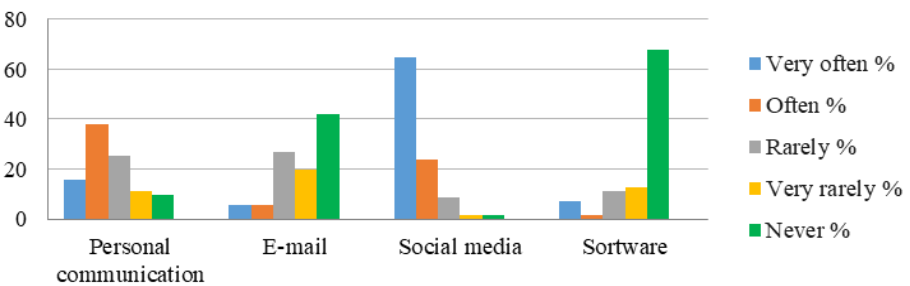

Figure 6. Use of instruments to communicate with fans.

More and more NSOs understand the need to communicate with partners and sponsors. Software for this category is still not a priority digital tool for communication and information transfer: 61.9% never use software, and 5.6% and 2.8% often and very often. Again, the most popular tool is social media: 40.8% and 29.5% of respondents use it often and very often. Personal communication is also used regularly: 30.9% and 32.4% use often and very often. Indicators of e-mail: 22.5% never use and 19.7% use very often. The maximum of using e-mail for communication with partners is 29.5%. Such a spread can be caused by the fact that e-mail

can be the most appropriate digital tool, or, on the contrary, it is not at all an appropriate way of transmitting information.

Fans and potential consumers of NSO services are the most numerous category of all consumers. Obviously, personal communication cannot provide maximum audience coverage. Among all the tools, Social media are most often used – 64.8% very often and 23.9% often. E-mail is not used regularly: 42.2% never use, 26.8% and 19.7% use it rarely and very rarely. Fan communication software is rarely and almost never used: 11.3% and 67.6%, respectively. However, among all categories of consumers "very often" is used by the majority of respondents - 7%.

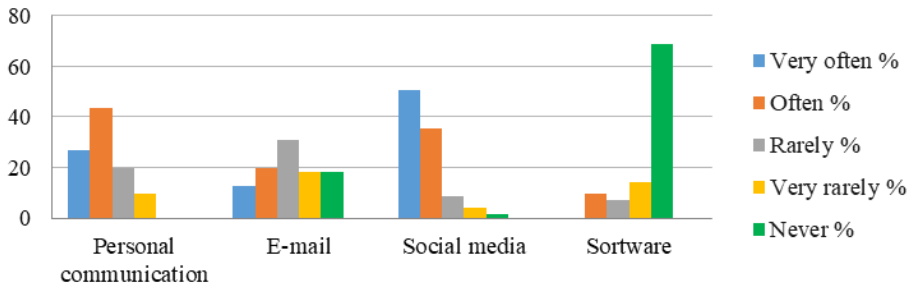

Figure 7. Use of instruments to communicate with NSOs.

The interaction of NSOs with each other is an important logistic process, where the interaction of NSOs is mutually beneficial. For communication and transmission of information flows, NSOs often use social media and personal communication. 35.2% and 50.7% use social media often and very often, with total 14% never, rarely and very rarely. E-mail is rarely used, only 19.7% and 12.7% use often and very often. Distribution results of software are noticeably different and have not a priority among other communication tools - 69% never use, but their implementation is noticeable: 9.8% use software often.

3.3. Second Stage Survey Results

The results of the second stage are presented in diagrams (Figures 8-15). Diagrams (Fig. 8) show that personal communications are a convenient and fast type to communicate and transmitting information flows. 42% of respondents fully agree that this type of communication is the most effective, and 36.6% think that it speeds up the process of transmitting information flows, and, therefore, saves personal time (Figure 9).

The results of the online survey regarding e-mail are controversial and cannot be answered unequivocally (Figures 10-11).

So 18% find it difficult to give any assessment, and 52% rather disagree with the usability of this tool, 9.9% of are strongly disagree. 28.3% of respondents estimate the e-mail as a convenient digital tool only partially, and only 1 respondent fully agrees. The using of e-mail as a tool that capable of speeding up the process of interaction and information transfer is not a priority for NSOs. 57.7% partially and completely disagree with the fact that e-mail accelerates communication processes. 9.9% find it difficult to answer, and 28.2% partially or completely agree, where 4.2% completely agree.

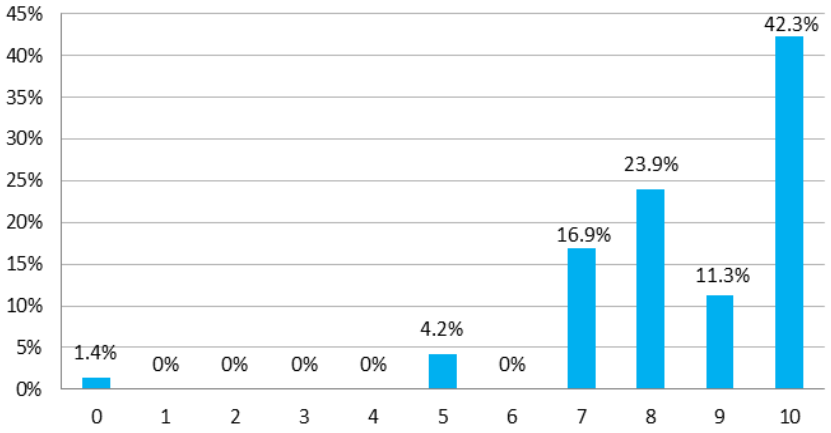

Figure 8. Convenience of personal communication.

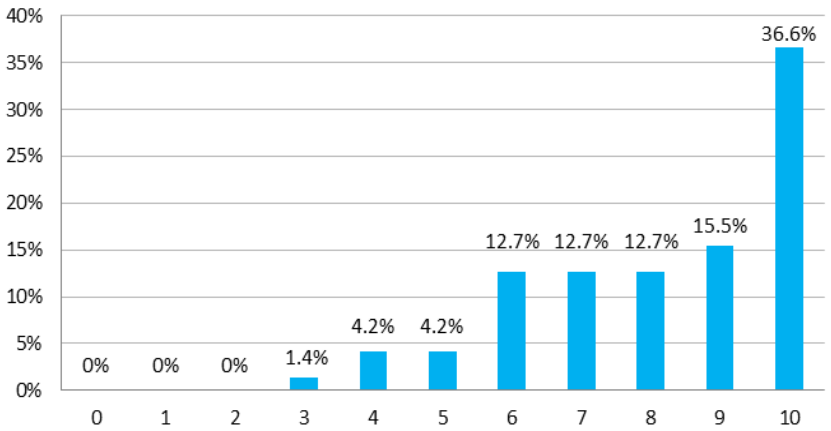

Figure 9. Communication speed of personal communication.

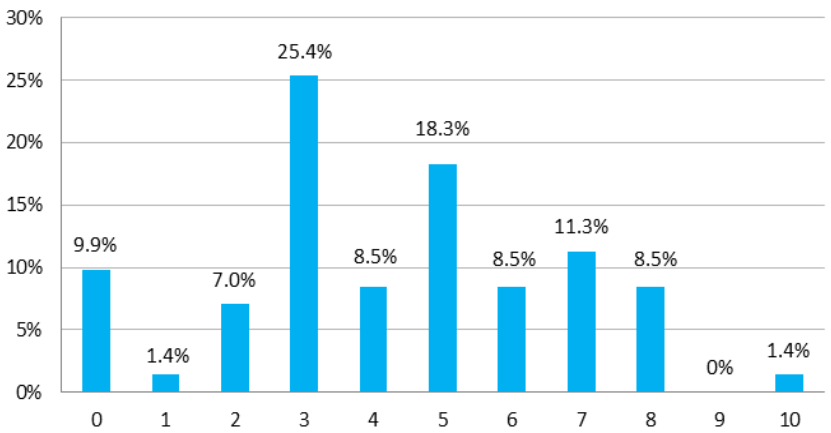

Figure 10. Convenience of e-mail.

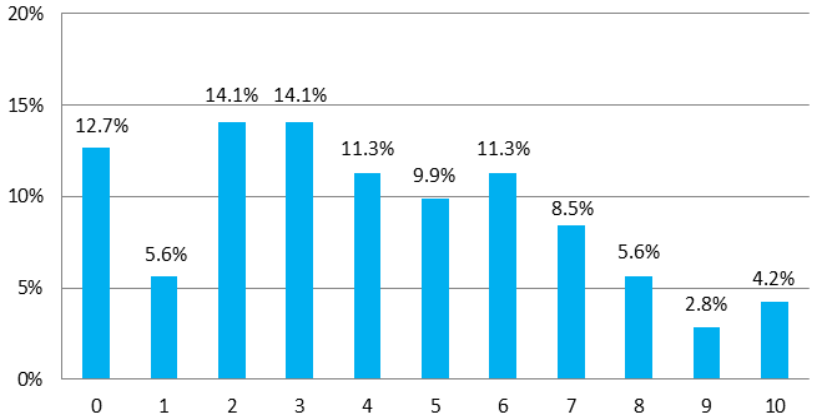

Figure 11. Communication speed of e-mail.

Diagrams of social media are similar to diagrams of personal communication (Figures 12-13).

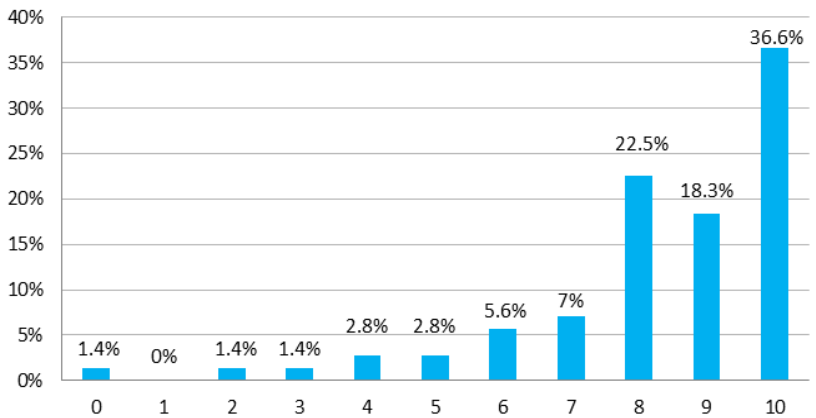

Figure 12. Convenience of social media.

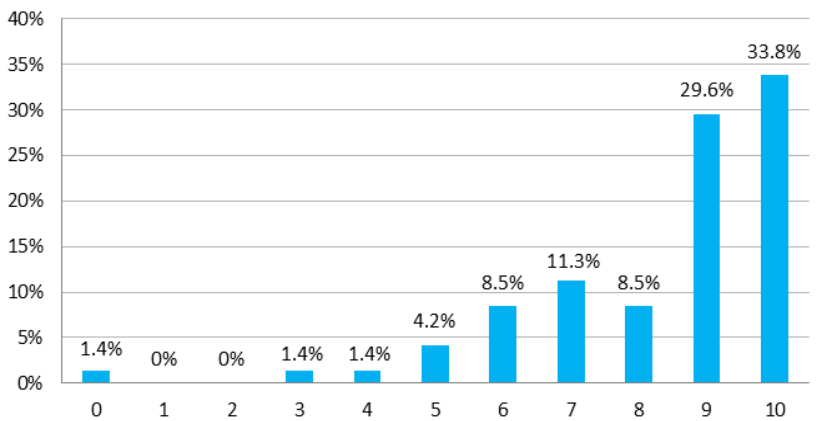

Figure 13. Communication speed of social media.

90% partially and completely agree, where 36.6% completely agree with the convenience of using the social media as digital tool of communication. More than 50% of respondents partially and completely agree (33.8%) that social media help to speed up the transfer of information and communication processes. 4% find it difficult to answer, and only 1% strongly disagree.

The usability of the software also remains a controversial fact (Figures 14-15).

The largest percentage of respondents - 21% find it difficult to answer. And 50.8% completely or partially disagree with the fact that the use of such digital tools as software are convenient. Only 28% have a positive attitude to the use of the software, of which 5.6% completely agree with the usability of the software for communication. 26.8% find it difficult to answer, 45% do not consider software is a tool that accelerates the process of transmitting information, 28% partially or completely agree that software accelerates the process of information transfer and saves personal time, of which 7% completely agree.

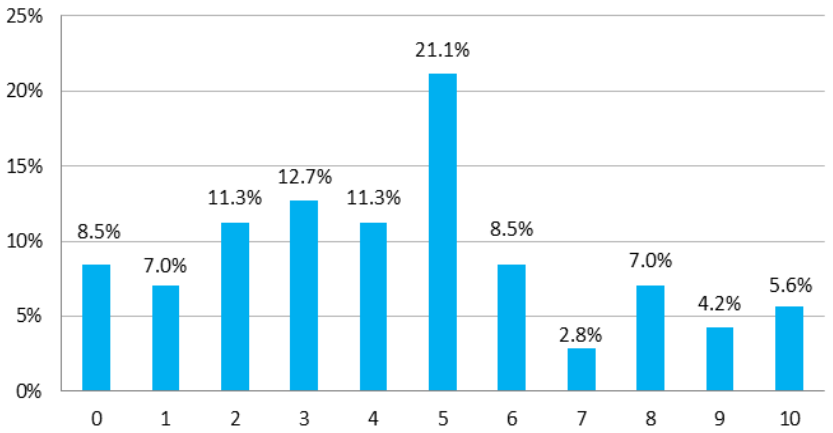

Figure 14. Convenience of software.

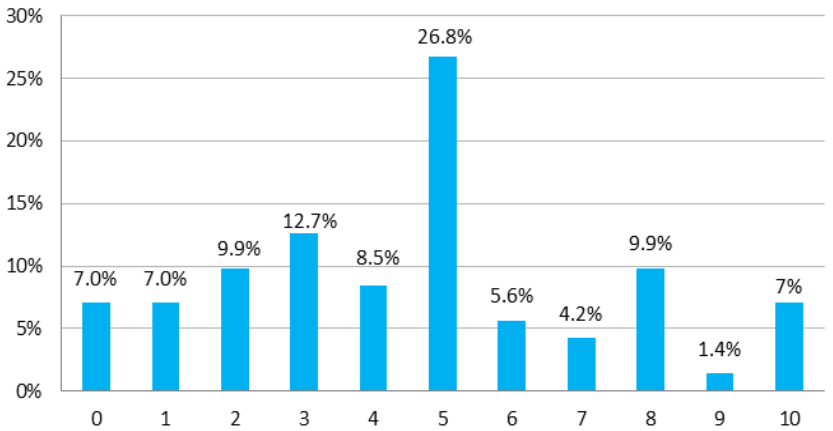

Figure 15. Communication speed of software.

Furthermore, respondents indicated that they use certain tools based on the category of the consumer and the purpose of the question. That means, if the information relates to some simple questions and discussions, then it is more relevant to use personal communication and social media. The transmission of such information as voluminous text files (regulations, applications, etc.) and packages of documents, etc., is more convenient using e-mail or automated systems, for example, for remote submission of an application by a team to participate in a competition. In the comments, the respondents indicated the types of software use: CRM, mobile apps and landing pages. In addition, 1 respondent mentioned an attempt to implement Bitrix programs, but the resulting process automation did not contribute to an increase in the efficiency of the NSO, so the NSO abandoned from that tool.

4. Discussion

According to the data obtained, it can be argued that the use of digital tools by non-commercial SOs occurs pointwise based on which category of consumers this or that information is transmitted. The results of the first stage of the online interview show that the use of personal communication is still a popular tool for communication and transmission of information flows. However, the movement of logistics flows using digital tools prevails in all of the listed categories of consumers. In particular, social media are the most used digital tools for interaction with any category of consumers or suppliers. All of 35 organizations have an account in the popular Russian social media “VK». The interaction between NSOs and suppliers within the logistics system is complemented by the implementation and usage of e-mail. However, in all other cases, as a digital tool for transferring logistics flows, e-mail is almost not used or rarely used. At this stage of digital transformation and development of the sports industry software has not been widespread. The results show that on average 65% respondents had never used software to communicate and transfer information flows. But there is also a tendency to integrate such programs into the work and logistics processes of NSOs. Ambiguity of software usage caused, first of all, by the newness of the approach to the management of the logistics processes of NSOs. Some softwares are more difficult to use and manage. Furthermore they require training and special skills from managers. Secondly, not all software is free, and NSO’s budgets are often limited and not designed for software usage. For this reason social media are the priority digital tools that do not require payment for minimal usage, although they provide advertising integrations that should be paid for.

Thereby, the described digital tools that increase the efficiency of the logistics processes of the NSOs: CRM-systems and systems automation of logistics process include the following: social media and e-mail, mobile applications and landing pages. Social media allow NSO to work more effectively with fans and other potential audiences. NSOs can provide access to information about itself, its structure, contacts for communication, the sports calendar, the participants of the competitions and the media block in social media. Social Media Manager gain access to information that facilitates targeting and audience segmentation processes, which allows them to build strategic and operational goals more effectively. In addition, social media are subject to regular updates. As a result of which additional targeting parameters appear, the graphical interface and functionality of the social media are improved.

The usage of landing pages allows NSOs, for example a sport club, to collect fan databases more quickly, speed up and automate the process of sending special information by subscribing,

etc. For a consumer of NSO services, a landing page is a convenient and visual way to learn about NSO, its services, subscribe to special newsletters in order to reduce the time spent on searching for them. Thus, landing pages contribute to a more efficient movement of information flows of the NSOs logistics system by reducing and automating communication processes.

Conclusion

Based on the results of this paper, it can be argued that digital transformation in the management and logistics of the sports industry is at the genesis stage. Digital tools are gradually being introduced into various commercial sports organization and non-profit sports organization management processes. For NSOs, communication processes or processes of transferring information flows are significant challenge requiring the development and upgrades of logistics systems. Following the development of Industry 4.0 and the widespread adoption of digital tools, NSOs are also using digital tools for management and marketing, including logistics and supply chain management. Digital tools allow non-profit sports organizations to shorten the chain of communication processes and increase their flow, thereby increasing the volume and speed of transmitting information logistics flows. At this stage of digitalization development, the most popular digital tools are social media and automation systems, including CRM systems that simplify many labor-intensive processes. This paper does not have the ability to specifically assess the level of digitalization of NSOs, since their number significantly exceeds the respondents. However, among the analyzed organizations, there are both flagship and leading NSOs using innovative solutions in management and logistics, and NSOs using the simplest and most affordable digital solutions. This sample allows us to make an approximate conclusion about the assessment of the level of digitalization, and to highlight the main digital tools that NSO uses in logistics and supply chain management. The results highlight the problem of the rare use of special software by non-profit sports organizations. This is due to the following factors. First, the use of software is often not free. Although NSOs try to seek support from partners and sponsors, but their finances are severely limited. Thus, few NSOs can afford to spend on software, with little understanding of how much this will increase the efficiency of their work. The second problem is the lack of special software skills. Easier to use tools do not require special training, making them more accessible and popular. Third, the directors and managers of sports organizations do not always understand how relevant it is to implement software in the management and logistics of the organization. The experience of using the software is still small and such implementation is irregular, in addition, there is practically no research on this topic, which does not allow to fully assess the effectiveness of implementation and the risks associated with additional spending. The online survey confirms the popularity of more accessible and easy-to-use digital tools such as social media and email. In addition, social media have the highest priority when communicating with all categories of consumers. The use of such digital tools makes it possible to increase the efficiency of the movement of logistics flows by increasing audience coverage, end-to-end access to information, and simplified management of statistics and databases. The use of digital tools increases the efficiency of logistics processes and helps to reduce communication time while increasing the volume of information flows. Thus, fans, partners or the media get access to information about the NSO, its activities, the media block, etc.

This study has several limitations, as a result of which it is necessary to expand the volume of knowledge in the field of logistics and supply chain management of NSO. In addition, the relationship between NSO and consumers is constantly evolving, which entails changes not only in the choice of communication tools, but also in the types of logistics flows. The implementation of the latest digital technologies is contributing to changes in the field of logistics and supply chain management tools. The absence of experience in using many digital tools and research on this topic limits managers in choosing digital tools for managing logistics processes, since they cannot adequately assess the effectiveness and associated risks.

However, the development of digital technologies, high-speed 5G data transmission networks, as well as an increased interest in the mass sports industry in Russia, the development of a state strategy, the establishment of the digital transformation department of the Ministry of Sports, make it possible to predict an increase in both scientific research in this area and the implementation of new digital tools in management, logistics supply chain management of non-profit sports organizations.

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Chapter 22

Development of the System of Requirements to the Architecture of Business Services in Terms of Interaction with Consumers within the Chain Trading Companies

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Abstract

The article considers the methodological framework for the development of the system of requirements to the service architecture in the chain trading enterprises. The paper systemizes the formation principles and provides the classification of the user, system, functional and nonfunctional, domain and integration requirements. The research allowed developing the classification of the business services of the chain trading companies by the areas of interaction. The paper comprehensively systemizes the internal and external business services, examines the account and analytical internal business services, the external services that facilitate the interaction between the chain trading companies and the consumers, as well as the services that shape the consumer's loyalty. Resulting from the analysis of the interconnection between the business services, applied services and infrastructure services, the research suggests the pattern structure of services in the chain trading companies, groups the business services in domains and classifies the basic stages of the development of requirements to the service architecture in the chain trading companies.

Keywords: digital transformation, information systems, service architecture, business services, service requirements, requirements to information systems, business architecture, retail, FMCG segment, enterprise architecture, business model

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1. Introduction

The FMCG market segment is currently facing the economic conditions that are pushing the chain trading companies to the introduction of a more comprehensive digital transformation and implementation of effective information technology solutions.

At the present moment, successful implementation of the most popular services largely depends on the formation of a well-designed system of requirements, which indicates an extremely important stage in the development of the architecture of chain trading companies. Therefore, this research aims to suggest the pattern structure of services in the chain trading companies, groups the business services in domains and classify the basic stages of the development of requirements to the service architecture in the chain trading companies, primarily via the analysis of the interconnection between the business services, applied services and infrastructure services.

Figure 1 shows the principles that should be followed while creating the system of requirements to the architecture of chain trading companies (Figure 1).

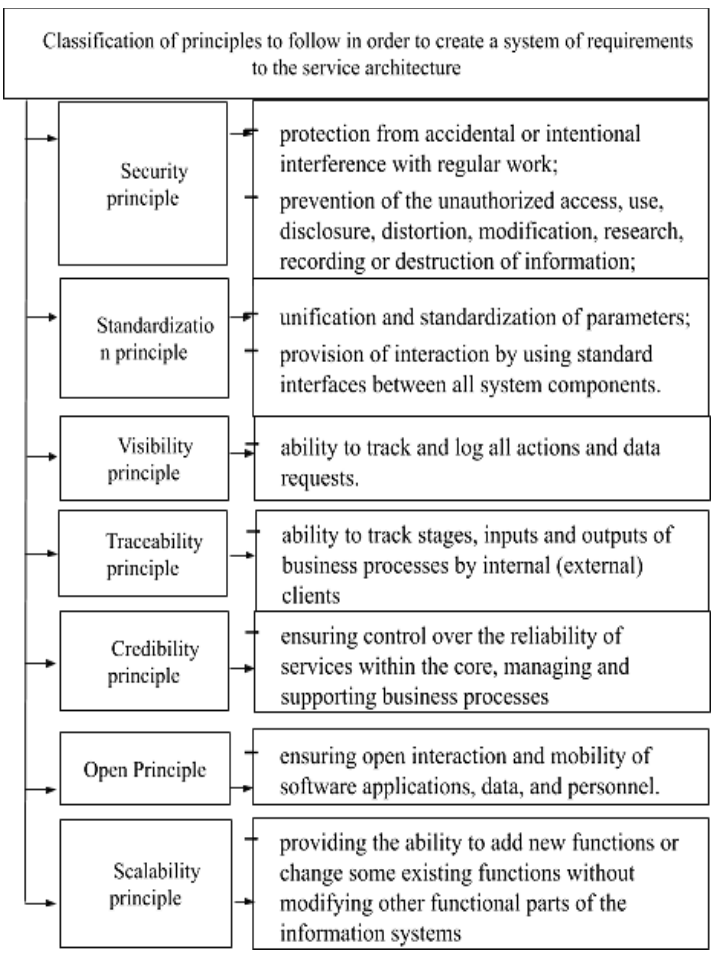

Figure 1. Classification of principles for the development of the system of requirements to the service architecture.

Figure 2 provides the system classification of the requirements to the formation of the services system for the chain companies.

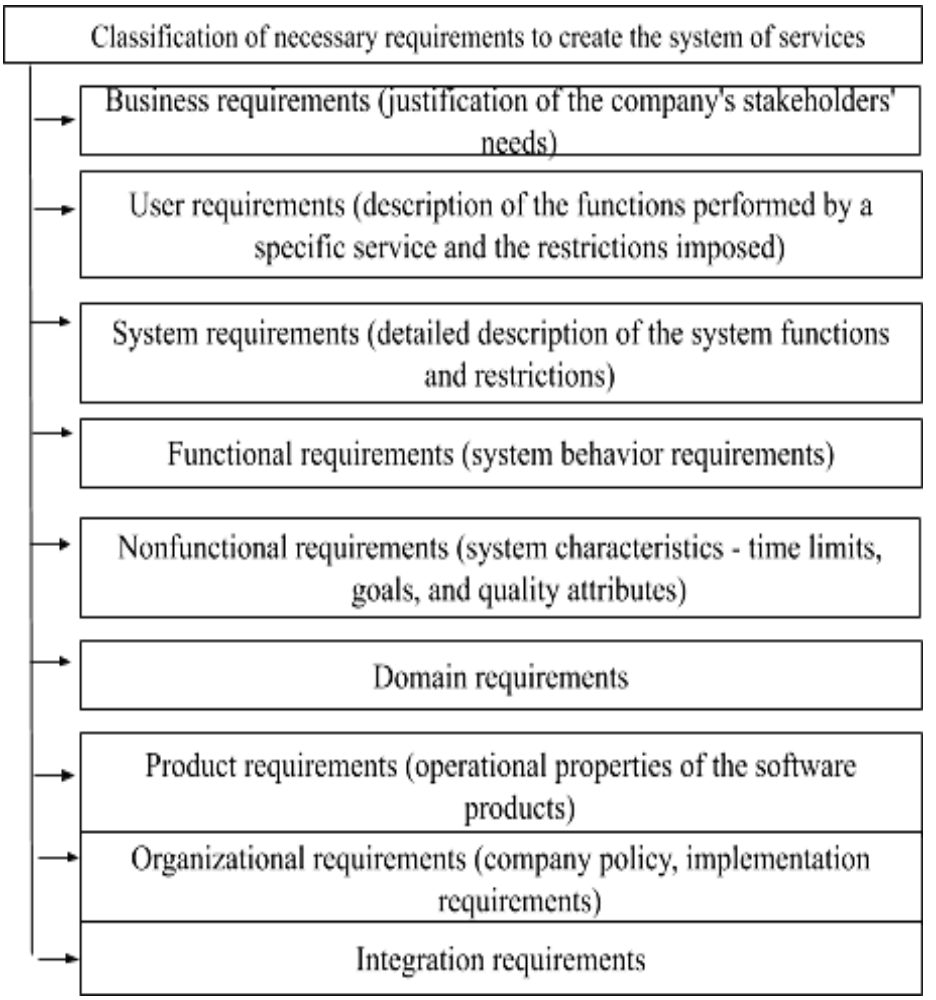

Figure 2. Classification of requirements to develop the system of services.

This research requires a more detailed analysis of the classification given in Figure 2.

Depending on the goals of development, we distinguish the following groups of requirements:

- requirements of senior managers of the chain trading companies;
- requirements of the direct customers of specific software for various services (owners of business processes).

User requirements are the descriptions of the specific functions performed by the particular services, system requirements are the much more detailed description of the user requirements, including the functional specification that describes the system functions and restrictions.

Functional requirements, in their turn, determine the functionality of the software ensuring that the business requirements of the chain trading company's stakeholders are met.

Nonfunctional requirements are intended to describe the characteristics of the system and its domain, not the behavior of the system itself. To a certain extent, the nonfunctional requirements reflect the user requirements.

Domain requirements characterize the environment of the business services, and, depending on the content, they can be attributed to both functional and nonfunctional requirements.

Product requirements are a set of requirements for the services performance and their usability (Levina et al., 2020). Organizational requirements are defined in accordance with the company's policy and include software implementation requirements, design methods, and output requirements. Integration requirements allow formalizing the choice of a method for integrating services of chain trading companies, and describing the interface for interaction between the developed services and the company's operating systems (Figure 2).

In this regard, these requirements apply to all levels of services of chain trading companies, such as business services, applied, and infrastructure service processes.

2. Materials and Methods

This study uses the methods based on identifying and summarizing the opinions of experienced experts and practitioners, basing on their experience and unconventional approaches to the formation of requirements for the development of services for the chain trading companies. The methods of formalized representation of control systems were also applied in the course of the study. Special methods for analyzing end-to-end service architecture are used to determine the relationship between business, applied, and infrastructure services. Moreover, when determining these relationships, it is impossible to neglect the interaction with the external environment of a chain trading company (Berente, Vandenbosch, and Aubert 2009; Dijkman, Dumas, and Ouyang 2008; Ganichev and Koshovets 2019; Rahimi, Møller, and Hvam 2016).

3. Results

Figure 3 presents the relationships of business, applied (information system services) and infrastructure services in more detail.

Business services are services of chain trading companies that provide interaction between internal and external clients of the business processes. These services provide direct interaction between internal customers and/or departments, as well as the interaction with consumers, suppliers, partners and other third-party organizations. Business services implement certain business processes, and the implementation can be carried out through any interaction channel, not necessarily the one related to automation. Business services can fully and/or partially consist of non-automated operations and operate with any types of resources of chain trading

companies (labor, financial, material, information). It should be noted that the functions of complex applications to implement the business services should meet certain business goals. Therefore, in order to display a business service on the application services of an information system, it is necessary to go to the assessment of the business process implementing this service and highlight the totality of automated actions of a specific performer. At this stage, it is necessary to identify the functions performed by the computer part of information systems in automated user actions and determine how to perform these functions (Figure 3). In their turn, the infrastructure services are used for the functioning of the IT-infrastructure. Examples of the infrastructure services include data archiving, backup, antivirus, etc.

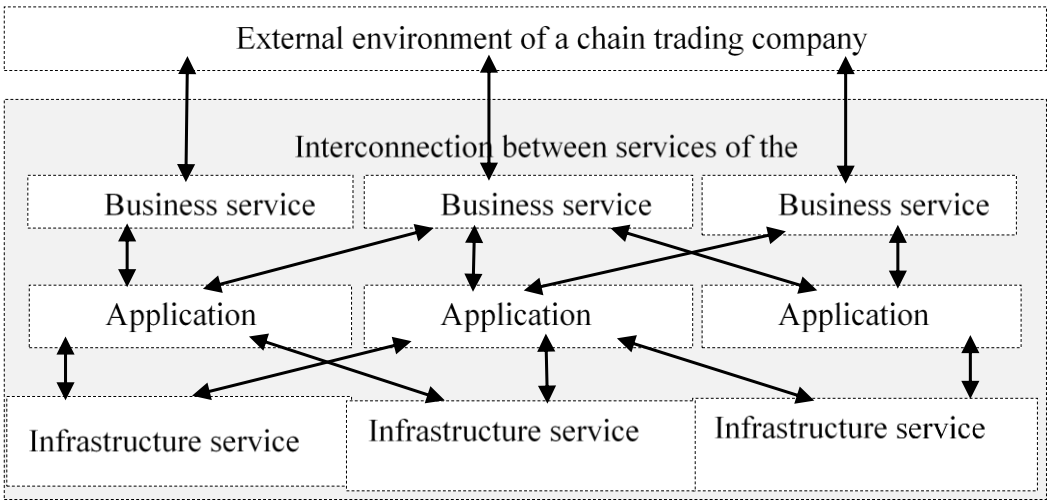

Figure 3. Interconnection between the business, application and infrastructure services.

Figure 4 shows the extended structure of chain trading companies' services. At the initial stage, business services were divided into external and internal ones. In addition to the business services that support the functions, business processes, and information flows, internal services also include services that provide information to suppliers, partners, and consumers (Chueva et al., 2017). In addition to business services, the structure includes information system services that ensure the direct interaction of information technology systems and infrastructure services that support the functioning of information systems within the chain trading companies. When developing reference architectural solutions in the FMCG segment, it is advisable to take into account the clear functional orientation of subdomains that reflect the operating business model of the company (Figure 4). In accordance with this, when considering the services of chain companies, the most efficient way is to use the model of a retail company as a standard structure similar to the structure of the operating business (Donichev, Fraimovich, and Grachev 2018; Kalinina et al., 2019). Namely, it involves considering the services of interaction with suppliers, operating services and services of interaction with consumers. Figure 5 shows the classification of business services of the FMCG chain companies by interaction areas.

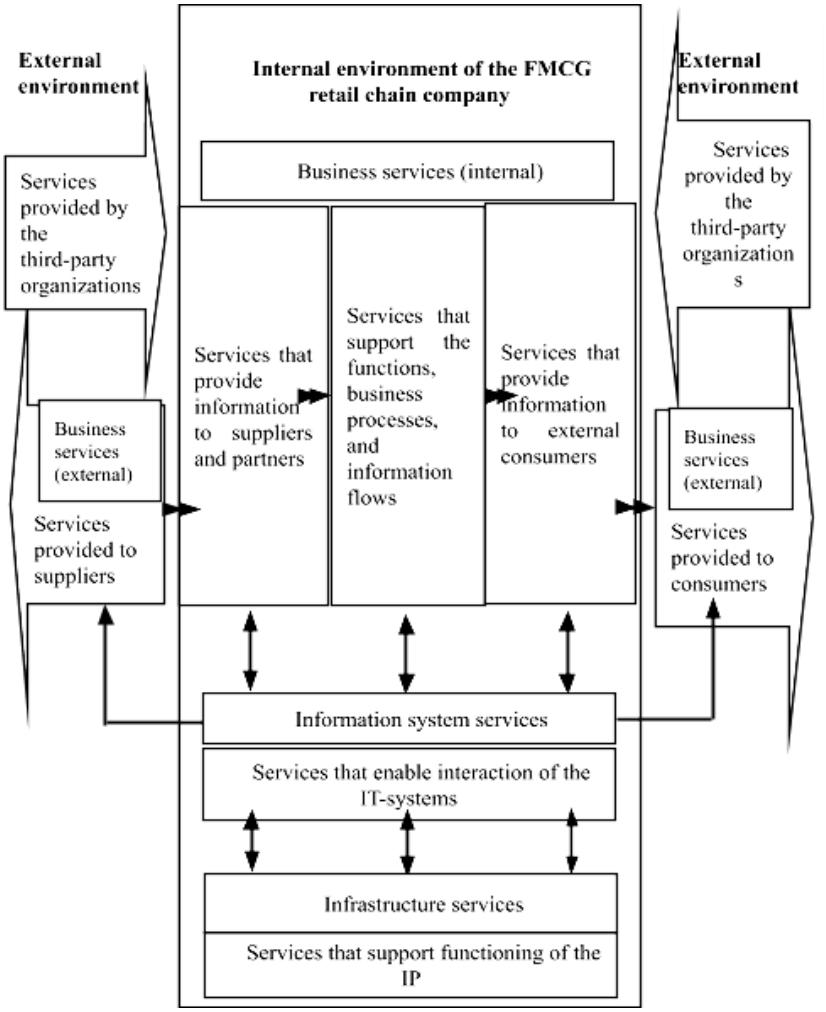

Figure 4. Structure of the services of the FMCG chain company.

For instance, as the illustration of the business services, we can consider several popular solutions, separately for each subject area.

Services for interacting with suppliers and partners:

- Electronic data interchange. For example, Comarch EDI is a cloud platform that provides high reliability of data exchange between business partners, deep integration of the company's IT infrastructure with an electronic document exchange system, or a web-based EDI system.
- Comarch SFA Online Distribution is an innovative platform for reporting and providing communication between the manufacturer and distributor. This data can be used to manage inventory levels, evaluate partner performance, reward partners based on sales data, exchange information with partners, and prevent fraud.

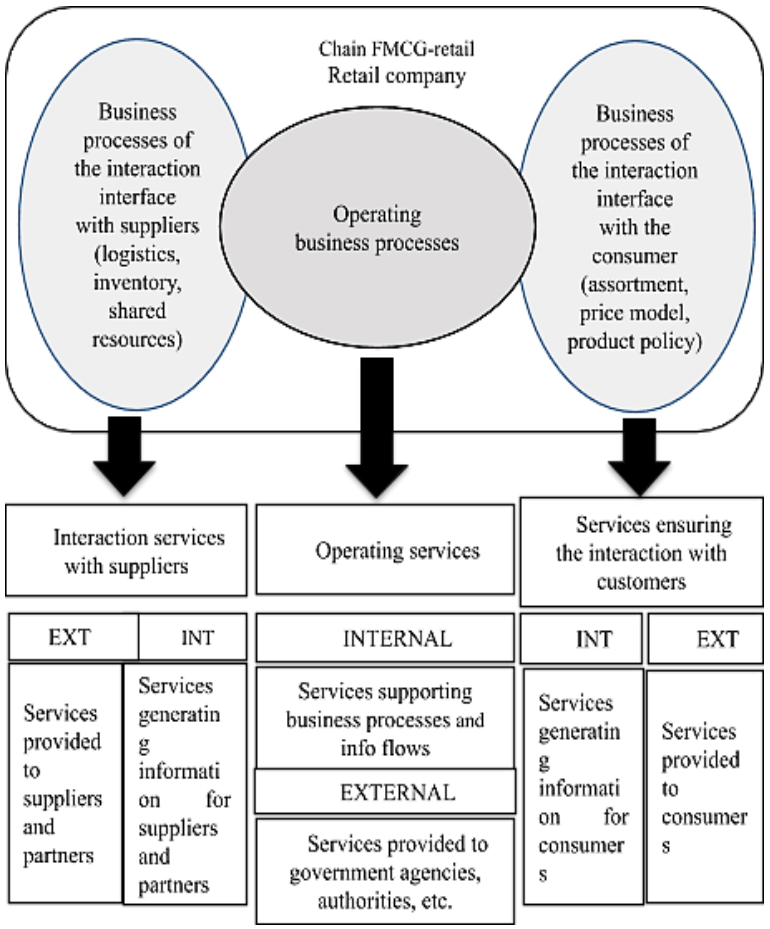

Figure 5. Classification of the business services in the FMCG chain companies by the areas of interaction.

Operating services:

- The KORUS Consulting is a legally significant electronic document flow (EDO) that involves the exchange of legally significant electronic documents (Malenkov et al., 2019).
- Electronic reporting to government agencies - this service allows submitting reports online to the Federal tax service, the Pension Fund of Russia, Federal state statistics service and the FSS.
- The labeling solution is the Special comprehensive solution for manufacturers and distributors working with labeled products.

Services of interaction with customers:

- Trade Promotion Management - the service allows using analytical data to identify the best methods of sales promotion. It also helps with planning promotions, calculate budgets, and evaluate the effectiveness of advertising campaigns (Figure 5).

Currently, under the influence of various factors, the requests and behavior of consumers of the chain trading companies are changing so quickly, that it becomes almost impossible to predict the next breakthrough.

Modern information technologies are getting deeper into the very essence of doing business which naturally leads to a significant expansion of the range of specific business solutions (I. A. Krasyuk et al., 2017). At the same time, the driver of business services development is the specific tasks of chain trading companies, and their development trends are aimed at real solutions to emerging problems. This becomes especially relevant for the chain trading companies in the system of interaction with consumers.

The classification of the business services for interacting with consumers is presented below in more detail (Figure 6).

First of all, it is advisable to consider the business services of the system of interaction with consumers from the point of view of the direction of impact, namely, to classify them into internal and external (Hänninen, Smedlund, and Mitronen 2018; Ilin, Voronova, and Knykina 2019; Syaglova 2019).

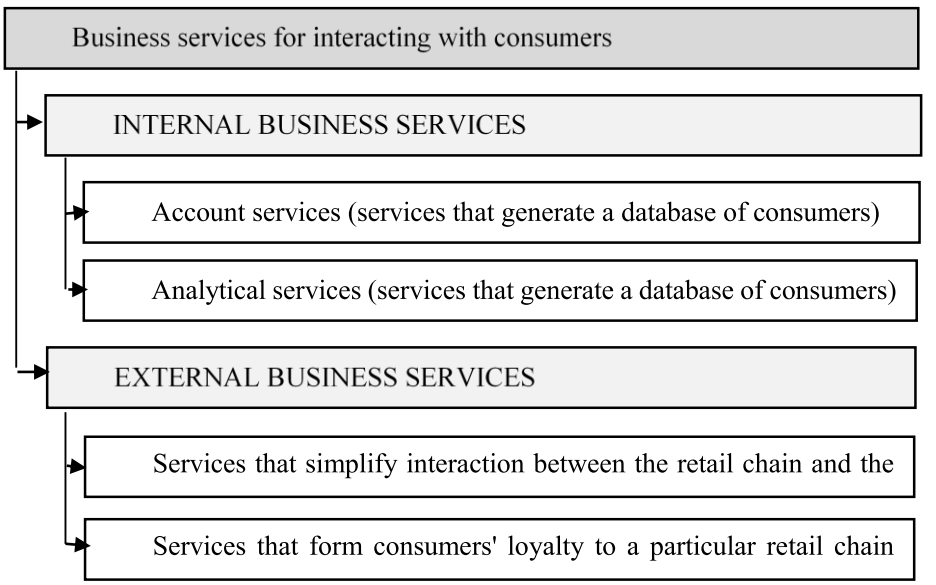

Figure 6. Classification of business services for interaction with consumers.

Internal business services should be divided into accounting services that directly form the databases of consumers of the chain trading companies, and analytical services that analyze these databases.

External business services can be classified as simplifying interaction between online retail companies and consumers, and forming consumers' loyalty to a particular retail chain and/or brand.

Figure 7 presents the internal business services of interaction with consumers of the chain trading companies.

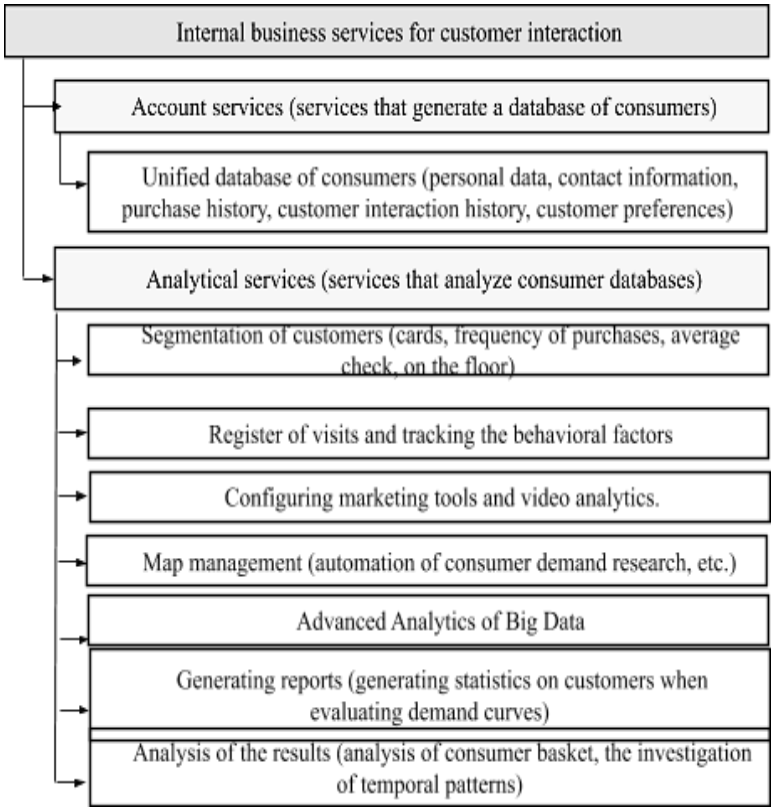

Figure 7. Classification of internal business services for interaction with consumers.

Accounting services that generate consumer databases:

- Unified customer database includes personal data, contact information, purchase history, and the history of interactions with consumers of goods and services of chain trading companies.
- Analytical services that analyze consumer databases:
- Customer segmentation – segmentation by card level, frequency of purchases, average receipt, gender, age, etc.
- Session registry and behavioral factor tracking - includes the date and time of the session, event, source, promotion, session depth, and duration of the session.
- Video analytics - currently, thanks to cloud platforms, the cost of video analytics has drastically decreased, and the configuration process has become much simpler (Voronova and Il'in 2019). Cloud video analytics allows improving the customer loyalty and service quality, ensuring production safety by performing such tasks as monitoring queues (not to exceed the number of people in the queue in the absence (prolonged absence) of the employee in the workplace, the permissible ratio of customer/expert in the work area); working time records of employees (estimation of the real-time presence in the workplace, increasing industrial safety in cases where a member of staff is strictly necessary, increasing work discipline); analyzing consumer behavior and controlling the number of visitors on the trading floor.

- Advanced Analytics of Big Data - the ability to generate forecasts for consumer behavior, such as purchasing the necessary quantity of goods to cover demand, modeling potential sales in accordance with previous customer purchases, etc (Alexander Osterwalder and Pigneur 2010; A. Osterwalder 2004).
- For example, X5 Retail Group is the first chain trading company in the Russian Federation to launch a service for automating the provision of data segments for customers and partners. The solution allows using the accumulated data about the purchase history for targeted digital advertising.
- Analysis of results - the assessment of sales growth by comparing customer activity. The analysis allows excluding the influence of factors such as seasonality, promotions, competitor activity, and so on as accurately as possible. The service allows getting statistically significant conclusions about the impact of the creative solutions, frequency, offer or ad format, and etc (Figure 7).

Let's look at the external business services of interaction with consumers of chain trading companies, presented in Figure 8 in more detail.

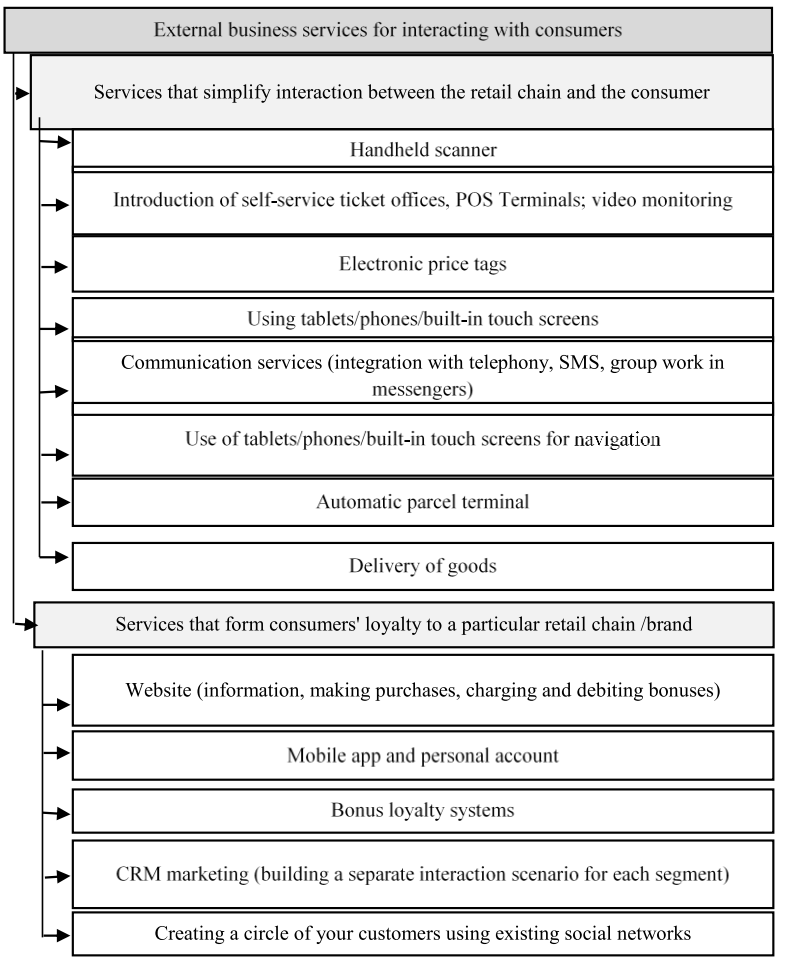

Figure 8. Classification of external business services for interaction with consumers.

Services that simplify interaction between the retail chain and the consumer:

- Manual scanners - self-scan system that allows the customer to scan the goods themselves before putting them in the basket.
- The introduction of self-service cash registers and POS-terminals significantly accelerates the purchase process and reduces the cost of paying cashiers, video monitoring of queues for remote tracking of the number of visitors at the checkout, reducing possible queues during peak hours and more effective management of the sales floor employees.
- Electronic price tags - automation of this process allows not only to minimize the number of errors, but also to free up some of the employees ‘ time. in addition, replacing paper price tags with electronic ones will eliminate situations when the price at the checkout and on the price tag differs.
- Use of tablets/phones/built-in touch screens-most major retail chains have their own mobile applications, which have recently become more and more popular among consumers. Mobile apps are used by chains to increase customer loyalty and make purchases easier (Ramazanov et al., 2021; Cheglov 2020). In addition, mobile devices can be used when implementing a system for self-scanning products using a phone camera, this service is already implemented in the applications “Vkusvil”, “Achan”, “Perekrestok”, “Scanner v Telefone” and “Pyaterochka s Toboy.” The system allows you to scan products with your phone’s camera and immediately pay for the purchase at the checkout after scanning the QR code.
- Communication services - integration with telephony, SMS, group work in messengers, e-mail.
- Automatic parcel terminal- buyers of online platforms can receive orders in terminals and at the checkout at retail points of sale.
- Product delivery - due to the threat of spread of coronavirus infection, contactless order delivery was introduced on the websites and mobile apps of chain trading companies (Borremans, Voronova, and Il’in 2019).
- Services that form consumers’ loyalty to a particular retail chain/brand:
- Website - information, making purchases, accrual and debiting bonuses.
- Mobile app and personal account - information about available points, bonus card status and ongoing promotions, information about ongoing promotions, special offers and current updates, information about purchases made, points accrued and debited, information about the location of stores and opening hours, information about the company’s history, goals and mission).
- Bonus loyalty systems - incentive programs for discounts, promotions, coupons and certificates, implementation of multi-level, cumulative, paid, partner and loyalty programs, flexible rules for awarding bonuses, combining Deposit and discount accrual systems, configuring the interaction of accrual of several discounts and managing their priority (Kozin, Ilyin, and Levina 2016).
- CRM-based marketing - data collection, audience segmentation, building a separate scenario for each segment of interaction with the company.
- Creating a circle of your customers using existing social networks - Facebook, Twitter and Vkontakte (Figure 8).

4. Discussion

Thus, the architecture of the services of the system of interaction with consumers of chain trading companies can be presented in the following form.

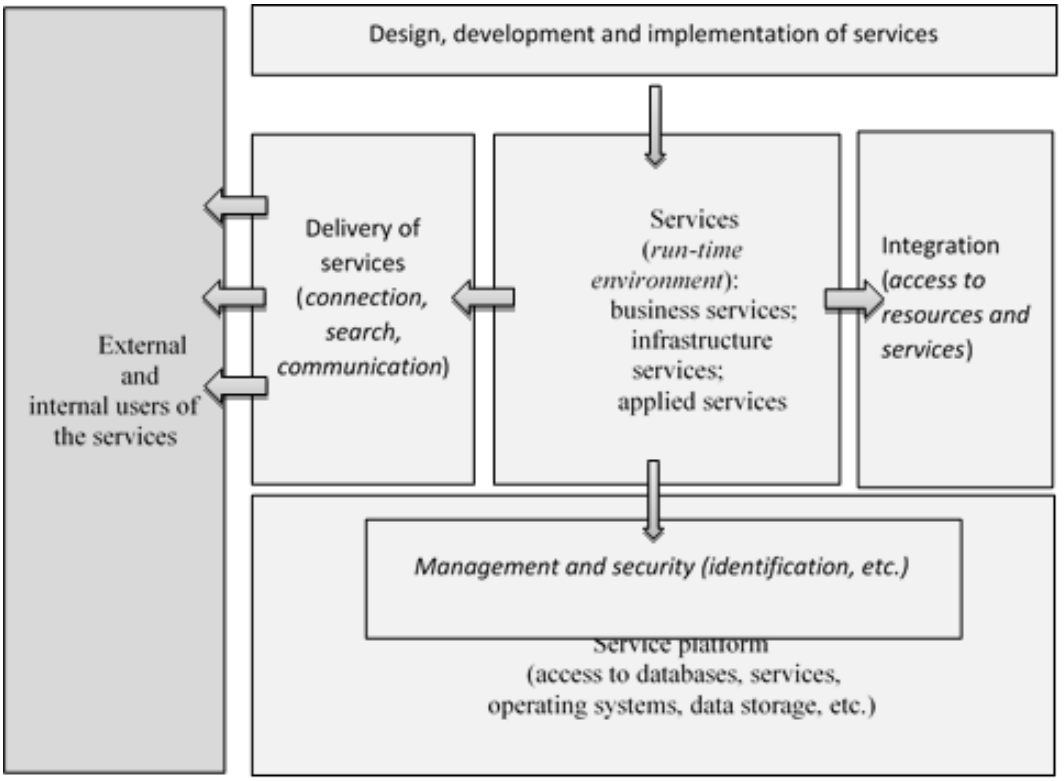

Figure 9. Architectural model of the business services in the system of the consumers interaction within the chain trading companies.

When evaluating the life cycle of business services of the chain trading companies, the following steps should be taken into account (Korchagina, Desfonteines, and Strekalova 2020; Pirogova et al., 2019; Irina A. Krasyuk et al., 2018):

- designing a business service;
- development of a business service;
- implementing a business service;
- operation;
- analysis of business service;
- business service optimization.

The practical use of this architectural model in the design and development of new business services for interaction with consumers will ensure the smoother adaptation of this area of business to the environment, since digitalization has already significantly changed and continues to change consumer behavior (Figure 9).

The digitalization of the economy and the rise of information technologies inevitably lead to the merging of digital and classic technologies in the FMCG segment, so only the timely introduction of new popular business services based on information technology tools will allow you to achieve your goals, increase efficiency, master new sales channels and maintain your niche in the highly competitive chain trading companies.

Conclusion

In accordance with the developed classification and architectural model of chain trading companies, Figure 7 shows the main stages of forming a system of requirements for the architecture of services.

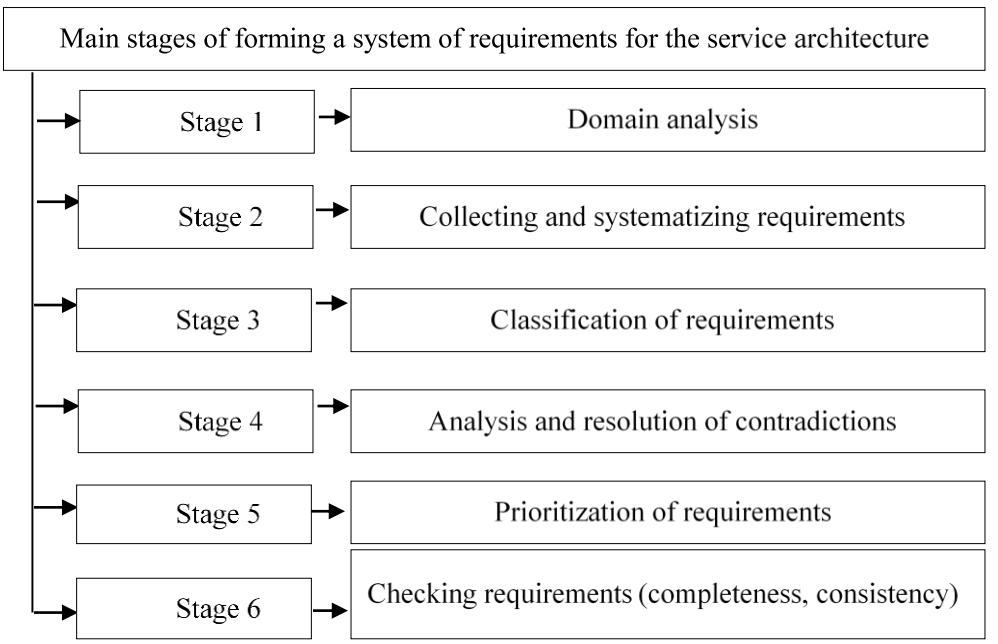

Figure 10. Main stages of forming a system of requirements for the architecture of chain trading companies' services.

When forming requirements for the architecture of a service system based on the proposed classification, it should be taken into account that these requirements are general and are subject to greater specification and implementation in a specific architectural solution during development (Figure 10).

The evaluation of the subject area it is necessary to conduct a more complete clarification of classification requirements, analyze and classify identified during the analysis of contradictions, and to prioritize the demands presented.

It should be noted that checking the requirements for the architecture of the service system, determining their completeness and consistency, must be performed at all levels of business services, application and information services of chain trading companies.

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Chapter 23

Blockchain in Retail: Development Prospects and Implementation Issues

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Abstract

This article considers the development prospects and blockchain implementation in retail in the Russian Federation. The research focuses on the opportunities and advantages of blockchain and analyzes the pilot implementation projects and the central outlook for using blockchain. The article also studies the main factors hindering the use of blockchain to implement the main business processes in Russian trade. As a result, the research identifies the critical directions of using the decentralized model of blockchain in trade, which is especially relevant when trade is undergoing significant changes due to various economic, political, technological, information, and other factors. Presently, blockchain implementation in trade is mainly focused on logistics, secure payment operations, customer identification systems, and loyalty programs. In this regard, the chain trading companies should pay special attention to the difficulties arising in the areas mentioned above.

Keywords: digital transformation, information technology, blockchain, decentralized management model, distributed databases, retail, network trading companies, business model

1. Introduction

Today, trade is undergoing significant changes due to the influence of various economic, political, technological and information, and other factors. However, many factors limit the

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effectiveness of chain trading companies not only in the domestic market but also in the international market. In this regard, blockchain appears to be a comprehensive way out of this situation in trade (Khareva, Voronova, and Khnykina 2020).

Trade has been experiencing a massive demand for the introduction of new technology (Barykin, Bochkarev, Dobronravin, et al., 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al., 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al., 2021). This is explained by the specifics of trading companies, which deal with a large amount of data that must have a storage platform, consequently needing security from unauthorized access. Blockchain meets these requirements a the full extent (Chaudhry and Yousaf 2019; Seppälä 2016). Methods of decentralization by using the blockchain help make the data immutable and transparent. In addition, blockchain offers to exchange this data reliably, eliminating the need for any third parties.

Blockchain implementation in trade is critical because many intermediaries are involved in the usual schemes (Tönnissen and Teuteberg 2020; Yakubov et al., 2018; Neslin et al., 2006; Johnston and Clark 2005).

As a result of the blockchain implementation in trade, this monopoly may be destroyed since the blockchain is an extensive unchangeable distributed database. Due to its security functions and decentralized nature, it can pose a threat to traditional intermediaries. By the ideas stated above, this study aims to determine the main factors hindering the use of blockchain as a tool to implement the main business processes in the Russian trade, as well as to identify the critical directions of using the decentralized model of blockchain in trade (Efanov and Roschin 2018; Vovchenko et al., 2017).

At the present moment, it is too early to talk about the widespread use of this technology in the industry. But such advantages as boosting trust between participants eliminating intermediaries and commission fees will inevitably ensure the rapid development of blockchain.

2. Materials and Methods

This study uses analytical methods, such as description, data grouping, cause-effect analysis, assessment, and forecasting.

These methods made it possible to link random facts about the application of blockchain in the Russian Federation into a single system that corresponds to the authors' concept at the stage of empirical research of the object.

3. Results

It is essential to consider the main directions of using blockchain in trade in the Russian Federation.

Logistics. Blockchain has begun to transform the delivery of chain trading companies. It allows tracking the goods and managing inventory in the warehouse.

This technology provides each product with its crypto-record. Every time a product changes its location, it is reflected in the blockchain. Counterfeit items will not have the original markings (Ilin, Voronova, and Knykina 2019).

Interaction with suppliers and partners. When using blockchain and creating a common information space with partners, costs and risks can be significantly reduce. For example, the "Diksi" group started using blockchain to interact with suppliers and factoring companies. The group has started the commercial operation of the "Factoring" blockchain platform. Retailers transfer all suppliers using factoring to this platform. Their financing is provided by "GPB-factoring," "Pervouralskbank," "Alfa-Bank," "NFK" and other market participants (Treleaven, Brown, and Yang 2017; Chow 2018; Das, Tao, and Cheng 2021). The companies note that the transition to the blockchain platform comprehensively solves the main problems of financing trade, automating the processes for all participants in the transaction. Moreover, large buyers can simplify the process of multi-stage approvals and avoid exchanging calls, letters, and paper documents (Figure 1).

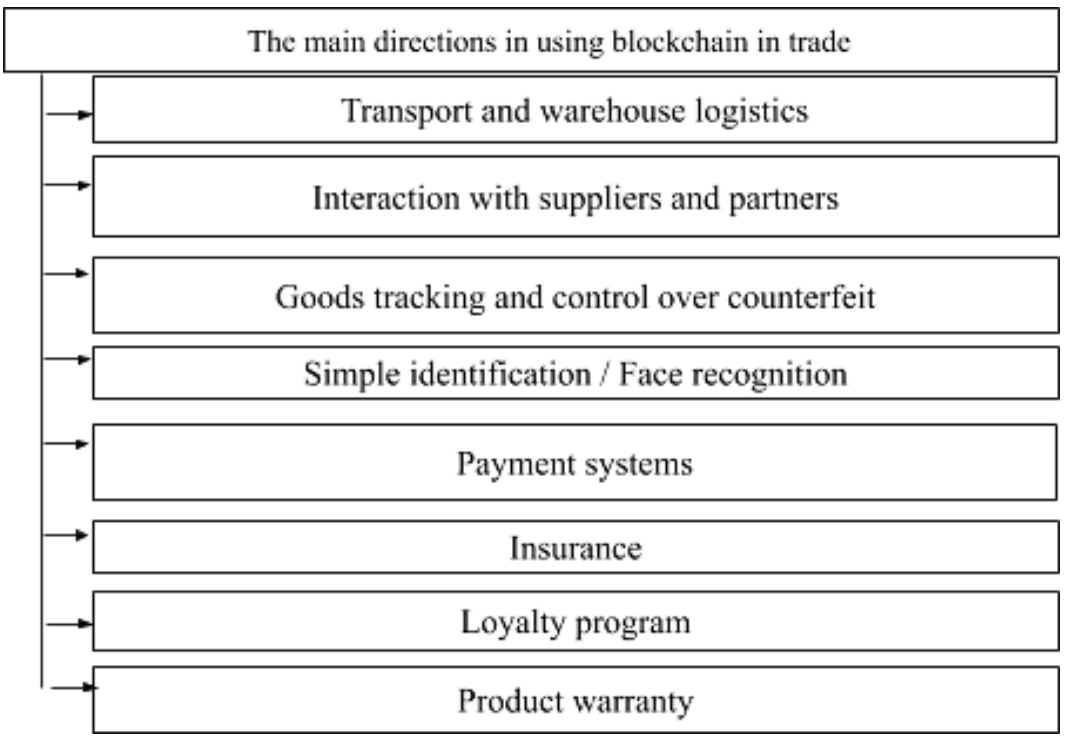

Figure 1. Main directions of using blockchain in trade.

Goods tracking and control over counterfeit goods. If each product is marked with an RFID tag or a simple QR code when produced or imported to the Russian Federation, and information about this tag and the product is entered in the blockchain network, the product can be controlled. For example, one of the largest American retailers - Wal-Mart is implementing blockchain to track the origin of all products and point-to-point recall of damaged products, thereby, reducing costs. Using the blockchain allows Wal-Mart to be constantly aware of who delivered a particular product and from which company. The retailer expects that in case of infection of some part of the products, the blockchain will quickly and accurately track the

source of these products and recall only part, not the entire batch, which will reduce the cost of placing the product (Yoo 2017). Blockchain will also enable the company to deliver products to its stores faster. While currently, it may take retailers several days to identify the manufacturer of a particular product or a specific batch. Blockchain will reduce the time of such search to minutes.

Simple identification / Face recognition Blockchain is used for data storing (images linked to data), while artificial intelligence is used for recognition. The use of biometric technologies and blockchain will significantly simplify the identification procedure. This will dramatically speed up specific business processes since identity can be confirmed by a fingerprint or retinal scan instead of a document (Lewis 2015; Swan 2015).

Payment systems Currently, the advantages of blockchain in processing payment transactions are the most obvious. Thanks to blockchain systems, companies can make transactions more convenient and reliable. Since cryptocurrencies do not belong to any country, there is no need to deal with different currencies and exchanges when traveling abroad.

A large footwear retailer, "Obuv Rossii," will protect the data of customers who purchase goods in installments using blockchain. All data on customer contracts and transactions will be stored in encrypted form in three data centers — in Novosibirsk, Khabarovsk and Moscow. The development is integrated with the 1C-based EPR-system. In addition, "Obuv Rossii" is working on the idea of creating its cryptocurrency. The group's IT systems already have mechanisms for generating cryptocurrency and charging it to customers' cards, along with bonuses. The retailer is not launching the system yet, as it is waiting for the official state's position on cryptocurrencies (Pirogova et al., 2019; Jun 2018; Yuan and Wang 2018).

Insurance. Insurance is another promising area for implementing distributed ledger technology. The new technology can help many industry players cope with competitive challenges, including weak customer interest in insurance products, limited growth in developed markets, and the trend of universal digital adoption.

Loyalty programs. The use of blockchain for loyalty programs is particularly effective when combining several programs and allows partners to get instant access to data at any time (Rashideh 2020; Nam et al., 2019; Kussy et al., 2018; Wang 2018; Karpova and Mayburov 2020). Loyalty as a marketing tool for communication with customers is becoming outdated. For consumers, the value of points is much higher due to their liquidity and potential growth in their value. For participating companies, it will simplify work and reduce costs. The blockchain-based system removes the need for an intermediary, and participants interact directly.

Loyalty. The retail industry relies heavily on incentive programs that help keep customers from switching to competitors. Blockchain will make the process more conscious and practical, allowing regular customers to quickly and transparently interact with representatives of network trading companies.

The goods warranty. Using a serial number or a secure cryptographic seal, companies can track the product's path from manufacturer to consumer. They can access evidence in the immutable blockchain to ensure that the product has passed to the wholesaler, retailer, and buyer. For each product, the manufacturer creates a record in the blockchain. As you move along the supply chain, documents are checked and completed at each point of interaction until the consumer buys the product. When a buyer submits a claim, the warranty company can review the records and track the product's path from the manufacturer to the buyer. This way, companies get proof that the product under warranty is genuine. The absence of fakes in the

supply chain benefits everyone. The lack of fakes protects the manufacturer's brand and the reputation of distributors. Thus, the company providing guarantees is protected from false claims with forgeries. Retailers gain another advantage to increase sales, and customers can be sure that they are not buying a fake.

4. Discussion

The main factors that hinder the use of blockchain in the Russian Federation are observed below:

- Currently, the Russian Federation does not have a legal framework regulating the use of blockchain.
- The real financial sector of the economy, with a significant share of the income being made up of intermediary services, does not show much interest in the development and implementation of this technology, since the active development of blockchain can significantly reduce its profitability.
- With the development of blockchain systems, they require more and more computing power and substantial energy costs, which, in turn, has a very negative impact on the environment.
- Blockchain can be slow and heavy. Due to the complexity of the system built on blockchain, due to the encryption used and the distributed nature of the network, transactions in it can be processed slowly compared to the "traditional" payment systems.
- For businesses in the trade sector, there are barriers to entering the blockchain. Any device can be connected to the blockchain in just a few clicks and purchase tokens. This option will be available even to the most minor players on the market. To form a single blockchain diary, it is necessary to combine the management systems of network trading companies. Encryption will make these processes more secure. Records cannot be falsified or deleted. A public key recorded using the app will allow you to view all public data: transactions, previous orders, and reviews. The authors of the recordings will not be disclosed. This decentralized diary will become a new mechanism and database to store information about companies, offers, and loyalty programs. However, a ready-made decentralized solution with a user-friendly interface is still not available on the Russian market.

The development of new technology inevitably entails a large-scale restructuring of the entire system, affecting the interests of many parties, each of which will have to take on certain risks and costs (Voronova, Khareva, and Khnykina 2020; Ilin Igor, Voronova Olga, and Iliashenko Oksana 2020; Khareva, Voronova, and Khnykina 2020). Several stakeholders already see blockchain technology as a threat to business rather than an opportunity for development. Thus, the Russian Federation is currently in a wait-and-see position.

In the field of trade, the blockchain will be helpful in confirming transactions that occur remotely, verifying the authenticity of transactions, controlling the supply chain, and other

operations. Blockchain makes these processes transparent (Golubev, Ryabov, and Zolotarev 2020; Kaluzhnova, Kosykh, and Frolov 2019).

Blockverify, using blockchain to detect counterfeit goods, provides a higher level of transparency in purchasing and delivering products. Each product is marked with a Blockverify label, which helps verify the origin of the product throughout the supply chain. Product data is stored in the blockchain and is available to consumers at any time to verify the authenticity of the product. Blockverify uses blockchain to verify pharmaceutical products, diamonds, electronics, and luxury goods.

Conclusion

The use of blockchain in retail will ensure customer satisfaction and integration of big data, the introduction of artificial intelligence in the industry, and high-level data protection for the delivery of a decentralized peer-to-peer transaction on the Blockchain platform.

As an example of using blockchain technology in the Russian Federation, we should refer to "Sberbank" and "M. Video." These companies implemented a pilot project using a platform that allows keeping a register of deliveries by the retailer and suppliers for further financing and storing information using blockchain technology. "M. Video" regularly monitors and implements new solutions in all areas: blockchain in payments with suppliers, big data in logistics planning, mobile solutions for sellers.

In retail, the effectiveness of blockchain projects can be pretty high due to at least two circumstances.

Firstly, retail business processes are usually well-algorithmized, which allows them to be performed using a blockchain virtual machine. In particular, this applies to making transactions, processing orders, and performing calculations.

Secondly, there are already well-trained artificial intelligence algorithms that allow you to automate many functions traditionally performed by humans: image recognition, customer identification and consulting, clustering and ranking products, and preparing recommendations for customers.

In the future, blockchain technology will allow the creation of institutions of network trade 3.0, which will inevitably lead to the transnationalization of the trade sphere as a whole.

Despite its rapid growth and excellent prospects, the trade sector is experiencing many problems. First, chain marketing companies need to reduce costs and improve customer service.

Blockchain platforms offer a way out — a transparent, decentralized network where suppliers of goods and services and consumers do not have the opportunity to provide false information to each other or fail to fulfill their obligations.

The combination of artificial intelligence and blockchain promises to provide such changes. Thanks to a decentralized approach, data can be quickly and freely distributed among different companies, making business processes more transparent.

Presently, the implementation of blockchain in trade in the Russian Federation is focused on four key areas: logistics, secure payment operations, identification systems, and loyalty programs. In this regard, the chain trading companies should pay special attention to the difficulties arising in the areas mentioned above.

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Chapter 24

Features of Logistics Transformation in the Context of Industry 4.0

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Abstract

The article describes the results of some research conducted by the authors in the field of logistics in the context of the global economic crisis and their impact on the implementation of Industry 4.0. The significance of specific factors that affect the level of competitiveness of the state in the conditions of transformation is determined. In addition, the main features of Industry 4.0 are identified. The main trends in the patterns of its development are presented. The primary limitations that slow down the growth of logistics approaches and digital transformation are considered. Conclusions are made about the future of logistics in the conditions of widespread implementation of the principles of industry 4.0. The article provides new efforts of digitalization conclusion in logistic trends and functions of economic agents in the market field co-operation under the influence of high volatility non-stabile dynamic fields by mathematical described models. It basically approved by the various valuations ways for short-term business alive national and many companies estimated choices in post-pandemic crisis world economy development, decreases rescues of intermediary influences of transportation and production cycles, cuts costs range operation road maps issues.

Keywords: logistics, global economy, business process transformation, global labor market, employment, automation

1. Introduction

Increased attention to the fourth industrial revolution is due to the increasing importance of new technologies and technological solutions, reflected in the number and control of ongoing

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transformations of delivering goods and services to the end-user in a 24/7 format. Further evolution of ERP (Enterprise Resource Planning), MRP (Manufacturing Resource Planning), SCM (Supply Chain Management), and Open Book of services requires not only transparency, diversification, and analytic database management products and services, but also developing innovative logistics of the future, linear and complex functions simultane-ously, depending on the specific chain in advance of any information on the market and outside it.

The global economic crisis, amplified by the pandemic, revealed the following significant challenges in technology transformation:

- Slow speed of transition to the digitalization of end-to-end business processes between enterprises from different sectors of the economy;
- Low level of technological solutions that allow organizing work on B2B, b2c (business to business, business to customer) interaction, both separately, and harmonizing and rationalizing these interactions permanently;
- Lack of balancing technologies for the development of various sectors of public life;
- Loss of traditional jobs with low-skilled staff;
- The emergence of qualitatively new professions that require universal knowledge from employees.

2. Materials and Methods

The primary research methods are analysis and evaluation of the effectiveness of digital technologies their impact on the level of competitiveness of the state (Barykin, Bochkarev, Dobronravin, et al. 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al. 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al. 2021).

The analysis of reports of domestic and foreign consulting companies on the digital transformation of business processes in the world's leading companies.

Using such research methods as monographic, data synthesis, comparative, graphical representation of data, a strategic analysis of the transformation of business technologies in the logistics activities of modern enterprises is carried out.

The study identified the main features and stages of transformation of logistics technologies in the new world economy.

Let's take a closer look at each of the presented methods.

2.1. Analysis and Evaluation of the Use of Digital Technologies

Various studies show that in 2020, about 53% of the world's population will have access to broadband Internet (Internet Live Stats.com 2016; MCMC 2018). For comparison, ten years ago, only 31% of the population had access to the Internet. The integration of new technologies and solutions allows States, businesses, and people to quickly benefit from improved living standards, transparency, and profits. At the same time, the Internet is an essential condition for controlling flows in the markets of various technologies, including labor flows.

Representatives of the world economic forum point out that the competitiveness of national economies is determined by a variety of institutional factors. Still, on an equal basis with them, other factors may be crucial, among which access to new technologies and knowledge is essential. The Internet also helps to expand such access. According to the GCI (Global Competitiveness Index) calculated by the World Economic Forum, Russia is in 43rd place.

The International Institute for Management Development (IMD) publishes its digital competitiveness rating. This rating reflects the readiness of countries to implement digital technologies in the lives of the state, society, and business. The Russian Federation ranks 38th in this list ("Flexibility and Adaptability Key to Digital Success: USA Top, Asia Grows in Strength in IMD World Digital Competitiveness Ranking | IMD News," n.d.).

Let's compare the positions of some States according to IMD and GCI ratings (see Table 1).

Table 3. Comparison of the positions of some States according to IMD and GCI ratings from the World Economic Forum

	IMD		GCI	
Country	**2019**	**2018**	**2019**	**2018**
USA	1	1	2	1
Singapore	2	2	1	2
Sweden	3	3	5	4
Denmark	4	4	10	10
Switzerland	5	5	8	9
Netherlands	6	9	4	6
Finland	7	7	11	11
Hong Kong SAR	8	11	3	7
Norway	9	6	17	16
Korea Rep.	10	14	13	15
China	22	30	28	28
Russia	38	40	43	43

As can be seen from the table below, overall trends are similar, despite some differences in calculating indicators. Nevertheless, the data obtained in this way are subject to comparison and allow us to draw several conclusions: new technologies and solutions play a vital role in the economic development of the state and society, and new logistics, cross-border and transnational chains are measured in terms of manageability, reliability and high flexibility of the participants themselves in the supply of knowledge, goods, and services.

2.2. Analysis of Reports of Major Consulting Companies

The Boston Consulting Group, a member of the "big three" consulting companies along with McKinsey and Bain, conducted research on the activities of the world's leading companies in the fourth industrial revolution. Evaluation of the reports of these corporations allowed us to present the data obtained in the form of Table 2.

Modern technological changes dramatically affect the current state of things. The fourth industrial revolution affects both labor markets and social relations.

Table 2. Impact of the Fourth industrial revolution on indicators [compiled by the authors]

Indicator	**The effort of indicator**
Productivity	Digitalization allows accelerating the production process
Revenue growth	Cost reduction leads to revenue growth
Employment	In the short term, employment is projected to decrease due to low-skilled personnel. They will not be needed by smart factories. However, the demand for qualified personnel will increase. In the long term, low-skilled personnel will regain their jobs in the process of retraining.
Investment	The introduction of new technologies creates a need for investment

Recently, the topic has been intensively studied in the scientific community and discussed in the media. Bots, machines, networks, and computers will replace up to half of the jobs in developed countries. Following the reduction of low-skilled personnel, there will be a demand for highly qualified personnel. The scale and impact of changes in industry and production are global. Progress, of course, leads to changes in the labor markets, and after that, changes will be required in education. Automation has already changed many industries. First of all, the destructive effect was felt by lagging industries and workers with low qualifications. It can be concluded that while developing industries benefit significantly from the digitalization of processes, fading ones only lose.

The OECD (Organisation for Economic Co-operation and Development) estimates that almost 10% of jobs could be automated in the coming year. A quarter of all jobs will be severely affected by digitalization. Significant changes are taking place in the world labor organization. According to the ILO (International Federation of Robotics 2017; International Labour Office 2017), there are significant changes in both the structure of work types and the gender structure of employees, and if previously these trends were only outlined, then in the context of the pandemic they have increased and become more apparent. The Covid-19 health crisis, which snowballed into a significant economic and labor market crisis, is likely to reduce working hours by around 10.7 percent in the second quarter of 2020 relative to the last quarter of 2019, which is equivalent to 305 million full-time jobs (ILO 2020) (Bárcia De Mattos et al. 2020). Back in the works by Frey and Osborne (Frey and Osborne 2017), it was noted that automation has the potential to replace up to 47 percent of jobs in the United States, 55 percent in Cambodia, 70 percent in Nepal and 80 percent in Ethiopia in the next decade or two (see World Bank 2016) ("World Development Report, 2016: Digital Dividends" 2016). McKinsey (Bughin et al. 2017) count such factors as costs, llabormarket dynamics, and regulations, suggesting that between zero and 30 percent of hours worked globally could be automated by 2030.

2.3. Strategic Analysis of Technology Transformation

The modern concept of Industry 4.0 consists of cyber-physical systems, the Internet of things (IoT), the Internet of services (IoS), and Smart factories.

One of the main features of the fourth stage of the industrial revolution is the integration of "cyber-physical systems" into factory processes. It is assumed that these systems form a network within which they will interact, perform production processes and bring the product to the consumer in an Autonomous mode, that is, without human participation.

Industry 4.0 is based on the following principles:

- the interaction of humans and technology;
- transparency of information;
- assistance in production provided by the machine;
- autonomy and independence of the system from the person.

Key features of Industry 4.0 (Kagermann, Wahlster, and Helbig 2013; Kapustina et al. 2020; Korchagina, Bochkarev, et al. 2019; Korchagina and Desfonteines 2019; Korchagina et al. 2020; Korchagina, Naumova, et al. 2019; McGann and Sabatini 2010; Binder 2016):

1. Compatibility. The German electronic and information technology Commission DIN and VDE (abbreviation of German titles: German Institute for Standardization, Association of Electrical Engineering) recognized this need and published a road map in 2013. In the context of a Smartfactoryklink factory ("Startseite | SmartFactory-KL," n.d.), compatibility means that all XP (extreme programming) within the factory (blank carriers, Assembly stations, and products) can interact with each other "through open networks and semantic descriptions".
2. Virtualization. We are creating a virtual copy of the physical world.
3. Decentralization. Thanks to the system's technologies, I will be able to make decisions independently, meaning there is no need for centralized management.
4. Availability in real-time. Data is collected, compiled, and analyzed immediately online.
5. Humanorientation. The implemented technologies are designed to facilitate human labor (Coff and Raffiee 2015; Neffke, Otto, and Weyh 2017).
6. Modularity. Modular systems can be easily adapted in seasonal fluctuations or changes in product characteristics. Based on stanNew modules are defined automatically based on standardized software and hardware interfacessed immediately via IoS.
7. Growing disintegration and criminalization of the world economy. The concentration of offshore companies. Formation of "grey zones" between national States, transnational companies (TNCs), and clusters that acquire a spontaneous, sectoral and alter-globalist orientation.
8. The fall of the cultural and civilizational braces rails in most national States. The loss of part of national sovereignty is transferred to the power of supranational governance structures. We are creating cryptocurrencies and criminal shadow markets for "anything–to-anyone" sales.
9. Return to the ideology of Bretton woods-2.0. for the leaders of the world economy and countries that can ensure national self-sufficiency and defend self-identity in the main trends of cosmopolitanism and global unification of goods, ideas, and labor resources.
10. Moving away from the traditions of key performance indicators oriented management to personal motivation and collective orientation in the growing cross-border flows of goods and services, labor, and capital markets. Globalization and sovereignty of national security branches in isolation or with fewer orientation trends to external criteria in favor of their self-organization and concentration of components of the basic level of autonomous management capabilities of the national economy.
11. Reformatting by global TNCs of final delivery systems and networks for distributing goods, services, knowledge, and competencies.

12. the Growing wave of mergers and acquisitions of the post-tandem recovery of the world economy, a new concentration in the redistribution of assets of newly formed strategic alliances of global and national type.

Currently, the industry of most countries of the world is developing, focusing on the trends of the new industrial era. Changes affect all processes-from product design to delivery and maintenance. Integration and digitalization are related not only to the internal processes of the company but also to external ones, such as interaction with suppliers, customers, etc.

Countries are already developing their own independent industrial development strategies. In the Netherlands, there is a "Smart Factory" program. The UK implements the High-Value Manufacturing Catapult program. The Russian Federation has a national technology initiative, and the United States has an industrial Internet Consortium, etc.

2.4. Main Stages and Features of Logistics Technologies Transformation

Logistics transformation stages:

At the first stage of logistics development (at the beginning of the past century), there was an understanding of the importance of distribution processes in implementing sales. The primary operations and functions were executed separately (fragmented) in procurement, production, and distribution.

At the second stage (in the 1960s and 1970s), the conceptualization of logistics took place and its partial integration, thanks to the development of the concept of marketing and the formation of a buyers' market.

At the third stage of logistics development (which can be described as the period from 1980 to the early 1990s), integration within the enterprise took place. This was facilitated by the introduction of automated control systems for technological processes, the overall development of logistics concepts, the development of regulation of transport activities in many states, the spread of the philosophy of total quality management, and the globalization of the market.

At the fourth stage (which began in the late 1990s), there was integration into the supply chain, within the framework of which relations with consumers, intermediaries, and suppliers develop directly in the course of order fulfillment.

The fifth phase that we are witnessing essentially involves the convergence of all participants in the supply chain through the development of information technology.

Let us consider in more detail the main features of the transformation of logistics technologies that are inherent in the current stage of logistics development in the conditions of Industry 4.0 (Kapustina et al. 2020; Korchagina, Bochkarev, et al. 2019; Korchagina and Desfonteines 2019; Korchagina et al. 2020; Korchagina, Naumova, et al. 2019):

- Integration of technologies in all spheres of society and economy. Digitalization is the reason for creating large amounts of economically significant industry and intersectoral data. At the moment, there are a vast number of platforms aimed at maintaining and providing various markets.
- Digital transformation of agriculture. Humanity cannot do without a new type of agriculture, which corresponds to the model of a circular (waste-free) economy and

the principles of sustainable development, to avoid severe problems in food and physical security (Rogova 2019; Rogova et al. 2019).

- Online trading. E-Commerce provides a direct and fast connection between the consumer and the supplier of goods and services.
- Digitalization of communications and platforms. Users are already more likely to use various media, services, and services in electronic form than the communication itself.
- Digital transformation of transport and logistics. Digital logistics will provide more convenient delivery to the end-user and improve the quality of delivery on the "last mile" section. The introduction of digital logistics will help circumvent logistics risks, especially during the coronavirus pandemic. The complexity of e-Commerce logistics is created primarily due to the faster pace of formation and implementation of supply chains of goods than in traditional trade.
- The financial services industry. The field of financial technologies refers to innovative technologies used to provide financial services. The main components in the field of financial technologies: are payments and transfers, crowdfunding, asset management, financial marketplace, blockchain.

3. Results

The digital economy is the next stage in developing the world economy. Judging by the level of popularization of the Internet and digital technologies, they certainly impact the world economy, affecting all sectors of the economy and life and certainly changing them.

Digitalization brings both challenges and threats, but above all, it creates new needs, offers, and solutions and diversifies the significance of various traditional industries. Digitization is being implemented in all areas of life: public transport, education, educational institutions, logistics, businesses, and other areas of human life. The need to implement these systems is obvious to the world now against the background of the COVID - 19 virus pandemic.

The global economic crisis caused by the pandemic is partly the result of the slow progress of the fourth industrial revolution – if businesses around the world had already been digitized, the damage from the virus outbreak would have decreased significantly, and the balance of life of national States would not cause so many questions now.

This can be seen in companies that operate on the Internet. During the pandemic, such economic entities did not lose and earned money because all their competitors, traditional enterprises, temporarily stopped their activities and lost their competitive positions.

One of the main problems and one of the main challenges of industry 4.0 is the loss of jobs, the emergence of a new trend of professions, and the reduction of the number of low-skilled personnel in the industry. If 10-20 years ago people laughingly perceived the scenario of the future, in which robots will replace people, now this scenario is more than real. Through Information and communication technologies (ICT) and Nano-bio-info-cogno-social-convergence (NBICS), the impact changes the paradigm of other International economic relations (IER).

Accordingly, in order not to fall under the wave of potential acquisitions or remain an attractive partner for strategic alliances, companies around the world are trying to reduce costs,

which, as we know, can be reduced at the expense of labor: layoffs, staff reductions, lowering costs and creating shorter and simpler logistics chains between national and global markets.

Increased attention to the fourth industrial revolution is due to the increasing importance of new technologies and technological solutions, reflected in the number and control of ongoing transformations of delivery of goods and services to the end-user in a 24/7 format. Therefore, further evolution of ERP, MRP, SCM, and Open Book of services requires not only transparency, diversification, and analytic database management products and services, but also the creation of fundamentally new logistics future - linear and complex functions at the same time, depending on the specific link of each chain to promote any information on the market and outside it. Various studies show that in 2020, about 53% of the World's population will have access to broadband Internet. For comparison, ten years ago, only 31% of the population had access to the Internet. The integration of new technologies and solutions will allow States, businesses, and people to quickly benefit from improved living standards transparency of operations and profits. In this case, however, the Internet is an essential condition of control of the flows in the markets and within labor migration personnel, including the "brain drain", forcing the company to fight for the originality of any step out of the creative base, each chain excluding post-pandemic calls that are not controlled in time will lead to the attenuation of the generation of profits and degradation of the segment of the market high volatility involved in the process of economic entities.

4. Discussion

An exciting research approach that should be explored further is how the findings from studies on earlier technological shifts can be used to support the research of logistics in the context of Industry 4.0. One example of this approach is the review (Kapustina et al. 2020), where authors examine how existing literature on logistics can support the current stream of research. In addition to the existing stream of research on lean automation, another exciting field to explore is radio frequency identification (RFID) technologies and lean manufacturing. Parts fitted with an RFID chip can, by using tracking equipment, be traced throughout the supply chain that might help overcome several of the stated lean implementation barriers.

Researchers are therefore encouraged to, in addition to the other areas outlined above, investigate existing knowledge in adjacent regions to discover how existing findings, propositions, and theories can be transferred to logistics in the context of the Industry 4.0 setting.

Conclusion

In this article, we have reviewed some reflections on the most important aspects necessary for the development of Logistics in the context of Industry 4.0 and some of the problems that arise in this process. Modern logistics in Industry 4.0 is a convergence of many technologies, including cyber-physical systems, software, and human support. Thus, modern logistics must be supported by intelligent systems embedded in software and databases, from which relevant information is provided and transmitted through the Internet of Things (IoT) systems. Special

attention in the future will be paid to new flexible and highly efficient models that will better meet customers' individual needs, contributing to a significant improvement in the quality of decision-making.

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Chapter 25

How Blockchain is Revolutionizing Supply Chains: A Literature Review

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Abstract

The chapter presents a literature review of scientific papers devoted to the impact of blockchain on logistics and supply chain management. The importance of this research topic is related to the fact that logistics and supply chain management are among the most important factors influencing the growth of global GDP and international trade. Therefore, the introduction of innovative tools for increasing logistics efficiency, one of which being blockchain, is nowadays extremely important. The research methodology has involved the selection of the most cited publications on the impact of the blockchain technology on logistics and supply chain management. The results of the study allowed us to identify the main promising areas of application of blockchain technologies in logistics, which include the supply of food, pharmaceutical, luxury and collection goods, as well as in the international logistics and trade. In addition, the paper has summarized the main advantages, disadvantages and limitations of using the blockchain technologies in logistics and supply chain management.

Keywords: blockchain technologies, logistics, supply chain management, international trade

1. Introduction

The volume of the world trade is constantly growing. As shown by the data of the World Trade Statistical Review, the growth rate of the world trade over the ten-year period from 2008 to 2018 was approximately equal to the growth rate of world GDP. Both have increased by 26% since 2008 (Bruno 2019) (Figure 1). Obviously, this growth requires the corresponding development of a number of economy sectors associated with the world trade and

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manufacturing. Transport and logistics are the most significant sectors for this development process.

The growth of global trade and manufacturing is leading to an increased importance of logistics and supply chain management. It is logistics that allows manufacturing and trade enterprises to create effective supply chains that ensure the availability of the right product in the right place, at the right time, in the right quantity, with minimal costs and at an acceptable price for the buyer. However, meeting the increased needs of world production and trade requires improved logistics and the introduction and adoption of innovative technologies in supply chain management.

Therefore, logistics is today one of the locomotives for the development of the Industry 4.0. A number of experts argue that logistics plays a key role in transforming the modern economy. For example, Tang and Veelenturf identified three areas of the positive impact of logistics on the modern economy: improving the competitiveness of enterprises, creating social value, and promoting sustainability (Tang and Veelenturf 2019).

The authors have highlighted several modern technologies that are seriously changing the logistics landscape. The main ones are the following: additive manufacturing (e.g., 3D printing), artificial Intelligence (AI), advanced robotics, Internet of Things (IoT) drones, and blockchain. Improving the competitiveness of enterprises is achieved by increasing efficiency through robots, reducing transaction costs, and increasing reliability and speeding up delivery by using drones and delivery robots.

The creation of social value is realized in various ways: through a quick and safe response to natural disasters (e.g., through the use of drones), by improving access to medical care through special smart devices, increasing productivity in agriculture through drones and smart sensors, facilitating the ability to track the origin of goods using blockchain, improving people's mobility using smart transportation technologies, developing autonomous transport technologies, improving public transport systems, developing smart home technologies, smart grids, smart retail, smart cities, etc. (Kapustina et al., 2020; Desfonteines and Korchagina 2019; Vilken et al., 2019; Bril, Kalinina, and Ilin 2017). An important result of the use of innovative technologies is the ecologization of logistics.

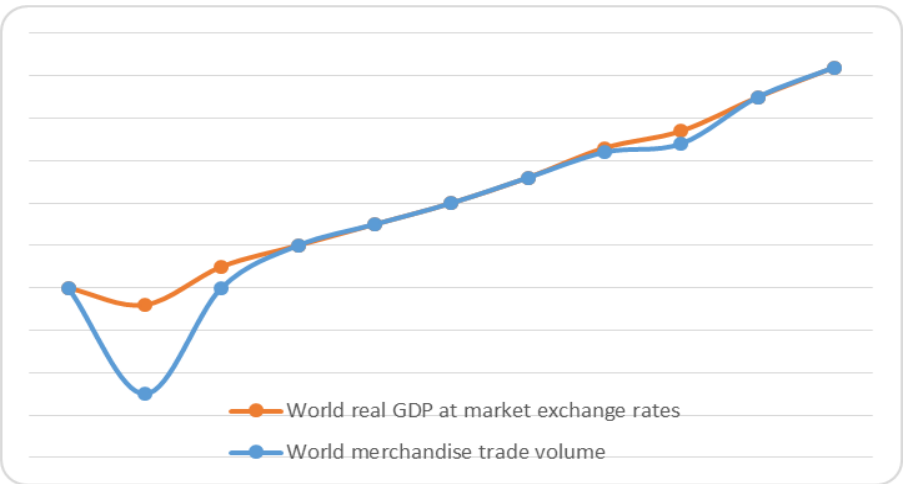

Figure 1. The world merchandise trade volume and real GDP at market exchange rates, 2008-2018(Indices, 2008 = 100) (Bruno 2019).

As an enabling factor in achieving sustainable development, logistics can contribute to the conservation of endangered species of plants and animals using drones and artificial intelligence technologies, reducing waste in agriculture using drones and data analysis, reducing emissions using smart transport, and maintaining the supply of high-quality products by using blockchain (Korchagina and Shignanova 2018a; 2018b). Thus, the directions of the impact of modern, newly developed technologies on improving logistics processes are efficient and very diverse. Among all these technologies, blockchain proves to have a remarkable impact and therefore occupies an important place among them.

Despite the fact that the blockchain technology appeared recently (the first blockchain publication was published 12 years ago (Nakamoto 2008)), it is today one of the most innovative and promising technologies that seriously changes market landscapes, company business models and partnership systems. Blockchain appeared as a tool for solving financial problems, but this technology turned out to be quite promising in other economic sectors as well like healthcare, trade, and logistics. In our study, we focus on using the blockchain technology in logistics and supply chain management.

2. Materials and Methods

Today, the use of blockchain in supply chains is gaining increasing attention in academic science. Many publications consider the advantages and disadvantages of the blockchain for solving logistics problems. However, there is a lack of review of the scientific literature on the blockchain impact on logistics and supply chain management. In this paper, we want to close this gap and provide a review of the literature on the use of blockchain in logistics and supply chain management. We present an overview of the most significant publications in this field, selected on the basis of Scopus by citation criterion.

3. Results

We start with a review of the Gurtu and Johnyarticle, which provides a quantitative analysis of publications on the use of blockchain in supply chains from 2016 to 2018 (Gurtu and Johny 2019). The results have shown, on the one hand, a significant increase in research in this area (from 1 paper in 2016 to 21 papers in 2018), and, on the other hand, the unevenness of research areas. Thus, the overwhelming majority of investigations concerned supply chain management, transportation was in the second place, and logistics in the third. At the same time, the number of publications on the use of blockchain in a number of other areas was significantly higher: 71 articles were published in the security sector, and 45 in banking and finance (Gurtu and Johny 2019). The authors highlight such advantages of using the blockchain as data security, reducing financial and banking risk, and increasing transparency supply chain and administrative operations, digitalization of workflow, as well as the ability to eliminate fraud and manipulation. Among the factors that can create obstacles to the implementation of the blockchain in organizations, the following are highlighted: the level of competence and understanding of the technology, the cost of implementation and the effectiveness of the

technology, its safety and confidentiality, the organizational culture of the enterprise, and government regulation.

The Tijan et a article identifies four main areas of use for blockchain in logistics: simplifying document flow, struggle against infringement production, ensuring product traceability along the supply chain, and maintaining the Internet of things (IoT) (Tijan et al., 2019). Among the advantages of the blockchain technology, the authors highlight the transparency of operations, the decentralization of procedures, and the safety of processes. In addition, blockchain can reduce or eliminate fraud and errors, improve the quality of management, reduce costs, and also contribute to sustainability and environmental friendliness by optimizing logistics and transport processes. As a result, the authors conclude that there are serious prospects for introducing and adopting the blockchain technology in logistics and supply chain management.

The Montecchi, Plangger and Etterarticle is devoted to the use of blockchain as a tool to confirm the place of origin for goods (Montecchi, Plangger, and Etter 2019). The authors indicate that the blockchain technology has the unique characteristics of advanced traceability, certifiability, trackability, and verifiability. Thanks to these characteristics, buyers and other participants in the supply chain are able to significantly reduce a variety of risks: from financial risk, through psychological, social, and performance risk, to physical risk. Such risk reduction is achieved through the provision of information on the origin, authenticity, storage and value of the goods (origin, authenticity, custody, and integrity). This information gives customers and companies' business partners guarantees of quality and compliance with the requirements, and increases confidence in the product, supplier and other participants in the supply chain as well. Like other researchers, the authors of this article emphasize the importance of the blockchain technology in reducing purchasing risks in luxury goods and collectible goods trade, as well as in pharma products.

In the Helo and Haoarticle, four main sectors of the application of blockchain technologies are identified: manufacturing, retail, healthcare and finance (Helo and Hao 2019). In each of these sectors, blockchain has a positive effect on the control of tangible and intangible assets, tracking the authenticity and identity of documents, and verifiability of transactions. In this way, blockchain improves the overall quality of the supply chain, reduces cost, delivery time and risks, increases trust and protects against unauthorized access to transaction records, and provides information exchange and synchronization, as well as smart contracts. Blockchain allows the formation of socially sustainable supply chains, providing control of the origin of raw materials and goods distribution procedures. In addition, blockchain provides security monitoring of transportation conditions (tracking and tracing). Also, the joint use of blockchain and IoT allows companies to create new and increase existing intellectual assets. The combination of blockchain technology and IoT enables the creation of digital twins of real logistics processes that provide real-time tracking of goods distribution processes. However, despite all these advantages, the authors highlight several difficulties and obstacles concerning its practical implementation. Among the main ones, they identified the following: a long development and implementation cycle; strong requirements regarding the competencies and skills of specialists implementing it and, accordingly, their high cost for companies; strong requirements and high cost of the information infrastructure providing the blockchain; and disclosure of confidential data to partners, which requires the creation of certain boundaries for the use of technology.

The Perboli, Musso and Rosano paper is devoted to modeling the process of implementing the blockchain in real supply chains (Perboli, Musso, and Rosano 2018). The authors choose the well-known Canvas business model as the basis for this description, slightly modified for project purposes. As in the original Canvas model, there are nine elements adapted to describe the implementation of the blockchain: decision makers; constraints; decisions: information & resources; users/decision makers relationships; users (actors involving in the solution); channels; goals/objectives; costs. The analysis allows the authors to conclude that blockchain has a high potential for being used in supply chains.

Schmidt and Wagner consider the topic of interaction between supply chain participants in the implementation of blockchain technology (Schmidt and Wagner 2019). In their analysis, the authors rely on the theory of transaction costs and analyze the influence of blockchain technologies on two key factors of the transactional interaction of the parties: opportunism and limited rationality (O'Brien and Williamson 1976). Limited rationality is associated with the inability to make an optimal decision due to a lack, or uncertainty of information. Opportunism characterizes the desire of the transaction parties to satisfy self-serving personal interests at the expense of the partner. The authors believe that the blockchain successfully fights with both negative factors. Firstly, the blockchain ensures transaction transparency by providing information on market prices and transaction history, and also assumes the role of verifying the transaction. Thus, the blockchain reduces the impact of uncertainty and ensures the rationality of decisions. Secondly, the blockchain eliminates the need for personal trust for partners, since the platform itself, based on smart contract technology, limits opportunistic behavior, determining the parameters of the transaction and ensuring their execution. As a result, the authors expect that the influence of the blockchain will allow, on the one hand, to reduce transaction and management costs in the supply chain, and, on the other hand, to facilitate the deal making on more attractive conditions for companies due to the simplicity of checking the blockchain platform with the interaction parameters and business history of the partner. Therefore, the blockchain provides greater certainty and economic rationality of decisions in supply chains.

Tönnissen and Teuteberg conducted research investigating the elimination of intermediaries/middlemen in the supply chain through the implementation of the blockchain technology (Tönnissen and Teuteberg 2020). The paper relied on case studies of the ten most famous blockchain applications: Origin Tracking, Ocean Freight, Cargo Chain, Agri-food, Agridigital, Animal product, Open Bazaar, Cognizant Retail, Everledger, and Life Crypter. The analysis leads the authors to unexpected conclusions. Despite the obvious advantages of the blockchain technology in terms of ensuring transparency and disclosure of information to participants in the supply chain, blockchain does not reduce the number of intermediaries participating in the chain. In seven out of ten analyzed cases of blockchain applications, mediation remains, but their roles were modified for a new service provider for the supply chain. In the further two cases there were initially no intermediaries, but, as the authors have pointed out, the supplier may become an intermediary over the period of time during which the development of blockchain takes place. In the last case, the blockchain simply replaces one intermediary with another. Thus, overall, the elimination of intermediaries from the supply chain did not occur, but the companies and the functions in the supply chains have been changed.

The Pournader et al., article presents an analysis of existing publications on the use of blockchain technology in logistics and supply chains (Pournader et al., 2020). The authors identified 48 key articles in this field and four thematic clusters: Technology, Trust, Trade and Traceability/Transparency. In each of the clusters, the main directions of using blockchain in supply chains, as well as transport and logistics management, were identified. In the Technology cluster, from the point of view of the influence of the blockchain on the supply chain, IoT compatibility and increased security (elimination of counterfeit goods) were highlighted. Also, there were three important directions from the point of view of transport and logistics management: the synchronization of processes in transport and logistics facilities, controlling the physical characteristics of goods in the process transport using IoT and smart contracts, and ensuring secure communication between vehicles. In the Trust cluster, from the point of view of the supply chain, there were two key points: decentralization through blockchain and cloud technologies, and transaction confirmation. The authors have also mentioned increased trust between transport companies through the sharing of transportation data as a main issue from the point of view of transport and logistics management. The Trading cluster indicates peer-to-peer (P2P) technology for the interaction of supply chain participants (leading to increased efficiency), as well as the use of cryptocurrencies to facilitate financial transactions and finance supply chains. Moreover, in this cluster there were mentioned blockchain-based trading applications, product compliance monitoring, financing of operations, cross-border trading operations under the One Belt One Road (OBOR) project from the point of view of transport and logistics management. Finally, the Traceability/Transparency cluster is dedicated to ensuring sustainable and ethical operations in the supply chain, as well as tracking and security in supply and cargo insurance in the transport network. Among the limitations of the blockchain technology, the authors of the article identify a relatively low throughput (transaction volume), delays in processing information (the time it takes to add information to the blockchain), and restrictions on the size of information transmitted per transaction. The blockchain is oriented towards high-value transactions, while in the supply chains transactions with large volumes prevail. However, the blockchain is not fit for the second type of transactions. Furthermore, the authors mentioned the lack of communication between different blockchain systems, and the incompatibility of various systems with each other as well. Another important limitation is the immutability (the key idea of the blockchain), which means that erroneously entered data will be irreversible (they cannot be deleted). Finally, the authors noted the high cost of technology, problems with confidentiality and complexity of implementation.

In the article “Making sense of blockchain technology: How will it transform supply chains?” the authors analyzed the importance of blockchain technology in supply chains based on a series of in-depth expert interviews (Wang et al., 2019). The experts were representing logistics or IT areas, have been holding leadership positions in companies and had more than 10 years of experience. During this research project 14 respondents were interviewed. Cognitive mapping and narrative analysis based on the results of in-depth interviews allowed the authors to answer three key research questions: what are the advantages of blockchain for supply chains, what are the problems in using the blockchain technology, and what may be the difficulties of disseminating the technology in supply chains. Among the areas in which the development of blockchain technologies is very promising, the following were named: ensuring transparency and traceability of operations for stakeholders; digitalization, simplification and optimization of operations in the supply chain (especially globally); development of smart

contracts; building trust between supply chain participants; eliminating supply chain intermediaries; providing the consumer with product quality guarantees (for example, perishable products requiring a cold chain) or guarantees of the place of origin of the product (e.g., for diamonds and other luxury goods). Among the advantages of the blockchain for supply chains, three key ones were identified: increased transparency of the supply chain (eliminating unnecessary checks, developing automation of operations such as forecasting demand, monitoring assets, optimization improvements, developing cargo tracking services, monitoring the supply chains of chilled products and luxury products, creation of additional value for customers); ensuring a secure exchange of information and strengthening trust between partners (a single pool of data accessible to all interested parties, improving the reliability of the data exchange system, developing standards for working with data throughout the supply chain, ensuring customer trust on a solid and reliable basis); improvement of operations (precise control of indicators, the possibility of identifying problems before they arise, accelerating the supply chain).

The key problems of introducing blockchain in the supply chain were named as well: some distrust of the blockchain technology in a number of organizations; insufficient development of technology today; the complexity of understanding and the high cost of blockchain technology; cultural, procedural and managerial issues (cultural perception barriers, the need to change thinking and working protocols of interaction, conflicting interests and possible resistance from some stakeholders); the need to process large amounts of data; excessive complexity of the supply chain ecosystem; lack of standards, regulatory uncertainty; the need to protect confidential information in supply chains; cyberattacks; the use of one blockchain together with other blockchains or other systems.

The article of Astarita et al., is devoted to the analysis of using blockchain in the field of transportation (Astarita et al., 2020). Among the most important features of the blockchain technology, the authors mentionreliability, stability, durability, transparency associated with the phenomenon of decentralization and the open structure of the blockchain, as well as the possibility of observing the anonymity of participants in transactions. Among the directions of using blockchain in the transport industry, the authors highlight the management of food and pharmaceutical supply chains, the management of interconnected smart vehicles, intelligent transportation systems, smart city, traffic management, transport network management, applications for electric vehicles, forensic and forensic expertise. Among the general directions of using the blockchain, the authors identified five key ones: trust, compliance with the law, decentralization and dissemination of information, as well as coordination of supply and demand. In addition, in the transport industry, tracking the conditions for transporting food products, charging electric vehicles, developing smart city and ensuring the safety of smart vehicles are relevant. The authors also consider the concern for the environment and energy saving as an important possible effect of using the blockchain. Thus, they argue that increasing the effectiveness of traceability systems can increase food safety and minimize the amount of food waste. The use of smart contracts can stimulate the growth of the electric car market, which will lead to a reduction in greenhouse gasemissions. The exchange of information between car drivers/motorists will affect the reduction of traffic in overpopulated urban areas, improving the quality of citizens' life. In general, blockchain technology can lead to an increase in the number of smart cities, which ensures sustainable urban development. It is also important to share the blockchain with new services and technologies, such as mobility such as service (MaaS), IoT, artificial intelligence (AI), 5G, etc. Thiswill create the basis for the development

of blockchain applications in those sectors of the transport industry where it has not yet found wide application: transit, rail, sea and air transportation.

Chang, Iakovou and Shi analyze the prospects for using blockchain in global supply chains in international trade (Chang, Iakovou, and Shi 2020). Arguing about the advantages of blockchain, the authors highlight the ability to track cargo, resolve disputes and conflict situations (which is important especially in cross-border supplies), ensure the integrity and security of cargo transportation, digitalize supply chains (which allows eliminating inconsistency and opacity of data, automate business transactions and transfer of ownership), compliance (i.e., compliance with a wide variety of requirements and technical regulations), principles of social and environmental responsibility, business ethics, meeting the interests of various stakeholders, etc. However, having considered the real cases of using blockchain in various sectors of the economy, the authors come to the conclusion that the development of this technology is associated with a number of serious challenges. Among these, they include technological problems (limited network bandwidth), interoperability of various blockchain systems, international standardization, lack of trust, legal and regulatory problems (especially in case of international supplies, when deciding what legislative systems of which countries have to consider disputes related to blockchain, privacy issues, etc.). The authors pay special attention to the use of blockchain in cross-border trade. Here, the prospects for reducing paperwork and bureaucracy and ensuring the visibility and transparency of goods are highlighted, as well as the possibility of creating a common platform accessible to all commercial organizations for quick verification of counterparties' data, and ensuring reliable and transparent exchange of information between regulatory structures. As the development of cross-border trade affects the interests of many players, the authors argue that the implementation of the blockchain system in these processes should be realized through a triple helix of academia, industry, and government. The cooperation of these groups will create a full use basis for all advantages of the blockchain technology and help in developing digital platforms that meet the interests of all key stakeholders in cross-border trade.

Conclusion

In this chapter we have provided an overview of the scientific literature on the impact of the blockchain technology on logistics and supply chain management. Despite the fact that most of the reviewed articles emphasize the importance of blockchain and the prospects for its use in logistics, the financial direction of using the blockchain is currently much more popular then the logistics one. This popularity is reflected by the number of publications devoted to the blockchain in the financial sector, which is much higher than in logistics. At the same time, most authors agree that the use of blockchain in logistics and trade is especially relevant in certain areas: the supply of food, pharmaceutical, luxury and collection goods, as well as in the international logistics and trade. These areas require strict control of the quality of the product and its place of origin, and compliance with the rules for its transportation, since not only consumer satisfaction, but even consumers' health and life can depend on them.

Discussion

Among the advantages of using blockchain technologies in supply chain management, the most often cited are building trust between consumers and suppliers, the transparency of the procedures for the production and delivery of goods, as well as the simplification of control and traceability of supply chains. Moreover, there is an important social effect of the blockchain technology related to the growth of the reputation of enterprises using it. Interestingly, though, some of the often mentioned advantages of blockchain – like for example the elimination of intermediaries and the facilitation of interaction between participants in transactions –, have not been confirmed by empirical analysis. It turned out that the blockchain does not actually reduce the number of intermediaries, but changes them or their functions in the supply chain.

At the same time, despite all advantages of the blockchain technology for logistics and supply chain management, the authors of the reviewed papers also highlight certain obstacles or challenges that hinder the adoption and the development of blockchain. Among the most important ones are the high cost and complexity of the blockchain technology, the problems of ensuring the security and confidentiality of information, the issue of trust between business partners, as well as the requirements regarding the competencies and skills of specialists implementing and using the technology. In addition, problems associated with the standardization of the regulatory framework of various regulators can slow down the development of blockchain in logistics.

In comparison with other disruptive technologies such as artificial intelligence, we consider that blockchain is still in its infancy, even if the technology has already developed rapidly in recent years and has triggered a real hype. The results presented in this paper show that the blockchain has yet to prove its real added value in the business environment. However, despite the above mentioned challenges, blockchain is becoming more and more widespread in the practice of companies worldwide, including in Germany and Russia. In this regard, an important area of future research is the study of the practical experience of businesses using blockchain technologies in these countries, by using a cross-country approach. The analysis of real cases of blockchain applications in logistics and supply chains will allow assessing the blockchain technology effectiveness.

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Chapter 26

Corporate Social Responsibility as a Trend of Innovative Development in Russia

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Abstract

The article is devoted to the study of corporate social responsibility (hereinafter CSR) in the context of the innovative development of Russia. For many organizations, the need for introducing ethical principles into the practice of business relations becomes obvious; issues of social responsibility and the business reputation of the organization are considered in a single complex. The need to find the most effective mechanism for interaction between business and the state makes CSR relevant. The goal of this article was to analyze institutional problems and trends in the development of corporate social responsibility in Russia. The results of the work indicate the influence of the transformation of views on the role of business in modern society on the change in the content of social responsibility. In modern Russia, CSR requires special close attention, since the traditions of the development of entrepreneurship in our country are not similar to those in foreign countries. The main conclusion of the study: further institutionalization of CSR depends on the position of the business and the state, but due to the specifics of the historical and socio-economic development of Russia, the state has special responsibility for the quality and dynamics of this process. Currently, it is necessary to create formal and informal foundations of the CSR structure in society; an objective assessment of the social significance of CSR and the development of recommendations for its improvement are required.

Keywords: corporate social responsibility, social capital, quality of life, transformation, motivation, humanization of business

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1. Introduction

Nowadays in many countries it has become a common trend for businesses to participate in solving social problems due to the influence of socially defined incentives and benefits, as well as moral and ethical factors. By the end of the last century, the attitude of the market to the offered products began to be determined not only by their consumer attractiveness but also by the social image of the manufacturer, taking into account their attitude to the environment and society as a whole. The main goal of CSR is to achieve sustainable development of society, i. e. to satisfy the needs of the present generation avoiding creating threats for future generations. According to A. Babkin, society changes conceptual foundations of management, destroying vertical hierarchy and creating new concepts based on network management principles that allow all actors in the management process to communicate directly (Egorov et al. 2015). The very idea of sociality makes management more human, implementing the ideas expressed by the famous humanist and innovator in the world of work, British philosopher Robert Owen.

A substantial contribution to the development of the theory of corporate social responsibility was made by K. Marx and F. Engels. In their works, they not only revealed existing contradictions in society in historical retrospective but also brought the issues of class struggle and the role of workers in the formation of political and economical systems to a new level, as well as society as a whole (Carroll 2009; Lee 2008).

Only in the middle of the 20th century, Professor Howard Bowen in his famous work “The Social Responsibility of a Businessman” for the first time made a serious attempt to reveal the content of this concept. The ideas formulated by the scientist caused a wide public resonance and served as the basis for the theory of CSR, determining the format of scientific discourse on the nature and essence of social responsibility of business (Moura-Leite and Padgett 2011).

The problem of CSR in the scientific context has been becoming more and more relevant as the social idea is popularized on a global scale, the leading economies of the world are reorganized on a socially oriented path, and labor relations are humanized. Today CSR is an urgent and frequently discussed problem in the scientific community (Degtereva, Ivanov, and Barabanov 2019). CSR is often considered to be a universal tool for solving many social problems (Friedman 2017; Benabou and Tirole 2010; Luo and Bhattacharya 2006). Awareness of the strategic importance of CSR for all types of organizations in the 21st century, regardless of their size and location, is reflected in the International Standard ISO / ISO 26000: 2010 “Guidelines for Social Responsibility” (Pojasek 2011).

In modern Russia, market institutions have begun to form consciously over the past 20 years. Despite the long traditions of charity and economic humanism of pre-revolutionary Russia, known far beyond the borders of our country, in the Soviet period the social responsibility of the producers of basic material wealth underwent significant changes due to specific conditions of that time: practically the only form of ownership - state, and centralized management mechanisms. In Soviet Union, social responsibility had a different embodiment and was determined by socialist management methods (Svirina and Khadiullina 2017; Guskov et al. 2015).

In the scientific community, social responsibility is conventionally divided into two types: internal CSR, which implies a contribution to its own work collectives, infrastructure, and external CSR focused on third parties, charity events, and participation in social programs. The synthesis of these two types of CSR makes it possible to contribute to the development of human capital, both on the scale of the company and the whole society.

The main problem in CSR research at the present stage is caused by two opposite types of approaches to the issue. On the one hand, there is a mercantile meaning, which implies an increase in profits due to the implementation of socially oriented projects. On the other hand, also exists an idealistic meaning suggesting that initially, the goal of each entrepreneur is to transform the world in order to improve living conditions for people (Barykin, Bochkarev, Dobronravin, et al. 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al. 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al. 2021). Talking about the activity of the largest Russian companies in the field of socially oriented activities, it should be pointed out that a number of factors, both economic and non-economic, are currently forcing their management to treat CSR with caution. Nevertheless, there already are some reasons to believe that this situation will be changing in the foreseeable future.

2. Materials and Methods

The goal of this article was to analyze institutional problems and trends in the development of corporate social responsibility in Russia. For the study, the methods of content analysis, synthesis, and theoretical generalization were used. With increasing frequency, the issue of social responsibility in producers of basic material wealth becomes the focus of attention for Russian researchers. There are works devoted to the impact of CSR on the company's image, the impact of CSR on staff motivation, and the company’s attractiveness for employees. O. Kanaeva (Sudova and Kanaeva 2013) points out that there is a wide range of approaches to understanding the essence of CSR: from its interpretation in the form of traditional charity to treating it as an integral element of corporate strategy and an important factor of sustainable development. It is noted that such organizations as the Russian Union of Industrialists and Entrepreneurs, the Association of Managers of Russia, the Business and Society Consortium, and others pay significant attention to CSR research in Russia.

There is a variety of methodological approaches to studying CSR problems. Let's dwell on some of them. Some authors point out the high importance of corporate reputation as a consequence of CSR, which increases the value of everything that the organization produces (Carroll and Shabana 2010; Schrempf-Stirling, Palazzo, and Phillips 2016). Some work denotes the connection between CSR and the processes of globalization (Jenkins 2005; Scherer and Palazzo 2009; Sklair and Miller 2010). Some works offer to analyze CSR through the prism of a philosophical and sociological concept, the essence of which should be determined by the very fact of the purpose of any commercial organization (McGlone, Spain, and McGlone 2011; Jamali and Mirshak 2007; Lim and Phillips 2008). Implementation of social responsibility is included in the management organization as a motivational and strategic factor, means of achieving success, and a criterion for business evaluation (Vveinhardt and Andriukaitiene 2017; Ansari and Teimouri 2009; Stanley 2011).

3. Results

The forced introduction of market relations and the active development of business outside the established institutional framework was accompanied by an increase in problems in the socio-

economic sphere. In the process of transferring many industries from state ownership to private ownership, the situation with unemployment worsened, a decrease in production volumes was observed, and delays in wages became permanent. It became obvious to all participants in economic relations that a new mechanism of interaction should be introduced, which would enhance the role of civil society, transfer the dialogue between government and business into a civilized format (James 2012).

The emergence of the mechanism of social partnership in Russia played a significant role in the formation of corporate social responsibility. In our country, the term "social partnership" at the legislative level was first enshrined in the Presidential Decree dated November 15, 1991 No. 212 "On social partnership and the resolution of labor disputes (conflicts)." It is noteworthy that the formation of CSR took place in Russia completely in use, in deeply crisis conditions compared to Western countries, as well as the mechanism of social partnership. Due to the loss of the ability to pay the normal reproduction of the labor force, the motivation of workers to work has significantly decreased.

In this situation, it was necessary to quickly build a new mechanism of cooperation between workers' associations, employers associations, and the state. Thus, a new type of functional representation of interests appeared in our country.

Excessive legal regulation of social partnerships can negatively affect the development of this institution. The informal component in the development of CSR, on the one hand, contributes to the development of this institution, plays a positive role; on the other hand, there are no traditions of such behavior in Russia.

A number of documents were adopted in Russia that clarified the essence of CSR. Among such documents, we should mention the Charter of Business in Russia and the Memorandum of Principles of Corporate Social Responsibility, which declared the need for this framework for doing business. Without such documents, human rights violations in the field of entrepreneurial activity are possible. It should be emphasized that these documents are advisory in their nature.

In order not to lose the position in the market of a domestic company, it is necessary to take into account the principles of work in the context of developing competition. Many organizations have become compelled to care not only about profit, but also about reputation in society. In this case, the risk of loss of business reputation and market position is possible.

The activation of foreign companies with the help of their representatives greatly influenced the introduction of social responsibility into domestic practice. Gradually, domestic companies are realizing the need to comply with the principles of responsible behavior. It is important to note the fact that the real sector of the economy accepts social responsibility from the point of view of economic feasibility.

There are different opinions as to when the initial institutionalization of CSR took place in Russia. By the mid-2000s, the value foundations of Russian entrepreneurship were being formed. More and more often, such a concept as the mission of an organization begins to be discussed; attention is paid to the system of interactions between the organization and society. We believe that it was during this period that the process of CSR institutionalization was observed.

The crisis of the model of the welfare state abroad pushed the state to the need to search for new sources of financing the social sphere. The need to ensure the financial burden on social spending began to manifest itself everywhere; the need to attract business became obvious.

Active training in practice in different countries, in particular, in Russia, is caused by the constantly growing interest in such interaction.

The problem of the need for the legal regulation of CSR raises a lot of discussions. As noted above, CSR has always been voluntary. Business at its own discretion applied various forms of CSR, chose for itself the measure of this responsibility. One might get the impression that the idea of legal regulation of CSR introduces institutional contradictions. At the same time, as world experience shows, many elements of CSR are clearly detailed in various branches of law.

There is an opinion that the development of CSR in our country is determined by two approaches. In the first approach, companies positioning themselves as socially responsible participate in various social events, as well as targeted programs at various levels. In the second approach, compliance with applicable laws is tantamount to socially responsible behavior.

It should be noted that in many foreign countries there is no CSR legislation. International law and international social standards have played a much greater role in the development of CSR in comparison with national legal systems. Based on the institutional characteristics of CSR, it would be logical to assert that the issues of CSR regulation should mainly remain in the sphere of public relations.

One of the first widespread manifestations of CSR was charity, which once again points to the voluntary basis of this institution. Individual (local) manifestations of CSR gradually expanded and became more complex as the scale of production increased and business transnationalized. Undoubtedly, the popularization of the idea of the welfare state or the welfare state played a significant role in the development of the very concept of CSR (Moon and Vogel 2009).

Among the many researchers of the problem of social responsibility, it is appropriate to note the work of R. Bauer “Social Indicators,” which laid the foundations for the subsequent development of the theory of the quality of life. It is the quality of life as a complex concept that has determined certain target parameters in the development of CSR. It is CSR that can make a significant contribution to the achievement of decent working conditions and a high standard of living (Bauer 1966). J. Rawls pointed out the need for social interaction and the implementation of the principle of mutual benefit, which significantly influenced the formation of CSR ideology (Rawls 2014). R. Nozick drew attention to the impossibility of establishing a fair system of distribution of material wealth in any country (Nozick 2014). For this reason, there is a need for joint responsibility of the state and society for social well-being (Kudryavtseva, Skhvediani, and Arteeva 2019; Kichigin et al. 2018).

Talking about the theoretical foundations of the development of the concept of CSR, one should mention such scientists as J. Habermas and G. Myrdal. They drew attention to the fact that appropriate conditions must be created for the development of socially responsible behavior (Habermas 2020). The synthesis of developed democratic institutions, guaranteed freedom, and a socially-oriented market economy gives the best result for the development of the state and society (Knox and Myrdal 1960). It should be noted that democracy in itself cannot eliminate social contradictions, but can translate them into an institutional framework in which the parties can already negotiate and find mutually beneficial solutions. For this reason, having such a framework is extremely important for CSR.

Nowadays, two models of social responsibility have become widely spread in the world: European and American. The European model is somewhat synthetic since social investment is carried out both within the internal and external environment. Funds are invested both in

labor collectives, personnel, and in the territories where the production facilities are located. Social investment in Europe is especially focused on environmental protection. The American model is more focused on various external charities (Kuznetsova and Matveeva 2015).

The problem of CSR development in Russia is largely complicated by the fact that domestic enterprises see in socially responsible behavior the possibility of obtaining certain benefits from the state. Social responsibility is often perceived as a social burden, which significantly contradicts the very idea of CSR, despite the fact that socially significant services are very important to local communities, especially in single-industry towns.

Corporate social responsibility may acquire new challenges in the near future due to the increasing differentiation of the owners of unique knowledge (product) and low-skilled specialists who will soon be unable to withstand this competition. Even in conditions of economic growth and stable development of the state, this contradiction will steadily increase with technological progress. In this case, only joint efforts of the state and business can help to find an optimal solution.

It is important to pay attention to the fact that the ways to achieve well-being and prosperity in the public mind do not always correspond to the real state of affairs. Within the framework of post-industrial development, those actors who are ready for modernization, for innovative development are successful. Wealth is not always equal to access to power since power in a dynamically changing society still needs to be retained. The modern world is experiencing many shocks of both natural and man-made character, social stratification is becoming more complicated, nevertheless, it is the state that concentrates the main resources of social development in its hands, but even economically developed states are far from always ready to withstand the challenges and threats of our time. which indicates the need for coordination of actions.

The development of CSR all over the world is undergoing many problems, some of which acquire national specifics, nevertheless, the institutionalization of CSR in Russia continues, the practice of non-financial social reporting of companies is expanding, the level of transparency and information openness is increasing. The main form of reporting is a report on a triune total i.e., on economic, environmental, and social performance. Changing the mechanism of external communications (public hearings, dialogue with stakeholders, exchange of views through participation in round tables and seminars, publication of reports on corporate websites.

CSR is institutionalized at different levels. At the federal level, the mechanism of social partnership is being developed, public associations of a social orientation are being created, and priority national projects are being developed. At the regional level, the social responsibility of town-forming enterprises is developing, commissions for interaction between the state and business are being created under the executive authorities of the constituent entities of the Russian Federation, chambers of commerce and industry are functioning. At the local level, a collective agreement is concluded that regulates the social security system, labor safety, etc (Volkova et al. 2019; Ivanova and Selentyeva 2019; Margulyan and Danilova 2020).

Currently, various parameters are used to assess public acceptance of good business practices. In December 2018, the TOP-50 CSR managers were published 4 times. At the start of the project, international companies predominated among the leaders of the rating, today the ratio is about 50 to 50.

To conclude, it should be pointed out that institutionalization of CSR in Russia is more difficult than in other countries for a number of reasons, including the need for catch-up development, slow overcoming of the consequences of political and socio-economic

transformations, insufficient readiness of society to fully develop CSR. Since the measure of state responsibility for the development of society in Russia is higher than in other countries, it is necessary to work out a unified concept of CSR development, which would be of a model nature. This concept would facilitate the involvement of government bodies of different levels in the development of CSR. It should also be noted that the development of CSR would significantly intensify the development of civil society.

4. Discussion

The idea of CSR was initially perceived by many economists and entrepreneurs as a threat to the very existence of business and capitalism, in connection with which a number of misconceptions regarding CSR have arisen historically, among which it is appropriate to note the following:

- CSR was a forced reaction of businesses to external pressure;
- CSR is equivalent to charity;
- CSR is an additional obligation that is not directly related to the company's activities.

A lot of controversies emerged from the thesis that socially responsible behavior is unprofitable since it leads to the diversion of funds from the main activity.

At the same time, there is an opinion that business is a part of society for which it must be responsible. This is a philosophical subjective assessment, but it deserves attention. The social responsibility of businesses makes “good business,” since it reduces long-term loss of profit.

In modern society, certain stereotypes have developed of how an organization should behave so that it can be considered a respectable corporate member of society. One of the most common stereotypes is that by spending funds on social programs, a corporation reduces its current profits, but in the long run creates a favorable social environment and, as a result, sustainable profits.

As D. Rodionov points out, the main goal of integrated management systems for the environment, labor protection, and industrial safety is to optimize the efforts of enterprises to meet customer needs as well as expectations of all stakeholders in terms of profitability and social parameters. We agree with the author’s point that approaches combining corporate social responsibility and sustainable development should become an integral part of the social and economic concepts used by enterprises to ensure a balance between economic growth, natural resource reserves and social progress (Rodionov, Daniali, and Mokeeva 2020; Rudskaia, Rodionov, and Degtereva 2017).

The influence of the global economic crises of recent years on the development of CSR is due to the need to search for more effective risk management mechanisms. The problem of unemployment, which traditionally accompanies economic crises, makes it possible to reveal the possibilities of CSR through the use of responsible practices in relation to the development of local communities, job creation, and raising the level of training in the regions of presence. CSR is associated with the so-called “Talent war,” meaning companies’ competition for qualified personnel.

According to S. Alshevskaya, it is a good reputation that allows attracting qualified employees to the company through effective management of reputation capital. The author claims that CSR is an innovative tool for building a reputation that makes a significant contribution to business development, sustainable development, labor relations, and life quality. V. Bova adheres to a similar point of view that the key reason for increasing corporate responsibility is the need to attract and retain highly qualified personnel with a high level of human capital development. A CSR program can focus on recruiting as well as staff retention, for example, in the competitive market for university graduates.

CSR programs are implemented by a number of large domestic companies, such as "Rosneft," which implements sustainable development and CSR programs, striving to increase the effectiveness of these programs. "LUKOIL" implements the principles of environmental activity, which are defined in the "Policy in the field of industrial safety, labor and environmental protection in the XXI century."

Already in the Soviet period, there were pronounced manifestations of internal social responsibility in the form of improving working conditions, scientific organization of work, prevention of occupational diseases, sanatorium therapy, etc.

City-forming enterprises in the USSR were a vivid example of the implementation of external social responsibility. These enterprises invested a lot in the quality of life of the local population, took responsibility for maintaining the social infrastructure. It is known that the quality of social behavior often suffered from responsibility to the management of enterprises. From an economic point of view, the social sphere was the prerogative of the state, which was special in comparison with foreign countries.

A distinctive feature of the Soviet social model was that it was focused on absolutely all social groups and economic actors. In terms of reaching the addresses of social support, there were no analogues of the model used in our country. The state concentrated in its hands all property, following the example of a corporation, while the synthesis of various interests (and not only corporate, but also private) was virtually impossible to realize (Degtereva, Ivanov, and Barabanov 2019).

Conclusion

Nowadays, Russia is undergoing further institutionalization of CSR. This process finds expression in the expansion of non-financial social reporting practice in companies, information transparency, the discovery of the benefits of responsible business practices. Nevertheless, there are different, sometimes opposite approaches to understanding CSR, the role of business in the development of society, as well as some terminological uncertainty.

Both throughout the world and in Russia, the search continues for ways to minimize contradictions between business and society, economic efficiency and social development, economic and social functions of the business. The success of the implementation of the corporate social responsibility model in Russia will depend on how effectively the state, business, and society can analyze the strengths and weaknesses of foreign experience.

As a solution to the existing problems, it is necessary to actualize the responsibilities of the state to address key social problems, more attention should be paid to interstate institutions. For example, the International Labor Organization has made an invaluable contribution to the development of human rights and the world of work over more than a century of its history.

The valuable experience of this organization should be actively used in Russia in order to increase social responsibility. Society needs to comprehend the ways to achieve social justice, taking into account serious social transformations, rapid changes in the economic environment. Charity should be viewed not as a one-time action, but as a kind of philosophy of mutual assistance.

To create an effective system of corporate social responsibility, it is necessary to develop the institution of social partnership, which should become a workable mechanism for developing socio-economic priorities for the country's development. More authority in the distribution of funds in extra-budgetary funds should be transferred to the actors of a functional representation of interests. It is very important to determine the priorities of interaction between business and the state in solving social problems, to involve not only large but also small and medium-sized businesses in socially responsible behavior. At the enterprise level, structural units should be created that would be responsible for implementing the CSR strategy. It is necessary to improve the legal framework for doing business, but one should not try to move CSR exclusively into the legal field. The development of a successful socially-oriented market economy should involve the voluntary acceptance of social obligations.

Further evolution of forms of responsible behavior in corporations in the context of environmental protection, formation of safe and favorable conditions for work, life, recreation, provision of affordable and high-quality medical care, production and sales of food of proper quality, internal and external social investments development are very important. CSR contributes not only to an increase in the level of trust in the organization's partners, government institutions, but also helps to increase competitiveness, attract new investors, and improve the attractiveness of the organization for its employees.

In the legal context, it is necessary to adjust the existing legal framework, and not to issue new regulations. The transition of the Russian business community to international standards and ethical norms of doing business, Russia's integration into the global economic space, establishing a constructive dialogue between government and business, forming a positive attitude towards domestic business in Russia and abroad — these are essential steps to reach the goal.

Currently, CSR is becoming not just an indicator of the institutional maturity of an organization, but also a marker of its role in the development of society, commitment to the development of non-economic social values. An effective CSR mechanism should be formed taking into account the general and specific characteristics of the existing institutional subsystems of Russian society.

The number of socially oriented companies is growing every year. In the nearer future, they can become a serious force for solving social problems. Society should develop an understanding of CSR as the most important driver of innovative development and a growth factor for civic engagement. But this requires an equal understanding of CSR importance both on the part of the state and on the part of business and society. Then CSR will be able to become a driver for real social innovation.

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Chapter 27

Digital Transformation at Regional Language Schools: A Study on the State of Maharashtra (India)

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Abstract

The school education sector is one of the severely affected sectors due to the COVID-19 pandemic. In India, the education sector is one of the severely affected sectors due to this pandemic, especially the regional language schools as 83% of Indian school students study in regional language schools. The impact on the education sector may not be visible immediately, however, it will have long term repercussions on the quality of education thereby on the future workforce as well. Globally 1.1 billion children and 430 million children in India have been affected since schools have been closed due to this pandemic. Though the private sector and higher education institutes have transitioned to the online teaching mode to cater to the needs of the students, the challenges for adapting the online teaching by regional language schools are immense and mammoth. The objective of this study is to identify the needs and challenges for adapting the readiness of such schools in Maharashtra - the most economically developed state in India. The pilot study has revealed some startling results like lack of regional language content, insufficient training to online teaching tools and unavailability of IT infrastructure resources causing major issues to conduct online lectures. However, there is a need for a comprehensive survey to study the issues in the digital transformation of regional language schools.

Keywords: COVID-19, digital transformation, regional language schools, online learning, India, Maharashtra, school education

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1. Introduction

The COVID-19 has disrupted all aspects of human life and the economy of every country across the globe. Countries are trying to cope up with the various challenges posed by COVID-19 on multiple fronts. The common solution that most of the sectors have adapted is the digitalization of their operations. Looking at the current trends of COVID-19, be it a personal or professional aspect of human life, digitalization seems to be a must. As the governments of countries across the globe are contemplating possible solutions to tackle this situation and are trying to get their economy back on track among sluggish growth, the education sector being one of the crucial sectors had come to a near standstill, and if the situation persists, it will have long term implications. Higher education institutes (undergraduate and postgraduate institutes), private schools and most of the schools operating in urban areas have adapted online teaching. But there are major issues with schools in rural areas and regional language schools. The current study tries to identify the various challenges faced by regional language schools in terms of adapting to online teaching.

In this regard, the objective of the paper is to identify the various challenges faced by the regional language schools in terms of adapting to online teaching. The paper is organized as follows: Section 2 discusses the survey methodology used for data collection, followed by results in Section 3. The discussion section, i.e., Section 4 gives an overview of school education in India, describes challenges posed by COVID-19 in India to the School Education sector and highlights the drivers and barriers for digital transformation faced by major stakeholders of regional language schools. Section 5 summarizes the hindrances faced by schools in coping up with online classes and lays the path for future work.

2. Materials and Methods

To study the issues faced by the regional language schools in adopting the online teaching tools, a pilot study with two separate sets of questionnaires were developed to administer on teachers and parents to identify how the regional language schools have been trying to cope to online teaching during the lockdown and pandemic. The study was conducted with the stakeholders of regional language schools in Maharashtra. An online survey form was designed and shared on various forums to capture data of regional language schools. In some cases, the respondents faced challenges in understanding the form since it was in English, we translated the questions for them in the regional language. The data obtained through the pilot study were analyzed by descriptive statistics.

3. Results

About 35 participants responded to the pilot survey. Two samples were redundant as they didn't belong to either teachers or parents. About 44.1% of respondents were teachers and 55.9% of respondents were parents of children studying in regional language schools. Most of the responses were from Marathi (Maharashtra's state language) medium schools.

Some of the results from the pilot study are as follows: All the teachers who participated in the study were conducting online lectures. The teachers covered a broad subject line up like English, Marathi, Hindi, Mathematics, Science, and History. About 86% of the teachers taught the Upper Primary (6th & 7th grade) and Secondary (8th to 10th grade) and 13.4% teachers taught kindergarten and Primary (1st to 5th grade). The study also suggested that 40% teachers were equipped with a computer/laptop and most of them (33%) used it to conduct online classes, 86.7% had a smartphone (with internet) of which 80% of them used it to conduct online classes and a small percentage (~7%) used their regular phone without internet connectivity to conduct lectures over phone calls, 80% of the teachers relied on mobile data to access the Internet. The study also reflected the use of multiple platforms and tools by the teachers to conduct online lectures, with the preferred platform choice being Zoom video conferencing. About 80% of respondents said they used Zoom to conduct their online classes, 40% said they use Youtube and Whatsapp, and a few others use Microsoft Teams and PDF for online classes. Most of the teachers used videos (73.3%) and PowerPoint (66.7%) and for online teaching, while 33.3% used a blackboard and 53.3% used Word documents to teach. About 60% and 66.7% of the teachers said they prepare for lectures and conduct classes respectively for 2 to 4 hours on a daily basis. The teachers also had multiple deterrents to conduct online lectures with the major deterrent for the teachers being poor internet connectivity (80%), followed by device compatibility and comfort in using online teaching tools. Though 40% of teachers said finding content in regional language was a difficulty to prepare for online classes, surprisingly, about 93.3% of the teachers managed to get content in regional languages.

From all the parents who participated in the study, 33.3% of parents said their ward's school hasn't started online classes. Most of the parents (75%) said schools are using Zoom to conduct online classes. About 50% said their children use a smartphone for attending online classes and about 25% use a computer/laptop. Most of the teachers used blackboard (50%) while others used videos, audio files and PowerPoint for teaching. 50% of parents said their children attend online classes for 2 to 4 hours daily. The majority of the parents (around 75%) said given a choice, they want their children to go to school over attending lectures from home. The same number of parents said they assist their children in online classes. Though most of the parents had to assist their ward with online classes, a large section of parents were satisfied with the online classes being conducted by the schools.

4. Discussion

4.1. School Education in India

The schooling system in India includes kindergarten, primary, upper primary, secondary, and at times higher secondary grades as well. In some cases, higher secondary is also considered as junior college or diploma courses. After schooling, students can opt for graduation, post-graduation, doctoral studies and post-doctoral studies. Schools in India are managed by the Department of Education, Tribal/Social Welfare department, local body, private aided, private unaided, other government-managed schools, central government, Madarsa (recognized and unrecognized) and few other unrecognized entities. And generally, schools are affiliated to CBSE, ICSE, state boards, or international boards.

Maharashtra is the second most populous and third-largest state by area in India. Maharashtra's population in 2020 is estimated at 123 million which is about 9% of India's population. Maharashtra is also the most economically developed state in India with a GDP value of about $330 million in 2019-20, i.e., it contributes 14.3% to India's overall GDP.

As per U-DISE report of 2015-16, India had 15,22,346 schools, of which 12,89,544 schools (84.71%) were in rural areas. Most of the rural schools are regional language schools where the medium of instruction is the state language. The state of Maharashtra had a total of 1,07,624 schools in 2015-16 (NEUPA 2016). About 17% of children in India go to English medium schools, the rest go to regional language schools ("Lack of Regional Language Content, Infrastructure: Online Education Double Trouble for Hinterlands | Education News, The Indian Express" n.d.).

India has 22 official languages and as per the 2011 Census, a whopping 19,569 mother tongue languages or dialects existed which are spoken by more than 10,000 people (Bose 2011). India has practiced tri-lingual learning at least since the time of its independence, i.e., for over 70 years now. Most of Indian students learn three languages by default - English, Hindi and the state-language, however it was not mandatory. In India, English as a language has been seen as a status symbol and is associated with class, because of which Indian parents want their children to be educated in English medium schools. As a result of this, the regional language schools struggle to find takers.

The National Education Policy (NEP) 2020 proposed by the Indian Government proposes the introduction of technology intervention for regional languages and learning aids. The policy also encourages all the states to develop state equivalens of e-learning in regional languages by establishing State Institute of Open Schooling (SIOS). The policy further emphasizes mother tongue/home language/regional language to be the medium of instruction till 5th grade, this could lead the schools to invest in a large number on language teachers across the country ("National Education Policy 2020" 2020). Most regional languages make up as mother tongue for children. Research has proven that kids who learn in the mother tongue develop a better sense of critical thinking ("Why Is Education in Regional Language Considered Low Standard? - Education Today News" n.d.). In line with the Sustainable Development Goals proposed by the United Nations, quality education will play a major role in the progress and prosperity of people across the globe.

4.2. COVID-19 in India & Challenges to the School Education Sector

The coronavirus disease 2019 (COVID-19) pandemic spread within China and subsequently outside China as well, with a basic reproductive number estimated to be from 2.2 to 3.3 and a mortality rate of around 2.3% (Lescure et al., 2020). The first case of COVID-19 can be traced back to December 2019 in China and appeared in Italy and other European countries in February 2020 (Strielkowski and Wang 2020). The first case in India was reported on 30th January 2020 when an Indian medical student had traveled from Wuhan (China) to Kerala (India) (Sharma 2020). The spread of COVID-19 had been slow in India with the 100th case being reported after 45 days from the first case, i.e., on 14th March 2020. With the number of cases slowly but steadily increasing in the month of March, most of the schools and universities were closed since 16th March 2020, and subsequently, the Indian Government announced a 21-day complete lockdown of the country on 24th March 2020 when the number of cases had

reached 536 cases. With the number of cases on the rise, the 21-day lockdown was extended until 3rd May, with conditional relaxations after 20th April for the regions where the spread had been contained or was minimal.

The lockdown was further extended till 30th June for the containment zones and services resumed in a phased manner in other parts starting from 8th June 2020. However, the educational Institutes had been recommended to remain closed till 31st August 2020. The academic year for most of the Schools and Colleges in India starts in June and ends in May. Hence, when the first lockdown was announced in March 2020, the academic year was cut short and examinations for most of the students were deferred or canceled. Some of the institutes with digital prowess managed to conduct online classes and exams.

With the Government of India planning to reopen the schools in some areas from 1st September 2020, a survey conducted by LocalCirles with 25000+ respondents over 261 districts in India, suggested 62% of parents said they won't send their children to schools if reopened on 1st September ("62% Parents Won't Send Their Children Even If Govt Reopens Schools on Sep 1" n.d.).

As per a UNICEF report, in India over 430 million children have been affected by the closure of schools. The online teaching and learning methodology adopted by most of the schools have partially filled the gap since many households, especially in rural areas – have no electricity and lack of internet access. There are increasing concerns that the above-mentioned issues may increase the number of children opting out of school. These numbers are estimated at 32 million before the COVID-19 pandemic ("Urgent Action Needed to Safeguard Futures of 600 Million South Asian Children Threatened by COVID-19" n.d.).

4.3. Challenges for Digital Transformation at Regional Language Schools

To ensure social distancing norms are followed to curb the spread of COVID-19, schools and other educational institutes had to adapt digital tools for conducting lectures. Most of the educational institutes started adopting video conferencing facilities like Zoom, Google Meet, Microsoft Teams, Cisco Webex, etc to conduct the lectures online.

Some of the major challenges for the digital transformation associated with regional language schools are as follows: Basic digital infrastructure will be the backbone for conducting online classes. Some of the basic digital infrastructure includes electricity connection, devices like computer/laptop, smartphone and internet connectivity. Analysis based on data from government schools from 596 out of 619 districts revealed 75% of the rural schools had electricity connection but a whopping 78.7% of schools had no computer available for children to use. Only 22.9% household in India had at least one member who knew how to operate a computer and there were 90.2% households which had a mobile phone ("Annual Status of Education Report (Rural) 2018" n.d.). Though the internet plans are the cheapest in India ($0.09 for 1 GB) (Cable.co.uk 2020), not having the required hardware infrastructure or technical know-how to operate a computer/smartphone, could be a huge deterrent for online school learning. In 2018, 91.8% of rural schools in Maharashtra had electricity connection, however, 35.4% of schools had no computers for student usage ("Annual Status of Education Report (Rural) 2018" n.d.). A report published by Digital Empowerment Foundation in 2018, suggested there are a total of 12055 gram-panchayats (village councils) in Maharashtra, of which fiber optics cable is laid in 4865 gram-panchayats and 201 gram-panchayats are

connected with broadband connectivity. According to the report published by the Telecom Regulatory Authority of India (TRAI) in July 2020, India has 86.66 tele-density inclusive of wireless and wired, with only 58.85 tele-density in rural India ("Telecom Regulatory Authority of India" n.d.). NITI Aayog, the policy think-tank of the Indian Government, in one of its reports 'Strategy of New India@75' mentions that quality and reliability of the internet is one of the bottlenecks for online education systems since 55,000 villages (~ 8.5%) across the country are still without mobile network coverage (NITI Ayog 2018; Gupta 2002). Having smartphones with individual households and their usage for the online classes seems to be challenging since only 57% of the rural population have smartphone devices amongst the 1.3 billion smartphone users in the country (Joshi, Vinay, and Bhaskar 2020; Mohapatra 2020; Ravi 2020). Bridging the digital divide needs to go beyond giving target stakeholders access to tools. Relevant policies and regulatory environments, institutional frameworks and human capacities that ensure information flows, innovation and effective practice are vital (Tiwari 2008; Ghosh 2007).

The students belonging to the rural part of India and Maharashtra rarely have access to the internet infrastructure to get them connected to the online education system. Despite the education sector being hit hard by COVID-19 pandemic lockdown, the educational institutes may take this unforeseen opportunity to identify shortcomings and ramp-up transformations of online education in course content and technology (Sun, Tang, and Zuo 2020; Houlden and Veletsianos 2020).

For effective delivery of online classes, along with basic digital infrastructure, one of the most crucial aspects is preparedness among teachers. Scholars in their study say COVID-19 has challenged the entire traditional education system to drastically shift to online mode overnight, they also mention that online learning is no more an option, it is a necessity. The paper also discusses the various issues faced in online teaching like downloading errors, login problems, problems with audio and video due to lower bandwidth (Dhawan 2020).

The other major challenge identified in digital transformation for rural language schools is the availability of quality content in regional language. In December 2016, the then Minister of Human Resources Development PrakashJavadekar had mentioned in the floor of the Parliament of India that "49% of students study in Hindi-medium schools while 33% schools teach in the mother tongue of the state. Only 17 percent of students across India study in English-medium schools" ("Lack of Regional Language Content, Infrastructure: Online Education Double Trouble for Hinterlands | Education News, The Indian Express" n.d.). Although the government has started platforms like Diksha, e-pathshala, GyaanDarshan and some of the educational content is also accessible through television in few regional languages, for rural schools and first-time learners, accessibility is still a problem. An important aspect of the availability of content in regional language has to be the transcreation of content which is found to be more effective than translation (Pedersen 2014).

The Government of India is taking various initiatives to encourage regional languages in schools and is also providing several resources to the regional language schools. However, the regional language schools are facing many issues and challenges in terms of adapting to the digital transformation during the ongoing COVID-19 pandemic. This is also evident from the pilot study results which indicated that some of the major issues faced by the teachers of the regional language schools were: insufficient training on online teaching tools, poor attention span of students and availability of computers/laptops to conduct online lectures. Most of the teachers expected their schools to support them with good internet connectivity and offer

laptops/computers to conduct online lectures. The majority of the teachers were neutral or dissatisfied about their teaching experience online. The parents highlighted that poor attention span, availability of content in regional language and availability of computer/laptop and internet connectivity were major hindrances for online classes.

Conclusion

It is evident that regional language schools are facing multiple issues and are struggling to cope with online learning. The pilot study highlights some of the pain points of online learning for such schools with the major ones being poor attention span of students, availability of content in the regional language, availability of computer/laptop and good internet connectivity. Irrespective of the pandemic, the above-highlighted issues need to be addressed to improve the quality of education in the regional language school keeping instead of the digital transformation of school education across the world. This is also necessary to achieve the goals of the recently released National Education Policy of India in which there is an emphasis on providing access to education in mother tongue/regional language. Due to the paucity of time and lockdown restrictions implemented because of COVID-19, this paper confines to a pilot study. We are planning to conduct this study at a pan-India level to identify the issues related to the digital transformation of the school education system.

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Chapter 28

Blockchain and the Supply Chain: A Cross-Country Comparison of German and Russian Industries

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Abstract

Over the past years, there has been a significant increase in the interest in blockchain technology in logistics and supply chains, also reflected in the increasing number of publications on this topic. However, no studies have analyzed similarities and differences of the blockchain implementation approaches in logistics processes across different countries. This article fills this gap by presenting a comparative analysis of the blockchain landscape in logistics and supply chain management in two countries: Germany and Russia. The research methodology is based on analytical reviews about the implementation of blockchain in both countries and case studies of German and Russian companies that have implemented blockchain technologies in their logistics and supply chain management. The results of the study showed both similarities and differences in the development of the technology in terms of the degree of penetration of blockchain into business, size, and motivation of companies using this technology, ways and methods of its implementation, as well as advantages and disadvantages of adopting blockchain at a business level.

Keywords: blockchain, logistics, supply chain management, Germany and Russia, cross-country comparison, companies cases

1. Introduction

Since the first blockchain advocates began promoting the capabilities of this technology over a decade ago, leaders across industries have often argued about the most meaningful way of adopting and implementing the new technology. What has meanwhile emerged is a broad recognition that blockchain can be considered now as a connecting platform that can enable

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and improve many business processes (Barykin, Bochkarev, Dobronravin, et al. 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al. 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al. 2021). Executives across countries and sectors have refined and redefined their view of how it is possible to use the blockchain into how it is plausible and practical to use it. While it is undoubtedly true that blockchain continues to evolve into a more sophisticated, elaborate technological solution ready to deliver on its initial disruption promises, the question for global executives is no longer "Will blockchain work?" but "How can we make blockchain work for us?" (Deloitte 2019).

Blockchain technology is no longer a topic only for technology experts – it is currently being implemented in more and more companies across numerous sectors around the world. It is being perceived more clearly and favorably by the general public. Still, it has long been discussed as a technology basis for business applications in a wide range of industries. The relevance of this topic has meanwhile become evident also at the political level.

Despite a rapidly growing body of literature on blockchain and its applications, no consistent reports or studies focus on analyzing and comparing the adoption, development, and implementation level of blockchain technology across different regions or economies. This paper aims to close this gap by proposing a comparative analysis between two countries that remain relevant on a European-Asian level, both from an economic and a technological point of view: Germany and Russia. With a GDP level of 3,845,630 million USD in 2019, Germany is currently the largest economy within the European Union and the fourth largest worldwide ("Gross Domestic Product 2019" 2020). The Russian Federation, with a GDP of 1,699,877 million USD in 2019 ("Gross Domestic Product 2019" 2020), has recently set ambitious economic targets, which include accelerating Russia's growth to about 3 percent and halving the poverty rate to 6.6 percent by 2024 ("Russia Overview," n.d.). In reaching these goals, adopting and implementing new, possibly disrupting technologies plays a very important role. And as both countries exhibit strong ties (Russia is the EU's third-biggest trade partner (behind the US and China), with Russian supplies of oil and gas making up a large percentage of Russia's exports to the EU. The EU is Russia's top-ranking export partner ("ICT Research and Innovation in a Globalised World" 2012)), relatively high levels of digitization and highly skilled labor force in the ICT sector, we consider this to be a strong background and a reasonable basis for conducting a comparative analysis of these two countries. Furthermore, Germany's and Russia's blockchain expertise has also spanned across universities, design and research institutes, and industrial companies. In this paper, we consider successful cases of using blockchain in Russia and Germany and conduct a comparative analysis of the practice of using this technology in supply chain management in these countries.

In general, already published papers mainly emphasize the bright prospects of blockchain technology in supply chains. However, they also point out specific problems or challenges that hinder the development of the blockchain. In this paper, we focus primarily on adopting and implementing blockchain technology in practice, using several examples of Russian and German companies to identify the similarities and differences in national strategies for using the blockchain.

2. Materials and Methods

The research methodology is based on comparing and contrasting the general characteristics of blockchain markets in logistics and supply chain management in Russia and Germany. We used blockchain market reviews to conduct this analysis and identify similarities and differences between the blockchain landscapes in the two countries. The German case study is primarily based on a recent survey conducted by Bitkom Research in 2019 ("Russian Railways Plans to Implement the First Smart Contract for Freight Transportation Support in 2020 | Iot.Ru," n.d.). For the Russian case, we rely on the research presented in the publication "The Map of the Russian Blockchain Ecosystem" that the most prominent experts jointly conducted in the blockchain field on the Russian market: Mindsmith, Waves Enterprise, IPChain, and Clifford Chance ("The Map of the Russian Blockchain Ecosystem - MINDSMITH," n.d.).

In addition, we use case studies to compare the practice of implementing blockchain in logistics and supply chains by German and Russian companies. We consider the cases of three large German companies (Mercedes-Benz, Hapag-Lloyd, and GS1 Germany) and, respectively, three large Russian companies (Gazpromneft, Russian Railways, and LANIT Group). We analyze companies from different industries to show the different directions of implementation of blockchain technology and its importance for other sectors of the economy.

3. Results

As a prerequisite for using new technologies, companies have to possess a certain degree of openness towards them and the willingness to deal with new technological developments. Even if the vast majority of businesses understand that for coping with new technologies, they also need to adopt them quickly, the reality in companies, however, often looks different and shows that open-mindedness towards new technologies and the confrontation with them requires more time than expected.

This section aims to present and compare the status quo of implementing blockchain technology in the supply chain in companies in Germany and, respectively, Russia.

3.1. Adoption and Development of Blockchain Technologies in Germany

The analysis of the German case is primarily based on a recent survey conducted by Bitkom Research in 2019. Bitkom (Bundesverband Informationswirtschaft, Telekommunikation und neue Medien e. V.) is the industry association of the German ICT industry. Founded in 1999, it now represents more than 2,700 companies in the digital economy, over 1,000 medium-sized companies, 500 start-ups, and almost all global players. Their multi-method survey consisted of a quantitative company survey and qualitative expert interviews. The choice of a multi-method approach was based on the fact that blockchain technology was a very young and little researched topic. Secondly, the blockchain was a very complex technology, even for people with an affinity for technology and IT, partly due to the regulatory issues associated with blockchains. For the quantitative part of the study, 1,004 companies with at least 50 employees in Germany were surveyed, selected on a representative basis according to industry and size

class (40% of companies have 50 to 99 employees; 35% have 100 to 199; 17% have 200 to 499, and 8% have 500 or more employees). The 14 qualitative interviews were conducted with managers responsible for blockchain or digital technologies in their company. The key results of the Bitkom survey shed light on the level and degree to which blockchain technology has been adopted in the German business landscape. The most important results are summarized in the following ("Blockchain in Deutschland | Bitkom Research," n.d.):

- 2% of all companies with 50 or more employees already use blockchain technology in their company. Another 4% plan to use blockchain, 2% are discussing this.
- Large companies take the lead on blockchain: 17% of companies with 500 or more employees already use blockchain technology, 27% of the large companies plan to use it, and 11% discuss it.
- Increasing efficiency and building trust are decisive factors for the use of the blockchain: 87% of users mention that blockchain is a crucial success factor. In comparison, for 41%, the blockchain is a trusted authority in cooperation with other organizations.
- 63% of the users work for the blockchain implementation or deployment with cooperation partners. 11% cooperate with IT consulting companies.
- As regards the topic of blockchain, 76% of the blockchain users consider themselves pioneers. In contrast, in a global, cross-country comparison, 57% of the companies see the German economy as being in the midfield when it comes to blockchain.
- New products, services, and business models based on blockchain: 82% of the companies that use the blockchain technology or plan to do so shortly state that they aim to offer new products or services based on blockchain. 66% expect to be able to develop blockchain-based business models.
- The challenges that inhibit or even block the use of blockchain are manifold. A majority of 88% of all companies with at least 50 employees are currently considering no clear blockchain use case in their own company or are complaining about a lack of qualified personnel in blockchain technology.

Overall, the topic of blockchain is viewed by companies both critically (9%) and with interest (12%). Besides artificial intelligence, blockchain shows how controversial these two hype technologies are. These are the only ones in which those who do not have a final opinion make up the largest share (blockchain 16%, artificial intelligence 30%). The vast majority of companies (60%) have not yet dealt with the topic of blockchain at all. However, this proportion is significantly lower among large companies having more than 500 employees. Only every fourth large company (25%) has not yet dealt with blockchain technology. At the same time, interest (49%) outweighs blockchain skepticism (4%) among large companies ("Blockchain in Deutschland | Bitkom Research," n.d.).

One of the significant classifications of blockchain networks divides these into public and private or consortial blockchain systems. The term "permission" is often used synonymously for private and consortial blockchains and, respectively, "permission-less" for public ones. The main criteria for distinguishing between the two types are public access, and check and write permissions. A look at the companies that are already using the blockchain or planning blockchain projects in the next future shows a clear trend. Two-thirds (67%) rely on the

permission or private blockchain. While the private blockchain is accused of contradicting the basic idea of a blockchain – decentralization – two blockchain experts see consortial blockchain projects as an essential enabler that will change the future cooperation between companies and their data exchange. Only every tenth company (11%) in the planning or project phase of blockchain deployment relies on the permission-less blockchain.

Companies are tackling the blockchain challenge strategically, but they are also bringing partners on board as part of the implementation and operation of the blockchain. Every third company (32%) that is planning, discussing, or has already implemented the blockchain was using external consulting services at the time of the survey. Another 12% had already done so in the previous years and half of the companies (49%) plan to use consulting services in the upcoming years. Furthermore, around two-thirds of the blockchain users(63%) are approaching the blockchain implementation with partners or at least plan to do so. Every fifth company (20%) exchanges information within the industry or interest groups, another 7% plan to do so. Overall, 12% plan or lead cooperation with scientific research institutions. Last but not least, only 8% would be willing to start a collaboration with start-ups, even if the German start-up landscape currently contains several young and innovative companies that can be suitable partners, especially for small and medium-sized companies.

While more than half of the companies (56%) deal with blockchain technology in accounting, finance, and controlling, every third company (34%) uses the blockchain in logistics and warehouse processes. This is an area to which the blockchain experts also attribute a great potential. Overall, 11 out of the 14 interviewed experts outline blockchain use cases in connection with supply chains and logistics processes or generally attribute great potential for the use of the blockchain in the logistics industry.

However, only 1% of the surveyed transport and logistics companies already have blockchain-based solutions in operation. A further 10% are, at least, concerned with the use and implementation of blockchain: 3% have concrete plans, and 7% are currently discussing its use. This is a rather sobering picture for an industry that would have numerous possible applications of blockchain technology, not only in transport logistics but also in the area of new mobility concepts. Also, most of the interviewed blockchain experts (11 out of 14) see great potential for blockchain applications in the logistics sector. This inevitably raises the question of what inhibits transport and logistics companies from using blockchains. The supposedly unclear legal framework, which was cited as an obstacle by 85% of the companies, notably stands out (“Blockchain in Deutschland | Bitkom Research,” n.d.). The blockchain experts name two further issues that are particularly relevant in this industry. On the one hand, the complexity of supply chains, especially where they cross national borders. The main problem here is not so much the regulatory framework of blockchain applications, but rather the representation of the regulatory requirements of the participating countries in the blockchain. On the other hand, logistics companies and suppliers are often dependent on the IT systems of the large manufacturers who supply them. As long as the manufacturers do not participate in the blockchain consortia, companies are, understandably, reluctant as to adopting the technology.

3.2. German Cases of Blockchain Implementation in Logistics and Supply Chain

Several selected projects of German companies that have successfully adopted and implemented the blockchain technology in their supply chains are briefly presented in the following.

3.2.1. Mercedes-Benz

Mercedes-Benz Cars is revolutionizing the supply chain with blockchain by bringing more transparency to complex supply chains. The aim is to ensure consistent and continuous documentation of contracts along the whole supply chain. Recently, the automaker has entered into a strategic partnership with Icertis, a leading provider of enterprise contract management solutions in the cloud, and developed a blockchain prototype ("Once Round the Block, Please! | Daimler," n.d.).

Daimler obliges its direct suppliers to communicate, monitor, and control the Daimlerstandards and contractual obligations regarding working conditions, human rights, environmental protection, safety, business ethics, and compliance within the supply chain. The blockchain makes it possible to transparently map and trace this transfer of information throughout the entire supply chain. Should one of the sub-suppliers deviate from the contractual obligations, this will be immediately visible in the blockchain service protocol similar to that in a secure bookkeeping system. Just how the suppliers and their partners are implementing this application and how the appropriate feedback is obtained are currently being tested in this pilot project.

3.2.2. Hapag Lloyd and TradeLens

TradeLens is an interconnected, global ecosystem of supply chain partners that brings together a large number of cargo owners, ocean and inland carriers, freight forwarders, and logistics providers, intermodal operators, ports and terminals, government authorities, and customs brokers as well ("TradeLens | Digitizing Global Supply Chains," n.d.). Through TradeLens, all these can access a supply chain and logistics network with a data coverage of over half of the world's ocean container cargo. Based on a joint venture between IBM and A. P. Moller – Maersk, the platform was announced in March 2017 and commercially launched in December 2018 (Hinckeldeyn and Kreutzfeldt 2019).

With a fleet of 235 modern container ships and a total transport capacity of 1.7 million TEU, Hapag-Lloyd is the world's fifth-largest liner shipping company ("Hapag-Lloyd and Ocean Network Express Join Blockchain-Enabled Platform TradeLens - Hapag-Lloyd," n.d.). Hapag Lloyd rapidly adopted TradeLens across the global shipping supply chain by announcing joining the blockchain-enabled digital shipping platform in July 2019. The platform enables participants to digitally connect, share information, and collaborate across the shipping supply chain by replacing peer-to-peer and unreliable information exchanges.

Hapag-Lloyd operates a blockchain node in the whole network, participates in consensus to validate transactions, hosts data, and assumes a critical role of acting as Trust Anchor (validator). The company is represented on the TradeLens Advisory Board, which includes members across the supply chain advising on standards for neutrality and openness.

3.2.3. GS1 Germany

To obtain reliable information about the strengths, weaknesses, and the potential of blockchain, GS1 Germany, together with over 35 companies from retail, industry, logistics, start-up scene, research, and associations, carried out a pilot project in 2018 on a specific logistics use case: the pallet exchange process between retail, logistics, and industry ("Der Richtige Partner Für Ihr Business | GS1 Germany," n.d.). More than 20 well-known companies tested, under the leadership of GS1 Germany, whether and how the exchange of euro pallets can be managed digitally, transparently, and efficiently using blockchain technology. Among these companies are Deutsche Bahn, DHL Freight, Frauenhofer Institute, European Pallet Association, PwC, SAP, Bosch, T-Systems, Henkel, Metro, etc.

The project showed that the blockchain-based solution can provide a digital copy of the pallet note and that the open pallet exchange process can also be mapped using blockchain. Due to the consistently user-centered, agile approach, the development and adoption of the prototype by project participants went well. Users confirmed good operational functionality at the front end and user-friendliness, comprehensibility, and clarity.

3.3. Adoption and Development of Blockchain Technologies in Russia

In this part of the section, we present a description of the blockchain technologies development in Russia. We rely on the research presented in the publication "The Map of the Russian Blockchain Ecosystem," which the most prominent experts jointly prepared in the blockchain field on the Russian market: Mindsmith, Waves Enterprise, IPChain, and Clifford Chance ("The Map of the Russian Blockchain Ecosystem - MINDSMITH," n.d.). We also use a number of Russian publications on relevant topics and case studies of Russian companies.

There are eleven groups of participants in the Russian blockchain market: regulators, development and support institutions, vendors and platforms, integrators, corporations, associations and consortia, clubs and communities, legal consultants, business consultants, information security service providers, and universities that train specialists in the field of blockchain. The report highlights nine maincentralulators of the blockchain market in Russia, from the Bank of Russia and Ministry of Digital Development, Communications, and Mass Media to the Federal Tax Service and Federal Security Service. This means that in Russia, almost all state authorities are involved in norms and standards regulation for blockchain technology. On the one hand, this requires numerous agreements and complicates developing the necessary framework for interaction. On the other hand, the state attracts industrial experts to discuss initiatives and also actively develops support institutions within the framework of the national project "Digital Economy of the Russian Federation." Among the institutions for support and development, four organizations can be distinguished: ANO Data Economy Russia, Blockchain Center Skolkovo, Waves, and Distributed Ledger Technologies Center of St. Petersburg State University. These institutions reflect the development of public-private partnerships in the field of blockchain technologies in Russia.

The category of associations and consortia includes Fintech (31 participants and 21 partners) andIPChain (26 organizations, including 4 academic institutes). Three more market participants are classified in the "Clubs and communities" category: Moscow Cryptoeconomics Research Group, Russian Association of Cryptoeconomics, Artificial Intelligence and Blockchain, and the St. Petersburg Blockchain Developers Community. For comparison, the

largest associations and consortia in the world (Enterprise Ethereum Alliance, Hyperledger, etc.) include hundreds of members (e.g.., Hyperledger includes more than 260 members, 20 of which are academic institutions). The Center for Distributed Registry Technologies of St. Petersburg State University has 12 academic and 20 industrial partners. Thus, the number of professional associations in the blockchain field in Russia is not large and their size is much smaller than international ones. However, the share of academic institutions in such associations in Russia is relatively higher compared to international associations. This fact indicates an extremely high interest of Russian science and education in this area.

The vendors and platforms category includes 16 companies. The integrators include 30 companies operating on the Russian market. In total, more than 40 Russian organizations from various industries published materials on the implementation of blockchain in business processes. The largest Russian system integrators are actively building up their expertise in the field of blockchain and opening specialized practices (for example, Softline, IBS, Digital Transformation Group, etc.). This allows them to create significant competitive advantages. However, despite the presence of large domestic platform and infrastructure players on the market, there are opportunities for the development of corporate blockchain platforms.

There are 42 Russian blockchain projects in the corporate part on the "The Map of the Russian Blockchain Ecosystem" and the logistics segment is quite significant among them (Vilken et al. 2019). Thus, the Map presents eight logistics projects of large Russian companies: Alrosa, Gazpromneft, Sugrutneftegaz, Transmash holding, Russian Railways, OMK, SUEK and Magnit. In Russia, blockchain has become more widespread only in the field of decentralized workflow (ten companies) and payments (9 companies). There are several segments that follow the logistics one: tokenization of traditional financial instruments (7 companies), registration of contracts (5 companies), as well as tokenization platforms, intellectual property market, voting systems and loyalty programs (one company in each direction). Thus, the use of blockchain by Russian companies is diverse. Blockchain has proven itself to be a technology that solves a wide range of business problems (Kapustina et al. 2020; Korchagina et al. 2020; Udaltsova 2020; Aleksandrova, Vinogradova, and Tokunova 2019; Vilkov and Tian 2019). The use of blockchain in logistics aims at optimizing the current interaction of participants and building a model of sequential interaction with several key agents (Korchagina et al. 2019; Hackius and Petersen 2017; Tijan et al. 2019; Helo and Hao 2019; Dujak and Sajter 2019; Karapetyan et al. 2019).

Among the blockchain positive aspects, Russian experts have highlighted the following: the features of its architecture and the implementation of smart contracts, guaranteeing data protection from falsification; an increase in the efficiency of processes by standardizing data formats in the organizations that are part of the system; ensuring the interaction of agents in a single trusted environment and the automation of the fulfillment of contractual obligations. In addition, the benefits of blockchain relate to eliminating intermediaries, improving data security and ensuring transparency of operations (Desfonteines et al. 2019; Desfonteines and Korchagina 2019). From the point of view of the Russian experts, the blockchain disadvantages relate to the difficulties regarding control and software updates, vulnerability to specific attacks, and the overall bulkiness of the system. Considering these shortcomings of the technology, blockchain is now used only by large Russian companies that have a clear understanding of what tasks they solve and what changes in business processes are required by blockchain.

3.4. Russian Cases of Blockchain Implementation in Logistics and Supply Chain

3.4.1. Gazpromneft

Gazpromneft was one of the first companies that have launched blockchain technologies. The RFID tags and satellite positioning sensors were installed on the valves purchased by the company. Consequently, the company could track the movement of valves from the supplier's plant in Veliky Novgorod to the warehouse in Murmansk. The company has followed the cargo's speed and route of motion, the number of stops on the way, and their duration. The data obtained was recorded by a smart contract using blockchain technology. The technology has also been extended to storage and transport operations for the cargo of the Prirazlomnaya platform in the Pechora Sea. Thus, the blockchain provided a link between the physical supply processes and the accompanying paperwork (Crockett 2016; Anderson 2017; Aalsalem et al. 2017).

3.4.2. Russian Railways

Large transport operators are also very interested in implementing blockchain in their business processes. The Russian Railways is one of these operators. Currently, the company is implementing a smart contract pilot project, which provides contractual support for transport and logistics activities on the October Railway within the framework of digital law. The smart contract is considered automatically executed if all its conditions are met: the goods are transported, the money is transferred, and the participants have no claims to each other. The Russian Railways plans to carry out the first freight transportation with the full use of this technology by the end of 2020 ("Russian Railways Plans to Implement the First Smart Contract for Freight Transportation Support in 2020 | Iot.Ru," n.d.).

3.4.3. Tracelabel Platform (Lanit Group) for Various Sectors of the Economy

Digital Transformation Group (DTG, an integrator of digital ecosystems within the LANIT Group) has developed the Tracelabel platform, designed to track the life cycle of goods and supply chain management ("Lanit," n.d.). The development is based on IoT and blockchain technologies, making it possible to reliably digitize the supply chain of goods and combine the data of network participants into a single source of truth. The Tracelabelplatform helps ecosystem members support transparency of the goods movement from producer to consumer, optimize overall business processes, avoid counterfeiting, and gain valuable insight into customer preferences for improving product and distribution. The use of the platform can be effective in different economic sectors: FMCG, alcoholic beverages, pharmaceuticals, luxury goods, and other goods for which it is critical to trace originality, supply chain, storage, and transportation conditions.

4. Discussion

Compared with other disruptive technologies such as artificial intelligence, we consider that blockchain is still in its infancy, even if the technology has already developed rapidly in recent years and has triggered a real hype. However, blockchain has proven its effectiveness both in Germany and in Russia. Pilot projects in both countries have shown the economic feasibility of

this technology. Sufficient data has already been accumulated on reducing costs and accelerating business processes through blockchain. Blockchain technologies are currently primarily used in the financial and logistics sectors in both countries. Experts from both countries have noted the supply of food products, medical devices, pharmaceuticals, and high-tech products as the most promising areas for blockchain implementation in logistics.

In both countries, experts predict an increase in interest in blockchain and an increase in the number of projects, and the development of associations and consortia. The expansion of cooperation is an important factor for blockchain technology development both in Russia and Germany. The creation of various platforms for experience exchange can stimulate the penetration of blockchain technology into new industries and market segments. To improve blockchain solutions, market players must become more open to interaction. The effect of using blockchain technologies increases significantly, along with an increase in the number of users. Another critical area of expanding blockchain efficiency is its combination with other end-to-end technologies and the development of cross-technology solutions.

Russian and German companies' key factor regarding the implementation and use of blockchain technology proves to be the same: increased efficiency and the possibility of building trust between business partners. Some differences are observed in Russia and Germany's approaches to blockchain implementation. While in Germany, most companies are engaged in the development and implementation of blockchain independently or in cooperation with business partners, without resorting to IT consulting, Russian companies often turn to consultants for help since they do not have the necessary competencies and skills. Therefore, the demand for IT support services is currently increasing in Russia.

As in Germany, Russian companies use blockchain not only to improve existing business processes but also to create new products and services and build new business models. Russian businesses use blockchain less often for logistics tasks (18% of companies) than German businesses (34%).

Conclusion

The study results show that despite the differences in the level of economic development of Russia and Germany, interest in the use of blockchain technologies is high in both countries. As expected, the level of blockchain adoption in Germany turns out to be higher due to the higher demand for innovative technologies in a country with a more robust industry. In Russia, the key players in the blockchain market are large businesses, which have already actively participated in implementing blockchain technologies. In Germany, the introduction of blockchain also began with large companies. Still, today more and more small and medium-sized enterprises are increasingly interested and involved in implementing the blockchain technology. Russian small and medium-sized enterprises have not yet reached this stage, as they do not have sufficient resources to use the blockchain.

The benefits of using blockchain technology are the same in both countries. Among the key ones are a significant increase in efficiency; time and cost reduction in the execution of business processes both inside and outside the companies; paperwork minimization; elimination of the risk of document loss; documents storage and transportation cost reduction; reclamation costs decrease by ensuring complete transparency of business processes; logistics costs reduction; reduction of unclaimed stocks of material and technical resources.

The difficulties of using blockchain for logistics and supply chain management are also the same in both countries: an unclear legal framework; differences in the regulatory framework across various countries; incompatibility of software solutions developed by different providers, which is especially important in international logistics.

Another common problem for both countries is the lack of specialists in blockchain. This problem is recognized by the state, companies, and educational institutions. In this regard, many universities have increased the number of appropriate educational programs.

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Chapter 29

Features of Integrating a Brand Strategy into the Business Processes of Intellect-Intensive Companies

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Abstract

The issues of integrating branding aspects into the business processes are acute for every intellect-intensive business that has a highly competitive external environment. The need for this research is determined by the business reality: the struggle of intellect-intensive companies for human capital, its development, and changes integration into the business processes.

The study was conducted in three stages: a series of observations in intellect-intensive areas; a series of expert interviews in intellect-intensive industries; a series of in-depth interviews with employees of various intellect-intensive companies. The article revealed the dependence of the company's intellect-intensive capital on its development. Thus, the internal brand allows companies to attract the best personnel. By influencing the elements of the business ecosystem, the brand is integrated into the company's activities at the strategic level and integrated implementation. The study includes a review of key business processes in intellect-intensive companies, characteristics of the influence of business and its relationship with employees, the role of internal brand policy in the formation of a new brand strategy. Also, it has a list of recommendations for integrating the brand strategy into the activities of an intellect-intensive company and for the development of the internal and external corporate brand.

Keywords: intellect-intensive sphere, intellect-intensive companies, brand integration, business processes, HR management, human capital, internal branding, brand ecosystem, intangible capital, intellectual capital

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1. Introduction

The global digitalization of society pushes a business towards a significant transformation and makes it necessary to revise not only the adopted technologies and tools for conducting operational activities but also the approach to developing business strategies at different levels – both the general corporate strategy of functioning and development in the market and functional strategies affecting such areas as R&D, interaction with consumers and partners, communications, sales, service. Updating business strategies also requires restructuring the company's business processes, transforming its entire ecosystem, including the management of resources, personnel, projects, and work processes. This is critically important when updating the positioning and branding strategy so that the new strategic vision is not only declared but also reflected in all business decisions and directly integrated into the company's activities. The digital transformation of a business thus affects all levels of the corporate system – from updating brand values to revising the structure of the company (Matt, Hess, and Benlian 2015).

The new business environment within the framework of digital transformation and renewal at the level of brand strategy also requires fundamental changes in human resources management, building new relationships between the company and employees based on understanding their needs, expectations, goals to organically embed professional and career development of employees in the process of market development of the company, development and promotion of the corporate brand. This understanding of the value of human capital for business development should be reflected in the strategic and operational management of the company's human resources (Strohmeier 2014).

Thus, the introduction of the updated brand into the company's activities is fundamentally important not only at the level of transformation of business processes and operating systems, but also at the level of human resource management. This process must be built in the following sections: corporate communications and internal training (broadcasting, transferring brand values to employees), the formation of a new brand identity (perception and reproduction of brand values by employees), the integration of the updated brand strategy into all business decisions (adoption of brand values by employees), strategy as a key reference point in the development and adoption of business decisions) (Melewar et al. 2017).

Human resource management is becoming not only a business-centered, but a brand-centered process, where the values of the corporate brand are put at the forefront in the long-term planning of human capital development and are not just transmitted to employees in the format of one-way communication. Those values are formed, developed, reproduced by people in the most organic way. The formation and development of human capital thus becomes a driver of the formation and development of brand capital (Ulrich and Brockbank 2009; Ulrich and Dulebohn 2015).

Studies of various industries and areas of activity in the field of human capital and brand capital have revealed the relationship and mutual influence between these strategic business resources. Although researchers' assessments differ regarding the degree of influence in different industries, experts are unanimous in the opinion that the development of human capital undoubtedly affects the development of a brand and, as a result, an increase in its value. European (Germany) studies have shown that the value of intellectual intangible capital in terms of increasing business value was more significantly manifested for companies operating in the service sector than in the production sector (Vomberg, Homburg, and Bornemann 2015). Asian studies of the influence of human capital on brand equity suggest the opposite: the great

value of human capital, as well as intellectual R&D research to increase brand value, has been demonstrated by companies in the manufacturing sector (Martínez-Climent, Mastrangelo, and Ribeiro-Soriano 2020).

As part of the study presented in this article, the authors put forward a hypothesis about the high importance of the type of business – from the level of intelligence intensity of the activity - for the reproduction and development of the brand and increasing the brand equity, this is confirmed by several industry studies. For example, in such industries as IT, education, consulting, the intellectual capital of a company, formed by employees, directly increases the brand's capital, in this context, training of employees and the development of their professional competencies becomes fundamentally important. By investing in the development of human capital, companies invest simultaneously in the development of brand equity. A corporate brand formed in this way becomes a reflection of the company's intellectual capital and an indicator of the organization's key competencies that bring it a competitive advantage (Gupta and Bhasin 2014). Based on this, it can be argued that the company's human resource management policy - in its modern reading - puts at the forefront not only and not so much the current financial performance of the business, but the goals of developing employees as intellectual and social capital, focusing on the formation of a long-term strategic competitive advantage and building up brand equity. Thus, human capital is considered in conjunction with brand capital as a strategic resource (Kramar 2014).

On the one hand, an appropriate approach to HR management policy should be reflected in business practice, not remaining only at the level of a declaration of principles and strategic vision. The level of direct integration of such an approach into business processes is an indicator of the success or failure of a business in terms of increasing brand capital and increasing its value (Chang-Howe 2019).

On the other hand, brand development has a positive impact on a company's human capital, helping to deliver the psychological, economic, and functional benefits of working for a strong brand, demonstrating and reaffirming these benefits to the company's internal audiences through creating a comfortable work environment, investing in training, and building a sense of belonging. to a brand with values that you want to share (Wilden, Gudergan, and Lings 2010). A developed human-centered brand with a position and values close to employees is a determining factor in the formation of a bond between a brand and employees at the level of acceptance of its values and culture, self-association with the company, and pride in the brand (Helm, Renk, and Mishra 2016). Thus, it is important to form not only an external corporate brand of the organization with a message aimed at consumers, but also an internal brand, focused on the company's employees. This approach to branding, considering external and internal brands in unity and integrity, leads to the development of corporate culture, contributes to the formation of the correct internal climate and overall health of the organization, which in turn affects the health of the corporate brand (Liu, Ko, and Chapleo 2017). Investing in the internal processes of employee interaction with the brand improves the experience of employees, increases their involvement and motivation, employees feel happier, are proud of their work, and realize the value of their work as intellectually and socially useful. This internal employee engagement affects the overall success of the organization and, in turn, builds brand strength (Punjaisri, Evanschitzky, and Wilson 2009; Rodrigues da Costa and Maria Correia Loureiro 2019).

The studies reviewed, however, do not pay due attention to the issues of integrating the updated brand strategy into the activities of companies with a high level of intelligence.

Previous research studies specific issues of business transformation and its brand strategy in the context of digitalization, human resource management, intellectual capital, and brand equity. However, no answer is given to the question of how to integrate the new brand strategy of an intelligent company into its business processes, how to ensure a holistic, consistent perception of the internal brand in conjunction with the external corporate brand, how to achieve direct use of the adopted brand strategy in the development and adoption of business decisions at all levels of activity and in all business processes, how to introduce the updated brand into the consciousness and daily activities of employees and form the desire and habit to correlate their actions with the brand values and the general brand strategy of the organization. In our opinion, it is necessary to develop a holistic approach to the integration of the updated brand strategy, both at the level of introducing a new positioning of the external corporate brand and the formation of an internal brand, which requires restructuring business processes, updating the corporate culture and creating a new holistic business ecosystem, including everything its levels range from revising corporate strategy to restarting work processes and systems.

The study aims to test the hypothesis about the high importance of the business intelligence in the process of integrating the updated brand strategy into the company's activities; influence on the perception of employees and implementation of a new brand in business processes and solutions, depending on the intelligence intensity of the employee's functionality; assessment of the prospects for the development and reproduction of the brand, taking into account the influence of human capital on the brand equity.

The research objectives are:

1. Identification of key business processes of an intellect-intensive company associated with the formation and adoption of decisions related to its market activities and predetermining the development of the brand.
2. Investigation of the influence of the characteristics of the intelligence intensity of the business and the intelligence capacity of the employee's functional on the perception of the updated brand strategy and the integration of the brand into the key business processes of the company.
3. Determination of the place and role of the internal brand management policy in the system of forming a new brand strategy, managing the development of the company's human capital and forming and developing brand capital at the corporate level.
4. Determination of the features of the integration process of the updated brand strategy in the activities of an intellect-intensive company at the level of the internal brand and external corporate brand; determination of the necessary focus of attention during the integration of the brand strategy at each of the two named levels.
5. Formation of a set of recommendations for integrating an updated brand strategy at the level of an internal brand and an external corporate brand into the activities of an intellect-intensive company, developing a corporate culture taking into account the new brand identity and building an integral business ecosystem following the new strategy.

2. Materials and Methods

To achieve this goal and solve key tasks, we conducted a study, during which we studied the factors affecting the integration of the updated brand strategy into the activities of intellect-intensive companies, to take them into account when forming a set of recommendations for introducing a brand strategy into business processes and corporate culture and business ecosystem transformation.

The study included three successively implemented stages, described below. Initially, to study the features of business activities and the processes of implementation and use of the updated brand strategy, a series of observations were carried out in several intellectually intensive areas, which made it possible to consider the process of brand integration itself and its final result. At the next stage, as part of a series of expert interviews with specialists in intellect-intensive industries, key difficulties and problems arising as a result of the introduction of a new brand strategy and transformation of business processes were identified, based on which generalized recommendations were formulated for the implementation of a brand strategy in the activities of companies of this type. As part of the third stage, a series of in-depth interviews were conducted with employees of intellect-intensive companies of various levels to identify the features and differences in understanding the updated brand strategy and the possibilities of using it in the development of key business solutions. Further, the results were confirmed by a quantitative survey. The study was carried out for 2.5 years (January 2018 – June 2020), the geography of the study is Russia.

Let us describe in a more detailed way the first stage of the study. As part of this stage, a series of observations were carried out on the markets of intellect-intensive industries (IT, telecommunications, FinTech, FoodTech, EdTech, consulting), this allowed us to objectively consider the process of brand integration and study the characteristics of the behavior of company employees in this process. Observation type: inclusive, open, structured (IT, EdTech, consulting); not included, hidden, structured (telecommunications, FinTech, FoodTech).

The second stage of the study includes two blocks that take place in parallel. Within the framework of the first block, a series of expert interviews were conducted with experts with experience in intellect-intensive industries, as well as experience in research, management, and marketing consulting for companies of this type. As part of the survey, the topics of the specific features of the sphere, key factors influencing the processes of forming the need for updating the brand strategy, developing and implementing the brand strategy, issues of the state of the markets at the moment, as well as identifying key trends and trends in the development of markets affecting the development process were discussed and integrating the updated brand strategy into the company's operations. As part of the expert interview, both open questions on this issue were asked, and well-known cases were discussed. Sample size 17 respondents, type - non-random, quota (the following quotas were used: HR specialists in intellect-intensive companies (4 respondents), brand managers (3 respondents), heads of marketing departments (5 respondents), specialists from consulting companies (5 respondents)). Geography of research - Russia (St. Petersburg, Moscow, Kazan, Yekaterinburg). As part of the second block, a series of expert interviews were conducted with internal experts of smart companies who were directly faced with the process of updating the brand strategy. The subject of the survey is the attitude to the transformation of business processes during the implementation of the brand strategy, the role and experience of participation in the process of brand integration. Sample size 13 respondents, type – non-

random, quota (the following quotas were used: heads of intelligent companies (3 respondents), specialists in intelligent products (3 respondents), marketers of intellect-intensive companies (3 respondents), specialists in working with clients of intellect-intensive companies (4 respondent). Geography of research – Russia (St. Petersburg, Moscow, Kazan, Yekaterinburg).

The third stage of the study includes two consecutive blocks. As part of the first block, in-depth interviews were conducted with employees of intellect-intensive companies to identify their attitude to the new brand strategy and its impact on employees' activities and perceptions of the company's internal brand. The sample type is non-random, quota-based. Quotas were set by industries: IT (6 respondents), telecommunications (3 respondents), FinTech (3 respondents), FoodTech (2 respondents), EdTech (5 respondents), consulting (3 respondents). There are 22 respondents in the following positions: middle and senior managers, educators, marketers, product specialists, IT specialists. Research geography – Russia (St. Petersburg, Moscow, Kazan, Yekaterinburg, Chelyabinsk).

Within the framework of the second block, a quantitative survey of employees of intellect-intensive companies was conducted to test the hypothesis about the influence of the intelligence intensity of activities (both at the company level and the employee level) on the perception of a new brand strategy and its integration into business processes. At the level of company selection, the sample is non-random, quota-based. The quotas were set by industry: IT, telecommunications, FinTech, FoodTech, EdTech. At the level of the respondents' choice, the sample is random, stratified; strata were determined by the level of intelligence intensity of the type of activity of employees (by the author's model of typology). The respondents were employees of the following companies: Yandex.Money, Wrike, ICL Services, Skyeng, Next Generation Clinic, Niagara, ITMO University. The sample size at this stage was 7 companies, 100 respondents. Research geography – Russia (St. Petersburg, Moscow, Kazan, Yekaterinburg, Chelyabinsk).

All the collected data were analyzed to identify the features of intellect-intensive business and an intellect-intensive type of employee activity, the influence of the identified factors on the perception of the updated brand, determining the links between the corporate culture of an intelligent company, the specifics of business processes and the level of adoption of a new brand strategy, as well as identifying key features integration of the updated brand strategy into the business processes of intelligent companies.

3. Results

When talking about integrating a brand into a company related to an intellect-intensive field of activity, as well as directly into the business processes of this company, it is important to consider the company as a single interconnected ecosystem, and not just a set of separate business units or a collection of disparate business processes. In the digital economy, the success of a company depends, among other things, as it was revealed as a result of expert interviews, on the following factors:

- flexibility – as the ability of a company to change and adapt to changing environmental conditions at different speeds;

- readiness to innovate – as an active, activity-oriented desire of the company to search, study, develop and implement innovations at various levels, including innovations of various types – from production to social;
- integrity – as the subordination of the company's actions inside and in the external environment to uniform principles, values, goals, and strategic guidelines, the general health (psychological and emotional) of the organization's employees, and the development of the company's intangible capital.

Thus, the perception of an organization as an ecosystem with diverse levels, interrelated processes, and people who provide and initiate them helps to keep the focus on these factors. The provision of the latter of them is precisely facilitated by the brand strategy as a single vector of the company's development, which includes common values for the company, focus on the identity and uniqueness of the brand, its characteristics, and attributes. Besides, following the brand strategy allows you to provide the necessary flexibility in the company's decisions while maintaining its uniqueness and its own identity.

A holistic approach to considering a brand in the overall business system implies that individual business processes make sense only as part of a single system. Accordingly, in this case, each business process in which the brand, its principles, and values are integrated, contributes to the formation, creation, and development of the brand at various levels. Through internal branding, the main function of the brand for the company is manifested – integrating. Indirectly, the brand components will not be able to solve the goals that the company wants to achieve, but the consistent and systematic implementation of the brand in business processes and the development of the internal brand as a link for integration allows achieving the desired indicators and business goals.

According to the results of the study and the opinion of experts, this approach is especially important for companies in intellect-intensive fields of activity, whose main competitive advantage in the market in the digital economy is precisely intangible capital. It is worth noting that it is the creation and development of an internal brand that becomes the quintessence of the values of employees and the employer's brand as a company's value proposition aimed at employees.

Employees are viewed, on the one hand, as brand creators, and on the other, as internal customers who need to form a positive experience of interacting with the company along the way. The purposeful formation of corporate culture and a positive experience of interaction with the company allows organizations to attract and retain the best talent, which, in turn, also stimulates the development of intangible capital. As a result, we get a spiral system for the development of intangible capital through brand integration, where each previous stage stimulates the next while creating certain circular cycles (Figure 1).

According to the results of a survey of experts and observation, the formation of an internal brand is based on:

- the formation of a common understanding of values among all employees, the consolidation of brand values in the minds of employees and reliance on the formed values in work processes;
- creating a system for the professional development of employees, creating an environment that motivates the development of professional competencies and soft

skills in line with brand values, creating an employee motivation system in accordance with brand values;

- establishing traditions and holding regular events of various formats aimed at developing corporate culture and consolidating brand values in it;
- continuous communications with employees aimed at the perception and development of brand values in the team, consolidating a positive brand image, and working out possible negative ones.

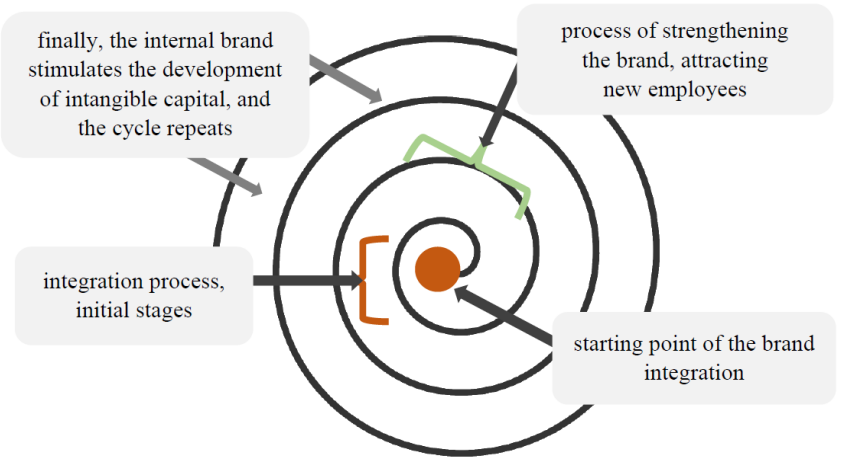

Figure 2. Scheme of the development of intangible capital through the integration and development of the internal and external brand in the company.

At the same time, speaking about the integration of a brand into the activities of intellect-intensive companies, one should not forget about the external brand, its translation into the external environment. The external brand is the basis of how target audiences perceive the company: potential partners, existing customers, competitors, media, future employees. The creation of a clear image in accordance with the brand strategy, according to the experts interviewed, can be a rather lengthy process, the result of which is not achieved at once and is not measured only in quantitative terms, which traditionally complicates the assessment of the effectiveness of brand integration. It is also important to note that the company's work on brand development, continuous communications, attentive attitude to consumers, studying their attitude to the brand creates a positive reputation for the organization, helps to increase the added value of the company itself and its products, ensures loyalty and trust of the target audience, and allows attracting highly professional employees. It also develops beneficial partnerships, reaching a new level of cooperation with both new and permanent partners. Therefore, for companies in the intellect-intensive spheres of activity, which were considered in this study, the development of an external brand is a logical and necessary continuation of the integration of the brand into the organization's activities.

The external brand formation is based on:

- creating a single and clearly readable brand image, its values among consumers and partners;

- creating an image of the company and employees corresponding to the brand strategy with the target audience to ensure the RTB brand;
- clear, simple and regular communication of the brand image through all communications of the company;
- broadcasting the company's image for various target audiences with a message corresponding to the brand strategy and audience characteristics.

3.1. Factors of the Effectiveness of Brand Integration and Its Subsequent Influence on the Conduct of Business Processes in the Organization's Activities

Since the very concept of a brand and brand strategy, as well as their effectiveness, is difficult to quantify, it is important to understand even before starting of brand integration, which factors will most affect its success to focus efforts in the right direction. Based on the results of the study, we identified the following factors for the effectiveness of brand integration and its subsequent impact on the conduct of business processes in the organization:

- The company's willingness to change: how regularly the company searches for, develops and implements innovations at different levels, and how employees adapt to them.
- The company's readiness to act actively: how much the company implements innovations in its activities, how often, how employees react to this, and how actively they participate in the overall life of the company.
- Matching the values of the integrated brand with the values of employees and their psychological type: how much employees share the values of the integrated brand before the process begins. The more pronounced this factor is, the easier and more natural it will be to integrate and identify with the new brand.
- The speed of diffusion of innovations in the company: how long it takes for the innovation to be accepted (used in the work) and shared by all employees of the company.
- Integrity of the integrated brand: how harmoniously and logically the brand identity is built during its formation, how different brand attributes do not contradict each other.
- Consistency of the company and management in changes: how much the company's managers are willing to implement integration, manage it, track changes, and continue the strategic vector even with initial resistance from employees.
- Employees ' willingness to work as a team: how much employees share the company's goals, are willing to accept them on an equal basis with their own, and actively work together to achieve them.
- The ability of teams to maintain a uniform rate of projects: how evenly distributed the loads among the business units in the company, how even the pace has the projects – not too slow and lengthy, and at the same time, not too fast and is constantly breaking deadlines due to the mismatch between load and time allotted to perform the tasks.

3.2. Features of Integrating the Brand into the Company's Activities in Intellect-Intensive Areas of Activity

As it was revealed by the results of the research on the role of brand integration in business processes and the company's activities in general, it is the brand strategy that sets the strategic vision of the company and determines the key vector of business development. This is due to the fact that the brand strategy combines and concentrates all the key business factors: strategic positioning, goals, and direction of development, approach to the selection of target segments, and interaction with them. Brand strategy, forming business values, translates them not only at the level of a specific product offer but also at the level of the company's ideology, informing what general humanistic values it adheres to and demonstrating its "human" face in the market. Including the internal value code of the company, brand identity, and its unique values, the brand strategy is gradually implemented in the business processes of the organization, transforming them in accordance with the accepted strategic objectives and principles.

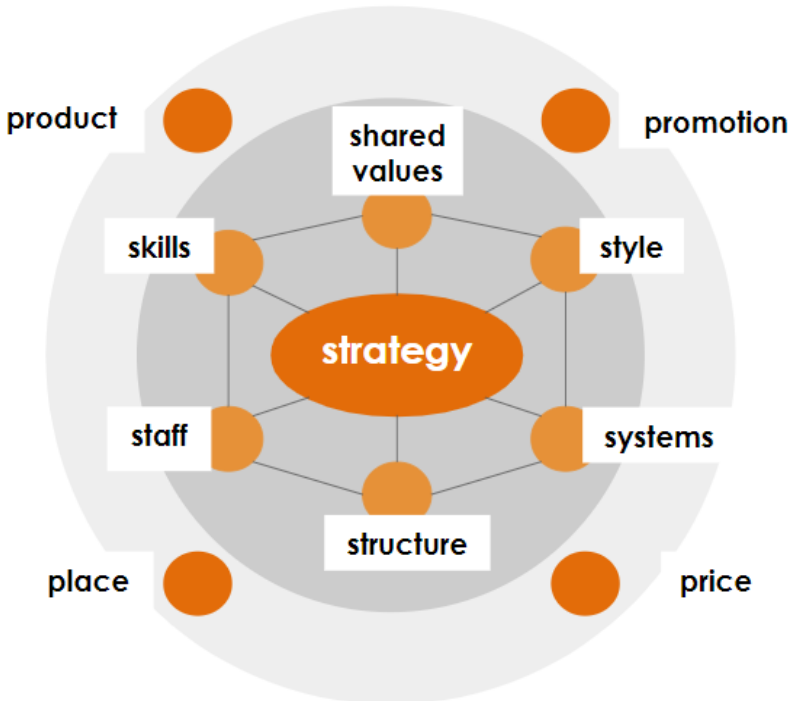

Figure 3. Business ecosystem through the prism of branding.

Intellect-intensive fields of activity are characterized by a special attitude to the brand, employees, and business conduct. The main feature is that employees, their behavior and attitude to work, and intellectual labor products directly form the brand capital that allows the company to develop products and business in general, enter new markets and take a certain position in the industry. That is why, according to the results of the study, it is particularly important for the company to work on the internal brand as a driver of the formation, reproduction, and development of the external corporate brand. Features of brand integration into the company's activities are revealed through the author's model of the business ecosystem,

based on the models of the McKinsey 7s corporate profile and the 4P business profile, creatively combined and reinterpreted through the prism of branding (Figure 2).

A fundamental element in the ecosystem of business in this approach is the brand strategy (in the center of the model) that defines the strategic vision of the company, communicates, integrates all basic business strategy, focusing on the fact that the positioning of the corporate brand defines the strategy of interaction with customers (targeting and building relationships with them), also competitive strategy (a tuning company from competitors and methods of competitive struggle), and the company's development strategy (the approach to selecting new markets and launching new products). The next level of the model describes the "inner loop" of the business, here it is shown that the brand strategy determines:

- the values proposed at the level of the external corporate brand to customers and partners, and internal brand – staff;
- corporate style, which is a concentrate of brand identity, which is reflected in all aspects of the company's interaction with external target audiences (through the product, communications, customer service system), and with internal audiences (through corporate culture);
- key competencies of the company required to create an offer to consumers in accordance with the chosen brand positioning and to form a stable competitive advantage and build on them (the company's key competencies, respectively, set the necessary competencies of employees);
- personnel, considered as human capital, creating, reproducing and developing the company's intellectual capital and brand capital;
- systems and structures as the backbone of the company's business processes, which should reflect all the key decisions related to the brand; it is the systems and structures that make the brand sustainable through its penetration, integration into business processes and operations, and form the basis for creating and reproducing the RTB of the brand.

The final level of the presented model is the "external contour" of the business – a set of 4P (Product, Promotion, Price, Place). In this complex, specific brand decisions are set, which should be reflected in the characteristics:

- product and price offer (what is offered to the consumer and at what price),
- communications (selection of channels and tools, the formation of a communication message that broadcasts the brand's message)
- customer service systems (channels and methods of sales and service).

We consider the 4P complex, on the one hand, as a concrete expression of the external brand (it directly communicates the brand to the consumer and demonstrates the RTB factors of the brand), and on the other hand, as a result, and reflection of the intellectual work and production activities of the company's employees, and therefore a reflection of how the internal brand is perceived by the staff and to what extent employees relate all their actions to the company's brand strategy.

Thus, the model element by element lays out the sequence and logic of brand integration in the company's activities – from the center to the outer layer from the adoption of a brand strategy, through its integration into systems, structures, processes, embodied in corporate identity and competences, the creation and translation of product offerings; from the formation and sustainable consolidation of the domestic brand to the formation of the external corporate brand and the reflection of it in all elements of business and product offerings.

3.3. Features of Building a Training System for Employees of Intellect-Intensive Companies When Integrating Brand Strategies

When integrating the updated brand strategy into the company's activities, it is particularly important to work, first, to convey the brand's values to employees, and secondly, to train employees in brand values, so that they perceive the brand values as their own through experience and knowledge. This is important because it is the employees who build the brand from the inside, which means that they directly develop the business and the external corporate brand. Based on the results of our quantitative survey, it turned out that in intellect-intensive companies, about 85% of employees are ready to accept new knowledge and experience, in addition to those directly related to their work functions. They tend to consider training as a mandatory part of their work, and they are ready and motivated to learn. Most employees of intellect-intensive companies view training as a continuous activity, covering the entire complex experience associated with the work, including the experience of interacting with the brand and brand perception. This attitude to the perception of new experience and knowledge is especially important in the process of integrating the updated brand strategy into the company's activities.

With this willingness and interest in training, only 50% of respondents reported that their companies are explicitly engaged in transmitting brand values and brand strategy features in the training format (41% said that such a training system is not set, and 9% do not know about it). The most frequently used formats for transmitting brand knowledge are articles (45% of respondents stated that their company uses this format), videos (38%), training events, lectures (34%), and information booklets (16.5%). Corporate events and holidays (77%), contests (43%), interactive online training (41%), meetups (36%), and training (33%) were the most frequently mentioned as interactive formats for brand immersion. Knowledge exchange directly between employees in companies most often takes place in the following formats: informal conversations (77%), communication in messengers (55%), communication during training events such as lectures, master classes (34%), communication in the format of a round table (18%).

Thus, comparing the data on readiness to learn and the actual brand training conducted in the company, we can conclude that the potential of this type of activity is not fully realized when integrating the brand strategy in the company.

4. Discussion

Over the past 10 years, a significant number of works by various authors studying human capital have appeared. The study of this concept and related aspects of capital intensity in

enterprises directly depends on the functioning and degree of development of the state economy. Russian authors (Ismagilova et al. 2017; Okorokov, Timofeeva, and Kharlamova 2019; Zhilenkova et al. 2019; Krasyuk, Kirillova, and Amakhina 2019) pay much attention to the consideration of innovative, creative, smart economy, which changes the business models of managing the companies and is characterized not only by the state of technology: the Internet of things, digitalization, automation, telecommunications; but also the understanding that the new economy cannot exist without the intellectual capital of people. In our opinion, this statement has a place in the modern theory and practice of human capital management and the new economy: a smart economy in a state can be born with the help of an intellect-intensive layer of people who create high technologies, smart cities, and high-tech products.

Some authors (Zhilenkova et al. 2019) also believe that the transition to an innovative digital economy requires paying special attention to the intellectual part of human capital. Similarly, we believe that the future belongs to an innovative economy based on people, their accumulated knowledge, skills, and ideas that help businesses develop, enter new markets, create new technologies, and have a strong competitive advantage.

The authors also consider the possibilities of human capital management in the framework of human resource management of high-tech companies in terms of using digital tools and software to optimize and improve business processes (Torosyan et al. 2020), including digital database accounting based on digital technologies: blockchain and intelligent data processing system (Novikov et al. 2019).

In our opinion, the first step for the successful development of a company in the new economy is to manage human capital from the inside, exploring the impact of quality indicators and brand positions on the results of an individual employee and the company as a whole. Among the authors who study the impact of branding on the digital economy and the economy of experience, there is an opinion about the impact of the brand of intellect-intensive companies on the formation of a new level of "brand-targeted public" communication (Fejling et al. 2019). However, this study only considers the relationship "brand – buyer," while in our work we investigate the importance of the internal state of the brand for direct participants in business processes-employees.

Some authors consider human capital not only as an influencing factor for the growth and development of the organization but also as a consequence of the work on the development of internal branding. It is worth noting that internal branding in this case is considered by the authors as a consequence of working with clients face-to-face (Matanda and Ndubisi 2013; Punjaisri, Wilson, and Evanschitzky 2009; Punjaisri, Evanschitzky, and Wilson 2009), forming through internal branding a special way of interacting with an external audience, as well as congruence of goals perceived by employees. In our research, we consider internal branding as a unity of corporate culture, internal regulations, and principles adopted in the company. The formation and development of an internal driver for the company as an internal brand allows it to successfully integrate the accepted branding provisions into business processes in the conditions of the influencing external environment of the digital economy. Also, the development of an internal brand affects the internal involvement of employees, which in turn affects the overall success of the organization, the cost, and competitiveness of the business, and therefore increases the strength of the brand.

Based on the results of the research aimed at identifying the features of brand integration into the company and business processes in the digital economy and intellect-intensive areas of

activity, we have formed recommendations on brand integration for companies in these areas of activity, as well as directions for further research.

4.1. Recommendations for Integrating the Brand into the Company and Business Processes in the Digital Economy

As mentioned above, one of the most valuable resources of the company is employees. They form intellectual capital, develop internal and external brands, create products and sub-brand portfolios, and interact directly with target audiences as brand ambassadors. In this regard, the work on the formation and strengthening of corporate culture is of primary importance and is implemented at all stages of brand integration and development.

When implementing a brand in the company's internal environment (internal branding), the focus should be on the following components:

- the corporate culture of the company, its compliance with the overall brand strategy;
- values of employees, managers, informal group leaders, the entire team, their compliance with brand values;
- corporate traditions, informal rituals, subject environment, internal visual communications, and artifacts;
- the style of interaction between employees and with customers and partners, their compliance with the character and style of the brand;
- internal training system for employees to perceive brand values, work in accordance with them, and translate brand values into the external environment;
- professional competencies and soft skills that match the brand's values.

In order to track the success and effectiveness of the internal brand implementation, we collected a set of indicators based on the results of the study, which allows us to see the dynamics of the company's development and brand integration when using them regularly. These indicators and methods of measuring them are described in detail below. They were selected based on the results of expert surveys based on the criterion of feasibility in small and medium-sized teams:

- employees' level of knowledge of brand values (knowledge at the level of reproduction, knowledge at the level of understanding);
- assessment of brand presence in the employee's information space and in work processes (do not notice the presence of the brand / notice the presence of the brand/work in accordance with the brand strategy);
- the level of agreement of employees with the brand values (in the abstract I share in principle / agree with and contributes to the fulfillment);
- assessment of reproduction and translation of brand values by employees (whether the company's activity factors that reflect brand values contribute to the formation and development, whether the brand values are transmitted to other employees, customers, partners, and the external environment through communication and direct activity);

- the share of brand "promoters" among employees (those who share brand values, are proud of the company, and recommend or are willing to recommend the company to their environment as a place of work, and the company's products for purchase and use);
- the percentage of "critics" of the brand among employees (those who are not satisfied with the work in the company, would like to change jobs and would not recommend the company to their friends as a place of work; those who rate the company's products poorly and would not recommend them for purchase and use);
- eNPS – the level of employee loyalty to the brand (the difference between the share of critics and the share of brand promoters);
- the level of employee engagement (interest, activity, willingness to directly participate in the promotion of brand values and their implementation in their work);
- competence level-compliance of professional competencies and soft skills of employees with brand values;
- assessment of the relevance of the internal brand (the ability to inspire employees to innovate, encourage productive work to create new solutions, customer orientation, work in the interests of the company).

Measurement of indicators:

- collecting information through employee surveys;
- the regularity of measurement – at the first stages of brand integration at least once every 6 months, then at least once a year;
- method for monitoring and evaluating changes according to the "was – became – should be" scheme;
- Gap analysis: what causes the gap and what needs to be done to bridge the gap.

Also, when integrating the brand into the company's activities, it is important to remember its external manifestation, which is expressed in the external brand, the company's relations with various target audiences, and its manifestation in the external environment. This image is a reflection of the internal culture of the company, a translation of its values, and a way to increase and develop intangible capital by attracting new employees who are close to these values and the company's activities.

When integrating the brand into the company's external relations with target audiences (external branding), the focus should be on the following components:

- formation of a single holistic brand image in accordance with the overall brand strategy: mission, values, brand positioning concept, brand style, and character;
- implementation of the strategy of interaction with consumers in the logic of the brand strategy-consideration of target segments through the prism of brand positioning;
- implementation of the competition strategy at the corporate brand level – formation and communication of key brand factors as competitive advantages;
- implementation of the company's development strategy in accordance with the mission and idea of the brand, in the logic of development of target markets and products set by the brand strategy;

- product strategy, service strategy and sales strategy for proper RTB brand formation;
- communication strategy with all target audiences: potential and existing clients, partners, potential employees, media, and the general public;
- development of relations with partners in all processes: communication, sales, consulting, support and support;
- regular research of corporate brand perception by target audiences (potential and existing customers, partners, potential and existing employees, media, and the general public).

In order to track the effectiveness of integrating the brand into the external relationships of the company, based on the results of the study, we formed a set of indicators that allow us to display the degree of formation of the company's image in dynamics. These indicators were also selected based on the criteria of implementation not only in large organizations but also in small and medium-sized teams, which is important for intellect-intensive areas of activity:

- assessment of brand awareness among target audiences (spontaneous and induced knowledge);
- assessment of brand preference (stability of the client's choice of brand, unwillingness to switch to another company);
- evaluation of LTV (lifetime value of the client);
- assessment of the corporate brand image in the perception of target audiences – customers, partners, potential employees (compliance with the target brand image. the reflection of brand values);
- evaluating the frequency and context of media mentions of the company, key employees, and products;
- evaluation of communications aimed at promoting the corporate brand (communicating the brand image, matching the style of communication with the style and character of the brand, brand identity);
- the share of brand “promoters” among customers (those who recommend or are ready to recommend the company to their environment as partners for cooperation, and the company's products for purchase and use);
- the share of “critics” of the brand among customers (those who are not satisfied with the company's work and would not recommend the company to their friends as a partner for cooperation; and the company's products for purchase and use);
- NPS – the level of customer loyalty to the brand (the difference between the share of “critics” and the share of “promoters” of the brand);
- evaluating the relevance of an external brand.

Measurement of indicators:

- collecting information through content analysis, qualitative and quantitative customer surveys, and internal expert survey using the Delphi method;
- the regularity of measurement – at the first stages of brand integration at least once every 6 months, then at least once a year;

- method for monitoring and evaluating changes according to the "was – became – should be" scheme;
- Gap analysis: what causes the gap and what needs to be done to bridge the gap.

Thus, using these strategically important key points that need to be kept in mind when integrating the brand into the company's activities in intelligence-intensive areas, as well as a set of indicators to track the effectiveness of brand integration in both the internal and external environment of the company will allow organizations to build their own brand integration strategy in a limited time and in accordance with the requirements that the market currently imposes on companies in the digital economy.

4.2. Direction of Further Research

Currently, changes in the external environment are more and more accelerated, which is a challenge for companies. Following the importance of integrating the brand into business processes and organizations in general for the development of their intangible capital and success in the market, it is necessary to continue research in the direction of measuring the state of the brand in the company after the integration process, as well as the overall mood of employees, compliance of the internal corporate environment with the values laid down and predicted future trends and changes.

Conclusion

As a result of the research, the key factors of the process of brand integration into the company's activities in the digital economy were analyzed and the features of brand integration into the business processes of organizations of an intellect-intensive type were highlighted. Taking into account the data obtained from the results of the study, the following important points can be identified:

1. The key processes related to the formation and decision-making for the creation and development of a complete brand of an intellect-intensive company when integrating the updated brand strategy into the organization's activities are considered. Key business processes are considered at two levels: the formation and reproduction of an internal brand, and the formation and translation of an external brand. They are collectively elements of the business ecosystem viewed through the prism of branding, where each factor is important for shaping the brand strategy as a whole.
2. The factors of influence of the business intelligence intensity in conjunction with the employee's activity intelligence intensity on the perception of the updated brand strategy and brand integration into the company's key business processes are analyzed. In particular, the company's total human capital is directly related to the formation and development of intellectual capital and brand capital, both at the external corporate level and the internal brand level (in terms of brand value for employees).

3. The role of the internal brand management policy in the system of forming a new brand strategy is defined, including the policy of transferring brand values through employee training, which allows purposefully managing the development of the organization's human capital, the formation and development of brand capital at the internal and external corporate level. When integrating changes into brand strategies, the internal brand management policy should act as a guiding vector that sets the movement from the formation of an internal brand to the formation and development of an external brand.
4. Features of the process of integrating the updated brand strategy into the activity of the intellect-intensive company at the level of internal brand and external corporate brand are revealed. Building an updated branding system in the company also determines changes in all structures and processes in the company, since the branding system must be complete and unified, without allowing dissonances, and on the contrary must contain supporting elements at all levels of the company's work.
5. A set of recommendations for integrating the updated brand strategy into the activities of the intellect-intensive company has been formed, including recommendations for developing an internal brand and an external corporate brand, developing a corporate culture taking into account the new brand identity, and building a complete business ecosystem under the new brand strategy.

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Chapter 30

Approaches of Assessing the Effectiveness of Digitalization of HR Departments

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Abstract

The article analyzes approaches to assessing the effectiveness of digitalization of an enterprise and, in particular, of the HR department. Today, a significant number of business entities are faced with the problem of assessing the effect of digitalization of business processes and determining the level of efficiency of the entire process as a whole. This raises the problem of choosing an adequate method and approach for assessment. The article identifies and analyzes the main groups of methods for assessing the effectiveness of digitalization of an enterprise, discloses the essence of each of them, clarifies the features of the methods and their possibility for use in HR departments. There are special methods and approaches that are used to assess the effectiveness of digitalization of an enterprise, which should include: cost methods, methods for assessing direct results, methods that assess the ideality of the process, qualimetric methods. Currently, enterprises in various industries are implementing information systems in the form of projects and programs that need to be assessed in terms of their quantitative and qualitative effectiveness.

Keywords: automation, HR department, costly assessment methods, informatization, digitalization, qualimetric assessment methods, methods for assessing the direct result of digitalization, methods for assessing the effectiveness of digitalization, assessing the ideality of the process, the effect of digitalization

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1. Introduction

Business process automation is highly relevant for HR departments (Svetlana Evseeva, Evseeva, and Kalinina 2020; Mitrofanova 2019). So, the introduction of information systems is necessary to solve the problems of hiring and firing employees, analyzing the KPI of employees of an enterprise, developing a motivation system based on collecting and analyzing big data and using BI systems (Bril et al. 2019). To obtain a general understanding of the effectiveness of the project, it is possible to use generally accepted methods and approaches, but to identify more accurate results, special methods for assessing the effectiveness of digitalization should be used (Dubitskaya 2019; Batkovskiy et al. 2015). In this case, the problem arises of choosing a specific methodology for assessing the effectiveness of digitalization, which is most suitable for the relevant department, industry sector of the enterprise and the information product being introduced (S. Evseeva et al. 2019; Rudskoy et al. 2019).

The performance indicator is the ratio of the effect and the cost to achieve it. Effect - the result obtained during the development and/or implementation of a software product at an enterprise; expenses - expenses for the development and/or purchase of software, installation and adaptation, maintenance and support of equipment for a certain period, for the remuneration of employees involved in working with the implemented information system, expenses for working capital. However, it is often difficult to determine the direct effect of the implementation and updating of IT systems in the short term; often, from an economic point of view, this indicator can be negative.

2. Materials and Methods

Currently, there exist special methods and approaches that are used to assess the effectiveness of digitalization of an enterprise, which should include: cost methods, methods for assessing direct results, methods that assess the ideality of the process, qualimetric methods (Caldas 2003; Dalkir 2011; Detlor 2011).

Cost methods evaluate and compare similar information assets being deployed in terms of the costs of acquiring, installing and using them over a standard useful life. This approach to the assessment of information systems is advisable to use when it is not possible to objectively assess the result of using the system or when it is necessary not to exceed the organization's budget allocated for digitalization and automation.

Cost methods can be the following types: total cost of ownership method; boiler method; method of functional points.

Total Cost of Ownership (TCO) implies the calculation and assessment of all costs associated with the implementation and operation of the system over the period of its life cycle (Ismagilova et al. 2017; Tcukanova et al. 2019).

The boiler method is based on determining, depending on the size of the enterprise and the results of its economic activity, the level of costs for the development and/or acquisition of information systems, including the costs of implementing and maintaining a software product. Within the framework of this method, an objective assessment of costs takes place, although there is a risk that the production costs of an individual product are not sufficiently accurate.

The cost of production is determined by one of the overhead allocation methods. Relying on the boiler method and using only production-dependent cost factors to allocate overheads can lead to material misstatements in the reports. Inaccuracies depend on the share of overhead costs in total costs and on the degree of diversification of the products.

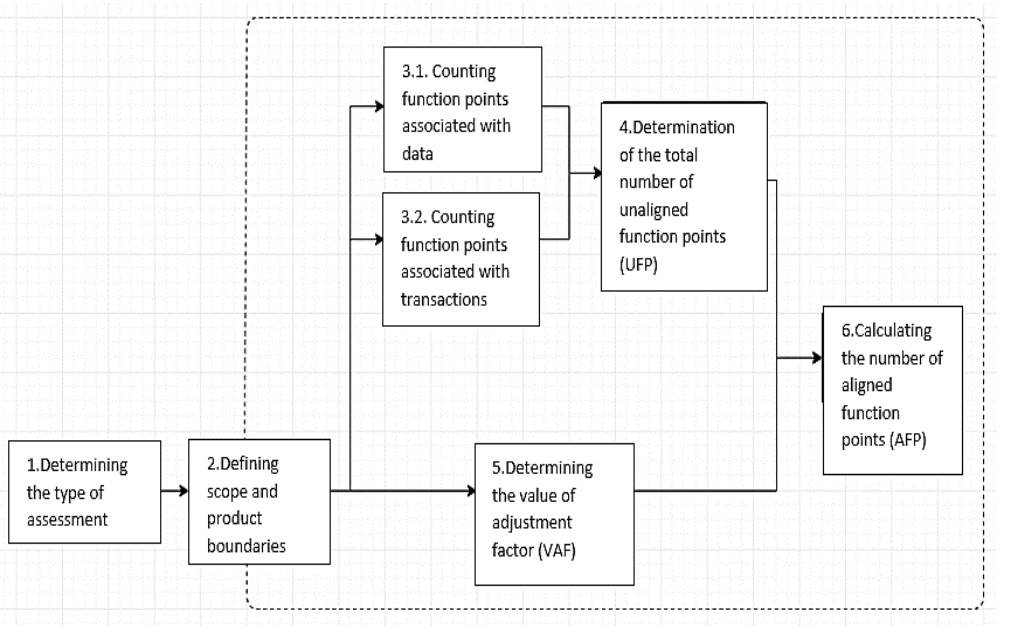

Figure 1. The sequence of stages of analysis of the effectiveness of digitalization.

The method of functional points is used to assess the effectiveness of informatization depending on the requirements of users, a set of functions performed by the system, and individual requests of consumers. The requirements for an information system are assessed on a scale of necessity for a user, each of which is modeled as a vector (functional point) in a multidimensional space. When analyzing by the method of function points, the following sequence of steps should be performed (Figure 1): determining the type of assessment; defining the scope and product boundaries; counting function points associated with data; counting function points associated with transactions; determination of the total number of unaligned function points (UFP); determination of the value of adjustment factor (FAV); calculation of the number of aligned function points (AFP) (Ogiela and Ogiela 2015).

The lack of evaluation of the results of digitalization can be noted as the disadvantages of the boiler method. When evaluating the effectiveness by the method of total cost of ownership, the costs of informatization in the future are tied to the results of economic activity for the past periods, which in some cases can lead to lagging behind the general industry trends.

Methods for assessing the direct result assess the specific result expected from the implementation and operation of the system: revenue growth, profit growth, cost reduction for individual items, the amount of lost profit (in the absence of this IT system in the enterprise) and other results.

The consumer index can be selected and calculated as such a result. This method of calculating the efficiency of IT systems implementation is suitable for enterprises with a significant number of clients (for example, banks, mobile operators, etc.), and the introduction

of IT systems implies an improvement in indicators that determine the characteristics of the consumer base (Didkovska and Machulyanskiy 2011; Chmielarz 2015; Ruhe and Wohlin 2014).

The method for assessing the applied information aspect (Applied Information Economics) implies both the assessment of the consumer index and the analysis of indicators characterizing the level of convenience for users with a specific information system and its modification. The methodology for assessing the sources of economic benefit (Economic value sourced) identifies and evaluates the sources of utility of the software product for the enterprise as a whole. For the assessment, it is advisable to choose such areas for analysis as: dynamics of income, profit; dynamics of labor productivity indicators and the use of the payroll; reduction of various cost items; reducing the time of release of goods and provision of services; reduction of risks by various parameters characterizing the effectiveness of the economic activity of the enterprise.

The method for determining the added economic benefit (Economic value added) allows you to determine the quantitative effect from the use of an information product at the enterprise. The effect is calculated as net operating income minus the cost of capital invested. The disadvantage of this method is that the sources of savings from the use of the information system are not determined.

Methods based on assessing the ideality of the process imply the use of both static and dynamic approaches. The static approach defines the system as optimal when the losses of the entire economic entity are minimal. The dynamic approach implies optimization of all business processes of the enterprise and achieving maximum efficiency within the entire system as a whole. Such methods for assessing the effectiveness of information systems allow you to compare the results of software implementation with existing examples typical for the industry and division in question.

Within the framework of this approach, the assessment of the effectiveness of implementation can be made on the basis of accounting and comparison with the industry average results. This approach requires the availability of statistics on the use of similar IT systems in enterprises in a particular industry. In this case, indicators of the effectiveness of the implementation of information systems are compared with the average indicators that are presented in a particular industry (Buslaeva, Bunova, and Malovechko 2017).

The Gartner Measurement methodology (named after the company that created it - Gartner Group) allows to comprehensively and systematically determine both the capabilities of the selected information product and its compliance with the requirements and needs of consumers. In this case, the assessment is not only of the internal capabilities of the system, but also of the subjective opinion of customers and the functionality of the system. For this, criteria such as the time spent on setting up the system, the functionality implemented, the average number of users per server, the average and peak number of transactions per unit of time, the cost of one transaction, the average and peak response time of the system, the training methods used, the cost information system infrastructure per user. On the basis of such a study, a specific implementation option is assessed, while it is compared with others (previously implemented) and, on the basis of the analysis, recommendations are given on improving the operation of the information system, selecting the optimal software configuration, using the most effective training methods for a given client, integrating information systems with other customer systems.

The methodology for assessing the return of investment considers the one for which the return on investment period is minimal as an optimal IT project. The disadvantage of the

method is that only the indicator of the return on investment period is analyzed to assess the effectiveness.

Qualimetric approaches to assessing the effectiveness of informatization involve considering a system of indicators, the factors of which are influenced by the implementation and use of the required IT product. The approach involves a comprehensive consideration of the information system, the organization of measuring the efficiency of its functioning by statistical, sociological and/or expert methods. Qualimetric methods are currently represented by two methods: the method for assessing the total economic impact and the method using the Balanced System Scorecard.

In accordance with the model for assessing the total economic impact (Total economic impact), the overall effect of the implementation of the system at the enterprise is estimated in four components: profit, costs, risks and flexibility (adaptability). When using this model, it is possible to analyze the efficiency of an enterprise or a department before and after the implementation of an information product, calculate the results of risky situations, analyze the effectiveness of using different system configurations.

The effect of implementation can be estimated from sources that provide the enterprise with new opportunities (for example, attracting a new segment of customers) and sources that solve existing problems (for example, cost savings, increased organizational efficiency).

Risks reflect the degree of uncertainty in the estimates of benefits and costs in making investment decisions.

The balanced scorecard (BSC) allows you to assess the impact of IT systems on a group of interrelated indicators of an enterprise's performance in four areas: financial indicators of an enterprise, parameters characterizing consumers, the results of an analysis of the company's internal business processes, and the potential for an organization's growth in the long term. The final number of indicators depends on the goals of the analysis and the specifics of the activity of the analyzed object (Torosyan et al. 2020). To use BSC requires its development and implementation, which leads to additional costs in the enterprise.

When choosing a method for assessing the effectiveness (Bychkova and Rudskaia 2018) of system-wide and office software, the following factors must be taken into account: assessment of both the effect and the cost component of efficiency; the ability to determine the effect in relation to system-wide and office software (the ability to assess financial and time indicators, such as labor productivity, reduction in production costs, etc.); the ability to determine indicators without conducting a deep survey of the organization's business processes (this survey is very costly and time-consuming. And as a rule, it is necessary only for specialized software); the universality of the technique is determined by the universality of the parameters and the strength of their influence (when changed) on the calculation algorithm.

3. Results

The choice of method for evaluating the effectiveness of digitalization will depend on the goals of the IT project, the size of the company, its industry affiliation, as well as the presence or absence of input and output data for analysis.

4. Discussion

The results of the possibility of using various methods are shown in Table 1.

Table 1. Comparative analysis of how to evaluate the effectiveness of digitalization

Method for evaluating effectiveness	**Evaluation of the effect and costs**	**Recommendations for application in the enterprise**	**Recommendations for evaluating the effectiveness of use in the HR department**
Boiler method	Objective cost estimation	Applicable to any enterprise	An objective assessment of the result is possible only when using IT systems in the HR department, and not in the enterprise as a whole
Functional point method	Effect, costs	Maximum consideration of user requirements and rational use of system capabilities	The method will take into account the individual requirements of the department, there is a possibility of IT systems adaptation depending on the user's requirements and the available budget
Total cost of ownership method	Objective cost estimation	A deep survey of business processes is not required, the method is universal	The costs of informatization are tied to the results of economic activity for the past periods, the performance of a particular department is not taken into account
Method of assessing consumer index	Effect	An assessment is required of how the IT systemsare convenient for clients. Recommended for use in enterprises that work with a large number of customers	The approach is used more to assess the effectiveness of work with customers, and not with employees of the organization
Applied information aspect assessment method	Effect	An assessment is required of how convenient the IT systems are for both customers and employees of the enterprise	The method is suitable for use in the HR department, since the indicator of the convenience of working with the system by each employee and department is taken into account
Method for assessing the sources of economic benefits	Effect	An analysis of the business processes of the enterprise is required. Sources of savings and/or additional costs when using IT systems are identified. The method is universal	The method is suitable for assessing the effectiveness of digitalization for an enterprise as a whole
Method for determining the added economic benefit	Effect, costs	The method is universal. The overall economic effect from the introduction of IT systems is estimated	The method is suitable for assessing the effectiveness of informatization for an enterprise as a whole, the sources of savings are not determined, therefore it is difficult to assess the effectiveness of using IT systems in a particular department
Method for assessing industry average results	Effect, costs	Can be used in enterprises of any size.	If there are statistical data for past periods, then using this method in the HR department is advisable
Gartner Measurement	Effect, costs	Can be used in businesses of any size. The method is universal, assesses the convenience of IT systems for both employees and clients	The method is suitable for use in the HR department, since the parameters of working with the system are analyzed by each employee and department

Method for evaluating effectiveness	Evaluation of the effect and costs	Recommendations for application in the enterprise	Recommendations for evaluating the effectiveness of use in the HR department
Return of investment	Effect, costs	Recommended for use at big enterprises	The method is suitable for the enterprise as a whole, but not for a specific department
Model for assessing the overall economic effect	Effect, costs	Can be used in businesses of any size. Efficiency assessment allows you to take into account changes in the overall effect of the system, costs, allows you to assess the risks and adaptability of the system	The method is suitable for use in the HR department, since it takes into account risks, including those specific to a particular department, and it is also possible to analyze the effectiveness of various system configurations
Balanced Scorecard	Effect, costs	Comprehensive and systematic study of indicators "before" and "after" the implementation of IT systems. Directions for rationalizing business processes are identified	BSC allows you to take into account the totality of parameters of the enterprise's activities, therefore, its use in the HR department is advisable

Conclusion

Summing up the above analysis of methods and approaches to assessing the effectiveness of digitalization, it should be noted that the choice of the method depends on the availability of data on the dynamics of indicators of the economic activity of the enterprise before and after the introduction of IS, the industry affiliation of the company, the availability of statistical data on similar projects, the set goals of digitalization. To assess the effectiveness of digitalization of the HR department, it is advisable to use only those methods that take into account the individual parameters of the work of each employee and department, as well as their functional requirements. A significant part of the methods and approaches makes it possible to assess the effectiveness of digitalization at the enterprise as a whole (Burchardt and Maisch 2019; Isensee et al. 2020; Lipsmeier et al. 2020).

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Chapter 31

Analysis of the Mutual Influence of the Scale and Structure of Employment on the Value of the Gross Domestic Product: The Experience of the People's Republic of China

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Abstract

The article presents the results of the author's study of the scale and structure of employment in the People's Republic of China (from now on referred to as PRC) based on a three-sector model of the labor market, as well as an assessment of the degree of mutual influence of employment and gross domestic product based on correlation and regression analysis. The authors have attempted to interpret the results obtained, taking into account the peculiarities of the socio-economic development of PRC, and draw conclusions based on the results of the study. The authors' findings boil down to confirming the hypothesis about the influence of the technological revolution on reducing the dependence of the gross regional product (from now on referred to as GDP) on the amount of living labor in the economy. At the same time, the opposite effect occurs, which is expressed in a decrease in the scale of employment of the population in a situation of growth in the people's income level. In this situation, taking into account the increasing differentiation of the income level of the people, it becomes apparent that it is necessary to revise the state social policy, including the employment policy and measures to combat poverty in terms of supporting and developing mechanisms for retraining workers at the expense of the budget, providing

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related specialties, which reduces the social risks of structural unemployment and deterioration in the quality of life of the population.

Keywords: gross domestic product, employment, structural unemployment, Okun's law, economic development, unconditional basic income, People's Republic of China

1. Introduction

1.1. The Origin of the Project and the Team

The team of authors of the article consists of three young, daring young lecturers, the deeply motivated student performing outstanding results, and the professor as the scientific coach of the idea. Authors have conducted a study of the employment processes in the People's Republic of China (here and after- the PRC), and this article is the result of this work. The team has conducted labor market analytics, investigating employment tendencies within more than 25 years (from 1991 till 2018).

From June to December 2019, they were engaged in choosing the right idea and indicators for the research, investigating the statistics and hypothesis testing development, and the team of authors of the article was involved in the data analysis process.

The purpose of the article is to determine the degree of influence of the scale and structure of employment of the population on the value of the gross domestic product and to identify the characteristics of jobs and economic development in the People's Republic of China (PRC). The objectives of the work are to present the results of the research carried out by the authors, including a correlation-regression analysis of the impact of employment on the value of the gross domestic product in China. The novelty of the work is the authors' approach to testing the hypothesis of a decrease in the degree of influence of the scale of employment of the population on the value of the gross domestic product, that is, weakening of the relationship deduced by Okun, in the context of a change in the structure of employment of the population, namely, the movement of labor from the agricultural and industrial sectors to the service sector.

2. Materials and Methods

2.1. Technologies Used

The economic development of the state is characterized and assessed by the dynamics of several indicators: the level of employment, the level of labor productivity, the value of the gross domestic product, the capital intensity and material intensity of a unit of gross domestic product, capital productivity of fixed assets, etc., which, with all their diversity and inconsistencies cannot give an objective picture of the state of the national economy, but they allow one to conclude the most important problems and tasks of managing the country's economic system.

The relevance of the study is determined by the attractiveness of the experience of economic development of the PRC and the possibility of studying it, as well as by the role and significance of economic categories of employment and gross domestic product in the system

of economic development of the state, by the ambiguity of approaches to their assessment, by the need to determine criteria for the effectiveness of employment and by evaluation of its impact on the prospects for the development of an any state's economy in general.

The research object is employment and gross domestic product, as one of the most critical economic categories and indicators characterizing the state's economic development. The research subject is the dynamics of these indicators and their mutual influence in the PRC.

The study aims to study the dynamics of the scale and structure of employment in the PRC and substantiate the mutual influence of the level and structure of jobs and the scale of gross domestic product using the example of the PRC. The research objectives are:

- a brief overview of the theoretical premises that substantiate the mutual influence of employment and the dynamics of growth in gross domestic product, as one of the key indicators of economic development;
- study of the structure and scale of employment and the characteristics of economic development in the PRC;
- consideration of the three-sector employment model in the PRC and its transformation within the framework of the "supply reform" of the Chinese economy;
- construction of models of correlation and regression analysis and assessment of the density and scale of mutual influence of employment and gross domestic product, interpretation of the results.

2.2. Methodologies Used

The methodological basis of this study was the correlation-regression analysis of the relationship between employment and gross domestic product in the PRC in the format of several model options.

There is an opinion that economic growth and economic development concepts should be distinguished. Economic growth has a reasonably clear definition - an increase in the scale of aggregate consumption and reproduction of economic potential (Black et al., 2009). Development is a more general term, which can be understood as regular changes in society, the transition from one qualitative state to another. Economic development, in general, can be understood as "expanded reproduction, as well as qualitative and structural positive changes in the economy, productive forces, education, science, culture, the level and quality of life of the population, human capital" (Black et al., 2009). Yu.V. Sharaev in his book "The Theory of Economic Growth" (Yu.V., n.d.) offers a classification of types of countries according to the level of economic development by the rates of dynamics of the indicator of economic development, highlighting countries with low ("plateau," "plains"), medium ("acceleration," "hills"), high ("steep hills") and rapid ("mountains") rate of economic growth. At the same time, considering the period from 1980 to 1992 as an example, the countries with the most pronounced rates of economic growth, according to this classification, include, for example, Brazil: the growth rate of the Gross Domestic Product (GDP) in Brazil for the period under review was 1.86 times (from 567.7 billion dollars in 1980 to 1057.7 billion dollars in 1992) (*Website of the State Committee on Statistics of Brazil*, n.d.). During the same period, the GDP of the People's Republic of China increased 1.6 times (from $ 303.446 billion to $ 488.222

billion) (*Website of the State Committee on Statistics of the PRC*, n.d.). At the same time, over the period from 2000 to 2012, the growth rate of the PRC's gross domestic product increased 6.86 times. The growth rate of the Russian Federation (RF)gross domestic product, for comparison, increased 7.92 times(*Website of the State Committee on Statistics of the RF*, n.d.). Accordingly, this growth rate for the classification under consideration exceeds the rapid growth rate by more than 3.5 times. It can be concluded that the criteria defined by Sharaev should be revised, taking into account the influence of various factors(Shishkina E.V. & Lavrova Z.I., 2018).

The factors determining economic development are divided into exponential and existential. Roy Harrod and Yevsey Domar (*Website Economicsdiscussion.Com*, n.d.) were among the first authors to consider and recognize the impact of productivity on the economic development of the economic system, who recognized the possibility of exponential economic growth based on capital accumulation and changes in labor productivity. The Harrod-Domar model considered economic systems at the macro level, was based on Keynesian premises, relying on the production function of Leontiev (Avtonomov V.S., n.d.) and the assumption of the instability of dynamic equilibrium, respectively, did not take into account the interchangeability of resources and focused on the negative consequences of economic development, such as an increase in unemployment, in first of all. The next milestone in the development of economic theory in this matter was the emergence of the neoclassical model of Solow (Arbex & Perobelli, 2010), which considers the relationship between gross domestic product growth rates and the level of technological development (Shishkina E.V. & Lavrova Z.I., 2019) (*Digitalization in Small and Medium-Sized Cities of Russia*, n.d.). Finally, one of the most popular theories linking the level of economic development with the scale of employment of the population is Okun's theory and the regularity he deduced, which states that there is a proportional change in the value of GDP by 1% due to a change in the scale of employment by 2%.

2.3. Metrics

The authors investigated the time series of the number of employed and the value of the gross domestic product in the People's Republic of China for the period from 1999 to 2018 (data are presented in Table 1).

The authors also examined employment in the context of three sectors of the economy: in the agricultural sector, in industry, and in the service sector. Analysis of the employment dynamics for the specified period showed a decrease in the number of people employed in the agricultural and industrial sectors and an increase in employment in the service sector. Analyzing the matrix of pairwise correlations of the mutual influence of jobs by industry and gross domestic product confirmed the expectedly high closeness of the relationship and the mutual result of employment and gross domestic product.

At the first stage of the correlation regression analysis, the authors built a matrix of correlation coefficients. They made a regression model using the least-squares method (from now on referred to as LSM).

In general, the model showed significant results with a coefficient of determination equal to 98.3%. Because the original data were represented by time series, an assessment of the

autocorrelation of residuals was carried out, which showed the presence of autocorrelation. The authors decided to change the form of the used model and modernize the data.

Table 1. The number of the employed population and the value of the gross domestic product (GDP) in the PRC from 1999 to 2018
(*Website of the State Committee on Statistics of the PRC*, n.d.)

Number in order	Year	Employment in the first sector	shareres to the previous year	GDP, million yuan	GDP in shares of the previous year
1	1991	65491.00		22050.30	
2	1992	66152.00	1.0101	27208.20	1.23
3	1993	66808.00	1.0099	35599.20	1.31
4	1994	67455.00	1.0097	48548.20	1.36
5	1995	68065.00	1.0090	60356.60	1.24
6	1996	68950.00	1.0130	70779.60	1.17
7	1997	69820.00	1.0126	78802.90	1.11
8	1998	70637.00	1.0117	83817.60	1.06
9	1999	71394.00	1.0107	89366.50	1.07
10	2000	72085.00	1.0097	99066.10	1.11
11	2001	72797.00	1.0099	109276.20	1.10
12	2002	73280.00	1.0066	120480.40	1.10
13	2003	73736.00	1.0062	136576.30	1.13
14	2004	74264.00	1.0072	161415.40	1.18
15	2005	74647.00	1.0052	185998.90	1.15
16	2006	74978.00	1.0044	219028.50	1.18
17	2007	75321.00	1.0046	270704.00	1.24
18	2008	75564.00	1.0032	321229.50	1.19
19	2009	75828.00	1.0035	347934.90	1.08
20	2010	76105.00	1.0037	410354.10	1.18
21	2011	76420.00	1.0041	483392.8	1.18
22	2012	76704.00	1.0037	537329.00	1.11
23	2013	76977.00	1.0036	588141.20	1.09
24	2014	77253.00	1.0036	642097.60	1.09
25	2015	77451.00	1.0026	683390.50	1.06
26	2016	77603.00	1.0020	737074.0	1.08
27	2017	77640.00	1.0005	820099.50	1.11
28	2018	77586.00	0.9993	896915.60	1.09

Further, the authors considered several variants of regression analysis models of the relationship between employment and gross domestic product, all of which became statistically significant, including the model using the trend component. Let's consider the results of the last model in more detail.

The initial data were reduced to the form of absolute increments by the method of first differences (Barykin, Bochkarev, Dobronravin, et al., 2021; Barykin, Bochkarev, Sergeev, et al., 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al., 2021; Barykin, Smirnova, Sharapaev, & Mottaeva, 2021). A matrix of paired correlation coefficients was built (Table 2) (It can be added to the application if desired).

Table 2. Matrix of pairwise correlation coefficients of the first differences by the time factor, sectors of employment, and gross domestic product (GDP) of the PRC

	t (trend component)	**General employment**	**Employment in first sector (Agriculture)**	**Employment in second sector (Industry)**	**Employment in third sector (Services)**	**GDP millions of Yuans**
t (trend component)	1.00	-0.91	-0.34	-0.24	0.25	0.89
General employment	-0.91	1.00	0.48	0.14	-0.29	-0.88
Employment in first sector (Agriculture)	-0.34	0.48	1.00	-0.55	-0.54	-0.46
Employment in second sector (Industry)	-0.24	0.14	-0.55	1.00	-0.31	-0.06
Employment in third sector (Services)	0.25	-0.29	-0.54	-0.31	1.00	0.24
GDP, millions of Yuans	0.89	-0.88	-0.46	-0.06	0.24	1.00

Based on the results of the correlation coefficients of the first differences, it was concluded that gross domestic product correlates significantly with the overall level of employment in the PRC, as well as with the trend component.

Further research consisted of fitting the form of the regression model. The selection of the best model was carried out by assessing the significance of the model as a whole using Fisher's F-test, assessing the importance of the regression coefficients using the Student's t-test, the presence of autocorrelation in the residuals using the Darbin-Watson test, and evaluating the paired regression coefficient based on the residuals of the resulting model. Among all significant models, the selection was carried out using the estimation of the coefficient of determination of the obtained equation. As a result, the authors selected an exponential model of the form:

$$\Delta y = e25.2 - 0.02 * \Delta x - 24.67 * t \quad (1)$$

where Δy – first differences in GDP level, Δx – first differences in the level of employment of the PRC t – trend component

In general, the model is significant, there is no autocorrelation. The dependence of gross domestic product on employment can be described as exponential.

Table 3. Estimates of the exponential model indicators of the dependence of the first differences of the gross domestic product (GDP) on the employment level in the PRC

Indicator	**Estimation of indicator**
R-squared	0.586
F-criteria	55,98
t-statistics: a b1 b2	4,31 -5,47 -4,28

The authors found that the model is significant, while there is an interesting fact of the reverse interaction between the size of employment and the level of gross domestic product.

Therefore, the authors analyzed the balances of the level of employment and gross domestic product (GDP) of the PRC using the method of deviation from the trend.

The results are most vividly presented in the "residuals" charts below.

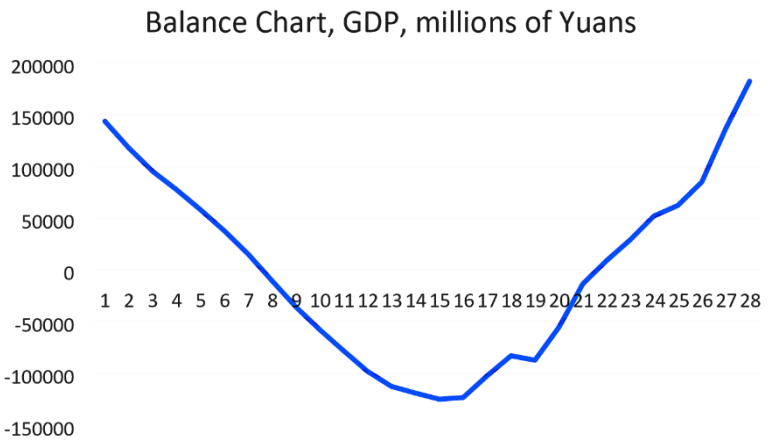

Figure 1. Chart of "balances," gross domestic product (GDP) of the PRC, million yuan.

Let's correlate with the data in Figure 2.

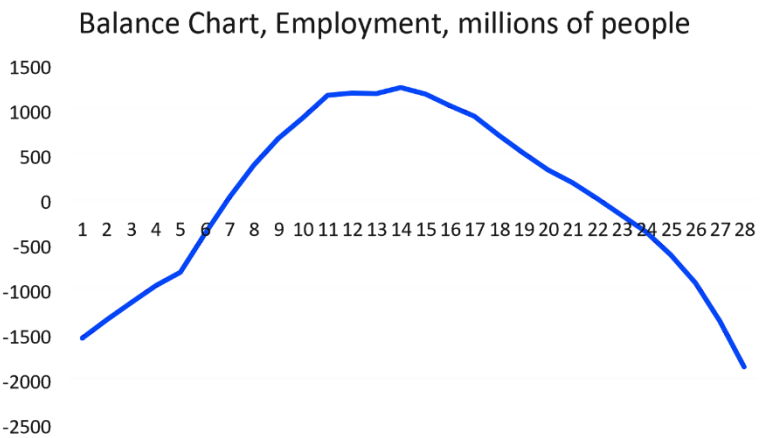

Figure 2. Graph of "residuals" of the indicator "Number of the employed population," millions of people in the PRC.

As can be seen from the graphs, the indicators under consideration have multidirectional values, which, according to the authors, are explained, among other things, by artificially high values of employment due to employment policy measures.

Our analysis of economic statistics data allowed us to draw a number of conclusions presented in this work (Fejling et al., 2019).

The most important conclusion of the study is that today the employment of the population in the People's Republic of China is less a factor in economic growth than before. This is due

to the influence of the fourth technological revolution, a decrease in the share of living labor in production, and the transformation of the structure of employment of the population: the redistribution of the employed population from the agricultural and industrial sectors to the service sector (Parshukov et al., 2020). The service sector is unable to accept the volume of the population transferred from the agricultural and industrial sectors, which leads to an increase in the structural unemployment of the people. The rise in structural unemployment indirectly confirms the presence of technological progress in the Chinese economy (BUTKENOVA & 6, 2018).

3. Results

3.1. Dynamic Reduction of Employment in Agricultural and Industrial Sectors While Employment Growth in the Service Sector

In the context of the growth of technological progress, the reliability of the interdependence described by A.M. Okun, i.e., the relationship between gross domestic product growth and the unemployment rate decreases, which is confirmed by the official statistical data of the PRC (*Website of the State Committee on Statistics of the PRC*, n.d.). The graph below shows data on gross domestic product and employment statistics in the PRC from 1991 - 2017. The development trend over the past years has been a decrease in the impact of employment on the gross domestic product, as shown in Figure 3.

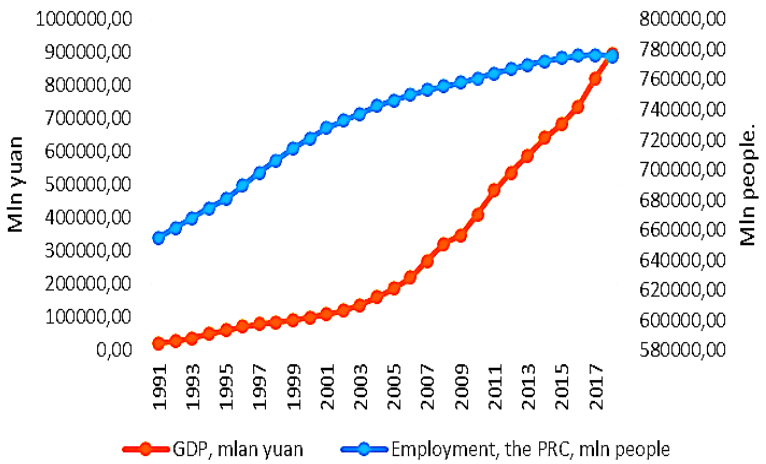

Figure 3. Structure and dynamics of Gross Domestic Product (GDP) of the PRC within 1991-2017.

The correlation of the scale of employment in the PRC for the period 1991-2017 in the context of the primary (agriculture), secondary (industry), and tertiary (services) sectors of the economy is shown in Figure 4 below. As could be seen from the graph, over the specified period, there is a noticeable (from 400 million people in 1991 to 100 million people in 2017) decrease in employment in the agricultural sector, while a significant increase in employment in the service sector (from 100 million people in 1991 year to 390 million people in 2017).

Decrease of the employment in the agricultural sector, while growth in the service sector is obvious when comparing statistics for several recent decades.

Figure 5 shows the dynamics of the indicator of the value of GDP from the tertiary sector of the economy (service sector) in the PRC for the specified period.

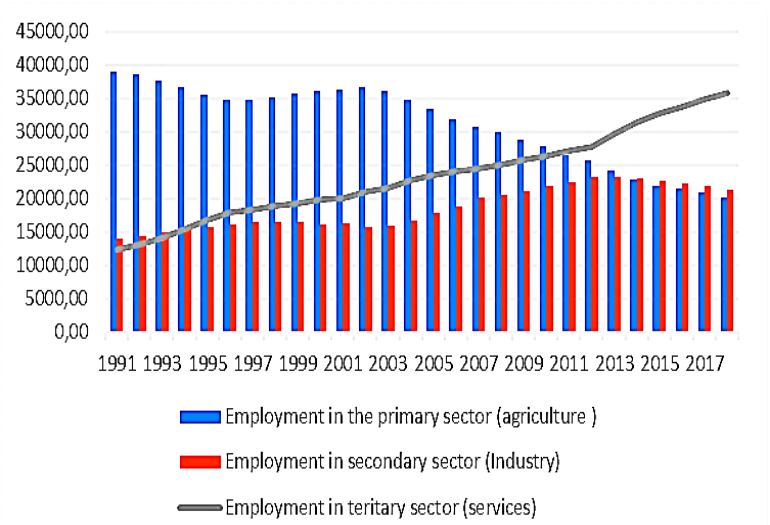

Figure 4. The structure and dynamics of the scale of employment in the PRC in the context of three largest sectors of the economy for the period 1991-2017.

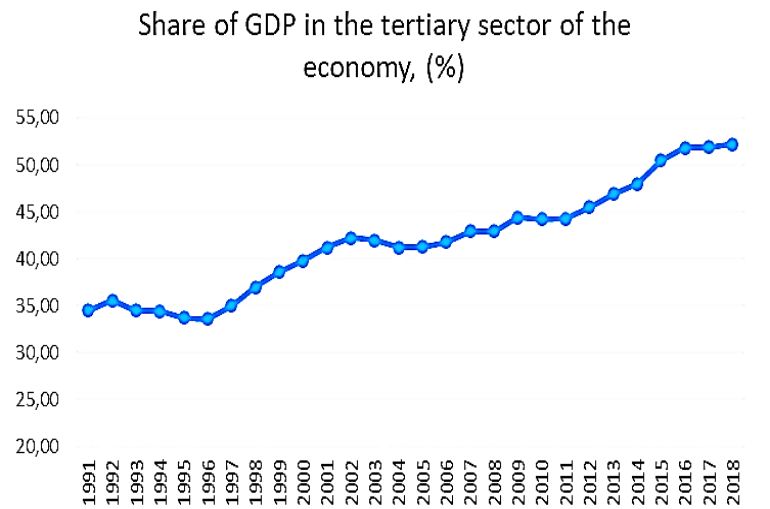

Figure 5. The dynamics of the share of Gross domestic product (GDP) in the tertiary sector of economy of PRC, %.

As could be seen in the diagram, the tertiary sector, or the service sector, has made a larger contribution to the structure of GDP of the PRC, and its share in GDP tends to increase. Thus, a change in the structure of employment, along with a change in the scale of gross domestic

product in the context of sectors, determines the change in the level of labor productivity in these sectors of the economy.

Table 4. Correlation of the rates of dynamics of GDP and employment in the PRC by enlarged sectors of the economy for 2007-2030 (taking into account the forecast value)

	GDP,%				Employment,%			
	2007	**2010**	**2020**	**2030**	**2007**	**2010**	**2020**	**2030**
First (agricultural sector), %	11.3	10.4	5.9	3.5	40.8	38.4	26.6	15.4
Second (industrial sector), %	50.0	48.8	46.6	44.8	26.8	27.1	29.7	32.7
Third (services sector),%	38.7	40.8	47.5	51.7	32.4	34.5	43.7	51.9
Total,%	100	100	100	100	100	100	100	100

So, according to the analysis above it could be concluded that the development trend over the past years and for the projected next decade is a decrease of the impact of employment on GDP, especially in areas with a traditionally high proportion of living labor (agricultural production, light and food industries).

3.2. Reduction of Ouken's Law Influence

Author's comparative analysis of the results of the study of the dependence of changes in gross domestic product in shares to the previous year on changes in the level of employment in the PRC in shares to the previous year for the periods from 1991 to 2000 and from 2001 to 2018 confirms the tendency of weakening of influence living labor per GDP. So, when conducting a correlation-regression analysis of the dependence of gross domestic product growth on the number of employed in the enlarged segments of the economy in the PRC from 1991 to 2000. the values of the multiple R square and R-square are 0.5 and 0.258, respectively, while for the period from 1991 to 2018, these indicators are already 0.27 and 0.07, respectively. Thus, we can observe a downward trend in the dependence of gross domestic product on employment. This result, in combination with the so-called technological unemployment mentioned above, is a consequence of changes in the structure of the economy, an increase in the influence of the technological factor and a decrease in the influence of the labor force resource. This is confirmed by the final regression equation, which has the following form: $y = - 49.3 X1 - 25.1 X2 + 6.87 X3$, where X1 is employment in agriculture, X2 is employment in industry, X3 is in the service sector, respectively. Accordingly, this equation can be interpreted as a decrease in gross domestic product with an increase in the share of people employed in agriculture and industry.

3.3. State's Policy Response on the Situation

In the PRC, the problem of the redistribution of labor by sectors is implemented with the participation and control of the state and is reduced to promoting the employment of persons released in the agricultural and industrial sectors, in the service sector, including through increasing the level of professional education of employed people. This concept was proposed by the current President of the People's Republic of China, Mr. Xi Jinping, and within the

framework of the implementation of the concepts of the New Norm and Supply Reform, the main postulates of which were announced in 2015 at the 5th Plenum of the Central Committee of the Communist Party of China 18- of the first convocation, which outlined a five-year economic development plan for the 2015 2020s. The essence of this reform is to change the internal infrastructure of the economy, and, as a consequence, to change the structure of the labor supply (Chow & Li, 2002). Schematically it can be represented as follows:

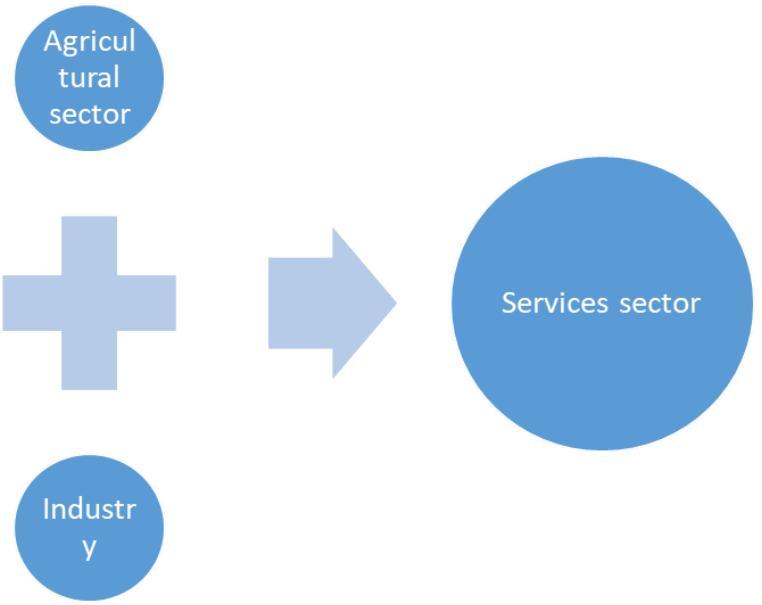

Figure 6. Schematic representation of the targeted redistribution of labor between the enlarged sectors of the economy in the PRC.

The risks of the release of labor from the agricultural and industrial sectors under the influence of scientific and technological progress are today one of the most pressing problems of Chinese social policy. Developing mechanisms to overcome or mitigate these risks is one of the most important tasks of the Chinese government.

4. Discussion

According to the authors, factors, determining the impact of employment on GDP include, again, first of all, the artificial creation of prerequisites for the underutilization of human potential (Shishkina E.V. & Lavrova Z.I., 2018), which finds expression in both economically less efficient jobs in comparison with potential, low wages, as a result, in a decrease in quality life of the population (Borokh O.N., n.d.). Speaking about indicators characterizing the degree of digitalization of the economy, by which in Russia it is customary to understand “overcoming the digital inequality” (*Analytics of the World Bank*, n.d.), in particular, such as indicators of investment in human capital (Shishkina & Lavrova Z.I., 2017), indicators of economic mobility, indicators of the development of the service sector, we have to say that, despite the rather serious successes in the spheres of education and health, the PRC certainly has much to

strive for. So, if we talk about primary digitalization, expressed in the formation of the infrastructure of both the PRC, the global economy is completely integrated, and in some ways even outstrips world trends, then in terms of secondary signs of digitalization, namely, the characteristics of the use of digital infrastructure and, above all, in the formation of professional competencies, things are worse(*2018 Summing up the Results of the Year*, n.d.).

In particular, this is evidenced by the place of PRC in the international ranking in terms of the human development index: at the end of 2018, the PRC took only 85th place (*List of Countries According to the Human Development Index*, n.d.).

Conclusion

Speaking about the prospects for economic development, it seems quite difficult to make any forecasts, taking into account the influence of a number of factors, both expected and rapidly and unexpectedly entering our daily life: technogenic and informational, the impact of the introduction of new technologies into economic processes; threats to the natural environment - the ecological situation, epidemics that sharply indicated the fragility of human life itself; economic losses, risks of poverty. The consequence of all is the predicted deterioration in the quality of life of the population in the event that the new realities of life are not taken into account and that timely measures of adaptation to them are not developed.

At the same time, according to the authors, the most preferable scenario for the development of the situation for the PRC would be the one the Government of the country has chosen- which is not an overestimation of employment in sectors of low economic efficiency, but the path of natural market competition and partial government regulation, in particular, by introducing an unconditional basic income as a measure reducing social risks, similar to how it is proposed to be implemented in a number of developed countries of the world. At the same time, it can be noted that in the PRC, the scenario of social payments was partially experimentally implemented as a measure to combat poverty and increase domestic demand. Given the peculiarities and modern nature of the economy of the PRC, authors suppose that the PRC's economy is quite ready to increase it's success in following this path.

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Chapter 32

Basic Prerequisites for the Emergence and Development of Digital Marketing

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Abstract

In modern times the business success of enterprises is more and more the result of the development of science and the accelerated introduction of new advances in marketing. The importance of digital marketing increases, and so does the interest in theoretical lighting and empirical research of its various aspects. Digital marketing is becoming an important key to success. Its importance grows and it becomes a way of meeting the challenges of globalization in business. Given this, the goal of this paper is to briefly present an analysis of the main prerequisites for the emergence and development of digital marketing. The author hopes that this would provoke a discussion on these and other similar issues related to this topic. The results would support future research on mechanisms to stimulate the development of digital marketing in companies. Clarifying these prerequisites would be useful for company management in developing strategies to overcome weaknesses in their marketing activities.

Keywords: marketing, digital, prerequisites, emergence, development

1. Introduction

Global trends in recent years, related to the globalization of markets and the rapid development of technology, have created the opportunity for the emergence of new dynamic business models. This in turn has completely changed the environment in which the business operates, making it extremely volatile, highly competitive and uncertain. According to the Global Leadership Forecast, 2017/18, the modern business organization exists in the conditions of: variability, 55%; uncertainty, 48%; complexity, 36%, and ambiguity, 31%. ("Global Leadership Forecast 2018 | DDI" n.d.). This new business reality poses serious challenges to

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business organizations. For them to survive and achieve high economic results and competitiveness, it is necessary to completely restructure the development strategies and move to the digitalization of their activities. Digital technologies and the opportunities they create are the main driving force of business and gradually replace the traditional methods, approaches and tools for carrying out various business activities in each functional area in the management of organizations. These include the various platforms for sharing digital skills, cloud technologies, huge databases and analytics tools, mobile communications, social technologies and their applications (Fitzgerald 2013; Fitzgerald et al. 2013; Chaffey 2015; Kane et al. 2015; Wade et al. 2016). We should not miss the development of smart devices, which have more and more functionalities (Internet of Things and Wearables) and thanks to their connection to the Internet create an opportunity for continuous data exchange, which has not existed before (Dubgorn et al. 2019; Soia, Konnikova, and Konnikov 2019; Maydanova and Ilin 2019; Kharlamova et al. 2019). In this way a connection of continuous interaction is established between the companies and their users not only until the moment of the purchase but also during the whole cycle of using the product or service. This in turn creates an opportunity for companies to receive quality feedback and analyze the entire life cycle of consumers. The Internet environment helps to gather huge databases and change the business models of organizations (Osterwalder 2013; Slavova 2018; 2020; Martin and Serban 2013; Seddon et al. 2003; Morris, Kuratko, and Covin 2011; Kuratko 2010; Latiff and Safiee 2015). The theory and practice of digital marketing are emerging and successfully developing. Moreover, it is becoming an important tool in the competition.

As the urgency of the problems and the importance of digital marketing increases, so does the interest in theoretical lighting and empirical research of its various aspects. The number of scientific publications in this field is growing. However, a number of important issues still remain unresolved, which raises the need for further research in some areas. Such a direction is the study of the prerequisites for the emergence and further development of digital marketing. Their knowledge is important for the correct direction of the efforts of companies to create conditions for its future development.

Given this, the goal of this paper is to briefly present an analysis of the main prerequisites for the emergence and development of digital marketing. The author hopes that this would provoke a discussion on these and other similar issues related to this topic. The results would support future research on mechanisms to stimulate the development of digital marketing in companies. Clarifying these prerequisites would be useful for company management in developing strategies to overcome weaknesses in their marketing activities.

2. Materials and Methods

For the purpose of this paper, 250 literature sources related to digital marketing are analyzed: articles; papers; publications in various media; Internet platforms; data from different Bulgarian marketing agencies.

3. Results

The gradual entry of the digital transformation and the changes it imposes in the overall activity of the organizations creates a new environment for the functioning of the business. Its specific influence in practice is expressed in:

- creating more opportunities for personalization of products and services;
- a higher degree of efficiency in data collection, processing, analysis and interpretation;
- greater transparency of business processes;
- improving customer service;
- increase in sales revenue and profit;
- the emergence of new business models;
- reducing the time for placing new products and services on the market;
- creating preconditions for better planning and management; improving the quality of products and services;
- better resource management; creating opportunities for cost optimization,
- creating an innovative culture and increasing competitiveness.

There are a number of models in the specialized literature that describe the nature and character of digital transformation. Their analysis shows that most of them are quite similar. The main difference lies in the way the whole process of digital transformation is structured. According to the "piano model" developed by the Global Center for Digital Business Transformation (IMD), there are seven areas of organizational change, Figure 1. (Wade 2015).

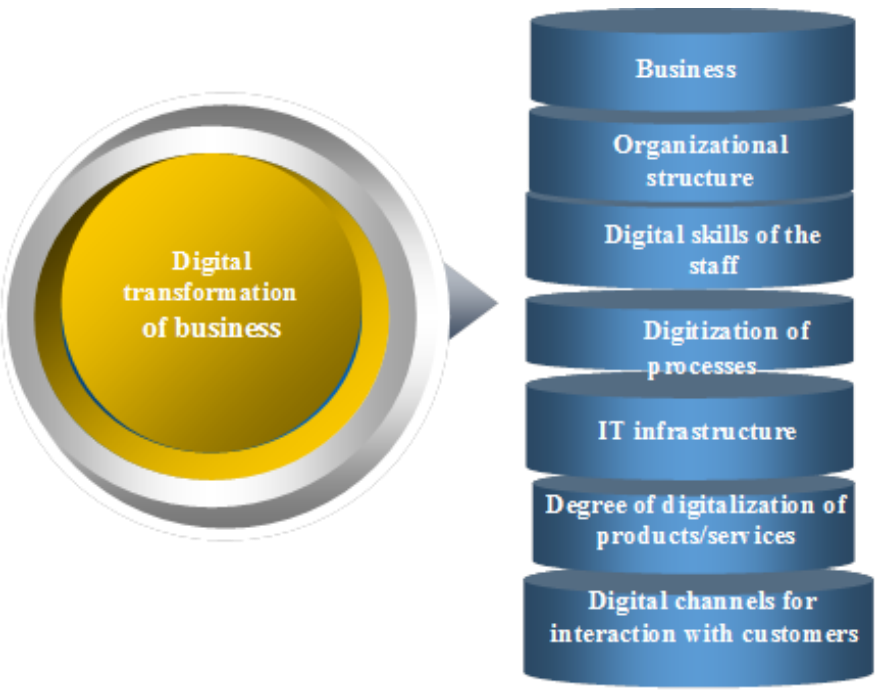

Figure 1. Piano model.

It is clear from the presented model that the digital transformation closely affects the ways of interaction with customers, which in turn leads to a significant change in the organization and management of marketing activities.

A similar approach is followed by a number of other authors such as Chaffey, Charlesworth, A, (Charlesworth 2014; Chaffey 2015) who adhere to the traditional strategic framework developed by McKinsey in the 1970s.

The results of a study by MIT and Deloitte (Deloitte 2016; MIT Sloan Management Review 2016; Deloitte 2020) reveal that modern business organizations use two approaches to digital transformation:

- solving individual business problems through the use of individual digital technologies;
- integration of social, mobile, analytical and cloud technologies in business changes.

Analyzing these two approaches, we must note that the second of them would definitely lead to higher efficiency and better economic results. This is because very often the implementation of individual technologies, without them being interconnected and integrated with the overall development strategy of the organization, would lead to problems in the process of their use.

Researchers at the Massachusetts Institute of Technology (MIT), for their part, have identified nine elements of digital transformation, based on a study of more than 100 companies that have made such a change in various aspects of their business. These elements are grouped into three areas (Westerman, Bonnet, and Mcafee 2014):

- transformation of consumer experiences in the use of goods and services of the organization;
- transformation of the business operations of the organization;
- transforming the business model through digital business modification, new digital business and digital globalization.

The models mentioned so far focus mainly on the technological side of things in the process of digital transformation, putting technology in the foreground. However, to achieve a higher degree of efficiency, the process of digital transformation requires an even deeper change in the basis of business organizations. This is confirmed by the opinion of a number of authors. For example, David Rogers in his book “The Digital Transformation Playbook” states that “digital transformation is not just a technology, but a strategy, a new different way of thinking.” The author defines five key strategic areas that need to be completely restructured in order to maintain a strong competitive position in the digital world and these are customers; competition; data; innovation and value (Rogers 2016).

Table 1 provides a brief summary of what has changed in each of these categories in the transition from the analog to the digital age (developed and supplemented by Rogers) (Rogers 2016).

Table 1. Changes in the key strategic areas

Key strategic areas	**Before (analog era)**	**Now (digital age)**
Customers	✓ customers are considered as a mass market; ✓ the emphasis is mainly on the needs of companies, not consumers; ✓ the individual approach to clients is poorly used and is considered difficult to implement; ✓ when developing strategies aimed at customers, feedback from them is rarely taken into account; ✓ communication is mostly one-way (from companies to customers); ✓ the main key role is played by the company; ✓ relies on the same, traditional techniques for attracting new customers; ✓ the strength of retaining customers and turning them into loyal ones is not assessed;	✓ customers are considered as individuals; ✓ focuses on the needs and requirements of customers, not companies; ✓ relies more and more on the individual approach to each client; ✓ customer feedback serves as a basis for developing marketing campaigns, plans, programs and strategies; ✓ active two-way communication; ✓ the client is placed in the center and plays a key role; ✓ more and more new interactive techniques are sought and used to attract new customers; ✓ emphasis is placed on various techniques and tools for tying and retaining customers, as well as for increasing their level of loyalty;
	✓ marketing is mainly used to persuade to buy; ✓ the created value is one-way; ✓ savings based on “company”;	✓ marketing is used not only to persuade to buy but also to create additional value for customers emotionally, functionally and rationally, as well as to build image and loyalty; ✓ savings based on “value for customers.”
Competition	✓ competition is mainly within certain industries; ✓ lower intensity; ✓ clear distinctions between partners and competitors; ✓ the competition is a “zero-sum game” ✓ the main assets are owned by the company; ✓ products/services with unique functions and benefits; ✓ several dominant competitors in a category; ✓ slower reaction to market changes; ✓ low flexibility of production processes and systems; ✓ higher resilience to competitive advantages. ✓ difficult to gather information about competitors.	✓ competition crosses the boundaries of individual industries; ✓ high degree of intensity; ✓ there is no clear distinction between partners and competitors; ✓ competitors cooperate in key areas; ✓ key assets are located in external networks (cloud spaces and technologies); ✓ availability of platforms with partners who exchange value; ✓ rapid response to market changes; ✓ high flexibility of production systems; ✓ low resilience to competitive advantages; ✓ easy and fast study of the competitors' actions.
Data	✓ generating databases in companies is an expensive and laborious process; ✓ data are generated mainly by companies; ✓ data is collected and stored without active use; ✓ companies use only structured data; ✓ data is used as a tool for process optimization; ✓ the process of data processing and analysis is long and difficult; ✓ the true meaning and significance of large databases is not understood.	✓ data is generated continuously and everywhere; ✓ data becomes extremely valuable and useful information; ✓ unstructured data are becoming more widely used and becoming an increasingly valuable resource; ✓ data is a key tool for creating value; ✓ the process of data processing and analysis is much easier and faster; ✓ data play a key role in the activities of companies - they become a strategic resource.

Table 1. (Continued)

Key strategic areas	Before (analog era)	Now (digital age)
Innovations	✓ decisions are made mainly based on intuition and seniority; ✓ testing different ideas is expensive, slow and difficult; ✓ experiments are conducted rarely and mainly by experts in the respective field; ✓ the challenge of innovation is to find the right solution; ✓ failure is avoided at all costs and on this basis, fewer attempts are made;	✓ decisions are made based on testing and validation; ✓ the testing process is significantly cheaper, faster and easier; ✓ experiments are conducted constantly and by everyone; ✓ the challenge of innovation is to find the right solution to the "right problem"; ✓ failure is rather seen as a source of ideas for improvement;
	✓ the focus is on the finished product; ✓ innovations are very expensive and can only be afforded by large companies; ✓ high degree of conservatism; ✓ innovations are concentrated in specific areas and directions.	✓ innovations are less expensive and become available to a wider range of companies; ✓ non-standard thinking and creativity are highly valued; ✓ innovations are applied in all areas and directions; ✓ innovation becomes the engine of business.
Value	✓ value propositions are defined by companies and industries; ✓ business models are developed over a long period and are rarely optimized; ✓ changes are assessed by how they affect the current business activities; ✓ basic tactical and operational solutions are developed; ✓ achieving market success leads to peace of mind and satisfaction; ✓ emphasis is placed on the main purpose of the products /services without looking for ways to create added value; ✓ high degree of customer loyalty to brands;	✓ value propositions are defined based on changing consumer needs and behavior; ✓ business models need to be optimized and changed constantly; ✓ new business models are created; ✓ takes into account how a change will affect the business not only in the short term but also in the long term; ✓ strategic decisions are developed; ✓ achieving market success is short-term and keeps you alert; ✓ new and different ways, techniques and tools are used to create added value; ✓ declining level of customer loyalty to brands.

Here we must note that all five categories are directly related to marketing. The changes in them testify to the need for significant restructuring of the marketing activity so that it can meet the challenges of the modern digital business reality. These changes are one of the main prerequisites for the emergence of digital marketing. Figure 2 summarizes the main characteristics of the Internet environment that have a direct impact on marketing.

We should not miss the fact that digital transformation causes disruptive innovations in the business models of companies. Many of them need to be restructured and others completely changed. This in turn leads to the emergence of completely new dynamic business models, which bring different competitive advantages and completely change the way the business is conducted. And here we must note that in some cases, technological changes may precede the willingness of individuals or companies to use them. To this end, to be able to make the most of the advantages they offer, they must constantly develop their potential (capacity to absorb new technologies). It is widely accepted that the capacity of the enterprise to absorb new technologies is its internal ability to identify, acquire and use external knowledge (according to the definition of Cohen W. and Levinthal D) (Cohen and Levinthal 1990). The determinants of the capacity are internal for the enterprise factors, which create a potential for absorbing new technologies. The higher degree of their development facilitates the prompt acquisition of

novelties in the enterprise and vice versa. The level of development of these factors is to a great extent the result of the development of the enterprise itself. It is a consequence of the efforts managers have made. The system of key determinants of the absorption capacity of enterprises is shown in Figure 3.

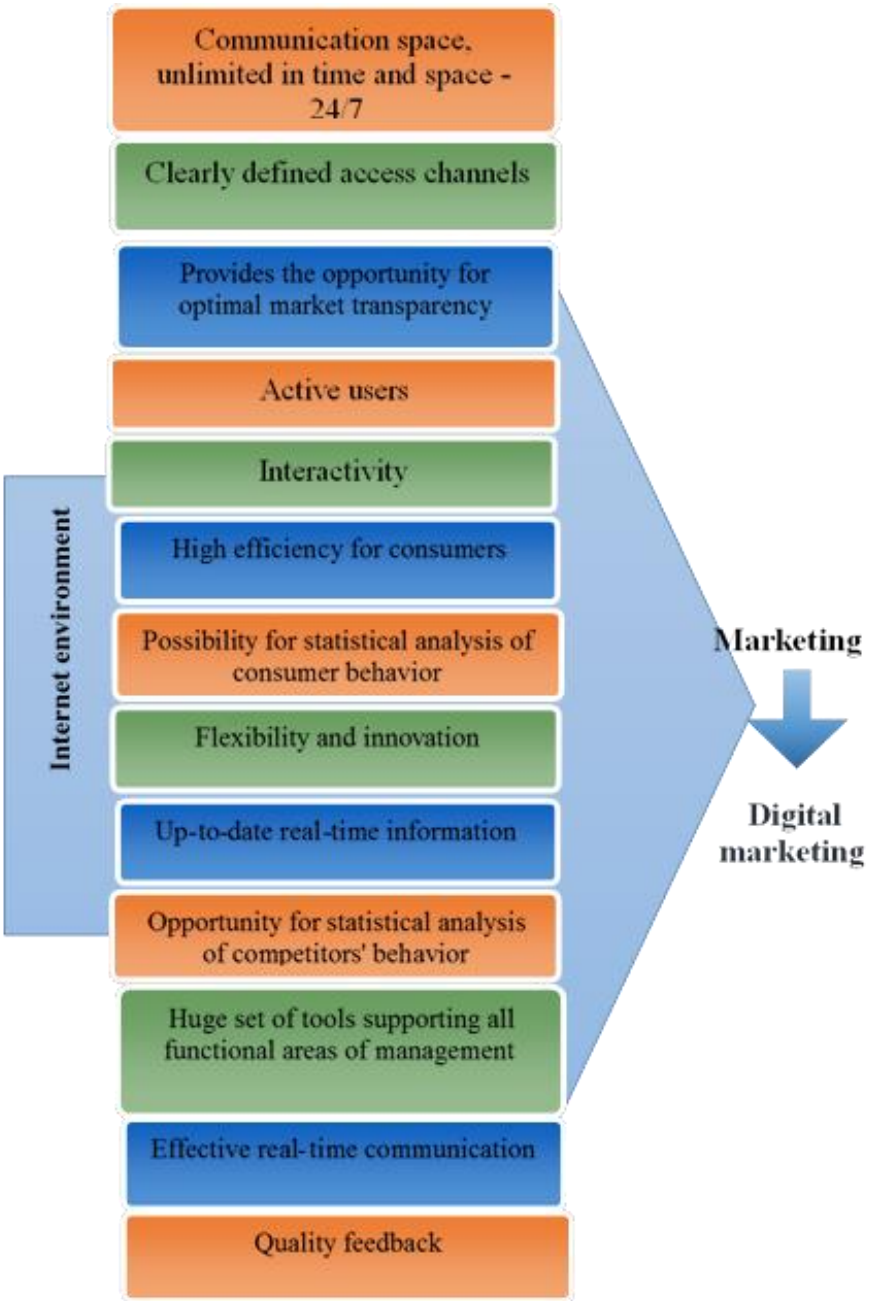

Figure 2. Features of the Internet environment that have a direct impact on marketing.

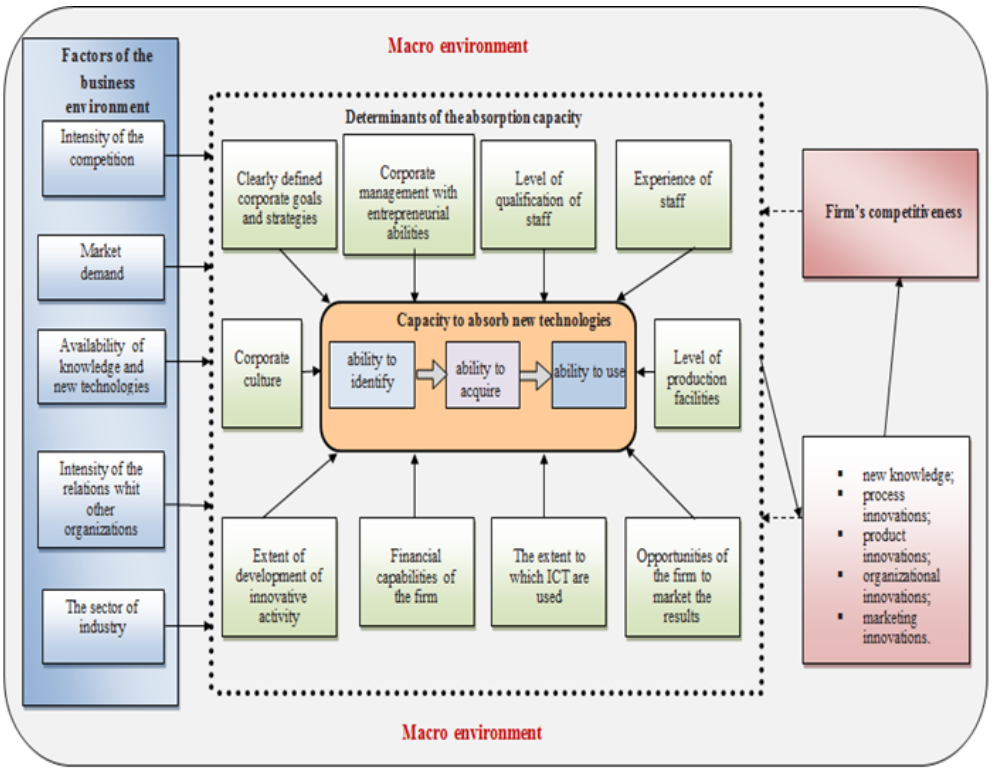

Figure 3. Model of the capacity of enterprises for absorbing new technologies (Glass and Saggi 2002).

In today's times of information revolution, high economic results and competitiveness will be achieved only by those companies that can clearly and precisely define their competitive advantages and subsequently develop them with the help of digital technologies.

Going deeper into the marketing activity, this rapid technological wave and the subsequent digitalization, completely changed the way the communication between the companies and their real and potential users. According to the latest data, over 70% of consumers spend a significant part of their daily lives in the digital environment and it becomes an important part of their lives, thus becoming their faithful ally in choosing companies, products and services. The IAB survey shows that 100% of Internet users in Bulgaria have searched for information online about their future purchases, in the European Union this percentage is 96%. This eloquently shows the increasingly crucial role of the Internet in choosing a brand to buy. In Bulgaria, 51% of Internet users say that the Internet helps them choose better products and services (Newswire 2014; PWC 2017).

On the other hand, in their quest to capture the interest of consumers and take them through the various stages of the so-called. consumer path and thanks to the huge arsenal of digital opportunities, companies create a variety of incentives. With them, they constantly irradiate them, thus significantly changing their consumer behavior. There is also a significant increase in the number of people who influence the overall decision-making process when making a purchase. If until recently this circle was composed mainly of family members, close acquaintances and the social class, now it is added to the opinions and reactions of strangers, with similar interests and lifestyles, actively sharing them on social media, blogs, websites and mobile applications. The number and type of sources of information are increasing

exponentially, which creates a huge flow of opportunities for the user to gather in a very short time, a large amount of information about products, services, brands or companies that interest him. This, to a large extent, in addition to being an advantage, can also become a significant disadvantage in certain aspects and lead to negative effects related to the difficult identification of quality information and confusion, and difficulty for the consumer in making a decision.

The development of Internet technologies and the mobility of modern people have completely changed the way of life of consumers. Consumer behavior has taken on entirely new dimensions, thanks to the digital environment, which has significantly influenced perceptions, needs, desires, needs, expectations, consumer experiences and the distribution of time. The variety of channels for real-time dissemination of information makes it much easier to impose new trends and provoke specific preferences. This is confirmed by the opinion of Gavrilova in the dissertation, who shares that "creating a need and realizing a specific problem in the online environment can be much easier and faster." It also created an opportunity to convince the consumer of the qualities and advantages of different products without having physical contact with them. For its part, the high degree of mobility provokes the need for the user to be informed, wherever he is, at any time convenient for him. This has also had a significant impact on the ways in which consumers seek and perceive this information.

Based on the above, we can say that today's consumers are becoming more demanding and difficult to trust. They expect and look for high added value (Krasnov et al. 2019). They tend to experiment often, which makes retaining them and generating loyalty to certain brands, products or services a very difficult task. On the one hand, they require specific interactive ways of communicating with them and a personal approach, and on the other hand, new ways of using products and services. This necessitates a continuous and in-depth study of consumer needs in real time. Understanding them and providing a specific attitude, not in principle, but in a specific context, as quickly as possible and at the most convenient time. "On-site service" and the provision of experiences in different contexts is a competitive advantage for organizations (Weber and Henderson 2014).

All these changes both in the market conditions and in the everyday life of the consumers lead to the formation of a new direction in marketing, namely "digital marketing."

4. Discussion

Globalization and rapidly evolving scientific and technological progress are intensifying competition and posing new challenges for businesses. Changes in the needs and requirements of consumers, as well as the rapid obsolescence of existing equipment and technologies make their competitive positions unstable. New requirements for their functioning are emerging, based on the need for continuous and rapid change and improvement. Digitalization is becoming a key success factor. The importance of digital marketing is growing and the interest in theoretical lighting and empirical research of its various aspects is increasing.

We could summarize that the main prerequisites for the emergence and development of digital marketing are:

- globalization and the resulting global electronic market;
- the rapid development of technology and the subsequent information revolution;

- the hypermedia environment of the Internet, characterized by a high degree of provision and absorption of information, which significantly increases the opportunities for marketing to interact with consumers;
- the emergence of new dynamic business models (Ilin, Bolobonov, and Frolov 2019);
- the emergence of different virtual enterprises;
- transition from a key role of producer to a key role of consumer;
- the significant change in the everyday life of consumers and their consumer behavior;
- high degree of dynamism in the communication process between the companies and their real and potential users;
- the emergence of new methods, approaches and tools for carrying out various business activities;
- the emergence of new ways of searching, buying and using products and services.
- the emergence of new products and services that require specific ways of communicating them.

Conclusion

The main prerequisites for the emergence and development of digital marketing were discussed in this publication. Their knowledge is important for the correct direction of the efforts of companies to create conditions for its future development. The author hopes that this paper would provoke a discussion on these and other similar issues related to this topic. The results would support future research on mechanisms to stimulate the development of digital marketing in companies.

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Chapter 33

Digital Technologies and Logistics Innovations as a Tool for a Company's Competitive Advantage Development

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Abstract

Digital technologies and logistics innovations have a great potential for shaping and updating business models and creating competitive advantages. However, it is not clear yet how to implement them. Despite a significant increase in interest in innovations and business models, successful companies' experience of updating their business models and creating competitive advantages are still insufficiently covered. This paper aims to close this gap. The methodology includes a case study approach to the business model analysis of a Russian company successfully operating in the building materials market. The results of the strategic process analysis are presented. They reflect the decision-making process of the business model updating on the basis of digital and logistics innovations for improving the company's competitive advantages. The obtained results can be useful for management practitioners in innovation flows management. Moreover, the research results can also be used in modern business education for developing managers' strategic thinking skills.

Keywords: digital and logistics innovations, competitive advantage, business model, case studies

1. Introduction

The dynamic changes in the business environment are now increasingly complicating a difficult task of finding sources and obtaining and retaining competitive advantages for companies. Innovation has always played a key role in the business competitiveness development (Elena Korchagina and Desfonteines 2019). Empirical research show that digital and logistics

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innovations and changes in business models have a great potential for the formation of long-term competitive advantages.

The digitalization and servitization mega-trends impact on existing business models and make their improvement the main strategic priority for business leaders (Weill and Woerner 2018). These mega-trends affect different industries in different ways, making it difficult to develop a standard business response to them.

Most companies operate within a particular business model, whether explicitly presented or not. However, more and more companies are faced with the need of updating their business models in response to market challenges or changes within the company caused by that challenges (Desfonteines et al. 2019; Desfonteines and Korchagina 2019). Despite the keen interest of researchers and business practitioners in the topic of innovation and business models, the key issues of the Russian leading companies' innovation process, their business models formation and improving are not sufficiently covered in modern literature yet.

The purpose of this paper consists of developing a holistic view of the business model, considering the process of its updating and a company competitive advantages formation on the basis of digital and logistics innovations using the example of the case study of the successful Russian company activities.

The main tasks of the study are as follows: identifying the key characteristics of the business model of a successful Russian company on the basis of the existing approaches to understanding the business model and ways of its presentation; creating the description of the main results of the strategic process event-structured analysis; reflecting the implementation of digital and logistics innovations for improving competitive advantages and increasing business efficiency.

The research questions of the study are following: What are the existing approaches to understanding the essence of a business model and ways of its holistic representation? What are the main characteristics of a business model of the successful Russian company? What are its strategic decisions and actions for gaining of strategic competitive advantages? How does the implementation of digital technologies and logistics innovations impact on the competitive advantages formation/maintenance and increasing business efficiency? What is the role of the company's top managers in the innovation process and achievement of success?

2. Materials and Methods

The methodological basis of the study was the concept of a business model, strategic, process and situational approaches, event-structure analysis, and case study design. The research is practice-oriented. It corresponds to the new research directions "strategy as practice" (V. L. Tambovtsev and Rozhdestvenskaya 2020; V. Tambovtsev and Verveda 2009). As an empirical basis for the study, a business case of the 'Ob'edinenie 45" was considered. The 'Ob'edinenie 45" is a part of the Russian company LSR Group holding, that is successfully operating on the Russian building materials market. The business case covers a ten-year period from 2002 to 2011. The collection and analysis of data was carried out with the following methods: structured interviews of top managers, employee survey, participative inquiry, analysis of primary documents, materials from the company's website and other materials from open sources.

Innovation research covers a range of disciplines, theoretical directions and concepts that open up new possibilities for understanding different aspects of this phenomenon. During the research, we relied on a number of basic concepts. "Innovation is the introduction into the use of any new or significantly improved product, service or process, a new marketing method or a new organizational method in business practice, workplace organization or external relations" (OECD/Eurostat 2005). Strategic innovation has been linked to changes in business models. The business model generally reflects the logic of the business and characterizes the ways of doing it: creating, selling and delivering customer value.

Many authors have contributed to the understanding of the concept of a business model (Teece 2010; Zott and Amit 2007), the study of the processes of its formation and updating (Zott, Amit, and Massa 2011; Morris, Schindehutte, and Allen 2005; Johnson, Christensen, and Kagermann 2008; Leadership 2010; N. Strekalova 2020; E. Korchagina et al. 2020). In modern literature, three main positions of the authors are traced, reflecting the economic, operational and strategic levels of understanding the essence of the business model. We adhere to the third (strategic) position, which focuses on the strategic aspects of business. It is based on the following understanding: "A business model is a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets" p.727 (Morris, Schindehutte, and Allen 2005). In our study, to describe the business model, we used an integrative framework of six components.

A significant contribution to the development of the modern concepts of strategic management and understanding of the competitive advantages nature was developed in the papers of many scientists (Prahalad and Hamel 2009; Teece, Pisano, and Shuen 1997; Porter 1998; Prahalad and Krishnan 1999; 2002). The competitive advantages are formed under the influence of various factors, among which there are three categories of different nature: competitive advantage based on quality, cost-based competitive advantage and competitive advantage based on core competencies.

The strategic process is associated with the search for long-term competitive advantages, the development of the strategy, and the renewal of the business model. The strategic thinking is considered as a special, complex type of intellectual management activity, the implementation of which depends on a set of competencies. The strategic thinking competencies are a set of skills and abilities that affect the development of a strategy, business model and strategic actions (Elena Korchagina, Desfonteines, and Strekalova 2020; Elena V. Korchagina and Shvetsova 2019). Their implementation can provide a strategic competitive advantages and growth of business efficiency (Blocher 2009; Garvin 2007; N. D. Strekalova 2018).

Logistics is evolving rapidly in the past decade, thanks to the introduction of new management frameworks, the internet and new technologies, mainly ICT-based. Logistics management is an integrating function, which coordinates and optimizes all logistics activities, as well as integrates logistics activities with other management functions including marketing, sales manufacturing, finance, and information technology.

To achieve the goal of the study, we have proposed a model of the strategic process. In its most general form, it can be represented as a sequence of five main stages, reflecting the key questions and actions for understanding the business model, its characteristics and competitive advantages:

Stage 1. Situational analysis.
Question: What are the threats/opportunities?
Action: Conduct the SWOT analysis and market research.
Assessment: threats/opportunities.
Stage 2. General characteristics of the business model.
Question: What is the current/future business model?
Action: Analyze the structure and main components of the business model.
Assessment: Qualitative/quantitative assessment of the main components of the business model.
Stage 3. Identifying the competitive advantages.
Question: What are your competitive advantages? What are their sources?
Action: identify sources of your competitive advantage.
Assessment: the competitive advantages.
Stage 4. Checking the business model for compliance and sustainability.
Question: Is there consistency between the elements and sustainability of the business model?
Action: conduct an analysis of the correspondence between the elements of the model and competitive strategy; conduct an analysis of stability.
Assessment: conformity/non-conformity, sustainability.
Stage 5: Generating Ideas.
Question: How can opportunities/threats be used to create customer value and create/retain/enhance company competitive advantages?
Action: search for ideas of creating value and maintaining the competitive advantages.
Assessment: required resources and degree of readiness for change.

3. Results

This section presents the "Ob'edinenie 45" case regarding its history of creating a new business and entering a new regional market in St. Petersburg and Leningrad region. It reflects the sequence of real events, strategic decisions and management actions in response to market challenges. The "Ob'edinenie 45" has become the market leader in the ready-mixed concrete and concrete blends in St. Petersburg and Leningrad region through capturing opportunities, moderating merger policy and implementing the strategy of leadership and business growth.

Before the analysis of the "Ob'edinenie 45" strategy we would like to give its brief historical background. In 2002, the LSR Group included, among others, three enterprises that produced reinforced concrete products. The organizational structures of these enterprises included concrete-mixing units, which were used primarily for their own needs. Their total share in the ready-mix concrete market was less than 5%. As a result of the business restructuring the new company called "Obedinenie 45" was built on the basis of these units. It has started the ready-mixed concrete and concrete blends production and sale.

We use the five stages model described in the section 2 for explanation the logic of events in the "Ob'edinenie 45" strategic process. Firstly, we describe the ready-mixed concrete market in St. Petersburg and Leningrad region in subsection 3.1. Secondly, we present the company business model, its innovations in the supply chain, digital process and marketing in subsection 3.2. Thirdly, we reveal the company competitive advantages in the subsection 3.3. Further we

evaluate suitability and sustainability of the company business model in subsection 3.4. Finally, in subsection 3.5 we present the ideas for the company further development.

3.1. The Market of the Ready-Mixed Concrete in St. Petersburg and Leningrad Region in 2002

In 2002 the ready-mixed concrete and concrete blends market demonstrated high growth rates. Its volume was about 1.5 million m3 and 25-30% of it was occupied by housing construction ("LSR Group Official Website" 2020). Other segments of construction also showed high demand for ready-mixed concrete: road, bridges and overpasses, large infrastructure facilities, commercial, industrial and warehouse real estate.

However, there was a quality problem on the market. The peculiarity of the product (ready-mixed concrete) is that it cannot be produced for future use, because it is impossible to store it, and long-term transportation is contraindicated for it. Small companies, that were active in the spring-summer season, produced cheap brands of concrete and low-quality blends. But due to price competition (dumping), they found a lot of orders.

The economic situation in Russia in 2002 was unstable and many construction companies experienced a lack of funds. There was a significant share of barter contracts caused by the low liquidity in residential real estate. Construction companies sought to save money on the purchase of building materials.

More than 70 manufacturers of ready-mixed concrete operated on the market. About 15 large manufacturers had a market share from 4 to 8%. The shares of the rest ones were much less ("LSR Group Official Website" 2020). The presence of a large number of manufacturers with approximately equal production volumes and a low level of concentration led to the high competition.

Most of the large manufacturers had one concrete-mixing unit (with different capacities and outdated equipment), which was used mainly for their own needs. Concrete production was viewed by them as an additional business. Their concrete quality was rather low, while it was very different from different suppliers.

A small share of the market was held by intermediary organizations (transport companies) owning concrete trucks. The fleet of concrete pumps in the Northwestern region was very little. About a quarter of the ready-mixed concrete deliveries used customers transport.

The study of consumer preferences showed that the following factors had a great influence: concrete quality, price, accuracy and reliability of supply. The most significant factor was the price of concrete (with delivery). At the same time, the clients paid special attention to the established reputation of the supplier and the quality control of concrete. The survey of consumers showed that they were interested in the geographic proximity of the supplier to the construction. The most common problem in dealing with suppliers was the delivering delay. Also the analysis revealed a high growth in demand for concrete pumping services.

At that time LSR Group had only small concrete-mixing units in its three plants. They were located in the eastern and southern parts of the city, not far from the center. They had certain advantages and disadvantages in the equipment capacity, customer proximity and delivery terms. It was decided to conduct an analysis of all production units within other LSR Group enterprises for identifying opportunities and creating the concrete production facilities.

Moreover, the competition level and demand volume were assessed in each St. Petersburg district. Some of the units were considered as promising.

Table 1. The "Ob'edinenie 45" business model characteristics

Component	**Foundation level**	**Proprietary level**
Component 1. Customer values factors	Manufacturing (ready-mixed concrete, concrete blends) Own manufacturing Standard offer Wide assortment line Deep range coverage Direct sales	Product + delivery (on orders, "just in time") High quality product Delivery (no more than 45 min.) Production of ready-mixed concrete and concrete blends of all classes and brands High degree of product modification according to customer orders Mostly direct sales (88%)
Component 2. Market factors	B2B market (corporate clients) Regional market (St. Petersburg and Leningrad region) Wide market coverage Building relationships (B2B)	B2B and B2G markets (construction companies and government) Full market coverage (all types of construction) Close, long-term and trusting relationship on a mutually beneficial basis
Component 3. Internal factors	Own manufacturing/ operating systems Mass production Modern equipment Advanced technology	The largest network of manufacturing Centralized production management, unified quality management and logistics system (online) Own certified laboratories Quality management system (ISO 9001-2000) Delivery by our own vehicles Own railway lines Automated order system (via the internet) Unique dispatching system The efficient system of logistics, marketing and sales
	Access to raw materials Intangible assets Information technologies, automatic control systems	Close relationships with suppliers Famous and recognizable brand ("45") Access to corporate investment sources Strong parent company
	Cooperation and partnership	Development network of cooperation and partnership Joint implementation of orders (for complex projects)
	Strong corporate culture Personnel motivation systems	Encouraging innovation and entrepreneurship (at all levels) Providing employees: - professional growth - professional development programs
	High professionalism of management, engineering and technical personnel	Qualified IT specialists Exchange of experience and knowledge in LSR Group Selective hiring policy Retention of valuable employees
Component 4. Competitive strategy factors	Leadership strategy High product quality Stability/reliability Image of "a company that comfortable to deal with"	Differentiation through emphasis on: - high quality product - high delivery speed - reliability, security and accuracy of supply - transparency of communications (service control via the internet)
Component 5. Economic factors	Constant income source Large production volumes Flexible pricing Average rate of return	Leadership in sales (St. Petersburg and Leningrad region) Price level (between medium and high) Economies of scale Production profitability increase
Component 6. Growth/exit factors	Growth model	Growth and retention of the regional market share (St. Petersburg and Leningrad region), use of growth opportunities (regional expansion)

3.2. Business Model Characteristics

The Table 1 illustrates the business model characteristics of the "Ob'edinenie 45" company. It presents six components reflecting the sets of solutions at two specific levels: "foundation" and "proprietary". If the first ("foundation") level shows what the firm does, then the second ("proprietary") characterizes how it does. The first level represents the nature of the business model that can be used by different firms, the second reflects the features of the business model of the particular firm.

The first component of the business model reflects the factors impact on the customer value and answers the question: "How does the firm create value?" The second component describes market factors. The main question is: "For whom does the firm create value?" The third component characterizes the factors of internal resources and answers the question: "What is the source of the firm's competitive advantage?" The fourth component reflects the factors impact on competitive strategy: "How does the firm position itself in the market?" The fifth component characterizes economic factors: "How does the firm make money?" The sixth component reflects factors related to the goals and ambitions of business owners.

The LSR Group and each its enterprise strived for unconditional leadership in their markets in terms of the volume and quality of supplied products. The analysis showed a completely logical and efficient business model, which has allowed the company to sustain high growth rates and take a leading position in a highly competitive market. The "Ob'edinenie 45" was able to overcome the difficulties of the construction industry crisis in 2004 and economic and financial crises in 2008 and 2014 that became a serious test of survival for many companies.

The business model is based on: competitive leadership and business growth strategy, focus on the mass market and offering customer value, creating and maintaining competitive advantages, constant renewal including the introduction of digital technologies and logistics innovations.

3.2.1. Supply Chain Innovation

In developing the new business, the management of LSR Group has relied on logistics. The basic concept underlying and giving the name to the enterprise was to deliver concrete to the customer anywhere in the city within 45 minutes. This time is the critical point after which, according to European standards, concrete cannot be used without special additives. It is known that on busy highways of the city, in city traffic jams, a car can stand from one and a half to three hours. And this was a very sensitive for the customers (construction companies). The delay in delivery leads to disruption of technological chains, loss of quality and increased costs of the construction.

For solving this problem, the company has decided to distribute production capacity evenly throughout the city while many competitors had concrete plants concentrated in one place. At the same time, the company has taken into account both the high level of demand for ready-mixed concrete in the actively built-up areas of the city and the need to locate plants as close to the end consumer as possible. It was important to achieve a presence in all districts for ensuring the concrete fast delivery in any volume, to any construction site (cities and regions). This solution helped company to implement the main idea: delivering concrete to any construction site within 45 minutes, ensuring efficient logistics and significantly increasing the volume of deliveries.

The creation and development of the deliveries network was carried out through the modernization (according to European standards) of existing manufactures (2002) and construction of new ones (2003), as well as the acquisition of the leading enterprise in the concrete production in St. Petersburg (2003). In the following years, three new modern manufactures were put into operation and included in the network in 2005, 2006, and 2007.

The network has provided a significant increase in capacity and could supply about 7000 m3output per operating shift. This helped company to cover the entire metropolis with its deliveries. Thanks to the installation of modern equipment at all factories, it became possible to produce concrete blends of high quality, homogeneous in composition. Therefore, the company could serve the largest construction projects in the region independently and supply large volumes of products to construction sites simultaneously from different network nodes.

In this way, the largest network of seven modern, high-performance concrete plants was created, linked by a digital fiber optic network. The introduction of the network computer technologies has provided centralized management and control of production, logistics and delivery of products, as well as online orders service for customers. Moreover, the company invested in the creation of its own large transport fleet (concrete mixer trucks, concrete pumps, dump trucks), and organized the effective logistics. Finally, its transport fleet included about 200 units. More than 130 machines operated on a permanent basis. The working hours of cars on the line are very tight. Every day in St. Petersburg, clients are served by more than 150 truck mixers and more than 50 dump trucks. According to the results of the competition “Builder of the 2007 Year”, the “Ob’edinenie 45” was prized as the best producer of concrete and concrete blends.

3.3. Competitive Advantages

There were the “Ob’edinenie 45” main competitive advantages:

1. High quality products. Internal quality standards were used by the company and they were higher than government or industry standards. The company's quality management system was certified according to the ISO 9001: 2000.
2. Continuity of supply and on-time delivery. The largest network of factories located throughout St. Petersburg provides the required production volumes and the intensity of deliveries of ready-mixed concrete and concrete blends. A well-developed information and logistics infrastructure and the presence of the company own transport fleet allowed delivering products at the required time and organize the supply to any construction sites.
3. Accuracy in product specification. All factories of the company are equipped with an automated control system.
4. Transparency of information and communication interaction and cooperation. The ability to track the process of customer service via the internet through the unique system “45Online” on the company's website.

Thus, the “Ob’edinenie 45” company was able to gain a strategic competitive advantage and become the leader of the ready-mixed concrete market, with the30% market share in 2008. Moreover, it has built a reputation as a reliable partner.

3.4. Business Model Analysis for Compliance and Sustainability

Sustainability depends on how well the components of the business model provide mutual fit, which is considered at two levels: internal and external. The table 1 shows that the economic factors of the model are well coordinated with each other, as well as with the competitive strategy, which characterizes its internal stability. The analysis also shows the internal consistency between the decision sets embedded in all six components of the business model, as well as the external consistency between the decision sets embedded in each of the six components and the external environment. In general, the business model can be characterized as sufficiently stable and efficient.

3.5. Business Development Ideas

The company postulated in its strategic vision “We strive to maintain and strengthen our leadership positions in St. Petersburg and the Leningrad region. We direct our main development efforts to the most promising construction market in Russia - the market of Moscow and the Moscow region. The markets of the cities with a population of over one million in Russia and the former USSR are also in the sphere of our strategic interests” (“LSR Group Official Website” 2020).

The regional expansion was one of the company's strategic priorities. Business development was seen in entering the most capacious, attractive markets in Russia and neighboring countries. In 2006 the “Ob’edinenie 45” entered Moscow market. Despite the high competition in the Moscow region, the LSR Group's management hoped to repeat the St. Petersburg success and create the similar network of factories, coordinated from a single center in real time. This production and logistics management system was unique for Russia at that time.

4. Discussion

The innovative activity of an enterprise is a continuous process, covering a wide range of changes in order to increase business efficiency and achieve market success. On one hand, our business case study showed the driving forces of innovative activity: demand, competition, opportunities for a new market entry and others. On the other hand, it revealed the company's dynamic ability to attract and integrate internal and external resources, conduct business reconfiguration, and use resources and capabilities to extract benefits. The business case analysis showed that successful companies are able to simultaneously maintain their operational competitive advantage, ensuring the current business operational efficiency through innovations, as well as initiating changes in the business model for obtaining the long-term competitive advantages.

Using the “Ob’edinenie 45” we have shown how powerful tool is the business model changes for the gaining strategic competitive advantage in the supply chain particularly. In essence, the company business has moved away from a product-only value proposition (concrete) to a delivery service. Customers have bought the package (concrete plus shipping)

and the business received higher margins. Thus, it was possible to create a new synergy, additional value for the consumer in the company logistics chain through saving customer time and construction costs.

The benefits of innovation were not only related to the economic results of current operations. Gaining long-term advantages and maintaining a competitive position became critical. The company pursued the proactive policy, developing and promoting high quality standards (above government and industry standards), which creates the barriers for competitors.

Research has shown that an enterprise succeeded by skillfully combining different types of innovations, which made its competitive advantage more sustainable. Thus, synergy in the innovation flow occurred when process innovations were complemented by product innovations, as well as innovations in the supply chain. And if the very approach of creating a network of plants is copied by other competitors, it is difficult to reproduce the entire chain of innovations for obtaining the same effect.

The results of the implementation of unique software built into the management system, the use of information and communication technologies, changes in the supply chain, as a rule, are less noticeable from the outside, they are quite difficult to discern. The less explicit the knowledge about the components of business processes, the more difficult it is for competitors to reproduce it. The role and importance of information infrastructure, digitalization of business processes for ensuring dialogue with consumers in real time are quite obvious, which allows us to consider time as a source of gaining a competitive advantage.

An enterprise needs innovation streams to achieve long-term success. For switching to an innovative development trajectory, Russian enterprises need the systematic development of various innovation types over a long period of time, as well as the ability to manage this process. Tactical thinking is quite enough for solving standard operational tasks. However, today the competencies of strategic thinking are the most relevant and demanded: the ability to look into the future, understand the strategic context, make strategic choices and implement innovations. The development and application of these competencies in the knowledge economy forms the basis of the competitiveness of an enterprise and the country's economy as a whole.

Future success does not come, but is done: skillfully or ineptly. Managers of proactive companies are able to transfer today's success into the future by setting the pace of innovation in their industries. Our research and experience of interaction with the leaders of successful enterprises showed that many managers used the recommendations of the theory of strategic management in practice, creatively applying them in the context of the market situation in which their enterprises found themselves. This confirms the well-known idea that “there is nothing more practical than a good theory.” According to scientists, success is born twice: the first time - in the head, and the second - in the realities of the company. Our results confirm this. It was also found that the developed strategic thinking of managers is formed in the course of the accumulation of practical experience, which is also confirmed by foreign studies (Goldman 2007; Tushman and A. O’Reilly III 1997).

Conclusion

The conducted research has shown that innovation is the main tool for the formation of a competitive advantage and achieving success in a competitive environment. The paper

discloses the main components and characteristics of the business model as well as digital and logistics innovations on the example of the Russian company “Ob’edinenie 45”that was successfully operating in the Russian building materials market. The strategic process model is presented for understanding and updating the business model. The study of the company's innovative activities showed that the basis of its success is the skillful management of the innovations flow as well as purposeful formation and renewal of the effective business model, which ensured long-term competitive advantages.

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Chapter 34

Ways to Develop Trade in the Era of Digitalization

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Abstract

The article examines the trends in the development of domestic trade in Russia and their changes in the conditions of digitalization of commodity movement, "seller-buyer" relations, integration of the country's economy into the global financial market. The article analyzes the ongoing transformational changes, how they are affected by temporary bans on the operation of some parts of the offline infrastructure, restrictions on population movements imposed by the state during the fight against the COVID-19 pandemic. The author assesses the ways and forms of trade development in the foreseeable future and the expected structural changes in the trade sphere. He proves that in Russia, the consolidation processes of trade infrastructure and displacement of small businesses have become irreversible; the trade business is becoming primarily investment-oriented, and the hasty introduction of digital technologies creates a risk of negative socio-economic consequences. Justifies the need to manage the digitalization processes of the trade sphere, the prospects for integrating offline and online trade in the form of omnichannel trading systems and marketplaces, which will allow small and medium-sized enterprises to maintain competitive access to the consumer market on the principles of franchising and partnership.

Keywords: trends in the development of trade in Russia, impacts of digitalization and COVID-19, transformational changes, ways and forms of integration offline and online trade

1. Introduction

For several years, Russia has been implementing a digitalization program of the economy, trying to catch up with the world's leading countries. But it does so in the face of increasing international sanctions and the world's generally unfavorable political and economic situation. They are conducting a strict monetary policy, introducing counter-sanctions. The government

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is struggling with inflation, and the Central Bank is steadily reducing the refinancing rate to stimulate production. But the money in the hands of the population no longer becomes. Hence the growth rate of retail turnover throughout 2019 steadily decreased: in the first quarter, according to Rosstat, they amounted to 1.8%, in the second-1.5-1.6%, at the end of 9 months-1.4% compared to the same period in 2018. At the end of the year, retail trade increased by 1.6% in value terms, which is almost twice as low as inflation, which means that in physical terms, sales of goods to the population decreased. The dynamics of retail sales are supported by personal savings and attraction (Kosareva et al. 2019; Cheglov and Stolyarova 2020).

In this situation, domestic economists are increasingly calling the development of online commerce in the country a driver of consumer market growth, which, in their opinion, can offer consumers a more comprehensive range and lower prices than the real trade sector, increase physical sales volumes without high costs and stimulate production development, optimize technological processes of commodity movement (Krasyuk et al. 2020; Ramazanov et al. 2019; Leonid Aleksandrovich Bragin et al. 2018; Mayorova et al. 2018; L.A. Bragin et al. 2018; Uryaseva and Mayorova 2019; Brusakova et al. 2017; Krymov et al. 2019; Gornostaeva et al. 2019; Bulychev et al. 2016). At the same time, market experts remained restrained in their estimates of retail turnover growth, predicting until recently that the indicator will grow by 1.3 - 1.9% in 2020, which indicated a skeptical assessment of the development of virtual trade instead. Therefore, the growth of e-Commerce has probably not received the status of a program document and is embedded in a single goal-setting document, “Strategies for the development of trade in the Russian Federation until 2025”.

However, in the first months of 2020, it was online trade that the government began to consider as a “lifesaver” in the fight against the COVID-19 pandemic and the need to make unpopular decisions on forced production stoppages, offline trade in non-food products, and public catering, and restrictions on citizens’ movements. It is no accident that against the background of restrictions on pickup, the activities of logistics companies were not affected, and online stores were restricted only in part of the organization of pickup, and not all of them. Established sales organizations were forced to convert sales online to survive, and operating companies were given the prospect of increasing their market share through online sales.

The situation in Russia was different in that the bans were imposed with some lag behind the leading world powers, differentiated by region in terms of the severity of application and timing, and in the context of a renewed fall in the national currency after unsuccessful negotiations with OPEC countries to reduce oil production.

The purpose of this article is to analyze the transformation changes taking place in the country’s internal trade, study the consequences of the policy of “manual” regulation by the state, and assess the ways and forms of development.

We have to note that only lazy people do not talk about digitalization as a tool for developing the economy, individual industries, and the sphere of consumption. We find ourselves in this new reality and need to get used to and possibly manage. But what is this new reality in the consumer market, how does it manifest itself in trade, what are the directions and forms of influence of the numbers on it? In our opinion, the new reality in consumption is the expansion of consumer opportunities in everyday communication through the development and improvement of electronic communicators (Barykin, Bochkarev, Dobronravin, et al. 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al. 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al. 2021).

But in the trade sphere, it is also associated with the emergence of significant and super-large associations of trade enterprises, which are based on new principles and processes of logistics, assortment building, centralization and redistribution of resources, integration of management, and network marketing. System formation in trade resulted from automation and robotization of production, growth of welfare of the population and overproduction of goods, the construction of the financial market. The owners of commercial enterprises have given their place to investors, people who are often very far from the trade business, and the management of associations of commercial enterprises has been concentrated in the hands of professional managers. Being the owner and managing a trading company has become neither profitable nor prestigious. Most commercial enterprise owners have become rentiers or multi-profile investors; only hired managers. The trading paradigm has changed. Retail chains from the commodity distribution channel have become the customers of the product, an attractive and equal partner for global manufacturers.

Obtaining a synergistic effect in a retail network requires combining multiple communications: retail, logistics facilities, suppliers, and employees—both buyer. In analog mode, this is a very time-consuming process that involves the elimination of contradictions and different interests. Still, thanks to algorithmization, digital communications can significantly increase the speed and efficiency of its flow. And here, we can highlight several approaches.

Cybernetics (Klir and Ashby 1991; Glanville 1982) apologize and link the set to the system by creating automated control systems. And there is some truth in this, but we have already passed this path. Management actions can be modeled and calculated, but they often "slip". We see the disadvantage of the cybernetic approach because it is mainly associated with managing the results of economic activity and is not compelling enough when conducting real-time management in the context of the development of predictive marketing and the "Internet of things" (Kranenburg 2006).

The second way we see is that the internal system of a retail network is linked using big data processing and analysis, and buyers are included in it using the Internet of things. This allows you to build an assortment to meet real needs and personalize the offer. But it causes the problem of protecting the confidentiality of the information and ensuring security for both the system and customers (Kuchment 2013).

The third way can be defined as "cyber-physical". The term is attributed to Helen Gill, in 2006 Director of embedded and hybrid systems at the US National Science Foundation. Proponents of the approach (Lee, E. A., & Seshia 2017; Colombo et al. 2014) interpret this term very broadly, including multi-industry complexes of enterprises connected to a single whole using artificial intelligence (AI); distributed Ledger systems (blockchain), and the industrial Internet (IoT). The whole here represents the interfaced value chains. Germany provided the impetus for developing these systems in the industry 4.0 program, which announced the modernization of the manufacturing industry on new principles. China is developing similar systems. The fourth industrial revolution, which was announced in 2016 at a conference in Davos, actually means the integration of digital and manufacturing technologies with the help of "smart machines" that provide "smart manufacturing," able to exchange data flows in real-time, assess the state of the environment, make adjustments to the technological process, detect and correct errors – for example, respond to equipment wear and tear. At the same time, data exchange occurs between equipment located on the production site, in the retail space, and along the entire chain of product movement, including consumers.

And here, an important issue is the awareness of the role of a person in this process, his future. It is no accident that the German University school, based on the analysis of human evolution, proposes to preserve the element of involvement of a person, his brain, and public consciousness in the digitalization of the economy. This means that the digital transformation should be implemented in an analog framework, in an environment of conflicting connections and interests, which will allow for the control of "smart machines" (Kollman 2008; Weiber and Kollmann 1998; Amit and Zott 2001).

In Russia, we can only talk about the government-approved program "Digital Economy of the Russian Federation", which provides for creating innovative digital technologies, but not about what transformational changes they can and should lead us to in the future. The more interesting it is to turn to the current trends in the trade sphere.

2. Methods and Materials

We have studied multiple sources, primarily the websites of leading trading companies in the Russian market, information from small businesses, and government statistics. The analysis of the received data, superimposed on the observation, was carried out. Analysis and synthesis were performed. Methods of scientific generalization, classification, deduction and induction, analogy, and abstraction are used. The trends in the development of domestic trade that has developed as a result of 2019 were identified. We also studied the effects of the economic activity of trade organizations during the period of restrictions imposed and immediately after the removal of most of them.

2.1. Trends in the Development of Domestic Trade on the Eve of the Pandemic

First of all, it should be noted that in the food segment, offline networks were growing at a rate much higher than the average market, extending their activities to most of the regions of Russia. The main task of their development was to divide the market by consolidating the trade infrastructure in economically developed areas, to maximize their saturation with standard objects within limits allowed by the law "on the basics of state regulation of trade activities in the Russian Federation"; territorial expansion into regions (mainly to the East and North-East).

As a result, we see the formation of trading systems in the Russian Federation, consisting of many dependent companies of various specializations and clusters of standard trading objects covering a particular territory, with one or another step. These entities began to impact the consumer market significantly and became the largest employers. X5 Retail Group, for example, currently generates 11.6% of the total retail turnover of food products. At the same time, in a stagnant market, the most prominent retailers began to slow down growth. X5 Retail Group showed an increase of 14.2% in the first nine months of 2019 (compared to 16.3% in the first quarter) and ended the year with a final figure of 13.3%. The Magnit retail chain showed high growth rates (9-10%), significantly lower than a few years ago (Cheglov and Stolyarova 2020).

At the same time, the factor of falling physical sales volumes only accelerated the consolidation of the food market in Russia: the growth rate of Federal retail chains in 2019

exceeded the industry average: X5 Retail Group and Dixie group have an order of magnitude. Even the slow-moving Federal networks Lenta (up 1.9%) and O'key (3.6%) developed above the market as a whole.

Optimization of existing infrastructure has become a trend in food retail. The decline in operating profitability in the context of the rebirth of market competition of stores in competitive wars of trading systems forces Federal chains to more carefully select new locations and re-evaluate existing ones from profitability. It is no accident that in the first nine months of 2019, X5 Retail Group opened 1,321 thousand stores compared to 1,564 thousand a year earlier, which is 15.5% less. The growth driver for many years remained multi-format, which reduced the risks of fluctuations in demand in conditions of economic instability. Retailers preferred more or less independent development of formats, resulting in which they became competitors in the market. While the hypermarket format was the most effective ten years ago, in recent years, the form of the discounter has emerged, whose share exceeded a third of sales in the market. Thus, 96.4% of X5 Retail Group's retail facilities were introduced in the discounter format. Only 3.6% of stores were opened as supermarkets, which indicates a cautious assessment of the market of money supply that the population can direct to consumers, its growth in the medium term. We should also note the trend of mixing discounter and supermarket formats, especially noticeable in the networks "Perekrestok" and " BILLA".

The accelerated expansion of Federal retail chains led to the fact that by the end of 2019, the share of one hundred largest food retail chains exceeded 42% of food turnover in Russia, which means that the first ten trading systems generated every third ruble. The redistribution of the market affected not only small businesses but also regional retail chains, as shown by a series of bankruptcies (Intertorg interregional network, large Novosibirsk retail chains "Holiday" and "The New trading systems").

The stagnation of the Russian food market has caused the development of foreign retail chains to slow down, and companies with mainly Russian capital control it. Only family-owned companies are developing among foreign companies ("Globus") and cooperative systems (Rewe). The Russian branch of Auchan showed a drop in turnover by the end of 2019 of about 13% against 8.5% in 2018. According to various estimates, Metro reduced its turnover in Russia by 3-5% in 2019. The reasons vary, but there are common mistakes: confusion in formats, overstated margins against the backdrop of growing competition, positioning errors, and withdrawal of earned money from the country. Russia's counter-sanctions also affected the import of some food categories, including STM companies.

The resulting reduction in the number of system-forming participants in the offline market led to "price wars" and the formation of the habit of purchasing goods at a discount among buyers. The syndrome of "promo-dependent" buyers covers up to 5% of the new audience per year and has already spread to the premium segment. Today, three out of five customers focus on products with discounts when buying. To solve the problem of customer migration, retail chains are implementing loyalty cards one after another, linking deals to personal cards.

The current trend is to increase operational efficiency by reducing retail space and cooperating with non-food chains. This includes the pilot project of X5 Retail Group with «Hoff Home», the placement of the discounter «Familia» on «O'key» shopping areas, and plans for the cooperation of Auchan and Decathlon stores. This can also include offline networks to the omnichannel approach in sales when the customer is given the right to choose the method of purchasing a network product. For several years the food network has actively worked to create their Internet stores with collection items in stores or through a postal terminal. Launched X5

Retail Group online supermarket “Perekrestok” for the first nine months of 2019 showed revenue growth of more than four times a year earlier. Still, the achieved sales volumes did not exceed 0.2% of the group’s turnover, and the segment leader with a share of just over 40% remained my company specializing in online sales “Utkonos” (growth rate of 7%). The practice showed unclear prospects for the online delivery of goods to the customer’s home from the distribution center and the universalization of the assortment.

Against this background, logistics companies specializing in delivering online food orders to offices or home (Instamart and IGoods) have formed. They have begun to expand into regional centers of the country with a high percentage of offline network penetration. However, the share of FMCG in online sales in Russia before the pandemic remained no higher than 3%, which is 2.5 times lower than the UK market.

The development of e-Commerce in the non-food sector was much more active before the pandemic. The market is faced with the accelerated growth of individual online trading companies’ transformation into Federal players. The trend here can be considered accelerated construction of goods distribution infrastructure, which includes points of delivery of goods (Ozon) and even a network of salons and stores (Citilink). We should note the counter penetration of retail chains in the online segment of electronics, footwear and clothing, construction materials, and home goods. The latter is that the buyer in this segment is more loyal to the possibilities of digital technologies.

At the same time, the offline market segment also consolidated. The growth rate is significantly higher than the market in 2019, showed most of the leaders: 7-8% - “Sportmaster”, “MVideo” and” Eldorado”, from 15 to 20% - “Detsky Mir”, Gloria Jeans and “Shoes of Russia”, almost 25% - retail chain “Petrovich”. And here, the role of online sales is significantly higher. The Petrovich network grew by more than 45% year on year. In MVideo, every two out three products were sold using the Internet. At the same time, online sales in the Leroy Merlin network did not exceed 5%. For the year, however, the share of online sales to the segment has not exceeded 7% (while in the US, it is almost three times higher in the UK and four times higher, and in China, every fourth purchase is year-end made online).

The non-food market is also generally controlled by domestic companies (mainly due to the current sanctions and the volatility of the Russian currency). Over the past three years, the rate of expansion of global brands to Russia has been declining: in 2016, 55 new product brands arrived, in 2017 – 27, in 2018 – 23 brands, in 8 months of 2019 – only 12. International companies use a cautious strategy when developing the Russian market and enter it with the pop-up store or corner formats to test the demand for their products with minimal investment or use a franchise. Only a few multinational companies play a significant role in the offline segment (Leroy Merlin, Decathlon, Inditex)

Note that the displacement processes from the online market of small and medium-sized entities in this market segment differ. Suppose in the food industry; Federal networks occupy locations used by small businesses, buying out lease rights or occupying vacated space. In that case, small companies retain places on lease rights or use the vacated space for other types of business. The main competitor of small businesses, both offline and online, are commodity aggregators that offer electronic trading platforms and use digital technologies to promote products. Their significant advantages are a versatile range and multi-channel logistics. In 2019 the growth rate of Wildberries and Ozon exceeded 80%, which is twice as high as the leaders of the offline and online segments of the electronics market-Safmar group (MVideo, Eldorado

brands) and Citilink. At the same time, the total growth of the remaining 500 online companies in Russia was below 20%, and the entire market grew by about a quarter.

An alternative to commodity aggregators was formed by companies implementing MXM technologies (marketplace of marketplaces), which offered information platforms with the ability to quickly place an order on various resources, with price navigation, and fast and secure calculations. Their competitive advantages are big data, product promotion technologies, and financial support for the country's largest banks and search engines. Yandex-market, for example, in 2019, offered information about the sale of almost 200 million SKU from 25 thousand sellers.

The impact on the digital technology market is also felt through the development of cross-border trade, which in 2019 exceeded 30% of online sales and accounted for half of all orders. At the same time, the growth rate of cross-border trade turnover in 2019 was about 35%, which is higher than the market. There are prerequisites for expanding Chinese and American companies to the Russian market in this direction.

2.2. Analysis of the First Results of Direct State Intervention in Market Relations during the Covid 2019 Pandemic

This year trade has faced unprecedented challenges. Nothing in centuries-old history has ever stopped such a significant trade sector. Regulation has been shared but closing down entire segments of trade is outstanding. Almost all non-food trade and catering were banned for a quarter or more. At the same time, the bans were imposed unexpectedly, and retailers were not ready for them. The restrictions also affected the food trade, as people within a radius of more than 100 meters from home was significantly restricted, and only then were limited trips to hypermarkets allowed. At the same time, production was stopped, but logistics were left "afloat". Although the authorities repeated the actions of most economically developed countries, the time frame and severity of restrictions differed in the regions that were granted the right to lift restrictions. The more interesting it is to look at the results.

As a result, we saw a surge in retail sales in January–March 2020: the turnover increased compared to the same period in 2019 to 4.3%. It was affected by the high demand for food products against the background of uncertainty and expectations of consumer price growth. However, in May 2020, sales declined by almost a quarter. Against the backdrop of inconsistent actions to remove restrictions in June, retail turnover lagged behind the previous year by nearly 8%. By the end of the year, according to the most optimistic scenario, the decline is likely to continue and will amount to 5-7% compared to the previous year. Still, it can be adjusted towards recovery by targeted payments to the population and an increase in consumer prices.

We believe it will not be the same as before: a concise period has significantly changed consumer behavior. The epidemic started new long-term trends, and vice versa reduced the impact of trends that seemed systemically important back in January-February 2020.

Food chains could maintain and even increase sales due to high demand and market redistribution. They could replenish their inventory faster than other market participants and connect specialized logistics companies to deliver online orders with their Assembly at their retail facilities. X5 Retail Group, for example, showed 14.7% growth in the 1st quarter of 2020, which is higher than last year's figures. Market consolidation accelerated and was characterized by the redistribution of the online segment between large offline companies and marketplaces.

Based on the results of the 1st half of 2020 X5 Retail Group showed 8.2 billion rubles of turnover against 8.05 billion rubles at the online retailer "Utkonos". At the same time, the total turnover of the following three marketplaces (Sbermarket, Ozon, and Wildberries) reached 16 billion rubles.

In the non-food segment during the pandemic, there was an even more significant redistribution of the market in favor of marketplaces, whose turnover for the 1st quarter of 2020 essentially doubled compared to a year earlier. At the same time, there was an accelerated transformation of the development models of most major retail chains, which were converted to omnichannel sales with a rapidly growing role as an online platform. So, sales of the group "M. Video-Eldorado" in the first quarter of 2020 increased by 19.8% compared to the same period last year, while the company's online sales in this period increased by 80% compared to the previous year, accounting for 46.7% of the group's total sales. Companies that have failed to rebuild for some reason are in a crisis.

3. Results

Taking into account the forecast of development of world market and trade until 2030 (Benson-Armer, Noble, and Thiel 2015), we are increasingly concluding that in Russia in the foreseeable future, the consolidation of trading infrastructure and the displacement of small businesses will be irreversible. Therefore the investment model of development of digital marketplaces, connected with the transformation of the Internet in the market, will allow maintaining competitive access to the consumer market small and medium-sized industrial enterprises. Electronic trading platforms where the buyer and the manufacturer/distributor meet should be supplemented with multi-channel wholesale and distribution infrastructure and centralized marketing. A logistics infrastructure with active marketing elements is being formed that is independent of retail chains. This shopping format will replace the Department store format and compete with the Shopping Center format. Partner companies will trade within the marketplace, including manufacturers, distributors of large manufacturers, and retail companies that have limited opportunities for offline expansion. The model will allow manufacturers to enter the market independently and in a cheaper version than when organizing branded trade, set retail prices with minimal deductions to the trading platform as an agency link, and supplement the trading business with non-trading operations (sales on credit, loans to small and medium-sized enterprises), but with a high degree of integration of technologies and information exchange. The range will be determined by loyal customers through groups, depending on recognition by social networks. A particular legal vacuum in terms of protecting the interests of suppliers and buyers will serve as a deterrent.

We believe that an omnichannel business model will also become popular, in which the territorial expansion of offline retail chains will not only be supplemented with an online order channel and opportunities for the buyer to choose the method of receiving goods, but also an algorithm for effective management of end-user purchases through a mobile app and integration of large manufacturers through the functionality of retail shelf management, medium and small-through the mechanism of STM, small retail enterprises within the framework of franchise programs.

The online store model (private or family business) that offers a particular catalog of products available for order and delivery with varying efficiency will die out and remain an

auxiliary within the omnichannel shopping business. We should expect a reduction in the nne stores and their integration into large online systems as partners on specific terms. The vertical integration model, in which owners control all stages of product movement, including the classic online store, will remain mainly in the agro-industrial sector's clothing, footwear, electronics, and individual products, but will not become widely popular due to the high cost.

In the new reality, small and medium-sized commercial businesses will no longer play any significant role, which increases the risks of crowding out national capital and replacing domestic companies with multinational ones. At the same time, digitalization leaves chances for forming regional associations of trade and production capital.

4. Discussion

Let's talk about ways to develop trade in the medium term. We should recognize that the future business models will be in the so-called semantic web (Linder and Cantrell 2001), and development strategies can be modeled. But opinions differ on specific ways of development. Here is the assumption that the level of recognition of innovative proposals will play an increasing role primarily in the ratio of supply and demand shortly. No less important to us is the conclusion that. That information will become a determining factor in business development (Galunic and Rodan 1998). We can and should agree with these statements. Still, we believe that the decisive role in the development of trading companies will be played not so much by electronic offers, sales, and auctions on electronic platforms but by involving consumers in the process of forming an offer and organizing its promotion on the market based on an entire trading infrastructure, through the creation and work with network communities, the use of combined (offline – online) platforms and, above all, user-generated content.

On the other hand, Chinese scientists believe that the creation of a cheap product will help to reduce the uncertainty in the movement of goods, develop the service sector, transferring most of it online, not only in terms of transactions but also create more jobs here (Huateng et al. 2021b; 2021c; 2021a). It seems to us that this assumption is too optimistic. And reducing the cost of goods in production itself will not solve the growing social problems associated with replacing cashiers and sellers with "smart machines". Instead, we should talk about transferring the management of the sales shelf to the manufacturer, creating a unified information exchange system. And this will be a different paradigm because the leading role in the consumer market will not be played by the manufacturer or trade organization but by the business system, which will be based on the interests of buyers and stakeholders. Consumers are involved in the process of forming an offer and organizing its promotion on the market based on an entire trading infrastructure, by creating and working with online communities, using combined (offline – online) platforms, and, above all, user-generated content.

Conclusion

Let us draw conclusions and outline some problems that need to be solved today. The development of e-Commerce in Russia repeats the global development scenario. However, it is lagging, primarily due to gaps in legislation regarding the lack of an intellectual property

market, mechanisms for returning funds invested in innovative development, and the lack of a policy of protection for domestic businesses and their protection from aggressive penetration of foreign companies. Up to the present time in Russia, there is no concept of regulation of cross-border trade.

To neutralize competition from online Commerce, Federal and interregional, and even some regional retail chains create their online stores, with which they enter the marketplaces (Auchan, Marks&Spencer, etc.), and some try to create their marketplaces, offer a versatile range of products, involving third-party working capital in the business. This creates a competitive environment.

We can assume that in the e-Commerce segment, the future belongs to marketplaces with built-in large online stores owned by operators and partners. The integration of sales channels online and offline will be more active; large online stores and marketplaces will go offline, creating the infrastructure for shipping goods and a network of full-fledged stores. The company – the owners of the marketplace, will slowly turn into a wholesale-and-logistic or logistic company.

The same consolidation and oligomerization processes will occur in the e-Commerce market as in the offline segment. Small companies that operate online stores will optimize the logistics component of the business, abandoning the content of their delivery infrastructure and pick-up points in favor of outsourcing, gradually lose their independence, integrating into the systems of marketplaces, as the trend is developing for the buyer to enter the product through marketplaces, or leave the market and remain autonomous only if they find their "niche" in the market. The implementation of these models will inevitably lead to tougher competition in the market. It will contribute to lower retail prices while bearing the risks of oligomerization of the market since small and medium-sized producers and traders will be restricted indirect access to the consumer market. The final consumer will be "cut off" from the manufacturer. All of this will require the extension of antitrust legislation to the sphere of non-food trade and online sales.

The spread of domestic Internet trade on the world market should in the short term be associated with the markets of the former USSR countries, such as Kazakhstan, Belarus, Kyrgyzstan, Armenia (where customs barriers have been removed), and Azerbaijan, mainly against the background of the ruble exchange rate that has been declining until recently against the currencies of these countries. However, the strengthening of the ruble will, on the contrary, seriously constrain this process. The exit of domestic online stores to Europe can be assessed with a low degree of probability since this requires forming a competitive range of domestic production products and complying with much stricter customs rules. And most likely, this is possible for marketplaces, with the resource support of the state.

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Chapter 35

Transforming Consumer Consumption Patterns in the Digital Age: Socially Conscious Consumption Behaviour towards a Zero Waste Lifestyle

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Abstract

The plastic pollution crisis has become increasingly visible in recent years, piles of plastic waste in the communities and ecosystems have intensified public concern. It has undoubtedly evoked strong responses from people, as they are increasingly growing aware of the tormenting waste management issue. More and more people are trying to adopt a zero-waste lifestyle by recycling and upcycling product packaging, composting and reusing. They have grown socially conscious in their purchasing behavior. This study suggests that socially conscious consumption has a broader appeal when people are adequately targeted with products that support the issues they care about, in this case, a zero-waste way of living life. The research was designed to analyze the awareness, intention, desire, and action phases of the consumer behavior cycle regarding the zero-waste lifestyle. A cluster analysis was conducted and checked on correlations with demographic characteristics like age, income, education, number of people in the household, marital status, gender, and occupation. This study touches upon the socially conscious consumption behavior of Indian and Russian customers towards a zero-waste lifestyle. The study results provide relevant insights to FMCG product manufacturers and retail marketers on customer management practices by adopting socially conscious consumption behavior.

Keywords: consumer behavior, socially conscious consumption, zero waste, marketing strategy, customer management

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1. Introduction

The industrialization and the trend of over-consumption have led us to design a linear society where things drop out at the end of their lifespan, becoming waste that stays forever and cannot be utilized for anything else. Our ever-growing consumption culture has fueled the widespread extraction of resources and production of goods and services (Krasyuk et al. 2019; Okrepilov, Kuzmina, and Kuznetsov 2019; Malenkov et al. 2019; Krasyuk, Kirillova, and Amakhina 2019; Krasnov et al. 2019). The complex production processes and designs have been developed for generations to satisfy the consumer's needs and desires and make it more and more comfortable to buy and sell. Indeed, the products are evolving to our convenience and delight. However, in this evolution of product designs and packaging production processes, an essential element lay forgotten, which is the very environment that supported the survival of the human race.

India generates over 150,000 tonnes of municipal solid waste (MSW) per day, with Mumbai the fifth most wasteful city. Yet, only 83% of waste is collected and less than 30% of its item. According to the World Bank, India's daily waste generation will reach 377,000 tonnes by 2025 (World Bank 2018).

In Russia, MSW volumes are growing at a tremendous pace. If in 2000, one person accounted for about 220 kg of MSW per year, then in 2020, more than 400 kg per year. That's about 1.1 kg a day. According to World Bank statistics, this figure is 1 kg worldwide. However, only 8% of waste is processed, according to the Ministry of Natural Resources of the Russian Federation.

Governments of different countries are waking up to action and hurriedly imposing policies to curb plastics and encourage segregation and waste sorting (Bozhuk et al. 2019; Ilin, Voronova, and Knykina 2019; Kamenik 2019). The deeply entrenched culture of convenience and resistance to making changes is hard to implement on a large scale (Kozlova, Golovkina, and Kudriavtsev 2019; Pryadilina et al. 2019; Sharipova et al. 2020). A 2018 comprehensive sector survey by Greenpeace International can help offer some insights for answering that problem ("A Crisis of Convenience: The Corporations behind the Plastics Pollution Pandemic - Greenpeace International" 2018). The survey suggests that a significant driving force behind the throwaway economic model that led to the ongoing plastic pollution crisis is the Fast Moving Consumer Goods (FMCG) corporations. The survey report titled 'A Crisis of Convenience: The corporations behind the plastics pollution pandemic', focuses on 11 of the biggest FMCG companies: Coca-Cola Company, Colgate-Palmolive, Danone, Johnson and Johnson, Kraft Heinz, Mars, Nestlé, Mondelez, PepsiCo, Procter & Gamble and Unilever.

The main finding the report suggest following:

- The mainstream delivery system of this sector employs single-use packaging.
- The attempt to move to alternatives, focusing on solutions that prioritize recycling rather than reducing.
- There is very little transparency on the amount of plastic used, recycled, and disposed of.
- They are still heavily dependent on plastics for branding their goods and communications strategy.
- None of the companies packaging waste goes after the using product. They have no means of monitoring that.

Digitalization is currently a critical global trend in economic development (Barykin, Bochkarev, Dobronravin, et al. 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al. 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al. 2021). However, the development of digitalization ultimately contributes to consumption growth (Bataev, Gorovoy, and Mottaeva 2018; Dakhnovich, Zegzhda, and Moskvin 2018; Evseeva et al. 2019). Increasing production efficiency through automation and digitalization has led to lower prices, making products available to new groups of consumers (Kapustina et al. 2019; Krasnov et al. 2019).

The development of online trading has had an unexpected consequence: packaged goods can be sold remotely (Somaiya and Peter 2020). Goods without containers for transportation to the consumer must be packed in a single-use package, which increases the mountains of garbage. This problem became visible during the pandemic when isolation led to a significant concentration of consumers in their homes, and households became the primary source of waste (Silkina 2019; Vasetskaya and Gaevskaia 2019).

Whether FMCG is online or offline, this sector creates the main MSW stream. With an annual growth rate of 1-6%, the FMCG sector represents one of the largest industries worldwide. If a shift in their outlook towards the problem & its solution does not happen, containing this spiraling issue would be impossible. In Russia, at the end of 2019, the growth in purchases of FMCG goods, including pharmaceuticals, according to GfK company research, amounted to 6.6% in value terms (“Insights | GfK Global,” n.d.).

Against this backdrop, a new wave of lifestyle is gaining momentum based on zero-waste philosophy. Much like its name sounds, the concept is about diverting waste from landfills and incinerators and reusing, recycling or composting as much as possible.

An essential part of understanding what zero-waste is is understanding how nature works. The planet has been programmed to function in a circle naturally. This cycle ensures all goods, materials, creatures ever produced will go back to nature for the use of other processes, life, and materials. Our food is generated from photosynthesis by plants, utilizing our bodies’ carbon dioxide as waste. We decided to mimic nature and outperform its abilities, learning to make and fly aircraft from the birds' functioning. We learned to build boats and ships mimicking the streamlined body of fishes, yet we forgot to mimic tits zero-waste cycle's most crucial element of nature.

The definition of Zero Waste as adopted by the Zero Waste International Alliance (ZWIA) is:

The conservation of all resources using responsible production, consumption, reuse, and recovery of all products, packaging, and materials, without burning them, and without discharges to land, water, or air that threaten the environment or human health (Zaman and Lehmann 2013; Zaman 2014; Quaye-foli et al. 2019).

Companies are ready to support environmental initiatives to meet the demands of consumers - “environmental activists.” According to Nielsen, 73% of the world's population is prepared to change consumer habits to reduce environmental damage. In Russia - 62%. At the same time, 81% of Russians believe that businesses should take care of the environment (“Nielsen Global Media | Audience Is Everything (TM) – Nielsen,” n.d.).

In 2019, the Russian retail chain «Perekrestok» provided online customers with the opportunity to return plastic bags in which the order is delivered to the courier for further recycling. Representatives of the company note that if in 2017-2018 customers wanted to receive orders packed in a more significant number of packages in 2019, the trend changed to

the opposite. As a result, the company abandoned part of the packing bags and introduced a package return service.

However, the environmental initiative of companies can be proactive and outpace the mood of consumers, acting as an ambassador of the environmental trend. So the Guardian reported on the municipal "Garbage Free Cafe" in India in the city of Ambikapur ("Nielsen Global Media | Audience Is Everything (TM) – Nielsen," n.d.). A kilogram of plastic waste is changed for lunch - hot soup, tortillas, and rice with fillers. The city hall fully funds the project. Ambikapur is one of the few Indian cities with efficient waste collection and sorting. The authorities make a monthly profit of 15 thousand euros, selling recycled plastic and paper products to private companies.

Environmental activism as a movement of consumers reacts to existing ecological problems. The digital environment has ensured high awareness of ecological disasters and their consequences, the rapid dissemination of ideas about environmental safety, and the consolidation of efforts of like-minded people. According to the Russian Public Opinion Research Centre (VTsIOM), every fourth Russian (27%) sorts household garbage. At the same time, the request for the possibility of sorting waste is significant: 47% of respondents said that they did not sort the trash now, but they would like it if there was such an opportunity. Only 11% of survey participants do not want to do this.

The Internet community is an active part of consumers. Therefore, when building environmental strategies, companies should be aware of the characteristics of various consumer segments to set up targeting and define key KPIs (Zaborovskaya, Kudryavtseva, and Zhogova 2019; Zaman and Lehmann 2013). The purpose of this review is to get an initial understanding of the field probe into the studies done regarding zero-waste lifestyle, the definitions, and insights derived through previous research. It aims to form a structure to this thesis based on relevantearliers studies regarding socially conscious consumption behavior and zero-waste lifestyle.

To achieve the study's goal, the following tasks have been solved: to identify consumer segments by their attitude to the idea of socially conscious consumption; to determine the portrait of each piece and ways of digital interaction to achieve the sustainable development goals.

2. Materials and Methods

Several research studies have been conducted on zero waste management, socially conscious consumption behavior, ethical consumption behavior. The section explores the previous studies that helped shape how a positive lifestyle nudge can be implemented and the existing inclinations of people to such a lifestyle that would be beneficial to all, in light of the current environmental crisis.

Socially conscious consumption is generally described as employing individual solutions to solve an institutional problem (Zhukov et al. 2018).

According to Elizabeth Roodhouse, socially conscious consumption is both active driven by individuals and reactive driven by institutions (Roodhouse 2013). If socially conscious consumption is purely functional, individuals do not need nudges to behave ethically and represent their political beliefs through their consumer behavior. However, the bulk of existing evidence regarding product choice and willingness-to-pay implies that consumers are less

likely to behave ethically unless presented with "nudges" in this direction. Hence, the comprehensive model developed is the one that sees it as resulting from the intersection of individual characteristics (bottom-up) and structural choices driven by institutions (top-down), which is more iterative rather than unidirectional.

Zero waste management is a holistic waste management concept that recognizes waste both as a resource and a symbol of the inefficiency of our modern society (Zaman 2014; Zaman and Lehmann 2013).In traditional waste management systems, waste is considered an 'end-of-life' product, produced in the last phase of the product-consumption process. Zero waste challenges the conventional definition of waste by recognizing that waste is a transformation of resources which happens in the intermediate phase of the resource consumption process . The resources that are transformed into waste as a result of our consumption activities should therefore be redirected into the production process through holistic zero waste management systems. Thus, zero waste management is a combination of integrated design and waste management philosophies.

In a study conducted (Roodhouse 2013) to investigate if the behaviors of individuals who are waste-reducers or zero-waste followers as we can call them, emerged from intrinsic factors such as altruistic preferences, or from extrinsic motivations, like social norms or peer pressure, the results revealed that the behavior patterns influencing an attitude towards waste reduction are highly due to altruistic attributes of the individual and not due to exposure to peer pressures or social norms.

This tells us that these individuals need a totally different approach when considering incentives during targeting

In the paper 'Zero Waste: A Key Move towards a Sustainable Society' (Connett 2017), Paul Connett, talks about 'Responsibility' being the Fourth R in addition to the Three R's (Reduce, Reuse, Recycle). This responsibility has to be shouldered by industries, communities, politicians and individuals together to get this ball rolling. The part 1 questionnaire of this study explores these intrinsic attributes and the nature and behavior of respondents towards making zero-waste choices.

Different researchers have used different metrics to measure the zero-waste potential of a product or a purchase decision.

The part 2 of this study questionnaire which presents the participants of the survey with different design choices uses the parameters from the concept of Zero Waste Index of a product, an alternative performance assessment tool proposed by Zaman and Lehman (Zaman and Lehmann 2013), to nudge people towards choosing a product with higher substitution of virgin resources, water and energy saving, compared to existing product. The study also probed if the respondents were willing to spend a few extra bucks in order to opt for eco-friendly packaging.

Research Methodology. This study comprises of two sections, Part 1 deals in analyzing the awareness, intention, desire and action phases of consumer behavior cycle with respect to zero-waste lifestyle.

It comprised of a set of questions for measuring the issue awareness, identifying supports and the degree of their support, and clustering the respondents to different groups in order to develop a suitable communication strategy for them.

Acluster analysis was conducted first by using Hierarchical Cluster Analysisto find out the number of clusters that can be formed and then by using K-means cluster analysis.

The clusters were checked on correlations with demographic characteristics like age, income, education, number of people in household, marital status, gender and occupation.

It was important to check how the perception of respondents varied according to these demographics.

While Part 1 of the research employed the bottoms-up approach to figure out the best way in which consumers can influence the companies designing of products, Part 2 employs the top-down approach and tests the nudges on passive consumers by presenting them with eco-friendly product design options that are visually appealing.

The Section 1 of the Questionnaire comprises of different demographic questions to assess how the responses varied with respect to demographics. The questions covered under demographics are as follows:

- Gender;
- Marital Status;
- Age;
- Education;
- Occupation;
- Annual Family Income;
- Number of people in the household.

These were multiple choice questions where the respondents had to choose their category among a good number of options.

Section 1 of the questionnaire ended with a question to check the awareness of respondents towards the term 'Zero-Waste-Lifestyle' as the usage of the jargon is still gaining traction and is in its adoption stage.

Section 2 of the questionnaire led the candidates to the definition of Zero-Waste Lifestyle followed by a question on what would motivate them to adopt such a lifestyle. The options suggested here were based on the traits of those following a zero-waste-lifestyle obtained through observation research from Facebook and WhatsApp groups and blogs. The different motivations for such a lifestyle stemmed from reasons like concern over the plastic pollution engulfing the world, desiring a better future for the next generation, wanting to curb global warming and climate change, protecting animals and wildlife or cutting down their budget expenditure.

This was followed by 16 qualitative research questions to check the respondents' awareness towards the necessary elements required to lead a zero-waste lifestyle. The set of questions tried to gauge their level of awareness like whether they know the damage improper waste handling is causing the environment, are they familiar with how to compost kitchen waste, do they know the vendors in their locality who collect, do they know how to segregate the waste in public dustbins. The respondents had to rate the questions on a likert scale of 1-5 which ranged from very likely to slightly likely, neutral, slightly unlikely and very unlikely. The questions aimed at inspecting the awareness levels were to understand the presence and impact in the minds of people about the concept of going zero-waste.

Another set of questions were regarding their nature and desire, about the kind of news stories they're attracted to and whether they want to see some change in waste management in spite of not being completely aware about the issues.

The third set of questions was to gauge the buying behavior of the respondent from a zero-waste perceptive, and fourth set of questions targeted the preference they customers had about

the kind of products they would like to have in their choice cart. These questions were jumbled in order to keep the respondents oblivious on what area they were being tested on, so as to procure more genuine answers, uncontaminated by self-manipulations of answers on the pretest of appearing ideal.

The second part of the study comprised of 3 sets of pictorial questions where respondents were to choose between two products, one of them being an eco-friendly alternative generating minimal waste. The products that were tested with options are flower bouquet, Dettol 250 ML pack and Pears soap bar.

The flower bouquet for gifting had options of one tied in jute, with a rustic yet appealing look and the other covered in a transparent plastic decoration. Both the bouquets were assumed to having the same number of flowers and costing the same.

The Dettol 250 ML pack was tested along with a green pack design for the same, having a compostable base and costing approximately 5% more than regular pack. Here, the respondents had to make a choice between the cost differential and their principles leaning towards eco-friendliness, as the base could be composted and top part of the container recycled in the new green pack design.

The third product was a pears soap, with the option of choosing between the regular pack and an eco-friendly version that has the soap bar wrapped in paper and encased in a composter-friendly paper-based box, instead of being wrapped in plastic film and encased in a plastic coated box. Both the products here were charged the same price, difference being the regular one more colorful compared to the eco-friendly design.

This study with an open-ended question asking respondents on what were their thoughts while choosing the options they chose. This was necessary to understand their idea about how they tackled their zero-waste challenge and to know what actually mattered to them at the moment of picking up a product.

The survey questionnaire was circulated through friends, family, social workers, waste management consultants in different peer and acquaintances circles in order to obtain a mixed and diverse set of respondents. The target group for the survey consisted of everyone who make/have to make a buying decision or can influence their family to make a purchase decision. The respondents to whom the questionnaire was circulated were from Mumbai city or have lived in Mumbai city previously and frequent visitors to the city.

3. Results

The data was collected from a sample of 144 respondents over a period of one week, which had diversity in terms of demographics.

Male respondents comprised 49% while female respondents 51% giving us an almost equal representation in terms of gender.

A vast majority of respondents belonged to 20-30 years age group with 55%, followed by 16% respondents belonging to 41-50 years age group. 31-40 and 51-60 had 10% and 13% respondents respectively. We received responses with a mix of age group with representatives from all categories.

We received an almost equal mix of single and married respondents with 52% and 48%, respectively.

Most of the respondents were either graduates or post-graduates, with 45% and 54% respectively, from both categories.

Maximum number of respondents were working professionals (51%), followed by students (29%), self-employed (8%), homemakers (7%), retired (4%) and unemployed (1%).

The data had good representation of respondents over a range of annual family income as the form was circulated through diverse sources, with 5-10 lakhs (33%), above 20 lakhs (21%), 10-15 lakhs (20%), 15-20 lakhs (11%), 3-5 lakhs (9%) and below 3 lakhs (6%).

Number of people in the household. 55% of the respondents had 4-5 people in their household, 39% with 2-3 in household, below 2 and above 5 each having 3%.

The data collected was analyzed first using hierarchical cluster analysis. A sudden jump in the distance coefficient was observed after the second last cluster and fourth last cluster. Since the stage before the sudden change indicates the optimal point for merging the clusters, we had the option for either going for 4 cluster analysis or 2 cluster analysis. 2-cluster analysis was chosen as having two target segments would be a cost effective and convenient approach for designing communication and marketing strategies at the initial stage than compared to having more clusters.

K-means cluster analysis was done on the data by selecting the number of clusters as 2, the table of final cluster centers is given below (see Table 1).

Table 1. Final Cluster Centres

Final Cluster Centres	**Cluster**	
	1	**2**
I am aware of the damage our waste is causing to environment, wildlife and humans	1	1
I am aware of brands that pay attention to sustainable and eco-friendly packaging	2	3
I know the vendors who collect plastic, glass and metal from homes in my locality for recycling	2	3
I feel drawn towards ideas and news stories on eco-friendly ways of living	1	2
I am aware of how kitchen waste can be composted	1	3
I am completely aware of how to segregate waste in the public dustbins	1	2
I am not aware about a lot of waste management related problems but it would be great to see some tangible change around it	2	2
I always carry my own bag to shopping market	1	2
I send the recyclable waste from my house for recycling	2	3
I buy/would like to buy recyclable products only if they are easily available	1	2
I don't mind paying a little extra for products with eco-friendly/sustainable packaging	1	2
I buy/would like to buy products that are ethically sourced	1	2
I usually buy essentials in bulk to decrease wrapper waste	1	3
I would like to buy products with packaging that are reusable	1	2
I would support brands with innovative packaging solutions that are eco-friendly, working to protect nature	1	2
I refuse to buy items that are un necessarily wrapped in plastic	1	3

Cluster 1: Passive Environment lovers.

Cluster 2: Potential Ardent Zero-Waste followers.

Cluster 1 comprised of those who had shown high inclinations towards the following attributes.

i. I am aware of the damage our waste is causing to environment, wildlife and humans
ii. I feel drawn towards ideas and news stories on eco-friendly ways of living iii. I am completely aware of how to segregate waste in the public dustbins
iv. I am not aware about a lot of waste management related problems but it would be great to see some tangible change around it
v. I always carry my own bag to shopping market
vi. I buy/would like to buy recyclable products only if they are easily available
vii. I don't mind paying a little extra for products with eco-friendly/sustainable packaging viii. I buy/would like to buy products that are ethically sourced
ix. I would like to buy products with packaging that are reusable
x. I would support brands with innovative packaging solutions that are eco-friendly, working to protect nature

The segment shows high interest in environment related aspects and consists of people who still are reluctant to leave their comfort zone and go out of their way for a zero-waste lifestyle, but are in their own way doing their bit and trying to consciously reduce the harmful impact of their waste.

Cluster 2 comprised of those who had shown high inclinations towards the following attributes.

i. I am aware of brands that pay attention to sustainable and eco-friendly packaging
ii. I know the vendors who collect plastic, glass and metal from homes in my locality for recycling iii. I am aware of how kitchen waste can be composted
iv. I send the recyclable waste from my house for recycling v. I usually buy essentials in bulk to decrease wrapper waste
vi. I refuse to buy items that are unnecessarily wrapped in plastic

This cluster comprises of people who are active zero-waste followers, they are conscious and aware about the impact of their actions. They compost their kitchen waste, send recyclables for recycling, consciously buy in bulk to avoid packaging waste and refuse to buy items they feel is not in sync with their principles. This group earnestly seek products that are eco-friendly and sustainable in terms of their design and packaging, and brands that actively advertise on these values are highly likely to grab their attention.

The ANOVA analysis tells us which attributes are important for our cluster solution which are highlighted in Table 2 (see Table 2).

The attributes 'I send the recyclable waste from my house for recycling' having a large F ratio value of 1.114, 'I know the vendors who collect plastic, glass and metal from homes in my locality for recycling' with F ratio value of 0.953 are important attributes for separating the cluster. The attribute 'I am not aware of a lot of waste management related problems but it would be great to see some tangible change around it' belonging to Cluster 1: Passive Environment lovers is also an important attribute to differentiate between the clusters.

The 2 clusters were compared with respect to demographics and the following points were discovered:

- *Cluster 1:* Passive Environment Lovers comprised of more females, while males dominated Cluster 2: Ardent Zero-Waste Followers

Table 2. ANOVA Analysis

ANOVA						
	Cluster		Error		F	Sig.
	Mean Square	Df	Mean Square	df		
I am aware of the damage our waste is causing to environment, wildlife and humans	1.915	1	.184	142	10.425	.002
I am aware of brands that pay attention to sustainable and eco-friendly packaging	33.547	1	.764	142	43.935	.000
I know the vendors who collect plastic, glass and metal from homes in my locality for recycling	94.226	1	.953	142	98.916	.000
I feel drawn towards ideas and news stories on eco-friendly ways of living	23.243	1	.483	142	48.125	.000
I am aware of how kitchen waste can be composted	66.790	1	.762	142	87.697	.000
I am completely aware of how to segregate waste in the public dustbins	38.502	1	.674	142	57.154	.000
I am not aware about a lot of waste management related problems but it would be great to see some tangible change aroundit	18.226	1	.866	142	21.043	.000
I always carry my own bag to shopping market	23.380	1	.680	142	34.363	.000
I send the recyclable waste from my house for recycling	58.199	1	1.114	142	52.227	.000
I buy/would like to buy recyclable productsonly if they are easily available	28.378	1	.694	142	40.886	.000
I don't mind paying a little extra for products with eco-friendly/sustainable packaging	34.702	1	.563	142	61.643	.000
I buy/would like to buy products that are ethically sourced	28.819	1	.388	142	74.198	.000
I usually buy essentials in bulk to decrease wrapper waste	59.936	1	.764	142	78.440	.000
I would like to buy products with packaging that are reusable	41.342	1	.626	142	66.049	.000
I would support brands with innovative packaging solutions that are eco-friendly, working to protect nature	11.137	1	.325	142	34.317	.000
I refuse to buy items that are unnecessarily wrapped in plastic	64.313	1	.673	142	95.614	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

- Cluster 1 comprised more of married people while Cluster 2 had more of single respondents.
- An over whelming number of Cluster 2 respondents belonged to the age group of 20-30, while Cluster 1 had quite a lot of respondents belonging to 40-60 age group.
- Cluster 2 had higher number of post-graduates than graduates.

These demographics, along with the attributes most important to the respective clusters formed, can help us in further consumer research and pave a path on targeting the respective cluster.

4. Discussion

The study revealed that the majority of respondents (35%) were not aware of what the term zero-waste meant. Only a tiny fraction (11.5%) claimed to be aware of the term and making an effort to follow it.

Among Russian consumers, 61.4% of respondents confirmed awareness of Zero Waste. However, with high awareness, Russian consumers in general did not show noticeable differences in choosing a consumption model. Among the reasons for what would motivate them to follow such a lifestyle, quite a few people were unconvinced that it can actually cut down their budgets, compared to other reasons which they found more convincing.

Russian consumers also noted money savings as the main motivation to follow Zero Waste. In Study 2, which presented pictorial choices of the products, an overwhelming majority of chose the eco-friendlier alternative version of the product. This behavior was noticed in spite of the price differential, which indicated that people were indeed willing to buy a slightly costlier eco-friendly alternative.

In the open-ended question, the thoughts expressed were mainly about how they just wanted to avoid plastic as much as possible, and how they wanted awareness about this to be spread. Quite a few respondents claimed the government should have strict regulations to implement eco-friendly products and ban those that aren't. Also, there were a lot of responses demanding eco-friendlier alternatives from popular brands.

Indian and Russian consumers showed consensus in choosing the answers to these questions.

Since, most of the 'Potential Ardent Zero-Waste Followers' members belonged to a younger age group of 20-30 year olds and happened to be single, these attributes can be considered while creating the ideal advertisements targeting this particular segment.

The marketing channels too can be that which are most popular for this age-group of millennials and Generation Z, which is social media and blogs. Interesting branded entertainment content can also be crafted to hook these youngsters to the brands that are in sync with their causes, through web-series and short ad films as they show high viewership in this format.

Another significant revelation through the study is that though the 'potential ardent zero-waste followers' cluster showed high interest and inclination towards the issue and believed in incorporating eco-friendly measures in their lifestyle by already practicing recycling and reusing, they were not aware about the term zero-waste lifestyle. Hence, it is highly likely that the term may not be very much evocative if used without explaining the context. We can see that the responses are almost the same for both clusters here, and are heavily leaning towards eco-friendlier alternatives. Also, cluster 1 consisting of youngsters, mostly students are less willing to pay more, though they show more willingness to buy eco-friendly products. This calls for companies to innovate and optimize their design and process to bring down the prices and make eco-friendly products affordable.

In the digital age, the following can be used as drivers of consumer environmental activism:

- The presence of active accounts of the company on social networks, which actively interact with buyers to promote the idea of Zero Waste, inform about garbage sorting and recycling points.
- Personality (celebrity or blogger), acting as an ambassador for the idea of Zero Waste.
- Story-telling about Zero Waste, offered products, the company itself from creators and employees.
- Discounts, special offers, contests.

An interesting example is the “Green is the New Black” campaign run by the “Azbuka Vkusa (the ABC of Taste)” retail chain. The company stopped giving out plastic bags for free from October 2018, which helped to reduce the volume of their use by three times: from 5 million to 1.7 million bags per month. Instead of packages, the company encourages customers to use eco-bags and string bags. New options of the loyalty program “Vkusomania (Tasting)” supplemented the environmental initiative with options:

- Food in customers' containers is rewarded with cashbackof of 500 bonuses (equivalent to five rubles) on “Vkusomania” loyalty card for every purchase.
- Weight products and cooking dishes in all stores of the chain can now be purchased without plastic packaging using their lunch box.
- Coffee in customers' glass is rewarded with cashback of 500 bonuses on “Vkusomania” loyalty card for every purchase. Visitors to “Azbuka Vkusa” cafeterias can order drinks from the barista in a thermocup brought with them instead of a disposable glass.
- Refusal to buy packages (if there are more than three items in the check) is rewarded with cashback of 500 bonuses on “Vkusomania” loyalty card for every purchase.

According to the company's estimates, if at least one in ten buyers uses the new options, this will allow them to spending 30,000 units of plastic containers and 45,000 disposable cups less monthly. Bonuses on the loyalty program card are thanks to buyers for helping to care for the environment. “Azbuka Vkusa” is the first in the food retail market to introduce such a practice.

Conclusion

This study gives us a glimpse into the thoughts of respondents of how they feel about having eco-friendly alternatives to the products they consume on an every-day basis.

The echoes of nature crying for help has been now resonated by consumers demanding for eco-friendlier solutions to their daily needs.

The following are some ways in which FMCG companies can implement this concept for the benefit of their consumers as well as the environment.

1. Resource extraction strategies should strive for utilizing existing resources rather than drawing out fresh resources and non-renewable resources for their processes. An example of this can be the amount of delivery packaging materials that goes waste, as their usefulness for a customer is only till the product gets delivered. If companies adopt a logistics system to collect their packaging materials used for delivery and reuse them, they can cut down their cost as well as rise up in their sustainability standards. The production process design should be optimized to maximize the resource re-utilization, ensuring very little waste is produced at the end of the process.
2. The design of the products being launched should be thought from an eco-perspective such that they can be easily dissembled, recycled or reused, without involving too much toil for consumers aspiring to go zero-waste.
3. Producer responsibilities should extend the lifespan of the product and services and should encompass the responsibility of tying up with waste management third parties that are involved in sorting, collecting and recycling of waste.
4. More products should come up which are based on upcycling the remnants of old products by the same manufacturer. For this there should be a proper means of collection after the product's term has ended. Such initiatives call for a more intimate relationship between the consumer and the brand where companies are in regular touch with the consumer even after their product is sold or the warranty period is expired.
5. Consumers must be made aware of the eco issues and the initiatives taken by the companies to empower their decision making. The group of passive consumers who feel for the cause but love their comfort zones can be attracted towards zero-waste products with suitable nudges and product designs that are innovative enough not to compromise with consumer convenience.

While it is true that 100% diversion rate is an impossible feat to achieve currently, there is indeed a need a transformation in the processes of FMCG companies towards a zero-waste strategy and goals. Initiatives to redesign their processes and products in all phases from extraction of resources, production of goods, marketing, consumption to recycling of products.

This study reveals the widespread inclination towards proper zero-waste initiatives in consumer sentiments, and also provides detailed characteristics and traits of clusters of consumers where this sentiment is high. The results can be utilized in prioritizing the elements in the company's strategy towards zero-waste and communication with consumers. This is possible only through a creative leadership in the company that not only pushes for an alternative zero-waste strategy at the industry level as an answer to consumers' passion, but also has an intrinsic culture that pulsates with the same values.

The digital environment provides many tools and points of contact to promote values and consolidate waste reduction efforts in the FMCG sector of all stakeholders:

At the stage of product development - studying the consumer's needs in terms of volume and portionality (for food products), duration and regularity of use in order to determine the necessary parameters of the product and how it is offered. If a product needs to be packaged due to safety standards, the material selection for it must be determined by processing capabilities.

At the stage of selection- informing the consumer about the standards of expiration dates, consumption rates per day and the possibility of further processing of packaging.

At the consumption stage - informing about the possibility of effective use without waste and proper storage, ways to extend the shelf life.

At the stage of deliverance - information about the point of recycling and processing, a bonus system for supporting environmental activism.

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Chapter 36

Analysis of Logistics Infrastructure Investments in the Russian Federation Federal Districts

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Abstract

The chapter is devoted to the analysis of investments in the logistics infrastructure development in the Russian Federation and its federal districts. The research methodology included systematic and comparative analysis, statistical analysis and graphical method. The key directions of logistics infrastructure investments were: ports and their infrastructure, transshipment terminals, logistics complexes, warehouses, gas and oil pipelines, and highways. The research results showed a high unevenness of logistics investments in the federal districts of Russia. The top three places in terms of the share of logistics investments in total investments are occupied by North West (45%), North Caucasian (28%) and Southern (23%) federal districts. In the other Russian federal districts (Central, Volga, Ural, Siberian, and the Far East) logistics investments were less than 10% of total investments. Different factors determine the difference in the logistics investment level among Russian federal districts such as the geographical location, level of economic development and regional industrial specialization, as well as involvement in the international projects.

Keywords: logistics innovations, logistics infrastructure, logistics investments, Russian Federal districts

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1. Introduction

Logistics is a key factor in a country's economic development. It is the link between the economic interests of a manufacturer and a buyer, ensuring a harmonious interaction between all participants in the supply chain (I. A. Krasyuk and Medvedeva 2019; Barbaruk, Krasyuk, and Medvedeva 2019). Improving the quality of logistical processes is beneficial for industrial and trade enterprises since the planning and coordination of actions of suppliers, manufacturers and intermediaries decrease supply chain costs and increase its efficiency (I. Krasyuk et al., 2019; I. Krasyuk, Yanenko, and Nazarova 2020).Also, logistics contributes to the development of the economy in general because the appearance of a workplace in logistics and transportation means the appearance of several ones within the supply chain (Elena Korchagina and Desfonteines 2019; Desfonteines and Korchagina 2019; Desfonteines et al., 2019). Therefore, logistics is essential for market relations development and impacts on socio-economic growth.

Logistics is a relatively young and rapidly developing science and business. Itis one of the most innovative industries (A. Bril, Kalinina, and Levina 2018; Kapustina et al., 2020; Vilken et al., 2019; Aleksandr R. Bril et al., 2017; Alexander R. Bril, Kalinina, and Ilin 2017; Elena Korchagina, Bochkarev, et al., 2020). Its actively implements innovations including digital technologies such as artificial intelligence, Big Data, virtual and augmented reality, blockchain, digital twins, drones in delivery, etc., (Elena Korchagina, Bochkarev, et al., 2019; Vilken et al., 2019; Elena Korchagina, Kalinina, et al., 2020; Elena Korchagina, Naumova, et al., 2019). However, the introduction of these digital technologies into logistics requires serious investments (Elena Korchagina and Shignanova 2018a; E. V. Korchagina and Shvetsova 2018; Elena Korchagina and Shignanova 2018b). Modern Russia seeks to develop investments in its logistics infrastructure. New ports and terminals, oil and gas pipelines, highways and airports are being built on the territory of the country. The high importance of the logistics innovations introduction is associated with the intensification expansion of goods-money relations, development ties between enterprises, increase of production infrastructure and the expansion of economic independence of enterprises and organizations. Thus, the Russian logistics infrastructure development is necessary for the country's economic growth and market stability, therefore, logistics attracts many investors both Russian and foreign.

However, despite the importance of logistics for the modern Russian economy, its development in the federal districts of the Russian Federation is uneven. This is caused by various factors from a region's geographic location, its population size or level of socio-economic development. Nevertheless, there is still a lack of research on the logistics investments unevenness in the different Russian regions contrary toa large number of publications on the general logistics or investments topics. In this paper, we strive to fill this gap and analyze the strategy of logistics investments in the Russian Federal Districts.

2. Materials and Methods

The research methodology included systematic and comparative analysis, statistical analysis, and graphical method. Information sources were the statistical databases of the Rosstat and its territorial divisions, the B2B Global database of investment projects, as well as the websites of Russian companies. The Rosstat and its territorial divisions provided information on the overall

investment activity of the Russian federal districts. The B2B Global database of investment projects, as well as the websites of Russian companies, made it possible to collect more detailed information on specific investment projects in the field of logistics.

3. Results

There are eight Federal Districts in Russia: Central, North West, Southern, North Caucasian, Volga, Ural, Siberian, and the Far East. The investments distribution in the Russian Federation's Federal Districts is presented in the Figure 1. Totally, 4.3 trillion rubles were spent in 2019 for the development of the territories. The logistics investments were approximately 8% of the total amount (348 billion rubles). The largest investments were in the Far East and Central Federal Districts. Each of them made about 27% of the total investments. In the Far East, Federal District investors have directed 1.2 trillion rubles. In the Central Federal District, investments were about 1.1 trillion rubles. The Siberian federal district was in third place: its investments amounted to almost 1 trillion rubles (23% of the total investment). The North West Federal District investments accounted for about 11% of the budget (almost half a trillion rubles). This investment level is significantly higher than in the Southern, Volga and Ural Federal Districts. In these three Federal Districts, investments were from 3% to 4% of the total amount. North Caucasian Federal District is characterized by the lowest amount of investment (1% of the total amount).

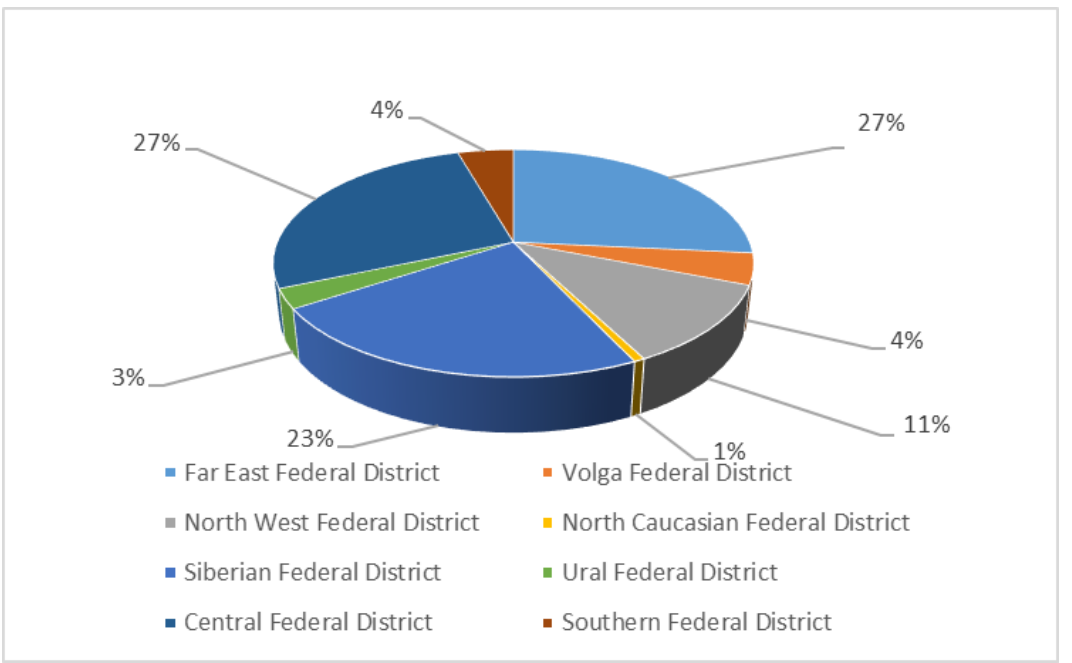

Figure 1. Distribution of investments by the Russian Federal Districts.

Figure 2. Share of logistics projects in the Federal Districts' investments.

Figure 2 shows logistics projects shares in the federal districts' investments. The largest percentage of logistics investments (45%) was in the North West Federal District, where 153 billion rubles were invested in logistics development ("B2B GLOBAL" n.d.). The high importance of the district logistics development is related to its territorial location since it borders on European countries that are Russia's key partners in foreign trade.

The next federal district with a large percentage of logistics investments was the North Caucasian. Its logistics investments amounted to almost 6 billion rubles, which is 28% of the total investment in the district ("B2B GLOBAL" n.d.). Most likely, this high percentage of logistics investments was explained by significant gap in logistics infrastructure in comparison with other Russian federal districts.

In the Southern federal district logistics investments amounted to 37 billion rubles, which is 23% of the total investments in the region ("B2B GLOBAL" n.d.). The significance of this area is associated with the Russian agricultural industry development within the import substitution strategy framework.

In the Far Eastern federal district, the logistics direction accounted for only 6% of total investments. However, since investments in the district are quite high, about 68 billion rubles were allocated in logistics ("B2B GLOBAL" n.d.). The development of logistics in the Russian Far East is associated with the growth of trade cooperation with China within the framework of the "One Belt One Road" project.

The Siberian federal district logistics investments were also accounted for about 6% of the total investment in this macro-region (55 billion rubles) ("B2B GLOBAL" n.d.). Siberia is an important region for the Russian oil and gas industries development; therefore, the logistics infrastructure development is significant for extracted resources transportation.

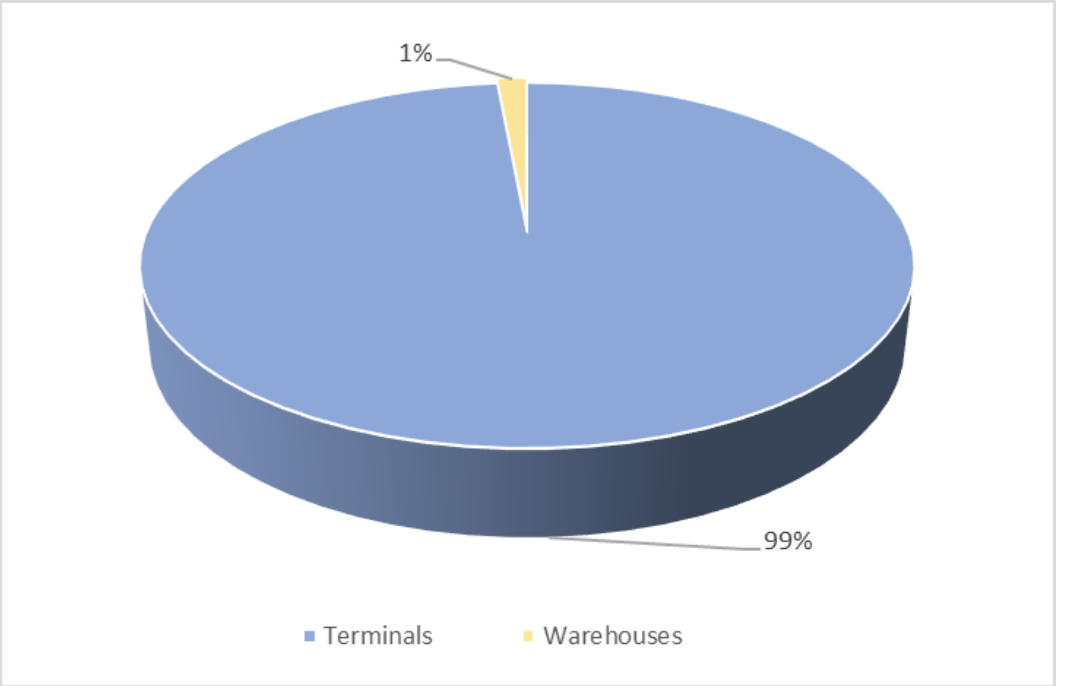

Figure 3. Distribution of logistics infrastructure investments in the Far Eastern Federal District.

There are only 2% of investments is allocated in logistics infrastructure in the Central federal district. However, the total amount of logistics investments in this district is quite large (17 billion rubles) ("B2B GLOBAL" n.d.). The reason for this investment level is that the Central federal district now is the most economically developed macro-region of Russia. It includes Moscow and the Moscow Region. Therefore, it is the leader in production, trade and logistics among the Russian macro-regions.

The Volga federal district logistics investments amounted to almost 10 billion rubles (5% of the total investment amount). The Ural federal district logistics investments amounted to only 1% of all investments (2 billion rubles) [3]. It is the lowest rate among the Russian federal districts. These districts are less economically developed, which is reflected in the number of logistics projects implemented there.

Figure 3 shows the distribution of logistic investments in the Far Eastern federal district. Most of the funds were directed to the construction of the terminals (99% or 67 billion rubles). The most expensive project was the construction of a transshipment terminal in the Far East. The total investment in this project amounted to 58 billion rubles. There were also investments in the warehouse modernization and logistics complex construction. However, these amounts are almost invisible compared to the investments in the construction of the terminals, since the amount invested in the logistics complex construction is not reflected in the diagram. This distribution of funds caused by the significance of Far East transportation infrastructure development for the Russian goods and Chinese transit to Europe.

Figure 4 shows the distribution of logistics investments in the Volga federal district. Investments in warehouses (48%) and logistics complexes (49%) account for approximately equal shares of the total amount of investments. Each of the directions accounted for about 5 billion rubles. The largest investment fell on the construction of a food complex in the Nizhny

Novgorod region. Its total amount was about 3.3 billion rubles. It is also worth noting the investments allocated for the construction of an oil pipeline in the Perm region. The amount invested in this project was about 300 million rubles, which is 3% of the total logistics investment in the Volga federal district. Most of the investments are made in the Republic of Tatarstan, where warehouses and logistics complexes were actively built.

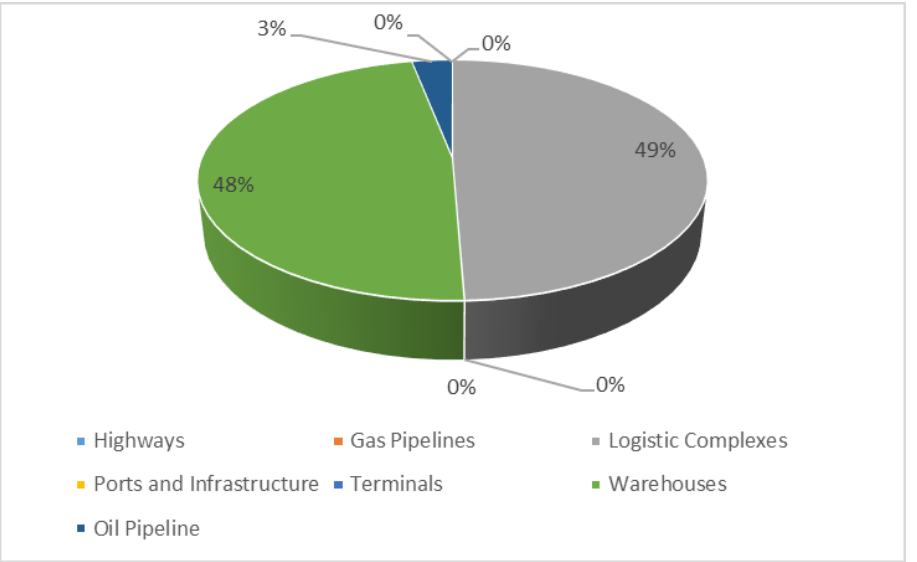

Figure 4. Distribution of logistics infrastructure investments in the Volga federal district.

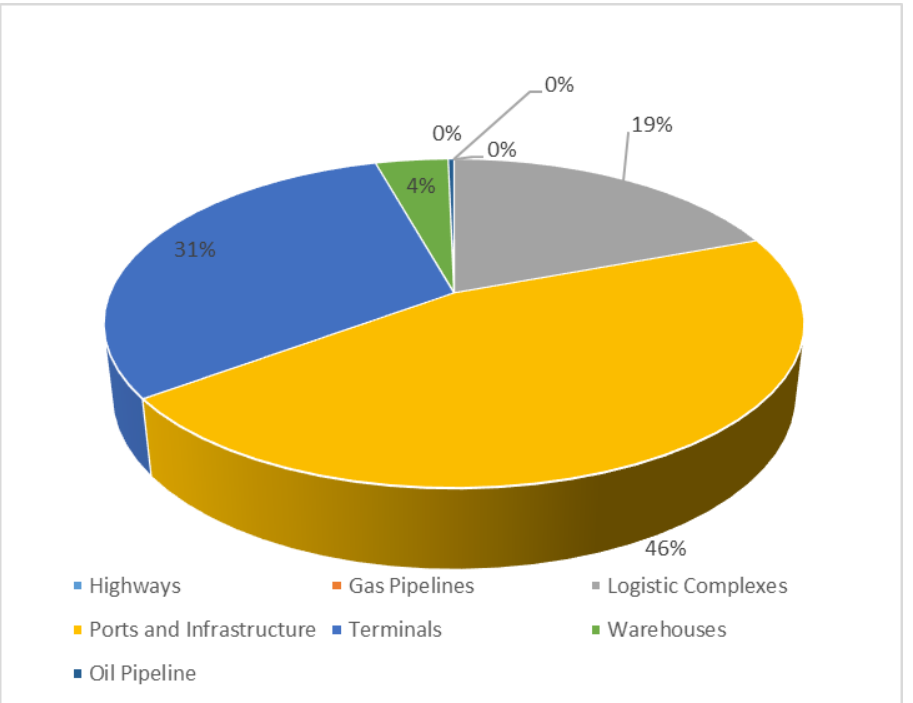

Figure 5. Distribution of logistics infrastructure investments in the North West federal district.

The distribution of logistics investments in the North West Federal District is presented in Figure 5. 70 billion rubles (46% of the total logistics investments) fell on ports and infrastructure. This investment project was directed to the transshipment terminal construction for mineral fertilizers in the Leningrad region. 47 billion rubles (31%) went to the construction of the terminals. About 30 billion rubles (19%) were allocated for the logistics complexes construction. 6 billion rubles (4%) were allocated in warehouse construction. The largest project in this area (5 billion rubles) was the construction of the third stage of an industrial and warehouse complex in St. Petersburg, on which funds were spent. Also, 500 million rubles were allocated for the construction of an oil pipeline in the Kaliningrad region. However, this amount is too small compared to others, therefore this investment is not reflected in Figure 5.

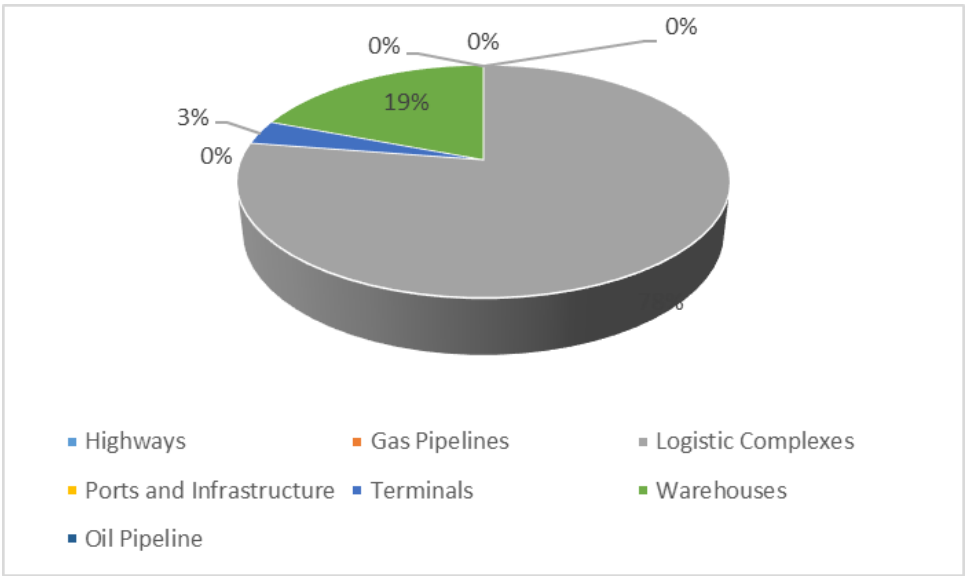

Figure 6. Distribution of logistics infrastructure investments in the North Caucasian federal district.

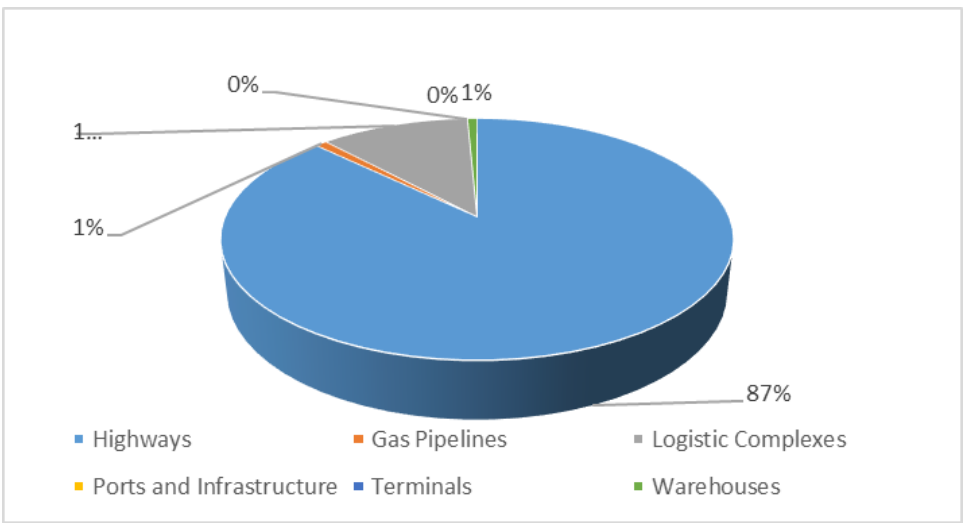

Figure 7. Distribution of the logistics infrastructure investments in the Siberian federal district.

The logistics investment distribution in the North Caucasus federal district is presented in Figure 6. 4.6 billion rubles (78% of the logistics investments) are directed to the logistics complex construction in the Stavropol region. 1,1 billion rubles (19%) were directed to the warehouse complex construction in the Stavropol region. 200 million rubles (3%) fell on the construction of a terminal in North Ossetia.

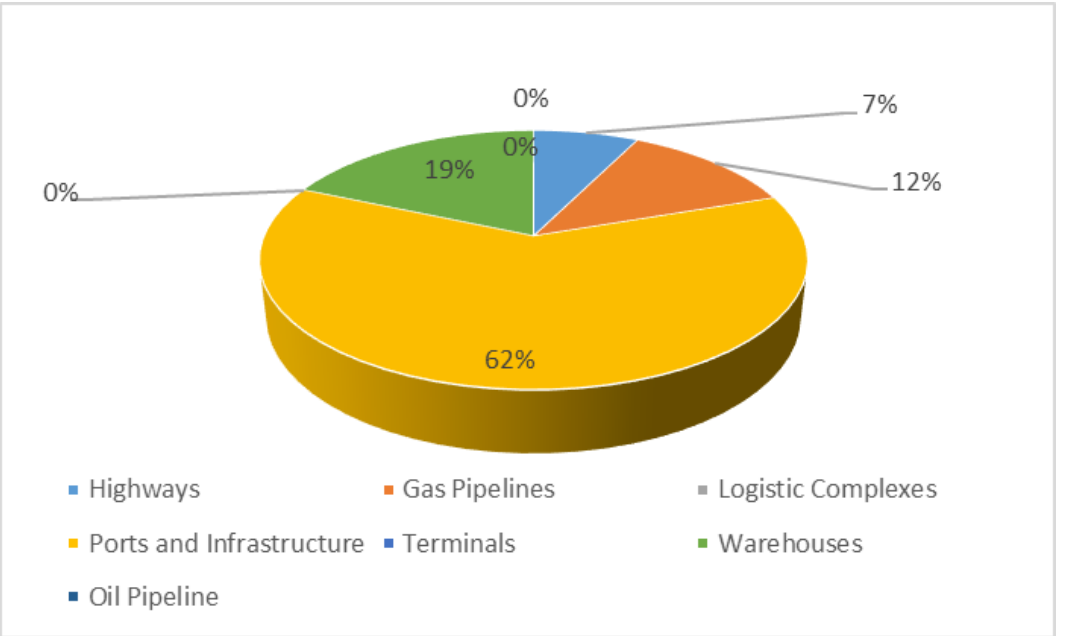

Figure 8. Distribution of logistics infrastructure investments in the Ural federal district.

48 billion rubles or 87% of the Siberian federal district logistics investments went to the construction of the highways (Figure 7).6 billion rubles (11%) were invested in the logistics complexes construction. The most expensive project in this area was the construction of a multifunctional logistics complex in Kuzbass (2 billion rubles). The investments in the warehouses and gas pipeline construction accounted for 1% of the total amount of logistics investments in the Siberian federal district. The funds invested in the construction of warehouse complexes amounted to 1.2 billion rubles. Investments allocated for the gas pipeline construction in the Irkutsk region amounted to 500 million rubles.

Figure8 presents the distribution of logistics infrastructure investments in the Ural federal district. The main area of the district logistics investments is ports and infrastructure. The investments in this area accounted for about 1 billion rubles (62% of the total logistics investments in this federal district). This amount was spent on the construction of the LNG (liquefied natural gas) terminal in the Tyumen region. 300 million rubles (19%) of investments were spent on the warehouse complex construction in the Sverdlovsk region. 200 million rubles (12%) were spent on the construction of pipelines in the Khanty-Mansi Autonomous District. Highway construction took about 7% of the funds (120 million rubles)(“B2B GLOBAL” n.d.).

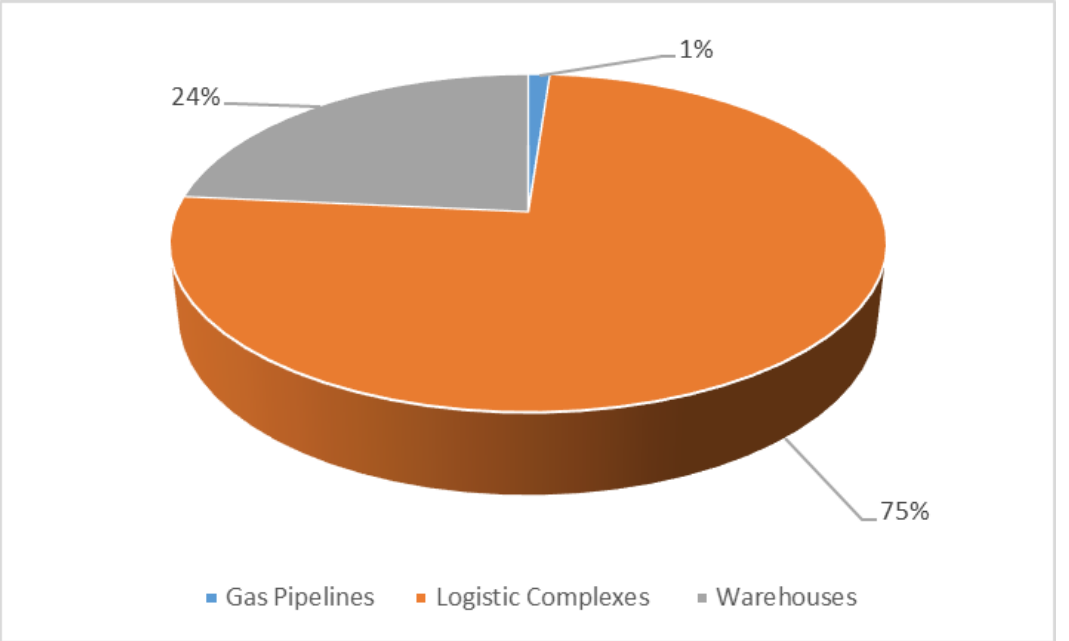

Figure 9. Distribution of logistics infrastructure investments in Central federal district.

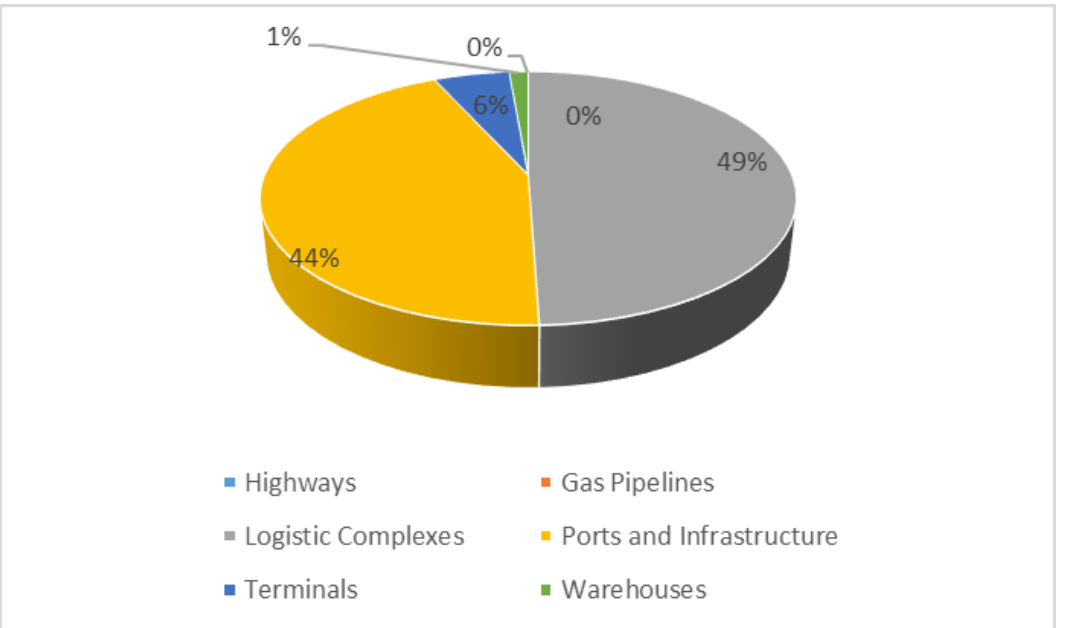

Figure 10. Distribution of logistics infrastructure in Southern Federal District.

The Central Federal District has the largest logistics investments.75% of them are directed to the construction of logistics complexes. The most expensive project in this area is the construction of the second stage of the logistics distribution center in the Moscow region (2 billion rubles). 24% of the logistics infrastructure investments are made in the warehouse complexes construction. The construction of a multi-temperature distribution center in the

Moscow region is the largest project among them with 1 billion rubles of investments. Finally, 1% of the total logistics investments in the Central federal district (200 million rubles) was made in the construction and reconstruction of a high-pressure gas pipeline in the Tambov region.

In the Southern federal district, 49% of logistics investments were directed to the construction of logistics complexes. The largest project among them was the construction of the logistics center in the Krasnodar Territory. It costs 15 billion rubles. 44% (16 billion rubles) of the logistic investments were made in ports and infrastructure. 6% of all logistics investments were allocated for the construction of terminals. 500 million rubles (1%) were allocated for the construction of the second stage of the warehouse complex in the Krasnodar Territory.

4. Discussion

Possible limitations of the presented study are related to the source base used. The Rosstat and B2B Global information helped us to show the general picture of logistics investments in the Russian Federation, as well as their distribution by federal district. However, the used resources could contain incomplete information and some information about logistics projects in the Russian Federation could be missed. Therefore, for further research of the Russian Federation investments, as well as investments in the logistics field, we recommend expanding the resource base. Due to the particular focus of our information sources, we considered the largest players and projects in the logistics investment market. However, it would be interesting to consider the whole investment picture and take into account other projects with less financial support but that important for the logistics development in the Russian Federation and its federal districts.

Conclusion

Summing up the results of our research, we can draw the following conclusions. The development of logistics in Russia is an important task. However, the funds invested in it make up only 8% of the total amount allocated for the development of the Russian territories. It is important that investments in logistics are different in each Russian federal district. The largest investment amounts are in the Central and Far Eastern federal districts, the smallest one is in the North Caucasus federal district. However, the importance of logistics direction for a federal district is reflected not only by the general amount of funds allocated for its development but also by its share in the total federal district investments. The Russian federal districts are developing unevenly, therefore, the volume of investments is differentiated depending on the geographical and economic conditions of their territories. Thus, among the Russian federal districts, there are territories where logistics development has great importance. The first of them is the North West federal district. Its logistics investments accounted for 45% of the total investment. The North Caucasian federal district is in the second place in the logistics investments share among the Russian federal districts. Its logistics investment share was 28% of total investments. The Southern federal district was in third place. Its logistics investment share was 23% of the total investment. In all other federal districts, logistics investments were

less than 10% of total investments. There are different factors that determine the difference of the logistics investment level among Russian federal districts such as the geographical location, level of economic development and regional industrial specialization, as well as involvement in the certain international projects (for example, the Chinese project "One Belt - One Road").

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Chapter 37

The EAEU Logistics Development: An Analysis of the Key Areas of the Logistics Infrastructure Investments

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Abstract

The article is devoted to the analysis of investments in the logistics infrastructure development in the Eurasian Economic Union (EAEU) countries. The research methodology included systematic and comparative analysis, statistics analysis and graphical method. The results of the study showed differences in the structure of logistics investments in the EAEU countries. Russia occupies the largest share in the total and logistic investments of the EAEU, Kazakhstan is in second place, and Belarus is in third. The Russian logistics investments have the largest volume. Moreover, they are the most diverse. They include investments in the construction of ports and infrastructure, logistics complexes, terminals, warehouses and highways. Kazakhstan's logistics investments include three main directions: ports and infrastructure, terminals, and a gas pipeline. At the same time, construction of terminals takes almost 90% of Kazakhstan's logistics investments. Belarus' logistics investments also include three items: terminals, warehouses and an oil pipeline. The distribution of logistics investments in the Republic of Belarus is more even than in Kazakhstan.

Keywords: Eurasian Economic Union (EAEU), logistics innovations, logistics infrastructure, logistics investments

1. Introduction

The Eurasian Economic Union (EAEU) is an international economic organization created in 2015 on the basis of the Eurasian Economic Union Treaty. The EAEU includes five member

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countries: Russia, Kyrgyzstan, Kazakhstan, Belarus and Armenia (Figure1). The purpose of the union is the stable economic development of the member countries, increasing the competitiveness of their national economies and comprehensive modernization. The EAEU provides free movement of capital, labor, goods and services, as well as a coordinated policy in all sectors of the economy. The EAEU free trade zone includes: Vietnam, Iran, Singapore and Serbia. Moldavia has now an observer status of the EAEU. Furthermore, entry and cooperation negotiations are carrying on between the EAEU and many countries, such as China, India, Thailand, Israel, Cuba, Egypt and others. Moreover, many other countries have expressed interest in interacting with the EAEU: Japan, Hungary, Chile, South Korea, Indonesia, Pakistan, Syria, Tunisia, Cambodia, and Laos ("The EAEU " n.d.). It should be noted that one of the goals of the EAEU was cooperation with China within the framework of the "One Belt, One Road" project. This is related with the risk of the US trade blockade of the China's maritime trade. In this case, China will need the EAEU support for continuation its trade with the EU using the EAEU railway network.

Figure 1. The Eurasian Economic Union (EAEU) countries.

The development of trade and economic ties both within the EAEU and with external partners requires an appropriate transport, customs and logistics infrastructure (I. A. Krasyuk and Medvedeva 2019; I. Krasyuk et al., 2019; I. Krasyuk, Yanenko, and Nazarova 2020; Barbaruk, Krasyuk, and Medvedeva 2019). Nowadays, the infrastructure support of the "One Belt, One Road" project has particular importance. On the one hand, this project can stimulate the growth in the transit of goods through the EAEU countries territories (Elena Korchagina and Shignanova 2018a; Elena Korchagina, Naumova, et al., 2019; E. V. Korchagina and Shvetsova 2018; Elena Korchagina and Shignanova 2018b). On the other hand, the logistics and transport infrastructure development can facilitate the export of goods produced in the EAEU both to the European Union and Asian countries (Kapustina et al., 2020; Elena Korchagina, Bochkarev, et al., 2019; 2020). In addition, the transport and logistics development can create a multiplier effect for related economic sectors and contribute to the new working places creation in the EAEU countries (Elena Korchagina and Desfonteines 2019; Desfonteines

et al., 2019; Elena Korchagina, Kalinina, et al., 2020; Desfonteines and Korchagina 2019). In the following parts of the article, we will analyze the structure of general and logistics investments in the three largest EAEU countries.

2. Materials and Methods

The research methodology included systematic and comparative analysis, statistics analysis and graphical method. Information sources were the statistical databases of the EAEU and the B2B Global database of investment projects. The EAEU statistical databases provided information on the overall investment activity of the EAEU countries. The B2B Global database of investment projects helped us to collect more detailed information on specific investment projects in the logistics field.

3. Results

The EAEU countries are unequal in the economic size and power. The largest and most economically developed among the EAEU countries are Russia, Kazakhstan and Belarus. Further we will focus on the analysis of investments in logistics infrastructure in these countries since the most important and large logistics projects are developing in them. The distribution of capital investment across the three largest EAEU member countries is represented in the Figure 2. The major part of investments (96%) was spent for the Russian projects development. This is caused by the fact that Russia occupies a dominant position in the EAEU. It surpasses its partners in the territory size, amount of resources, and degree of economic development. 3% of all investments were directed to Kazakhstan. Belarus, the third most important partner in the EAEU, received only 1% of the total investment ("Construction Projects in Russia and the CIS | B2B GLOBAL" 2020). This investments distribution is explained by the fact that Kazakhstan has larger territory and population than Belarus. The second important reason is strong relationships between Kazakhstan and China. Chinese investments within the framework of the "One Belt, One Road" project are very significant for the Kazakhstan development.

The logistics direction of investments is presented in the Figure 3. This picture almost completely repeats Figure 2. However, the reasons for such investments distribution are slightly different from those mentioned above. One of the most significant reasons is caused by Russia's ability to pull over international logistics flows (Bril, Kalinina, and Levina 2018; Vilken et al., 2019; Kalinina et al., 2019). The traditional logistics flows now become risky because of trade wars between the United States and China. Russia can offer a safe and reliable transport and logistics route between China and Europe through the Russian territory. Therefore, it is extremely profitable to invest in the development of logistics infrastructure in the Russian Federation. This fact explains that 95% of the EAEU total logistics investments were directed in the Russian projects. 4% of the EAEU total logistics investments were directed to the Kazakhstan and 1% to the Belarus logistics development ("Construction Projects in Russia and the CIS | B2B GLOBAL" 2020). This investments distribution is caused by the Kazakhstan activities in attracting foreign investors and developing a large number of logistics infrastructure projects.

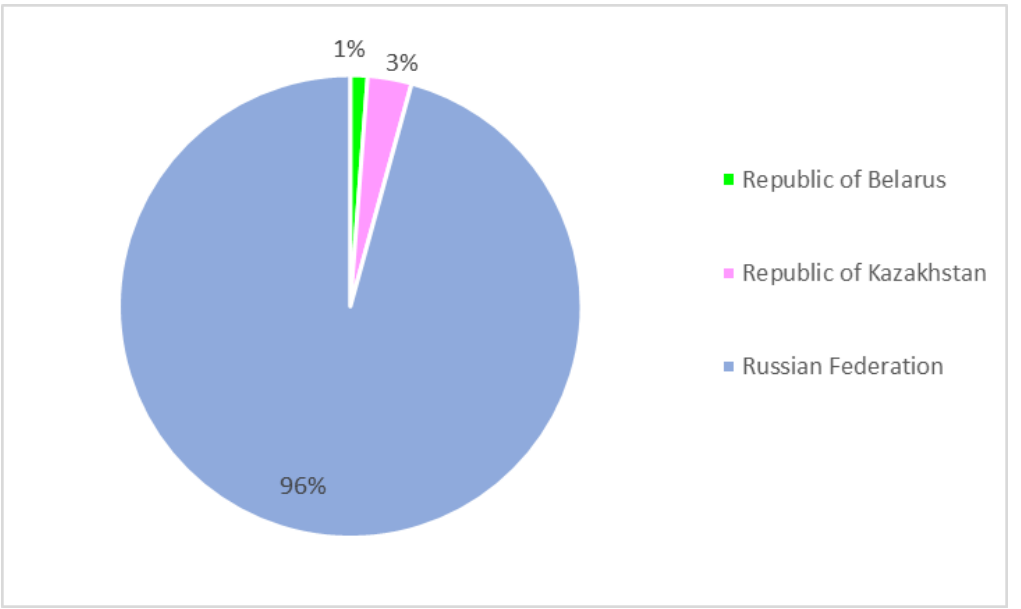

Figure 2. Distribution of the EAEU investments by countries in 2020.

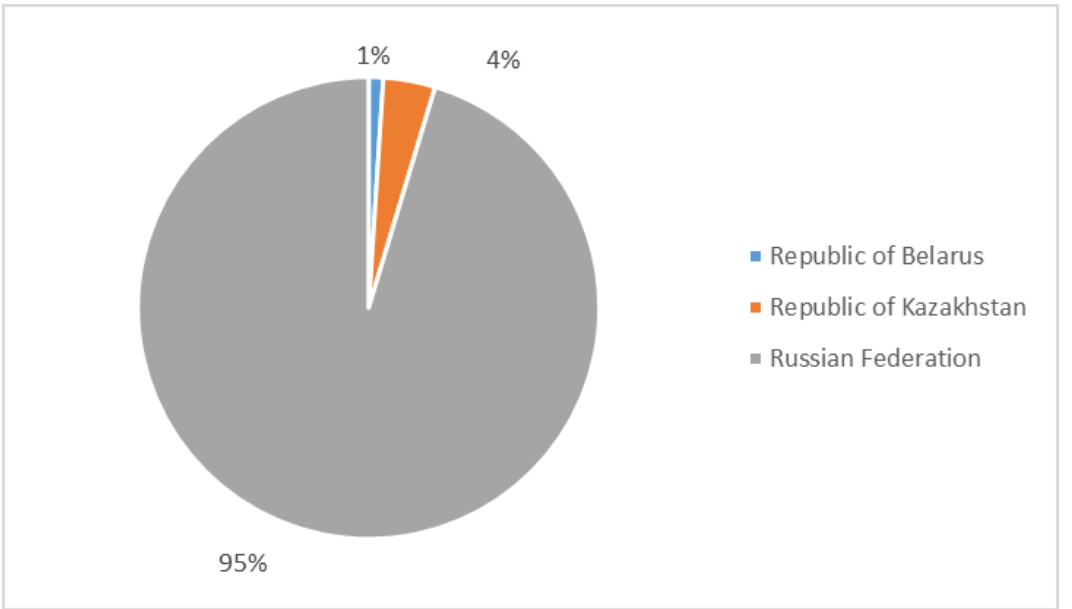

Figure 3. Distribution of the EAEU logistics investments by countries in 2020.

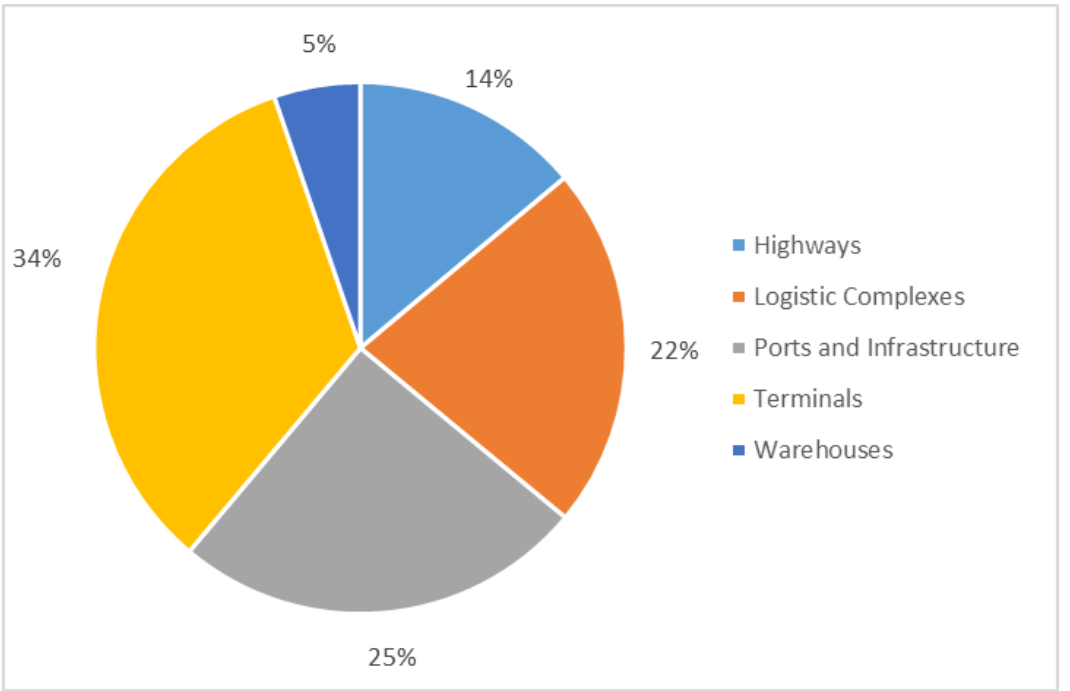

Figure 4. Distribution of logistics investments in the Russian Federation in 2020.

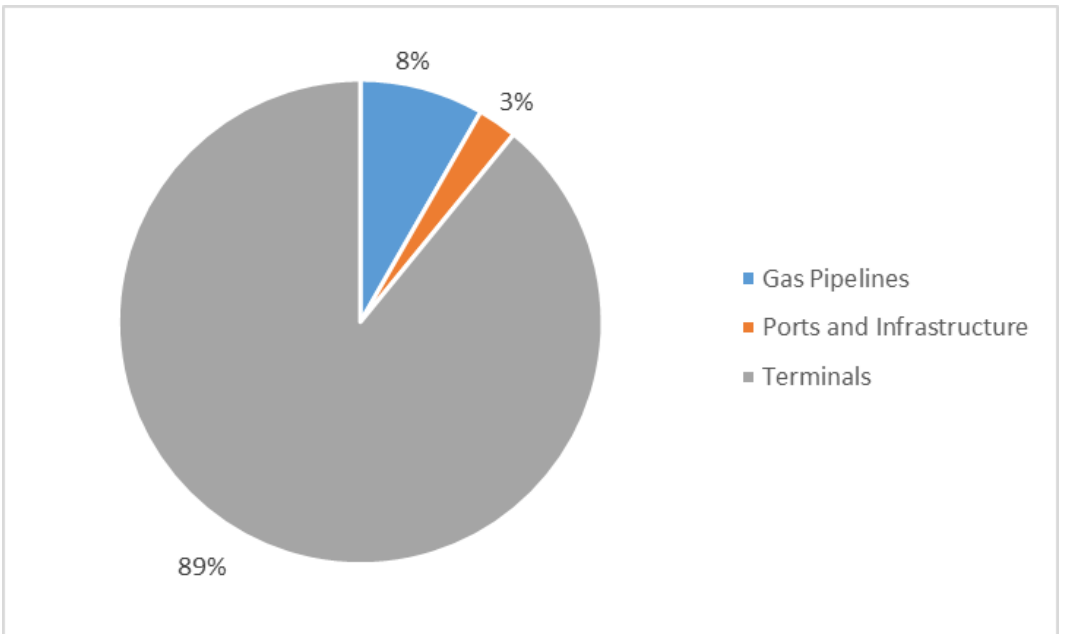

Figure 5. Distribution of logistics investments in the Republic of Kazakhstan in 2020.

Figure 4 shows the key directions of the logistics investments in the Russian Federation by. The largest part of the Russian logistics investments (34%) was directed to the terminals construction. 25% were directed to the ports and related infrastructure construction and

development throughout the country. 22% were directed to the logistics complexes construction. 14% were allocated for the highways development and construction. Finally, 5% were allocated for the warehouses construction and modernization ("Construction Projects in Russia and the CIS | B2B GLOBAL" 2020).

Figure 5 shows the logistics investments distribution in the Republic of Kazakhstan. 89% of total Kazakhstan logistics investments were directed to the terminals construction. 8% were allocated for the gas pipelines construction. The remaining 3% of investments were directed to the ports and related infrastructure construction ("Construction Projects in Russia and the CIS | B2B GLOBAL" 2020).

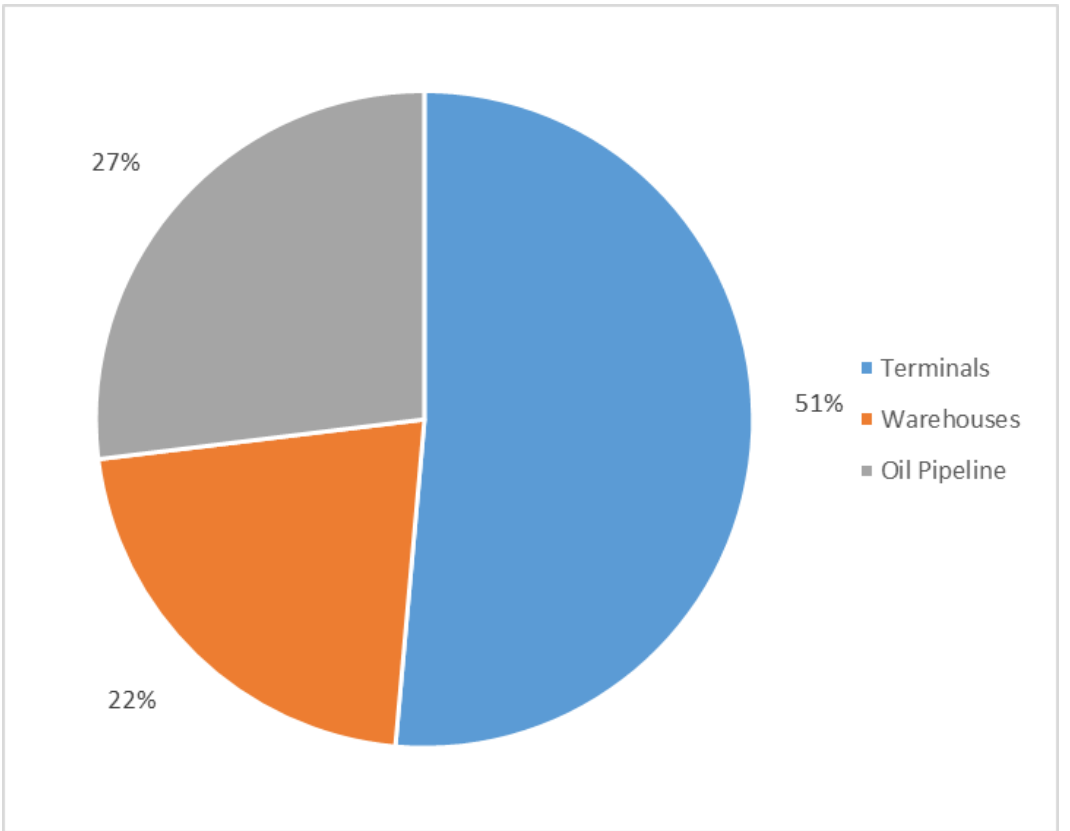

Figure 6. Distribution of logistics investments in the Republic of Belarus in 2020.

Figure 6 shows the logistics investments distribution in the Republic of Belarus. The most significant area for the Belarusian logistics development is the construction of terminals. 51% of the total logistics investments were in this area. The next most important area for the Belarusian logistics was the oil pipelines construction (27%). Finally, 22% of total investments were directed to the warehouses construction ("Construction Projects in Russia and the CIS | B2B GLOBAL" 2020).

4. Discussion

The possible direction of the further research is related with the expansion of the resource bases in order to form the more complete picture of the EAEU logistics investments including Armenia and Kyrgyzstan. We also believe that it would be interesting to compare the EAEU and BRICS logistics investments structures. Russia is a member of both unions. Both of them are important for Russian economic development. Therefore, it would be interesting to analyze how is Russia involved in transport and logistics interactions with both groups of partners. The next important area of research is the analysis of the mutual influence of the EAEU and BRICS member countries on each other's logistics systems and logistics investments.

Conclusion

Summing up the results of our research, we can draw the following conclusions. The EAEU is a developing international economic union. Investors are actively investing in the development and modernization of at least its three largest member countries. Russia is the leading partner in this union, since it exceeds other countries of the EAEU in terms of the territory size, number of population and, accordingly, the degree of economic development. This means that the funds invested in the EAEU are distributed unevenly. Most of them are directed to the development of the Russian Federation projects. The next important partner in the EAEU is Kazakhstan. It exceeds the remaining partners in both population and territory. The next important factor for the Kazakhstan development is its close partner relations with China. Belarus is the third important partner. It is smaller than the Russian Federation and Kazakhstan both in the population and territory. However, it has the developed IT sector and close partnerships with Russia. The Kyrgyzstan and Armenia investments are too small compared to the three largest EAEU members, so we did not include them in our consideration.

The results of our study showed that the pattern of the logistics investments distribution in the EAEU is very close to the total investments distribution. The significance and magnitude of the Russian logistics investments are caused by two reasons. The first is its great economic potential. The second is its support for the railways connection between the EU and China. The economic importance of this connection can significantly increase in the nearest future, due to the aggravation of trade relations between the United States and China. Thus, the Russian logistics infrastructure development is one of the most important EAEU goals.

The distribution of logistics investments in Kazakhstan and Belarus showed that the construction of terminals is of great importance for both countries. This direction took almost 90% of the total logistics investments in Kazakhstan. However, the investors were also interested in the construction of the Kazakhstan gas pipeline and ports on the Caspian Sea. In Belarus, the construction of warehouses and oil pipelines was also the important areas of investments.

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Chapter 38

Development of an Influencers Segmentation Algorithm on the B2F Market

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Abstract

The article discusses the issue of interaction between the manufacturer and the consumer through the influencer market by increasing the volume of interpersonal communications. The specific characteristics characteristic of influencers has been determined, which allow them to be distinguished into a separate market, called by the author B2F. A two-step promotion strategy for a manufacturer's launch of goods to the market is proposed, during which interaction with influencers, within the B2F market, and consumers, within the B2C market is carried out. The main characteristics, on the basis of which it is possible to perform segmentation on the B2F market, have been identified. The author proposes an algorithm for segmenting influencers within the framework of interaction with a manufacturer in order to increase the efficiency of interpersonal communications between an influencer and a consumer.

The proposed algorithm is considered taking into account the cyclicality of the steps performed by segmenting influencers when the manufacturer introduces a product to the market.

Keywords: Segmentation, Influencer, B2F-market, digital marketing, influencer marketing

1. Introduction

The volume of marketing communications is growing from year to year and new participants appear on it. These participants include opinion leaders, whose share is growing all over the world and is significantly developing due to the digital space: they carry out their activities there, forming their own target audience, which later manufacturers reach with the help of interpersonal communications carried out by influencers (S. G. Bozhuk, Maslova et al., 2019; S. G. Bozhuk, Evdokimov et al., 2019).

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Influencer is someone who has the power to influence/affect the purchasing decisions of others ("Influencer Marketing Agency|Influencer.Agency" n.d.).

Companies are increasingly turning to influencers when introducing products to market for promotion. Influencer Marketing Industry is set to grow to approximately $9.7B in 2020 from $6.5B in 2019 (O'Brien, 2020).

However, for successful work with influencers, it is necessary to have experience of successful interaction with them, to determine possible criteria for describing influencers and to be able to predict successful campaigns to promote goods in the influencer market (Martin, 2011; Dibb, 2000; Parshukov, Aleksandrov and Fedorova, 2020; Zhu, Zhao and Man, 2018; Rosara and Luthfia, 2020).

2. Methods and Materials

Taking into account the described interaction between the manufacturer and the influencer, the author notes that if a new product is introduced to the market through the services of an influencer, the manufacturer must also choose the influencer, select them, that is, segment them, but it arises about the criteria for segmenting them: On the one hand, these are consumers who fall under the B2C (Business-to-Customer) market and the corresponding segmentation criteria for them, on the other hand, they often do not purchase goods for personal use and have an interest in it exclusively from a commercial point of view, which refers them to B2B market (Business-to-Business) (Jílková, 2020; Bourdages, 2019). In this regard, noting the characteristics of influencers inherent in both markets, the author proposes to single out the interaction of producers and influencers in a separate market - B2F (Business-to-inFluencers). Table 1 provides a comparison of the B2C, B2B and B2F markets.

Table 1. Comparison of B2C, B2B and B2F markets
(Yamashita, 2016; Brown and Hayes, 2008)

	B2B	**B2C**	**B2F**
Purchase volume	wholesale	1 piece	1 piece
Procedure for reconciliation of interests	complicated	ordinary	complicated
Risks	high	low	unpredictable
Expertise	expert	non-expert	expert
Communication between the seller and the buyer	direct	indirect	direct
Duration of conclusion of a sale transaction	long-time	short-time	short-time
Client cost	high	low	high
Potential customers	a few	a lot	according to the size of the target audience
Personal contact	important	do not matter	important
Decision maker	2-4	1	1
Functions	sale	use	interpersonal communication

Based on the presented table, it can be noted that the B2F market, highlighted by the author, has characteristics inherent in some criteria to the B2B market, according to some criteria - to the B2C market, and according to certain criteria it has individual characteristics.

The characteristics of segmentation of consumers not related to the B2C market deserve special attention. As the author said earlier, influencers belong to the new B2F market, which requires the allocation of separate criteria for segmenting them. These criteria were formed by the author based on the analysis of influencers, their content, advertising offers and the activity of their target audience. Based on the results of the analysis, the following segmentation criteria were identified in the B2F market (Table 2).

Table 2. Criteria for segmentation in the B2F market ("Sprout Social: Social Media Management Solutions" n.d.)

Group of characteristics	**Criteria**	**Commentary**
Socio-demographic	Age	These criteria apply to the description not of the influencer himself, but his target audience
	Gender	
Geographic	Country	These criteria are applied to the description not of the influencer himself, but his target audience
	Region	
	Language	
Psychographic	Interests	The criterion of interests can be explained through the subject matter of the content
Behavioral	Share of coverage	These criteria apply to influencer content
	Engagement rate	
	Conversionrate	
Selected characteristics of the B2F market	Content type	Audio, video content, social media posts, podcasts
	Target audience size	Number of users viewing influencer content
	Terms of advertising integration	Cost and other remuneration received by the influencer for the posted content

Based on this table, the author notes that despite the presence in the B2F market of the same groups of characteristics as in the B2C market, these characteristics are applied in segmentation not to the influencers themselves, but to those objects with which they interact: the target audience, content. In addition, a number of separate criteria can be distinguished that can be applied to segment influencers, but they do not fall into any of the existing groups of consumer characteristics, which once again confirms the need to separate them into a separate market in view of the specifics of interaction with the manufacturer.

On the basis of the formed trends and relationships, it was determined that in the digital environment, during the process of segmentation and targeting, the elements of the group of psychographic characteristics of the consumer turn out to be key, since they more accurately explain the motives for making a purchase and provide a higher efficiency in promoting a new product.

The classical segmentation strategy, operating earlier in the context of traditional marketing, implies the construction of a classic segmentation funnel with the selection at the final stage of various segments by imposing segmentation filters on them in the form of a set of characteristics and selecting the most priority segments (Figure 1) (Chorianopoulos, 2015).

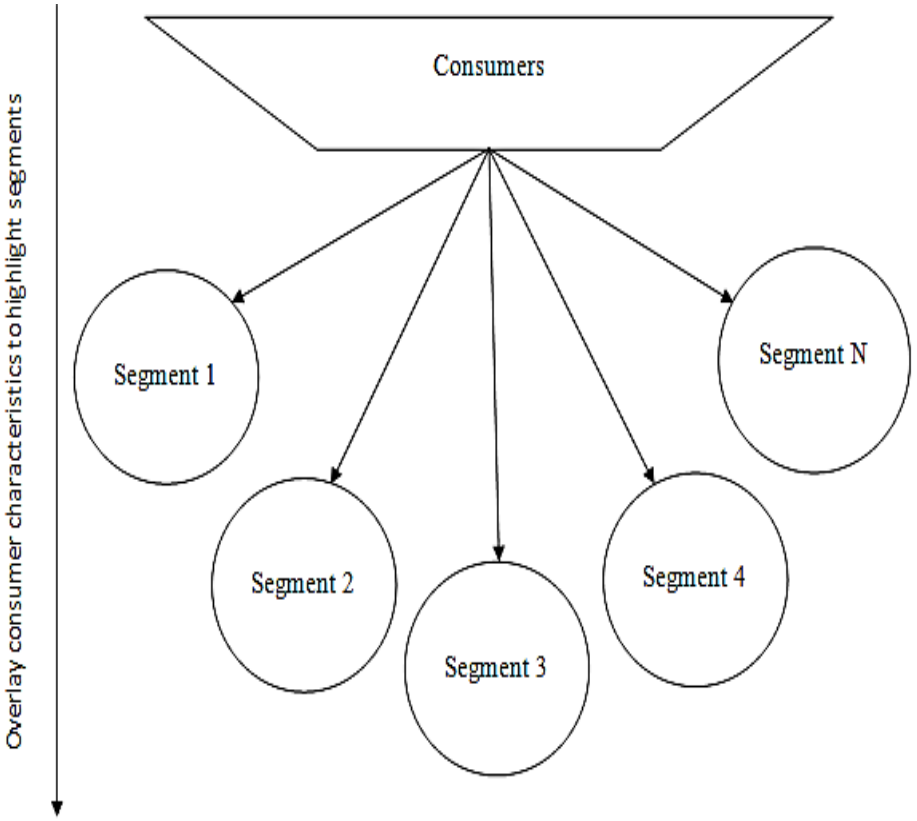

Figure 1. The process of identifying customer segments.

However, it is worth noting the fact that such segmentation strategies were developed in those moments when there was only offline marketing, when traditional priorities in terms of characteristics were used to determine the target audience and describe the segments. focusing on the geographic and socio-demographic characteristics of the consumer.

The gradual development of technologies made it possible to transfer the segmentation process to the digital space, applying the same segmentation strategy, but with the help of new tools: online did not change the content of the strategy, but only changed the methods of implementing segmentation and increased their efficiency.

However, the further development of both marketing and production technologies suggests that it is impossible to maintain the existing segmentation strategy in the digital environment, which is being transformed as an element of the external environment in the digital economy, while maintaining the same level of efficiency when launching a new product and requires the development of a new strategy (S. V. Krasnov, Krasnov and Bozhuk, 2019; A. Krasnov et al., 2019).

3. Results

The classic strategy of the product promotion complex has shifted in time and requires the start of its implementation before the stage of market launch with a focus on influencers. With the

subsequent launch of the product on the market, the company focuses more on interpersonal communications, rather than advertising: consumers are already aware of a potential novelty and are waiting for its release. Such observations, according to the author, make it possible to refine the existing and applied segmentation strategy to a new strategy for segmenting consumers when introducing new products in the online environment (Figure 2).

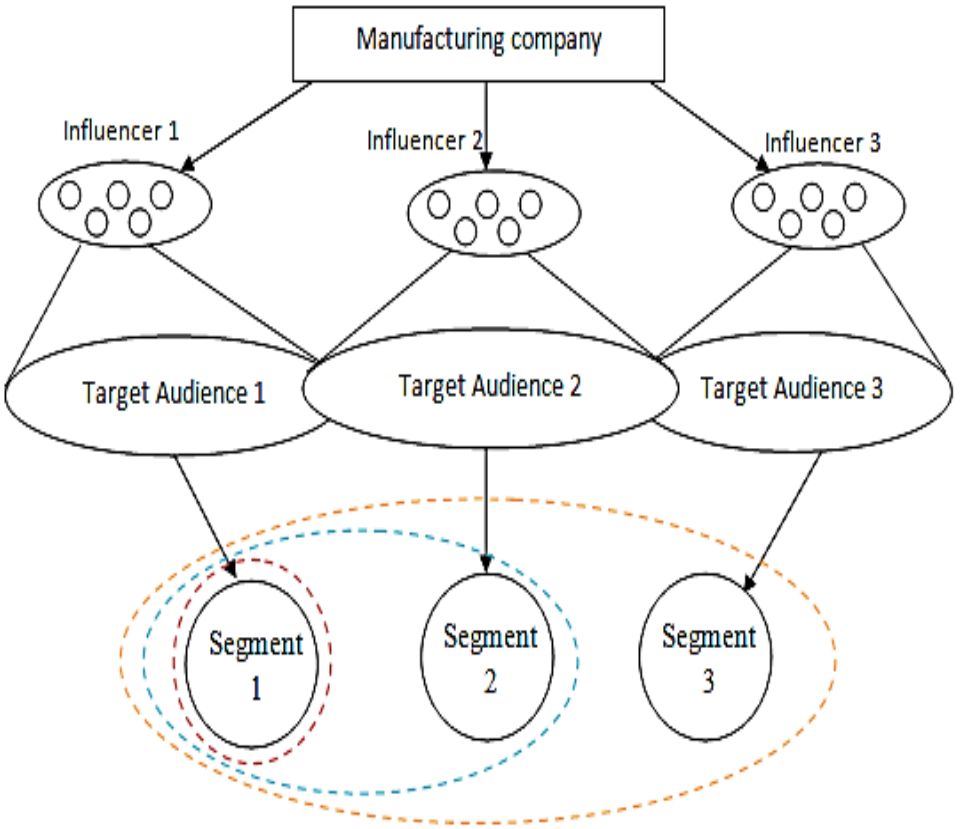

Figure 2. Strategy for segmenting consumers within the new complex of product promotion through the B2F market.

In accordance with the new strategy proposed by the author, based on the early refined impact of the complex of promoting a new product to various groups of consumers, depending on the stage of the life cycle and interaction between consumers and manufacturers of a new product before its launch on the market, the following procedure for the functioning of the segmentation strategy can be determined:

1) selection of criteria and selection based on these criteria of influencers;
2) implementation of interpersonal communications within the framework of the promotion complex with the formed target audience of the influencer through the expression of his opinion on the product;
3) formation of a segment based on the target audience of an influencer who carries out interpersonal communication for a new product;

4) the transfer of segment characteristics (mainly psychographic, as the most accurately explaining loyalty to the influencer) to the entire volume of potential consumers and the expansion of the promotion complex to consumers who are not affected, but have similar characteristics with the influencer's target audience.

Thus, the new strategy for segmenting consumers proposes to reverse the segmentation process and not narrow the audience of consumers to segments, as in the classic strategy, but expand the audience based on the segments identified in the course of interaction with selected influencers.

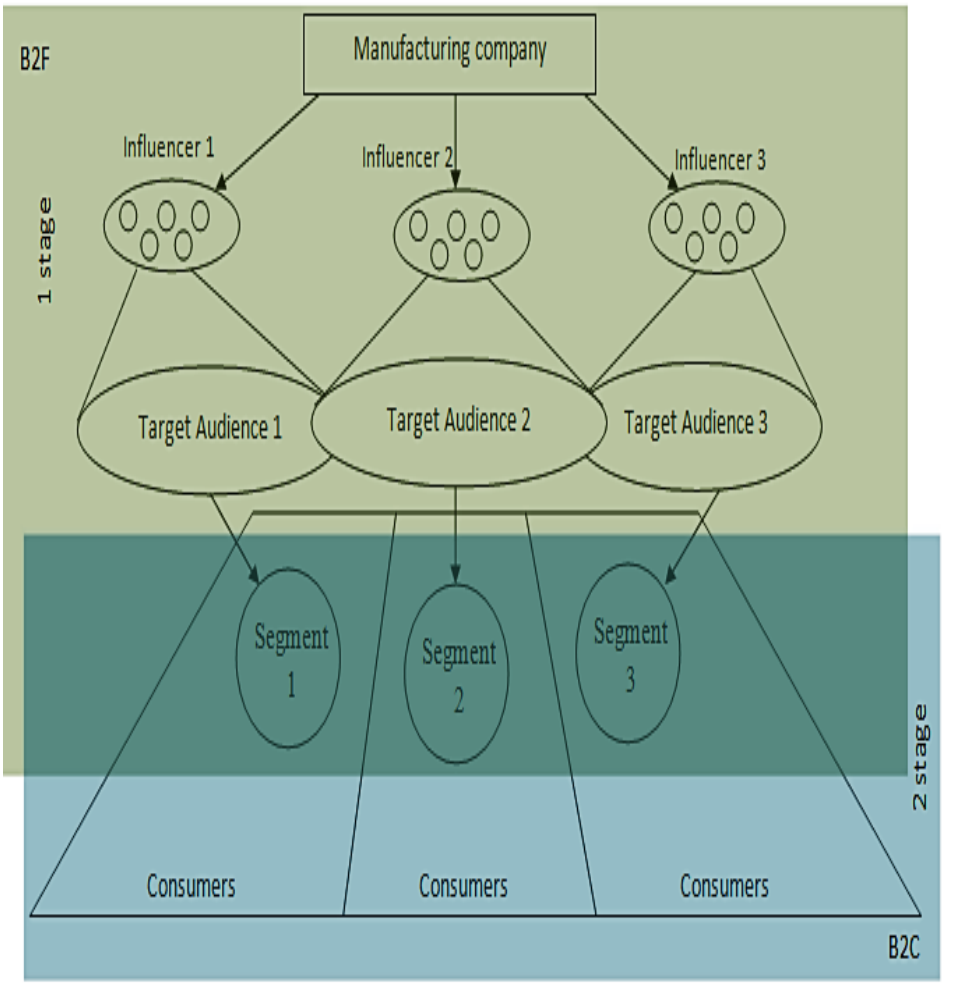

Figure 3. Stages of product promotion within a new promotion complex.

Complex of promotion into two stages, visually separated in Figure 3:

1) promotion through influencer: this stage is characterized by a differentiated marketing strategy, during which the manufacturing company determines the characteristics of the influencer (for example, topic, audience size, reach, activity,

engagement, etc.) and carries out a differentiated interaction with them. Promotion at this stage is carried out through interaction within the previously identified B2F market, which determines the basis for interaction with influencers and their audience.

2) expansion of segments through their characteristics: this stage is characterized by a mass marketing strategy, during which generalized characteristics of the consumer are highlighted on the basis of previously defined segments built from the audience of influencers with whom interaction was carried out within the first stage.
Interaction with consumers similar to consumers included in the segment identified based on the analysis of the audience of influencers, as well as the segment itself, is subsequently carried out within the framework of the classic B2C market.

The formed new segmentation strategy most accurately reflects not only the practice of a modern promotion complex implemented by companies when launching a new product on the market, but also finds confirmation of it in the classical marketing theory, based on the previously proposed models by F. Bass and E. Rogers (Rogers, Singhal and Quinlan, 2019; Bass, 1969).

The modified segmentation strategy proposes to move in the opposite direction and to determine the target audience not by narrowing down consumers, highlighting segments from them, but to target the promotion complex at consumers with similar characteristics as the consumer segments formed on the basis of the analysis of the target audience loyal to the influencer, with which the manufacturing company interacts with in order to carry out the function of interpersonal communication (Konnikov et al., 2018; Konnikova et al., 2019; Ianenko et al., 2019; S. Bozhuk, Maslova et al., 2019).

For the proposed segmentation strategy focused on a new complex of promotion through the B2F market, an algorithm for segmenting consumers was built, the basis of which was the consideration of the first stage of promotion within the framework of the complex proposed by the author.

The algorithm assumes a more thorough work with influencers, interaction with whom takes place in the B2F market defined by the author.

The algorithm proposed by the author is focused on the complex for promoting new products formed in the article at the stage of entering the market. This complex directly affects the interaction of the manufacturer with influencers, who take on the function of interpersonal communication and promotion in the course of their interaction with the manufacturer, described by the author as a B2F market.

Thus, the model proposed by the authors for constructing a system of end-to-end analytics allows the most accurate assessment of the effectiveness of the marketing activities implemented, which was demonstrated by the example of the functioning of the PopUp store. The use of registration technologies using WiFi-modules Mac ID and using systems of personal account/loyalty cards - User ID allows not only to take into account the actions performed by the visitor in online and offline points of sale, but also to establish a sequence of such actions, which allows you to better study the features of consumer behavior and establish patterns of consumer choice.

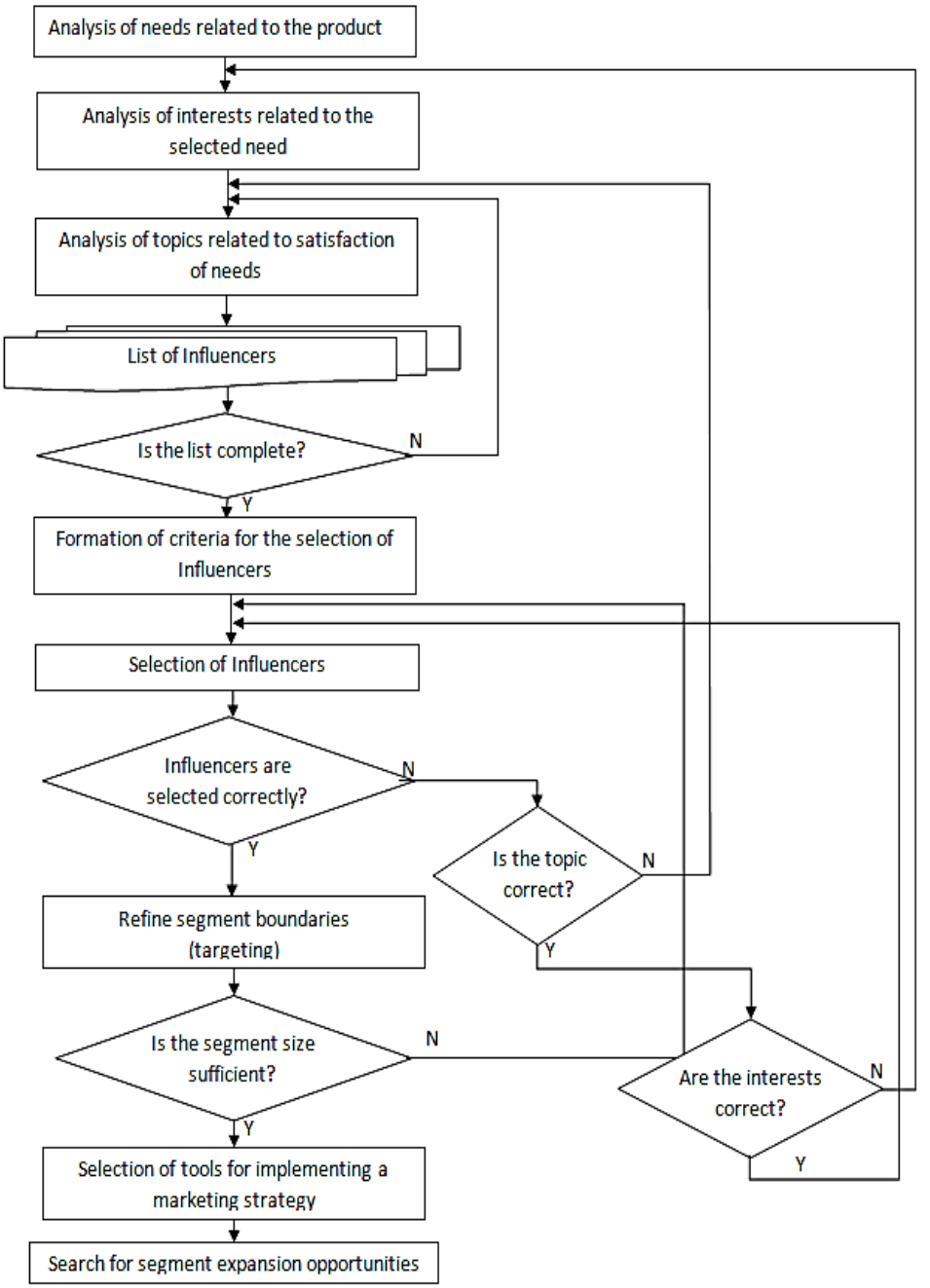

Figure 4. Algorithm for segmenting consumers within a new complex of promoting goods through the B2F market.

4. Discussion

The complex of promotion proposed by the author, despite the projected increase in the efficiency of communications and product promotion, requires the attraction of more resources

than the traditional promotion complex. The attraction of these resources, primarily financial, is often impossible for the majority of small and medium-sized businesses, inappropriate for goods with a low market value, impossible for some groups of goods.

The author notes that for the full functioning of the proposed algorithm, the presence of influencers in the sphere determined by the manufacturer is required.

Conclusion

In this article, the author has analyzed the segmentation process in an offline environment, which occurs by allocating segments by applying various characteristics to consumers as selection criteria. According to the results of the analysis, we can note the transformation of this segmentation process in the digital environment: the formation of a segment occurs through the application of an expansion approach - segmentation is initially aimed at influencers operating in the B2F market and their target audience, and only then the segment expands through the use of characteristics consumers target audience influencers on other consumers as selection criteria (Figure 3). Taking into account the amendments noted, the author proposed an algorithm for segmenting consumers within the framework of a new complex for promoting goods through the B2F market (Figure 4), which is focused on the implementation by influencers of the functions of interpersonal communications that contribute to an increase in sales of a new product on the market.

Acknowledgment

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Chapter 39

Overcoming the Effects of COVID-19, Ensuring Business Continuity and Stimulating Digitalization in Russia

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Abstract

The chapter analyzes the global trends to handling crises, which include fiscal, regulatory, budget and fund levers. Russia has overcome a number of crises in the late 20th and early 21st century and we show that business continuity can be ensured using additional factors of public, regional and corporate governance, which explain the resiliency of the Russian economy. The work considers financial, credit, tax, administrative and rent measures taken at the federal and regional levels to support business during the COVID-19 pandemic. Regional measures are given on the example of the second most important constituent entity of the Russian Federation - city of Saint-Petersburg. The focus is on rent support as for many organizations in the time when their activities are being suspended the issue of rental payments has a critical significance. The pandemic has given a significant impetus to the digitalization of business, which in turn is changing the structure of demand for rental property. We have considered the rules according to which the changed terms of lease contracts have to be accounted by the lessor and lessee according to IFRS 16 "Lease," analyzed in detail how the lessor can apply a practical simplification to document rent concessions due to COVID-19, and its impact on the financial statements.

Keywords: COVID-19, state governance, corporate governance, measures to support business, lease, business' digitalization, rent concessions, IFRS 16

1. Introduction

The cyclic market fluctuations and the negative impact of the pandemic caused by COVID-19 are going to influence the economic situation in all countries, including Russia. A serious and

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long economic crisis is forecasted. State and corporate governance is a factor affecting the success of the operations of enterprises and their business continuity. Competent handling of any crisis depends on the decisions and measures being taken. It is important to make effective management decisions at the state, regional and corporate levels of governance. The impact of the state and region on corporate governance is obvious for large corporations as well as for medium and small business. Every organization is going to face the current crisis, so it is important to keep on working in a way so that the negative events are overcome and the damage is minimized.

Focusing exceptionally on economic characteristics, we are assessing the options of resolving the crisis by Russian enterprises of different forms of ownership. The business continuity of enterprises during and after crises can be considered due to the availability of the historical data of modern Russia, which has successfully handled several crises in the recent history since the late 1990s up to this day. This paper, based on the literature review of modern scientists, practitioners, legislative documents of the Russian Federation, illustrates that the gap of standard macroeconomic tools is overcome by merging with public administration.

2. Materials and Methods

The review of Russian and foreign literature, legislative documents, and global reports define the structure of our paper. For each component of the structure we analyzed:

- the logic of relationships between state, regional and corporate governance,
- the impact on financial statements documented according to the IFRS,
- the summarized results, and
- the prevalent research methods and paradigms in the extant literature.

The city of St. Petersburg was chosen as a region to study. It is the second constituent unit of the RF in terms of significance after Moscow with a population of 5.4 million people. 280,000 enterprises had the annual turnover equal to 13.9 trillion rubles in 2019, while the gross regional product was over 4 trillion rubles (Petrostat, 2020).

Reviewing the relevant literature, global surveys and research studies is an integral part of all academic work as it forms the basis for new knowledge (Webster and Watson 2002). The analysis we conducted helped to synthesize the literature and reveal the ideas accumulated by scientists, economists, lawyers, and managers in this field. Researchers should approach the actual activation of the strategic peak of entrepreneurship (Pettigrew 1992; Massaro, Dumay, and Guthrie 2016; Light and Pillemer 1986), who claim that “the need for a new study is not as great as the need for the assimilation of already existing studies.”

3. Results

The distinctiveness of Russia’s economy gains attention of both Russian and foreign scientists, economists and analysts. The problems of governance in the time when economic conditions are instable were studied in the works by foreign and Russian authors. Among foreign

researchers, these questions were considered by (Imai 1997; Pande, Neuman, and Cavanagh 2007; Goldratt 2009; Deming 2019; Rand and Goldratt 1998; Ohno 1988; Womack and Jones 1996; Goldratt, Cox, and Whitford 2005). Among Russian scientists we should mention the works by (Balashova and Gromova 2016; Glukhov and Balashova 2015; Kharlamov and Kharlamova 2019; Katkalo and Medvedev 2010; Rodionov and Rudskaya 2017; Kudryavtseva, Rodionov, and Skhvediani 2018; Shastitko 2007) et al.

In the 21st century, Russia is experiencing the typical problems of the world: economic crises, unemployment and inflation. The problems of corporate and state governance are widely discussed and constantly updated by economists (Mikhailov, Sokolitsyn, and Ivanov 2018; Nikolova, Rodionov, and Litvinenko 2017; Victorova et al. 2019; Tricker 2005). There is no consistency in describing and explaining the problems of governance and insurance of business continuity for enterprises. The topic is theoretically substantiated and empirically studied in the aspects of law, economics, and management. J. Schumpeter claims that the boundaries of sciences, especially those of economics, are shifting and represent intersecting fields of knowledge (Schumpeter 2006). There is no comprehensive and complete description of stakeholders and their interactions. Different approaches to strategic management are used. In the British and American literature they consider the significance of resources and knowledge (Pagano and Volpin 2005). E. Ostrom (Ostrom 2007; 1990) provides for a host of functional rules.

These are the world economic trends today:

- The world economy is recessing due to the coronavirus (COVID-19) pandemic;
- A lot of companies have suspended their activities;
- The main damage is caused to the service sector, which is recovering more slowly than the production sector;
- There is a dramatic fall in demand;
- The financial markets are characterized by a great strain;
- The G-20 countries suggest fiscal incentives in the amount of $5 trillion or 6% of the world GDP;
- The instability of the banking sector is going to increase the economic slowdown;
- The role *of the state in the activities of organizations is growing.*

For the Russian economy the forecast is as follows:

- A growing deficit of budget;
- An increasing debt strain on business;
- Rising inflation;
- Weakening of the national currency;
- Recession in the sectors focused on external demand (export) - in oil and gas production, as well as in the coke and petroleum products industry.

According to the International Monetary Fund, the fall of the world GDP is expected to be bigger than during the 2008-2009 crisis (International Monetary Fund 2020). In 2020 the growth of the Chinese economy, according to various estimations, will slow down by 1-4%, the US economy will lose around 6% (IMF, Goldman Sachs, Morgan Stanley), the GDP of the

euro-zone will decrease by 7.5%, that of Germany by 6%, France by 8%, and Russia by 5.5% with a recovery by 3.5% in 2021. The Bank of Russia is forecasting inflation of 3.1-3.9% in 2020, 4% in 2021. The price of Urals oil is expected to be 27 USD per barrel in 2020, and 35 USD per barrel in 2021.

This historic challenge calls for decisive responses on the part of economic policy at the state, regional and corporate levels, so the governments of most countries adopt wide-ranging programs to support the economy.

As a rule, the support programs include:

- Fiscal measures (reducing the actual tax burden);
- Support of the financial system to maintain crediting affordable;
- Direct budget payments to companies and population to maintain employment and effective demand.

The crises of the late 20th and early 21st centuries have shown that there are no ideal models or measures to overcome crises. Thus, searching for new, more effective forms of organization of large business is a must. A distinctive feature of Russia comparing to other countries during 2009 crisis was a sharp decrease in effective demand and a considerably bigger fall in industrial production and GDP. The majority of the anti-crisis measures taken by the government were aimed at compensating the losses of large companies in the traditional sectors of the economy (car-making and agricultural machine industry; military-industrial complex; housing construction; and, considering the redistributed resources, oil and gas sector, too). The government did not devote its attention to medium enterprises (Yakovlev, Simachev, and Danilov 2009).

A group of Russian economists and Konstantin Sonin (a professor at the University of Chicago and of the research institute “Higher School of Economics”) (Akindinova et al.) believe that the focus should be on two main areas to support the economy: support of the population, i.e., support of effective demand, and support of small and medium business, including self-employed people and sole proprietors.

The central banks all over the world along with the Bank of Russia have taken decisive actions to liberalize the monetary policy, acquired a whole range of assets and provided the financial system with liquidity, trying to withstand the harsh financial conditions and allow credit flow into the economy (IMF).

Handling the crisis, going back to normal economic life, development of digitalization and triggering the innovative activity will be possible as the pandemic is over and the support to the economy is increased, in particular support to small and medium business and population up to the 4% of GDP (about 4.5 trillion rubles), including both fiscal measures and direct measures of support.

The world experience convincingly proves (Guzikova and Shagun 2019) that the financial market is the driver mobilizing the internal and external resources, stabilizing the economy development of innovation and investment activity, transition to global digital services. The study conducted by the BCG in the USA(Boston Consulting Group 2020) notes that given today’s low valuations, investors expect management to pursue potential acquisitions (64%) and take proactive steps to mitigate activism risk (66%). Now investors put more emphasis on acquisitions (64% vs. 58%) and mitigating activism risk (66% vs. 59%), and can use non-

traditional financial politics and aggressively purchase shares at a lower price. The international stock market recommends that policy-making authorities should maintain the balance in ensuring financial stability and supporting economic activities:

- The bank's buffer reserves of capital and liquidity should be used to absorb losses and pressure on financing;
- Fiscal support should be provided either in a form of direct subsidies and tax incentives, or the provision of loan guarantees to the banks with;
- Sustainability of financial markets should be ensured by meticulously elaborated, clearly defined and properly interpreted measures, such as automatic breakers.

In Russia the Government Decree dated April 3, 2020 No. 434 "On the approval of the list of sectors of the Russian economy affected to the utmost in the time of the aggravating situation resulting from the spread of the new coronavirus infection" established the list of industries mostly affected by the pandemic. 6.4 million people are employed in these industries, with 3.3 million working in small and medium business (SMB).

Federal and regional enterprise support measures can be divided into four categories:

- financial and credit: subsidies, soft loans, credit holidays;
- tax: reduction of insurance premium rates, deferral of tax payments;
- administrative: extending the validity of licenses, a moratorium on inspections, on initiating bankruptcy proceedings at the request of creditors;
- rental - presented in the Table 1.

Table 4. The main rental measures taken by the RF state to support business during the pandemic

Federal level	**Regional level (St. Petersburg)**
Exempting SMB entities of the affected industries from paying the rental under lease contracts on federal property constituting the state treasury of the RF for April-June 2020.	Exempting SMB entities of some affected industries from paying the rental under lease contracts on land plots, non-housing properties, under agreements on deploying non-permanent retail facilities for the second quarter of 2020 in respect of municipal property.
A deferral on paying the rental stipulated in 2020 until October 1, under lease contracts on the real estate property held in public, municipal or private ownership.	A deferral on paying the rental for using municipal property until January 1, 2023 for the part of the first quarter starting from March 13, 2020, for the second and third quarters of 2020 for organizations of the affected industries.
Property tax incentives for private lessees (organizations and physical entities), property land tax incentives for the period of high alert.	

In the time when many organizations have had to suspend their operations because of COVID-19, the issue of rental payment has become critically significant for them. According to the surveys of entrepreneurs in April 2020, 41.5% claim that they are unable to pay the rent; 10% of organizations risk going bankrupt due to rent debts; 55% have used or are going to use the opportunity of reducing the rental for property in the context of state measures of support.

Let us consider the rent measures taken to support business in more detail (see Figure 1).

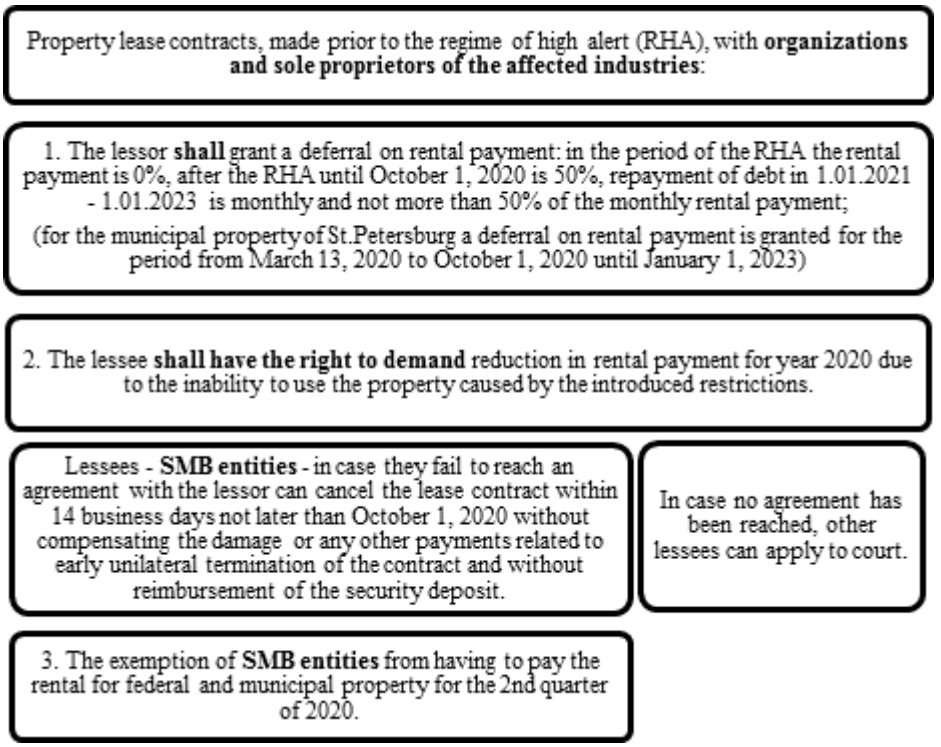

Figure 1. Rent measures taken to support business in St. Petersburg.

In St. Petersburg about 1500 SMB entities operating in the sphere of culture, leisure and entertainment, sports, education, catering, tourism, hospitality, air transportation, airport services, automobile transportation, organization of conferences and exhibitions, consumer services were exempted from having to pay for the municipal property for the amount around 300 million rubles, which accounts for approximately 8% of quarterly rental payments to the budget of the city. These concessions embrace just 2-3% of small business enterprises. A deferral on rental payments was granted for 3500 properties belonging to St. Petersburg.

According to experts, about 85% of all commercial premises in St. Petersburg are rented by SMB entities from private owners, and about 80% of lessees were given discounts from 50% to 80%.

In the time of pandemic many enterprises, in the context of settling the contract relationships, including the lease ones, tried to apply to the circumstances beyond their control (force majeure) to avoid penalties and fines for the delay in fulfilling obligations.

The St. Petersburg Chamber of Commerce received more than 5.5 thousand applications claiming force majeure in March-May 2020, with 60% of them being submitted by lessees. As a result only 2% of applications were satisfied.

Landlords pointed out the threat of default on credit obligations of the commercial property enterprises in the amount of 6 trillion rubles and cause the banking sector to collapse.

The experts of the Center for Strategic Development highlight that abroad (in Germany, Switzerland, France, the USA, Singapore), as a way of providing rent incentives, they usually declare moratorium on terminating lease contracts and a deferral of rental payment is granted

without its essential reduction or cancellation. The owners who have reduced the rental get their taxes and mortgage interest rate zeroed out.

In Russia the declared concessions on lease contracts are mostly provided at the expense of the property owners, rather than thanks to the state or banking support. For this purpose, the legislation regulating lease relationships between organizations has been amended with the balance of interests being shifted in favor of the lessee.

The consequences of the pandemic and restrictive measures have given a significant impetus to the digitalization of business, organization of remote work of employees, internal and external electronic document management, video conferencing, online sales, etc. Digitalization has a long-term impact on the structure of demand for real estate rental. Experts predict a drop-in demand for large office and retail real estate and an increase in demand for warehouse premises, logistics distribution centers, safekeeping warehouses, and coworking spaces, offices for rent. Thus, the development of digital technologies does not require an increase in the number of lease relations, but development of crucially different options for lease objects.

The crisis phenomena in the economy caused by the pandemic once again test the ability of accountancy to form appropriate and reliable information about business activities. It is accountancy that forms the essential core of information support of entrepreneurship and performs two major functions: control-analytical for management and information-communicative for investors and creditors. The IFRS have already been corrected with due regard of the previous financial crisis experience in 2008, for example, in the context of transfer from the model of incurred credit losses to expected credit losses by financial assets. Moreover, since January 1, 2019, the new standard of IFRS 16 “Leases” must be applied, according to which the lessee has to use a principally different way of accounting with recognizing the lease asset and lease (Morales-Díaz and Zamora-Ramírez 2018). Under today’s difficult conditions, experience in applying this standard in practice is being gained.

In case the conditions of economic activities change dramatically as a result of pandemic, lease agreements, as mentioned above, can be cancelled or their terms can be changed (for instance, deferral of rental payments, reduction of their size, transfer from fixed to variable payments, depending on the performance of the lessee or on the use of the asset, reduction in the lease period, etc.).

4. Discussion

An important point of discussion is to consider how the changes to the contracts will affect the financial statements of the lease contract parties.

According to IFRS 16, a decrease in the scope of application of the lease contract (the floor area of the rented premises or the lease period) or rental (discounted value of rental payments) that was not originally foreseen by the lease terms is a modification of the lease contract. The measures of rent support in a form of deferral or reduction of rental payments due to the pandemic were legislatively introduced in the RF after the lease contracts they apply to had been signed. They imply that an additional agreement to the contract should be made, so we assume that these are not the initial lease terms.

IFRS 16 first included detailed guidelines to account modified lease contracts in response to the practical problems of companies which reconsidered contract terms due to the change of circumstances (Table 2).

Table 2. Accounting the modified lease contracts

Changes	**Lessee**	**Lessor**
	Basic order of lease accounting	*Financial lease*
Modifying the lease contract by reducing the scope of the contract (floor area, lease period)	The reduction in the balance values of the right-of-use asset and lease liability is proportional to the reduction in the scope of contract with charging to the profit and loss account; reevaluating the lease liability by discounting the revised rental payments using the revised discounting rate with charging the difference to the right-of-use asset (Clause 45, 46 IFRS 16)	Repetitive classification of lease as of the date of modification: if the lease, taking into account the modification, was operational as of the date when rent relationships started, it is accounted as a new lease contract, and the basic asset is recognized in the amount of net investment in the lease before the modification; otherwise the accounting should be in accordance with IFRS 9 Financial Instruments (Clause 80 IFRS 16): no recognition of the part of net investment in the lease with referring it to the profit and loss account
Modifying the lease contract by reducing the rental payment (decrease in the discounted value of rental payments due to reduced amounts of payment or due to a granted deferral)	Reevaluating the lease liability by discounting the revised rental payments using the revised discounting rate with charging the difference to the right-of-use asset (Clause 45, 46 IFRS 16); A practical simplification can be used (Clause 46A IFRS 16)	
	Short-term lease	*Operational lease*
Modifying the lease contract	New lease contract (Clause 7 IFRS 16)	New lease contract (Clause 87 IFRS 16)

The International Accounting Standards Board (IASB) issued two documents on this problem: materials on applying IFRS 16 to account rent concessions during COVID-19 and an amendment to IFRS 16 (Clause 46A, 46B), which contains a practical simplification for the lessee to account rent concessions.

According to the amendment, the lessee is allowed not to assess whether rent concessions due to COVID-19 are a rent modification and account them in accordance with IFRS 16 as changes that are not a modification.

The lessee has the right to use this simplification only in case all the conditions below are observed:

1. The change in rental payments has led to revising the rent commission, which in its essence is equal or less than the rent commission immediately preceding the change.
2. Any reduction in the amount of rental payments is applicable only to the payments initially due and payable on June 30, 2021 or prior.
3. No essential changes in other lease terms have taken place.

When applying the simplification, the lessee accounts the reduction in rental payments caused by COVID-19 as a permanent rental payment (Clause 38 IFRS 16). The recognition of the part of rent obligation with charging to the profit and loss account is terminated, the discounting rate is not revised, and the right-of-use asset is not corrected.

The impact of the accounting of the changed or terminated lease contracts on the lessee's financial statements is illustrated in Figure 2. A deteriorating operating environment for a lessee as a result of a pandemic is an indicator that its assets may be impaired and it is more likely to recognize an impairment loss on the right-of-use asset. In our opinion, this will reduce the differences in financial results if the practical simplification is applied or not, but the simplification will undoubtedly facilitate the accounting procedure for the lessee.

We believe that the attention of the IFRS Board to the lease problems is evidence of the importance and a wide use of rent support measures during the pandemic around the world, the development of qualitatively new lease relations in the context of digitalization. The authors are confident that the revised IFRS 16 advocates fair measurement of financial performance, which will increase the reliability and transparency of information in financial statements. This is an important strategic aspect for financial reporting, which is part of corporate governance.

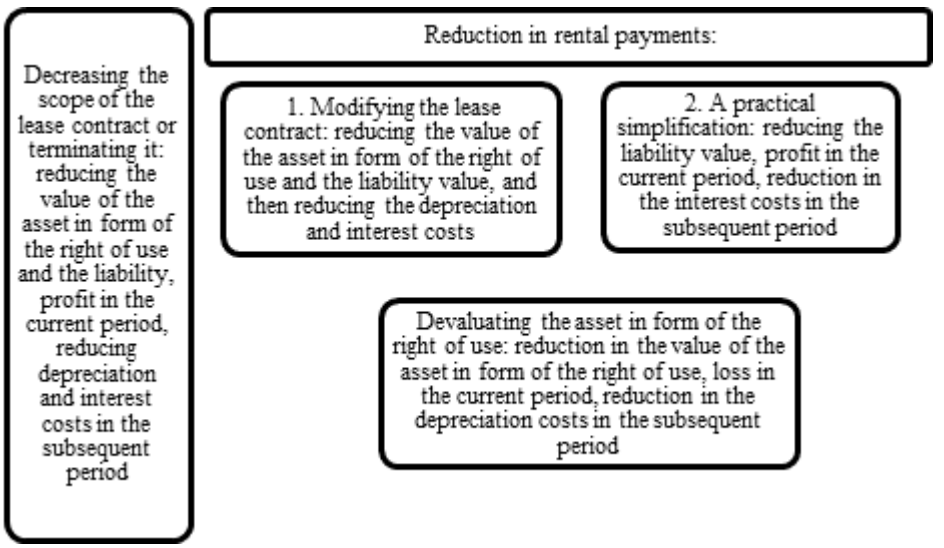

Figure 4. The impact of the change or termination of lease contracts on the lessee's financial statements.

Conclusion

The experience of handling previous crises suggests that business successfulness and continuity depends on, at least, four circumstances: a) state support; b) regional solutions; c) activation (stabilization) of financial markets; d) regulatory measures on the part of the Bank of Russia.

Since the 2020 crisis is distinct in terms of novelty and scale, in the RF they are taking various state measures at different levels to support the liquidity of enterprises when the operations of the latter ones are suspended or reduced. These include direct subsidies, affordable loans, reduction in tax burden, mitigation of administrative demands, support of

lessees renting state property, etc. Corporate governance during crisis is getting more complicated too. Relying on the state measures of business support, enterprise management implements various policies to control costs, attract finances, the development of qualitatively new lease relations, implementation of digital technologies. The IFRS concerning the accounting of rent concessions provided help to the lessees.

Thus, going out of the crisis in the Russian Federation is considered under the effect of large-scale state and regional measures of support, activation of financial markets, effective corporate solutions, including those concerning rent. We are sure that the gained experience will be rethought and modified while the support measures will be properly applied to the Russian reality to ensure business continuity and develop digitalization.

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Chapter 40

Continuing Education for Professionals in Logistics

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Abstract

The article is devoted to analyzing the corporate universities' models in logistics continuing education—the innovative economy development impact on the growth of the logistics. The rapid development of information technologies requires a creative approach in logistics projects. However, now many specialists without professional education work in the logistics field. Some logistics specialists have rich practical experience but do not know modern technologies. The lack of specialists in the logistics area is partially compensated by continuing educational programs. Corporate universities are considered a long-term human capital investment because they create the conditions for personnel continuing education. The study analyzes examples of corporate universities becoming more important in the Russian educational system. Special attention is paid to the interaction of universities, businesses, state, and public organizations within the framework of a corporate university. It is proposed to use the corporate university model for logistics specialists training. This model creates a center of innovation and knowledge management, which implies long-term investments in human capital in the logistics field and increases the sustainability of enterprise development. Creating stable partnerships between universities and enterprises within this model provides the successful professional development of logistics specialists.

Keywords: logistics, professional education, continuing education, corporate universities, corporate training system, information technologies

1. Introduction

Logistics development has particular importance in the modern economy. The spread of the Covid-19 pandemic has accelerated the logistics field. We can assume that logistics services

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will be in demand shortly. Nowadays there is a tendency of the employees' number increasing in logistics. Logistics companies employ specialists from related fields without exceptional experience and skills (Korchagina, Desfonteines, and Strekalova 2020). The university graduates partially compensate for the lack of qualified personnel. However, they usually do not have logistics experience and are not always interested in such employment (Korchagina and Desfonteines 2019). The level of competition and customer requirements will change direction and increase in the future. Enterprises in various fields of activity will have to find new ways to reduce costs (Kapustina et al., 2017). Logical companies can be considered a promising direction for maintaining and increasing the profitability of enterprises. This is indirect proof of the positive prospects for logistics development in Russia. The statistical data presented in table 1 show positive prerequisites for the development of logistics in our country ("Official Website of the Federal State Service," n.d.). One of them is related to the active implementation of information technologies in the logistics process. The digitalization of all types of logical operations has led to the coverage of many clients (Bozhuk et al., 2019). Another prerequisite is the training of logistics specialists by transforming consumer needs and tastes. Digitalization processes have already changed approaches in retail by the customers' interests and sales channels expansion (Strekalova, Korchagina, and Desfonteines 2020; I. Krasyuk, Kirillova, et al., 2019). Technological logistics changes are inevitable, requiring the widespread use of digital technologies and new strategic solutions. Changes occurring in the tourism business will also affect the activities of logistics companies in the direction of increasing their workload and developing new areas of activity (Lukina, Kurochkina, and Karmanova 2020). The spread of the Covid-19 pandemic has accelerated the development of this area worldwide.

Figure 1 shows the growth of transport traffic in Russia from 2014 to 2019 ("Official Website of the Federal State Service," n.d.). The graph corresponds to the data in table 1. The total traffic decreased in 2015. However, it increased again in the period from 2016 to 2019. The most significant increase in the number of shipments was in the automobile transport category, which can be explained by the rise in online purchases and their delivery to all regions of Russia by road. Large cities also require logistics companies to develop new goods delivery methods (Sergey Sergeev, Kirillova, and Krasyuk 2019; I.A. Krasyuk, Kirillova, and Kozlova 2017). The development of the retail food chains covers large territories in all regions of Russia. The retail chains are interested in new technologies for food processing, storing, and maintaining high-quality products during their transportation (Asfondiarova et al., 2019; Demchenko et al., 2020). This interest in the retail food chains encourages the development of innovative technologies in retail (I. Krasyuk, Medvedeva, et al., 2019). Although the increase in freight traffic is not significant, it has been stable and shows growth since 2014. This is a positive factor for the logistics development of Russia.

Table 15. Dynamics of cargo transportation in Russia (2014 – 2019)

Million tons	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Traffic (total)	8 006	7 898	7 954	8 073	8 265	8 421
Railway	1 375	1 329	1 325	1 384	1 411	1 399
Motor vehicles	5 417	5 357	5 397	5 404	5 544	5 735
Pipeline traffic	1 078	1 071	1 088	1 138	1 169	1 159

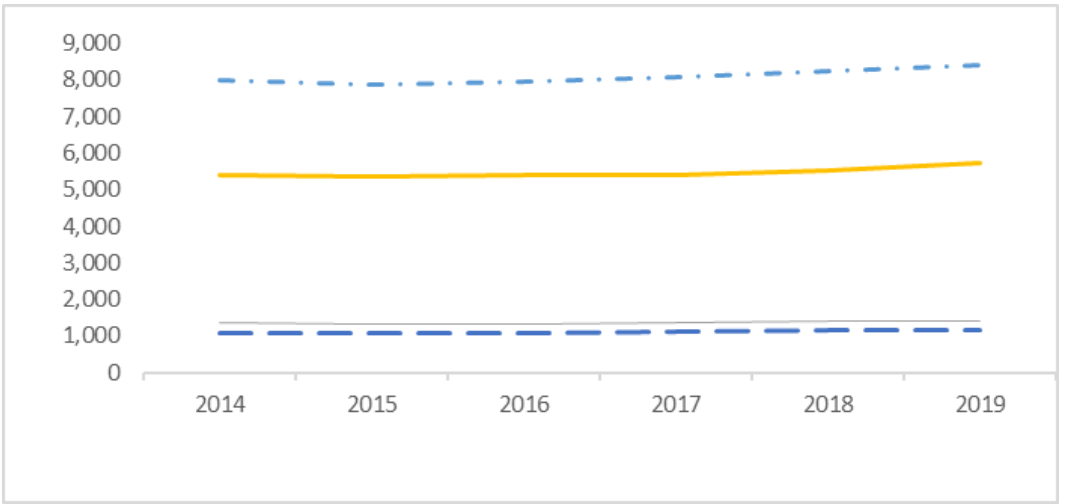

Figure 1. Cargo transportation by type of transport (2014-2019).

The logistics industry has developed rapidly with the use of information technology. However, the logistics companies have to hire specialists with modern technologies skills and practical experience for competitive advantages increasing through innovative projects implementation. In the conditions of rapid customer expectations, logistics companies win by improving their staff skills and mastering new ways of working (Lyamin and Krasyuk 2019). The critical area for the companies' human resources development is the creation of their corporate universities, training centers, and training programs for personnel. The continuing personnel training is considered a long-term investment in the enterprise's human capital that ensures its stable position in the market.

2. Materials and Methods

We have used system methods, statistical, comparative, and graphic analysis. The research information base consists of the Russian Federal State Statistics Service database, the Boston Consulting Group (BCG) analytical reports, and Russian and international corporations reports on human capital development.

3. Results

Corporate universities are one of the most attractive areas for the continuing professional adult education and professional development of working staff. Corporate universities are considered closed training structures aimed at developing human capital within the company, hiding their teaching methods, methodological approaches, and generalization of practical work experience from competitors. The corporate universities are focused on meeting the companies needs in qualified personnel using its potential exclusively within the company that invests in staff training and corporate culture creating (Desfonteines et al., 2019). The trends in the development of the continuing education system are associated with the integration of the

Russian continuing education system into the international scientific and educational space. This integration requires the cooperation of traditional academic and corporate training systems: for example, the creation of joint network programs and various forms of interaction between the real economy and education. Data from the Boston Consulting Group shows that companies in developed countries have invested almost $ 400 billion in improving the skills of their employees. Markets are responding positively to these investments. The results of a global survey of 4,300 top managers in the field of personnel management from more than 100 countries conducted by BCG in 2012 showed that over the past ten years, companies that were focused on human development have provided higher shareholder profit and exceeded the industry average indicators by eight times. Investments in professional development also contribute to revenue growth. The companies with higher qualifications ineffective leadership training, employees' potential, and performance management have demonstrated3.5 times revenue and 2.1 times profitability growth compared with the average indicators (I. Krasyuk, Yanenko, and Nazarova 2020).

In the United States, corporate universities doubled between 1997 and 2007. More than 4,000 companies worldwide have established official corporate universities (I. Krasyuk, Yanenko, and Nazarova 2020).Corporate universities can be divided according to the following criteria:

- by industry;
- by mission and target audience;
- on the management structure;
- on the content of educational programs;
- according to the forms of the educational process;
- in terms of participants or types of partner organizations.

The most popular functions of corporate universities are training, staff assessment, and knowledge management. Suppose a corporate university provides quality improvement services for permanent employees and managers of the company. In that case, the main goal is to achieve high operating standards and coordinate the main business processes and standards. Suppose a corporate university operates as a center for leadership development. In that case, its target audience is mid-level managers and top managers, and the goal is to introduce a corporate leadership culture throughout the company. By bringing together different groups of company managers, these programs help form contacts between participants, which remain even after completing formal training. Strategic planning programs have been developed for senior management and top managers. Their goal is to combine the professional development of each manager with the company's goals and integrate the learning process into the development of the strategy.

The work of the corporate universities as an educational network involves creating opportunities for continuing training outside the university itself for a wide range of managers and specialists to strengthen their professional skills. There are three current trends in improving the quality and adaptation of educational programs of corporate universities:

- innovative program content,
- use of information technologies (Learning Management System, LMS),

- development of cooperation programs and strategic partnerships.

The largest oil and gas companies in personnel training have moved from local to global solutions. In the United States, the Exxon Mobil Training and Research Center was established in the upstream sector, built in 2004. The center has 700 employees and is located in 66,000 square meters. Its internal training is characterized by:

- 7,000 students are trained per year, 65% of students are trained in Houston,
- 375 educational programs,
- 550 550 teachers, 85% of them are its employees.

The Corporate University of the Brazilian State Oil Company "Petrobras"-Petrobras University in Rio de Janeiro is characterized by:

- 52,000 square meters' area,
- 500 employees,
- 62,000 students are trained per year.

The Petrobras University operates according to international standards, and its competency model has been developed to implement educational programs. Training methods used:

- problem-based learning,
- distance learning.

The training center of the Anglo-Dutch Company Royal Dutch Shell meets the international standards ISO 9001:2008. The training process is based on a system of professional competencies. Any training or development plan for an employee is directly related to their work and is based on the requirements for a particular position. Shell has developed "learning ladders," in which each career stage corresponds to the necessary or recommended training. The company uses new technologies in training, including online learning. The other training method is "on-the-job training," based on practical experience. A new employee can attend the "Shell Life" program. It includes five days of intensive training during which employees receive information about the global activities of the Royal Dutch shell company.

Oil companies 'universities in Stavanger, Bergen, and Trondheim in Norway offer free learning and combine several large corporations. The StatoilHydro, Rogaland, Petrolink, Nortrain, PNI, NOSEFO, Falck Nutec training centers represent an alliance of large businesses and small companies. The Dubai Knowledge Village in the UAE is the world's largest "knowledge Park," which includes more than 300 training and innovative companies. The corporate universities of the world's oil companies expand their employees' competence, helping them master similar areas of activity. The corporate universities give their students deep competencies with broad scope of application, both in the oil companies' activities and in logistics, marketing, trade, and other areas (Irina A. Krasyuk and Medvedeva 2019; Barbaruk, Krasyuk, and Medvedeva 2019).

4. Discussion

The analysis of corporate universities of the world's largest oil companies allows us to use their personnel training models in the Russian logistics industry. The comparative analysis of the international companies' corporate universities will enable us to identify the following models of human capital development:

- center for developing employee competencies and corporate culture,
- strategic development support center,
- center for innovation and knowledge management.

In the last model, integrating enterprises and academic institutions with scientific projects becomes very important. It should include stable long-term partnerships since companies' scientific development contributes a lot to achieving competitive advantages in the global market. (S. Sergeev and Kirillova 2019). The use of the presented models of the corporate universities in the specialists training in the field of logistics will allow logistics companies to achieve their strategic advantages (Barykin, Bochkarev, Dobronravin, et al., 2021; Barykin, Kalinina, Kapustina, Dubolazov, et al., 2021; Barykin, Smirnova, Sharapaev, and Mottaeva 2021; Barykin, Bochkarev, Sergeev, et al., 2021). Moreover, the development of the continuing education system will allow logistics companies to achieve sustainable development and growth of intellectual capital.

Conclusion

Comparative analysis of corporate universities of the largest oil companies in developed countries allows us to apply the successful experience of human capital investing in logistics as the rapidly developing sector of the Russian economy. Creating an environment for continuing education of specialists and managers for logistics enterprises is important in modern Russia. Suppose a system for developing and enriching human capital in Russian logistics is not created. In that case, the pace of this industry development will stop, which may negatively affect the related industries. The logistics specialists' recruitment is also affected by demographic changes in the Russian labor market. The predominance of the female labor force in the Russian labor market will lead to the mastering of traditional male activities by women in the nearest future (Korchagina and Shvetsova 2019; Desfonteines and Korchagina 2019). These changes will inevitably affect the Russian logistics companies. Thus, the percentage of female specialists in the logistics sector may increase soon. The female specialists will need training for professional skills and special knowledge to improve the efficiency of their activities. To solve the problem of lack of qualified personnel in the logistics sector, which hinders the development of this industry, we can recommend the following:

- implementation of the global companies' experience in the personnel development;
- investment in the human capital as a long-term and effective accumulation of strategic advantages;
- use of the corporate universities for creating the organizational culture of enterprises;

- training, retraining, and continuing training for the managers and specialists with full or partial reimbursement of costs at the expense of logistics enterprises;
- exchange of personnel between the academic institutions and logistics companies for mutual enrichment of knowledge and experience;
- development of the corporate universities educational directions taking into account in the labor market gender changes;
- training of experienced professionals in the logistics field with modern digital technologies.

Integration of the logistics companies with education and science creation of the stable long-term partnerships between the enterprises, academic and scientific institutions will ensure the corporate universities development as a favorable environment for innovative entrepreneurship based on continuing professional development in corporate training.

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Chapter 41

Adaptation of Traditional and Digital Economy Institutions as a Factor of Socio-Economic Development of Trade Industry Economic Agents

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Abstract

The article discusses the theoretical foundations of the study of the adaptation of institutions of the traditional and digital economy of the trade industry in the context of digital transformation associated with the reform of existing relations and norms of interaction and development of trade organizations in the external and internal institutional environment. The purpose of the article is to form the theoretical prerequisites for the institutional regulation of the trade sector, largely determined by the emergence and development of qualitatively new institutions in connection with the accelerated development of information and communication technologies in various sectors of the national economic complex. Achievement of this goal led to the formulation and solution of the following tasks of scientific research: to show the variety of approaches to the study of various aspects of the institutional regulation of the socio-economic development of business entities; identify the mechanism and the main features of the institutional adaptation of economic agents in the trading industry; identify the features of the institutions used by trade organizations in the context of the development of the digital economy. In the course of the study, the basic principles of the study of institutional adaptation of trade organizations, such as consistency and evolution, were identified and disclosed. From our point of view, these principles provide for the need to consider the institutions of the traditional and digital economy of trade organizations as interrelated elements that are in constant development. The results obtained make it possible to determine the importance of institutional adaptation of business entities in the trade sector as a key tool for their socio-economic development.

Keywords: adaptation of institutions, institutional regulation, institutions of trade organizations, digitalization of trade

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1. Introduction

The study of the institutional adaptation of trade organizations is relevant due to the fact that ensuring the accelerated introduction of digital technologies in the economy and social sphere of Russia is one of the most important national development goals, while the process of technological and industrial transformation is accompanied by the transformation of socio-economic systems.

The accelerated development of the digital economy, as an economic production that uses digital technologies and the rapid obtaining of relevant results, is largely constrained by the insufficient development of issues of institutional support for the socio-economic development of the modern economy, as well as the lack of a unified interpretation of the relevant definitions and research tools for these processes.

A significant role in the system of institutional regulation instruments is played by the development of mechanisms for the institutional adaptation of trade enterprises, which makes it possible to ensure the use of a wide range of institutions of the traditional and digital economy, which determine the key directions for the development of economic entities in the trade industry.

The object of our research is the institutions of economic agents of the trading industry, which determine its uninterrupted development in all segments of reproduction - production, distribution, exchange and consumption of material goods. At the same time, the structure of institutions is not homogeneous (Kumar and Borbora 2019), it is represented by institutions of the external and internal environment, which are directly affected by digitalization processes. The purpose of the article is to form the theoretical prerequisites for the institutional regulation of the trade sector, largely determined by the emergence and development of qualitatively new institutions in connection with the accelerated development of information and communication technologies in various sectors of the national economic complex. Achievement of this goal led to the formulation and solution of the following tasks of scientific research: to show the variety of approaches to the study of various aspects of the institutional regulation of the socio-economic development of business entities.

2. Method

2.1. Theory and Research Methodology

The increased interest of researchers to the issues of institutional regulation of socio-economic development of society is largely associated with the variety of approaches to the study of institutions.

At the same time, it should be noted that researchers leave the main role in this set to the institutions of centralized management, as the most effective in the mechanisms of managing the socio-economic development of society (Donina, Meoli, and Paleari 2015; Solodilova, Malikov, and Grishin 2016; Volchik 2018), including when considering the effectiveness of institutional mechanisms from the standpoint of theory institutional matrices (Hayden 2017), and one of the most important areas for managing changes in the external and internal

environment is considered institutional regulation (Frolov and Lavrentyeva 2019), which is the area of the research of strategic management (Du 2018).

This article summarizes the existing research in order to identify important mechanisms underlying the institutional reform of the trade sector.

Touching upon institutional monitoring as one of the tools of the institutional adaptation mechanism, attention is drawn to the need to form the institutional attractiveness of trade organizations, which as an institutional factor affects the economic security of the region, and the importance of economic security for overcoming management shortcomings is noted (Kayukov and Shikhverdiev 2018).

Some authors draw attention to decentralization as an important factor in the development of firms and regions, noting the dependence of the level of corruption in the region and the likelihood of a firm choosing a management model in which decisions are made centrally (Levina 2017). Other researchers identify factors and obstacles for the development of small and medium-sized businesses in Russia in the form of the shadow economy and corruption (Gamidullaeva, Vasin, and Wise 2020), name the distinctive features of the institutional environment in the corporate sector - the weakness of the institutional structure of the corporate sector, the presence of significant administrative barriers, uncertainty of state policy, uncertainty and imperfection of the regulatory framework governing the organization of legal entities: legal regulation is superficial and fragmented (Lapinskas 2018).

Some studies are directly aimed at increasing the efficiency of institutional support for the development of entrepreneurship (Eniola 2020), noting the presence of a correlation between state ownership and the profitability of firms, as well as the influence of the institutional environment on these relations (Ha et al. 2019), changes in institutional conditions in Russian regions (Bogatyreva and Shirokova 2017; Amiri and Beiranvand 2020; Shastitko and Pavlova 2016; Bedoya Villa, Toro Jaramillo, and Arango Alzate 2017)in view of the significant level of uncertainty in the institutional environment with serious differentiation across regions (Solodilova, Malikov, and Grishin 2014).

In addition, at the regional level, the mechanism for assessing the institutional support of social innovation in a big city (Popov, Veretennikova, and Safronova 2019) is studied, the need to create institutions of social entrepreneurship of direct action is emphasized, which will support and ensure the development of socially oriented business (Popov, Veretennikova, and Kozinskaya 2018), it is noted that political measures to optimize the business environment have efficiency, time lag and accumulation effect, forming the basis for the stable development of the urban business environment (Sambharya and Musteen 2014).

The heterogeneity of the institutional environment of the regions of Russia is emphasized, which prevents the implementation of the import substitution scenario, which provides a maximum of multiplier effects in the current conditions of the “new normalcy” (Gurkov 2019).

Some publications note the constraining role of the internal institutional environment to ensure innovative development (Donbesuur et al. 2020; Volchek, Jantunen, and Saarenketo 2013), determine the factors affecting the ability of firms to develop and implement innovations (Tian et al. 2020), in particular, highlight the firm level factors and regional factors such as the institutional environment, government support and human capital (Davidson, Mariev, and Pushkarev 2018). In our opinion, the internal institutional environment can have a significant impact on the effectiveness of the development of economic entities as a tool that allows timely adjustments to the current framework of norms and rules that mediate the activities of economic entities in terms of accounting policy, financial planning, indicative planning, etc.

Some authors call these factors institutional factors in the entrepreneur's assessment of the investment climate of research objects, for example, a municipality (Kokovikhin et al. 2017).

Other authors use the analysis of institutional transformations when diagnosing the expectations of economic agents as a tool for modeling economic cycles (Safiullin, Elshin, and Prygunova 2017).

Of great importance for the implementation of institutional monitoring of economic agents in the trade industry is the assessment of the economic efficiency of institutional changes, including in relation to sectoral markets, which is considered by the authors as a way of dynamic analysis of the institutional environment and is associated with the definition of the sectoral market boundaries, the selection of economic entities and description of their institutional environment (Chung, Kang, and Ryu 2018), the institutional features of the sales mechanism are analyzed - through formal or informal marketing channels (Haddad et al. 2017).

Some sources consider the influence of the institutional environment on public-private partnership with the differentiation of the environment on the political environment, business environment and organizational potential (Opara et al. 2017).

It can be noted that at the national economic level, the solution to the issue of institutional efficiency is associated with the construction of the criterion of institutional efficiency, for which production-institutional functions are introduced using indicators of net profit, labor, capital and institutions (Balatsky and Ekimova 2016).

Considering the multifactorial impact of institutions on the socio-economic development of society, some researchers emphasize the importance of identifying institutional sources of global financial instability to minimize the likelihood of systemic risks and reform mistakes (Arkhipova 2016); some authors identify the relationship between political constraints and fluctuations in international growth rates (Forcadell et al. 2020), others emphasize the influence of the institutional environment on the performance of Business Groups and note that this effect is mitigated by political ties (Xavier, Bandeira-de-Mello, and Marcon 2014).

At the same time, a number of authors propose to consider the issues of institutional change in perspective using concepts such as institutional design - a definition used mostly in political science research, and not in the economic sphere (Volynskii 2018); institutional planning theory with the justification of its interpretation as a general planning theory (Tambovtsev and Rozhdestvenskaya 2018), institutional configuration for the future, as a factor in the development of social entrepreneurship (Urban and Kujinga 2017). In our opinion, in relation to this segment, it is more accurate to speak about the institutional design of the given parameters when using the optimal values as standards.

The considered approaches to the implementation of the institutional reform of the socio-economic development of society affect various levels of research - enterprises, industries, regions and the national economy, and various aspects, which indicates the importance of the scientific problem.

2.2. Theoretical Basis

Institutional theory uses a variety of definitions of the institution. In our opinion, North gives the most accurate and comprehensive interpretation of this definition, defining an institution as rules, mechanisms ensuring their implementation, and norms of behavior that structure repeated interactions between people (North 1989), as well as human-created restrictions that structure

political, economic, social interactions (Lott and North 1992), highlighting formal rules and informal restrictions and ways to ensure their effectiveness.

The starting point of our research is the consideration of institutions, as well as the emergence and development of qualitatively new institutions in connection with the accelerated development of digitalization in various sectors of the national economic complex.

The set of institutions that determine the activities of business entities leads to the definition of the institutional environment, which O. Williamson proposes to qualify as a set of basic political, social and legal norms that form the basis of production, exchange and distribution (Williamson 1972).

One of the main elements of trading systems is the development goals of trade organizations, which in the institutional aspect can be considered as a guideline for management and regulation. Strategic-level objectives are complemented by operational and tactical objectives. Moreover, the more fractional the goals are, the more accurately the technologies for their achievement can be determined, including in terms of economic, legal and sociological norms. In addition, speaking about the ratio of goals and instruments, one can rely on Jan Tinbergen's inequality, according to which the number of instruments should exceed the number of goals in terms of the practical implementation of these processes, which ensures the optimal functioning of the system (Guitton, Tinbergen, and Bos 1963).

So, for example, the target of the organization of the trade industry to optimize taxation does not exclude the use of a set of appropriate tools for these purposes - monitoring existing tax liabilities, assessing the effectiveness of the implementation of the tax burden by business entities, identifying opportunities to reduce the tax burden by using other taxation regimes.

2.3. Research Methodology

In our opinion, a significant role in the system of institutional regulation instruments is played by the development of mechanisms for the institutional adaptation of trade enterprises, which are based on such basic research principles as the evolutionary and systematic development of institutions in the trade industry.

As for the evolutionary transformations of trade business institutions, they affect gradual changes in the legal framework for the development of trade organizations, as well as current changes in the procedure for the formation of corporate trade policy and norms for organizing business processes of trade organizations. This includes the design of institutions; this group can also include the institutional design of institutions-indicators of economic activity of economic agents in the trade industry in the event that the planned indicators are modeled on the principle of "from the achieved level." The implementation of this principle largely reflects the differentiation of adaptation into passive and active institutional adaptation and corresponds to its passive part.

At the same time, consideration of active institutional adaptation is associated with radical transformations of business institutions in various areas, affecting, first of all, various areas of the corporate economy - marketing, finance, accounting policy, tax policy, and forming a multi-faceted network of corporate business institutions.

The emergence and development of institutions of the digital economy in the trade industry (for example, the chain of value creation institutions) is largely accompanied by qualitative business transformations in accordance with revolutionary scenarios of the adaptation

mechanism. This set of institutions - transformers can include both the institutions of the "purely digital economy" and the institutions that emerged in the conditions of "convergence with the institutions of the traditional economy" (Kapustina et al. 2019).

Another principle of the formation of an adaptation mechanism of institutional development is consistency, which, in turn, provides for the need to identify all institutions of the traditional and digital economy of economic agents in the trade industry and consider them as interconnected elements that are in constant development (for example, omnichannel trade institutions, artificial intelligence institutions, product delivery institutes, online and offline trade institutes). In this case, we are talking about the various types of connections between trading systems, the consideration of which is possible from different points of view, depending on the objectives of the study.

As for the set of goals, their determination is of practical importance. Consideration of specific tools that influence the corresponding goals allows you to increase the efficiency of the trading business, to help increase the validity of management decisions on the development of the trading business in connection with the interrelationships of the designated goals and tools. In the procedures for making management decisions, it is important to keep in mind the lagged lag between the formulation of the goal, the selection of tools, the implementation of the tool's impact and some expectation of the result from the corresponding impact.

Institutional instruments differ in the speed of impact, the level of effectiveness of the impact, especially since the analyzed system includes various participants - manufacturers, trade organizations, consumers, that is, all links of commodity circulation are involved. In this sense, we can say that their successful adaptation is accompanied by a trail of specific institutional changes for each of the participants, and the successful adaptation of trade industry organizations affects the improvement of the quality of life of the population through updating online and offline stores and applications, subject to integration with systems loyalty. Moreover, there are still differences in the functioning of loyalty systems among the same business entities in the trade industry in online and offline stores, which suggests further adjustments.

Consideration of the systematic development of the institutions of the trade industry means the presentation of the institutional environment as a system consisting of external and internal institutional environment. This kind of division is of significant practical importance for organizations in the trade industry as long as it allows business entities to represent the entire set of institutions they use and identify institutions that can be reformed in the first place, such as accounting policy institutions, pricing institutions, corporate finance institutions, taxation institutions, forming the internal institutional environment.

At the same time, the development of the concept of open innovation enhances the adaptive value of the external institutional environment in terms of the emergence of an additional imperative of creativity using not only internal, but also external R&D. Thus, the center of gravity of corporate R&D is shifting towards promising technologies from external developers, which, in turn, means the emergence and development of new types of interactions and institutional consequences for participants in institutional relations.

The differentiation of institutional adaptation instruments into formal and informal is of great importance for the systemic representation of the institutions of the trade industry and the intensification of the processes of institutional adaptation. Instruments of formal institutional adaptation are represented, first of all, by instruments of state regulation, sectoral regulation, regional regulation, regulation of small business and find their concrete expression in

institutional agreements (contracts), regulatory sectoral acts, federal and regional laws, presidential decrees, government decrees, bylaws acts.

At the same time, instruments of informal institutional adaptation are represented by instruments of state regulation, sectoral regulation, regional regulation, regulation of small business, instruments of the "shadow economy" and find their concrete expression in customs, habits, traditions, social norms, and "shadow" norms.

The set of institutional adaptation tools is quite extensive and reflects various types of interaction of trade organizations with suppliers, tax authorities, customs services, certification and licensing bodies, etc.

In this set, formal institutions play a decisive role as an institutional basis for the development of all stages of commodity circulation. At the same time, informal institutions, complementing formal institutions, affect segments not covered by formal institutions and allow expanding the institutional field necessary for the effective development of trade business.

The system of institutional adaptation is very flexible and largely reflects the prevailing technological realities. The emerging innovations in the development of trade organizations also led to the formation of new institutions and norms that accompany them, affecting the rules for the functioning of economic entities and consumers. This is, first of all, about such innovations as multichannel trade; stores without cash registers, despite the very significant investment (according to Morgan Stanley, opening one Amazon Go store costs $1 million excluding the cost of maintaining the store); Scan & Go technology through scanning and paying for goods using the buyer's smartphone; stores without sellers, which is associated with the desire of management to reduce the number of personnel and redistribute its functions, which is accompanied by the introduction of electronic price tags, self-service systems, information kiosks, systems for optimizing work schedules, etc.; the introduction of video analytics in stores, in particular in the processes of automating the control of warehouse operations and displaying goods on shelves; technologies for increasing the average check, in particular, using tablet computers (for non-food stores such an opportunity is provided by the introduction of mobile solutions for consultants, according to the Zebra Technologies survey, 66% of surveyed sales consultants believe that the availability of tablet computers improves the quality of service customers and increases the store's revenue); artificial intelligence by predicting the assortment depending on external factors, opening new stores from geo-forecasting, personalizing purchases; creation of logistics hubs as logistics centers of a significant scale (Kapustina, Bakharev, et al. 2020), etc.

In this regard, the task of increasing the efficiency of institutional adaptation of business agents is inseparable from the construction of an institutional adaptation mechanism, which includes a number of stages:

- clarification of the goals of institutional adaptation and tools for their implementation on the basis of the principles of consistency and evolution, and this study includes all participants in the movement of goods - producers, trade organizations and consumers, and each of the above groups has its own specific institutions and tools in use. As for the ultimate goal of institutional adaptation in the person of the consumer, here it is necessary to bear in mind such a property of this segment as heterogeneity. Due to the rapid development of the digital economy - the number of digital shoppers increased from 1.32 billion in 2014 to 2.05 billion in 2020, many organizations in the retail

industry are trying to introduce innovations in one form or another, at the same time, new formats demanded mostly by middle-aged consumers or young people - consumers aged 35-44 are more active than the youngest group of buyers (18-24 years), at the same time, the age contingent prefers to use traditional institutions and tools [45];

- identification of the institutions of the traditional and digital economy of economic entities in the trade industry and determination of their dynamics (the penetration of offline trade into online and vice versa - classic trade networks continue to create online stores, launch mobile applications, at the same time, online stores open points of delivery of goods, showrooms and retail outlets; search for new formats, in particular, the sale of goods under their own brands, the takeover of stores by state banks, the withdrawal of some Western retailers from the market);
- identification of new modifications of institutions used by consumers and their changes (growth of non-cash payments, growth of payments for Google Pay and Apple Pay; increase in home delivery; decrease in counterfeit goods; increase in promotions; growth in sales of goods of emotional demand (clothes, accessories, jewelry) via social networks);
- determination of the need for a business organization to change the institutional field in the context of the institutional trading environment (Kapustina, Pereverzeva, et al. 2020), which, first of all, concerns the internal institutional environment, which is directly dependent on the management decisions of business entities of the industry in terms of such business processes as the accounting policy of the organization, planning, financing, taxation, pricing, etc., in fact, we are talking about the institutional reengineering of business processes of the internal institutional environment in the context of the contours used, counting on a more efficient procedure for the implementation of trade business;
- grouping of institutions by types of adaptation - passive or active, consideration of institutions of active adaptation as preferential drivers of socio-economic development of economic agents, including the implementation of revolutionary scenarios for restructuring individual business processes in the trade industry;
- identification of the institutional potential for the development of individual institutions, bearing in mind that each of the institutions has its own life cycle, mediated by the need for an economic entity in the trade industry to apply them and determine the main factors that determine them, a factor such as the “network effect” deserves special attention, manifested in the creation of a point of intersection of the expectations of buyers and sellers with a projection for use by various contingents of the population, which means the formation of an effective innovative business model (Capello 2000; Krasyuk, Kirillova, and Kozlova 2017; Barykin et al. 2020) and is confirmed by the development experience of leading leaders of the digital economy, such as Google, Amazon, Facebook Apple, which illustrate business success in the digital economy (Galloway S. 2017);
- selection of the most significant institutions for industry organizations, taking into account their specifics of development - the size of enterprises, profile, types of activities, etc. in order to increase the financial results of organizations and ensure the sustainability of reproduction processes occurring in the market. So, enterprises of

different formats may have different institutional adaptation capabilities and mechanisms, due, first of all, to the nature of the resource potential of organizations - small businesses, with limited resources of all types, implement a simplified adaptation mechanism, for example, in terms of the taxation procedure for large business, a general a regime with corresponding tax liabilities and special regimes for small businesses, which illustrate the very different business processes to which enterprises have to adapt;

- formation of support blocks for selected institutions (institutional planning; institutional optimization; identification of institutional risks; determination of institutional security). Characterizing the institutional security of an organization, we can say that it reflects the socio-economic state of the organization with the maximum possible minimization of risks associated with the economic activity of an economic agent and an acceptable level of his "law - abiding";
- assessment of the institutional attractiveness of economic entities in the trade industry and identification of directions for its strengthening, consideration of institutional attractiveness as the most important factor in increasing the efficiency of the functioning of economic entities, the assessment of which, oriented towards the end user, can provide the basis for sustainable development of economic agents in the trade industry in the long term (Malenkov et al. 2019).

As for the indirect assessment of the degree of institutional adaptation of business entities in the trade industry, for these purposes, a model of the institution - an indicator of the implementation of a rational choice - a model of financial strength, which makes it possible to identify the expected high or low utility of economic activity, can be used. Moreover, the higher the financial strength, the higher the risk of choosing an alternative adaptation option.

Financial strength can be mathematically represented as follows (1):

$$Fs = 100 - (Cf/ Lmi)/T, \quad (1)$$

where *Fs* is the expected utility, determined by the indicator of the financial strength of an economic entity; *Cf* is the fixed costs; *Lmi* is the level of marginal income; *T* is the volume of turnover.

As can be observed, expected utility, as measured by the financial strength indicator, is directly related to the break-even point (2):

$$Pb = Cf/Lmi, \quad (2)$$

where *Pb* is the break-even point.

In expanded form, the institution - the indicator of the break-even point can be presented in the following form (3):

$$Pb = Cf/Lmi = Cf/T \times T/Cv \times Cv/Ct \times Ct/Lmi, \quad (3)$$

where *Cv* is the variable costs; *Ct* is the transaction costs; *Cf/T* is the cost intensity of fixed costs for goods turnover; *T/Cv* is the cost-return of variable costs for goods turnover; *Cv/Ct* is

the cost return of transaction costs at variable costs; Ct/Lmi is the cost intensity of transaction costs per unit of marginal income.

Using the method of chain substitutions, it is possible to calculate the influence of the factors included in the model and assess the rationality of the choice of the adaptation contour.

3. Results

Institutional adaptation of retail organizations is undergoing significant changes due to digital transformation.

Modern retail trade is a product of the convergence of the institutions of the traditional economy and the institutions that determine the digital economy, which predetermines the need to take into account the phenomenon of their convergence in the adaptation mechanism.

The use by trade organizations of the mechanism of institutional adaptation of the traditional and digital economy of the trade industry in the context of the indicated stages with the determination of adaptation goals based on the principles of consistency and evolution, determination of the used institutions of the external and internal institutional environment, assessment of the institutional state of organizations, designation of possible options for the transformation of institutions allows to increase the efficiency of trade business.

The main importance of institutional adaptation is that it allows you to establish the degree of implementation by organizations of the basic rules and norms in various areas of economic life and to bring organizations closer to their implementation in case of non-compliance.

In addition, institutional adaptation in terms of active adaptation involves the implementation of revolutionary scenarios and provides for the design of institutions - indicators at specified levels in accordance with the institutional trade policy of the organization, which may affect the efficiency of the use of material, labor and financial resources.

Institutional adaptation aimed at increasing the efficiency of trade business can include institutional reengineering of business processes of the internal institutional environment in the context of the contours used - planning, financing, taxation, etc.

The implementation of the institutional adaptation mechanism by the organizations of the trade industry, including the grouping of institutions by type of adaptation, the selection of the most significant institutions of the external and internal environment and the directions of their transformation, determination of institutional risks and institutional security, constitutes the prerequisites for the formation of the institutional trade policy of organizations in the trade industry.

4. Discussion

The theoretical prerequisites for the study of institutional regulation of the socio-economic development of society were formed in the second half of the twentieth century (Chung, Kang, and Ryu 2018; Haddad et al. 2017; Opara et al. 2017). In the future, the formation of a system of evolutionary - adaptive institutional regulation of trade development was developed in terms of creating a system of formal and informal instruments for institutional regulation of trade and

optimizing the relationship between them, as well as in terms of institutional design as a way of adapting trade organizations.

The peculiarity of the current stage of institutional adaptation of trade organizations was noted, consisting, first of all, in the convergence of the institutions of the digital and traditional economies.

The article considers institutional adaptation not only as passive adaptation to the emerging new institutions of the digital economy, but also as active adaptation in terms of the formation of new institutions within the framework of the implementation of revolutionary scenarios for transforming the institutional space.

In further studies of the institutional adaptation of trade organizations, the issues of a reliable assessment by economic entities of trade of the institutional attractiveness of economic agents may be raised, which is extremely important in terms of determining possible directions of adaptation, in particular, this may affect the completeness and timeliness of payment of tax obligations, the implementation of the provisions of the accounting policy. This kind of monitoring increases the degree of transparency of the trading business, the level of corporate institutional culture, forms the preconditions for the growth of the efficiency of economic activities of organizations.

Conclusion

The concept of institutional adaptation of trade organizations includes various principles, provisions and implementation tools, which together make it possible to identify the most optimal combinations of social, economic and legal institutions of the traditional and digital economy.

Moreover, a high level of institutional adaptation is a prerequisite for the formation of the institutional attractiveness of an economic entity in the trade industry.

The procedures for the implementation of institutional adaptation involve various participants - manufacturers, trade organizations, consumers, each of which has its own set of relevant institutions of the traditional and digital economy, including institutions for choosing goods for a client's profile, logistics institutions, institutions for paying for goods - cash and plastic cards are supplemented payment and online purchases, as well as the use of contactless shops (Amazon.go), which has a beneficial effect on the development of the institution of loyalty, which enhances the social orientation of the trading business.

Institutional adaptation of trade industry organizations emphasizes the special role of the consumer as the ultimate goal of the reproduction process, which means the need to take into account the heterogeneity of buyers in their use of the institutions of the digital and traditional economy, depending on the age, mentality and shopping practice when choosing goods and paying for them and, accordingly, the need to develop and transform the institutions of the digital and traditional economy.

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Chapter 42

Attracting Foreign Direct Investments (FDI) in Italy: Digitalizing and Standardizing the Territorial Promotion for the Attractiveness of the Regional Areas

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Abstract

The article analyzes the aspect of the attraction of foreign direct investments (FDI) linked to the presentation phase of the territorial offer of the Italian Regions, highlighting in a synoptic table all the characteristics and differences, geographical area by geographical area. The aim of the paper is the proposition of a unique web model for each Region that is standard and effective. Each web page attributable to the Investment Attraction Agencies (IPA) of the various Italian Regions is analyzed, evaluating the main aspects in order to recognize their value within the investment attraction strategy of each Region. The basic characteristics for each Region are studied and a hypothesis of an organizational model is formulated for the promotion of the territories according to a systemic and organized presentation of the Regions inside the global FDI scheme. The paper opens the discussion about the duplicity and spread of digital information that can confuse and produce a negative impact on attracting foreign investors in Italy, providing a base for the implementation of new regulations on FDI promotion in Italy.

Keywords: real estate, territorial development, foreign direct investments, FDI, valorization, facility management, corporate real estate

1. Introduction

In the modern competition between territories, a predominant role is played by the ability of each territorial area to attract foreign direct investment (FDI) and to understand and measure its effects on the economy of the territories (Mosa, 2002) and on the effects on the economic and social fabric (Mohsin & Zurawicki, 2002). Often the definition of foreign direct investment

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is not clear to public decision-makers (Sucháček & Petr, 2011), overlapping with specific definitions and concepts of territorial marketing in its various souls and applications such as cultural tourism (Ventura, 2014) or with variations on the theme of territorial marketing and the identification of the territorial offer (Alaoui & Abba, 2019), and the process of attracting investments in its phases is neither organic nor coordinated in its processes. Studies on FDI may have a focus on localization processes and on the dualism between territories and functions of interest of multinational companies that intend to localize (Kogut, Foreign direct investment as a sequential process, 1983) as well as studying the behavior of multinational companies as key elements of globalization (Rugman & Verbeke, 2004) and as global structures formed by local souls that network (Kogut & Kulatilaka, Operating flexibility, global manufacturing, and the option value of a multinational network, 1994) and they are centers of excellence whose success is influenced by the territorial context (Frost, Birkinshaw, & Prescott, 2002). This article aims to analyze the offer of the Italian territories, in particular the Regions, by studying the first aspect that a potential investor considers when comparing a territorial offer in a comparative way: the website. Among the competences of the Regions in Italy there are the following (Costituzione Italiana Art. 117), highlighting the regional level of jurisdiction for attracting foreign investments:

- International and EU relations of the Regions;
- Foreign trade;
- Protection and security at work;
- Education, except autonomy in scholastic education and vocational training;
- Professions;
- Scientific and technologic research as well as support to innovation in productive sectors;
- Protection of health;
- Food;
- Sports;
- Civil protection;
- Town planning;
- Civil ports and airports;
- Large-scale transport and navigation networks;
- Communications;
- Energy production, transportation and distribution;
- Complementary social welfare;
- Public accounts harmonisation, coordination of the public finances and taxation system;
- Development of cultural and environmental resources;
- Regional savings bank, rural banks and credit agencies, and
- Regional land and agricultural credit institutions.

The starting point can therefore be considered the regional investment promotion agency (IPA) as an aggregator of policies for attracting investments in the area. The evaluation of IPAs is the subject of studies in the literature (United Nations Conference on Trade and Development, 2008) who analyze its strategic and organizational aspects and evaluate its

presence on the web (Lozada & Kritz, 2007) o they study the slogans that characterize the territorial offer, in particular in their paper version which represents a large portion of expenditure (Wilson, 2020).

Table 1. Stakeholders for the "Sessione Straordinaria della Cabina di Regia sull'Internazionalizzazione dedicata all'Attrazione degli Investimenti Esteri (AIE) (Elaborated by the author)

Player	Role	Public or Private entity
Rappresentanti di 12 Ministeri	Decision Makers	Public (national politics)
Presidente della Conferenza delle Regioni Autonome e delle Province Autonome	Decision Makers	Public (local politics)
ICE-Agenzia	Operational support	Public (FDI promotion)
Invitalia S.p.A.	Operational support	Public (Investment promotion)
Cassa Depositi e Prestiti (CDP)	Facilitator (financial support)	Public (Investment and finance)
SACE	Facilitator (insurance support)	Public (Investment Insurance)
SIMEST	Facilitator (financial support)	Public (Finance)
Associazioni di categoria firmatarie del Patto per l'Export	Stakeholder (group of Interest)	Private

In Italy, the impetus for the growth of foreign direct investment has been faced by various parties over the years, sometimes creating duplicated skills and inefficient overlaps with regional agencies. In recent months, different subjects of public administration, politics, the public-private world (grouped in a control room) have come together to integrate the investment attraction policy with post-covid plans such as the PNRR (Recovery Plan and Resilience), as seen in the following figure.

It can be considered a control room the permanent round table built to monitor new trends and to develop new guidelines for laws and regulations, in which the representation of all the stakeholders is guaranteed. The results of the control room were related to the need to include the objectives of attracting foreign direct investments in the PNRR which concerns the following sectors: green transition, digitalization of businesses, health and the pharmaceutical sector, consolidation of the ability to compete on the markets. An important aspect that emerges from the deeds of the control room is the definition of the need to have an efficient system for attracting, assisting and accompanying Foreign Direct Investments in Italy (Ministero degli Affari Esteri e della Cooperazione Internazionale, 2021) and operationally in the strengthening of the foreign network of ICE-Agenzia through the creation of a single portal InvestInItaly.gov.it with the strengthening of the network of the Foreign Investment Attraction (AIE) branches of the ICE Agency (Desk and FDI Analyst) foreseen in 26 compared to previous 19 according to the following priority markets: USA, Germany, France, China, India, Israel and Benelux. The mandate for the presidents of the control room is defined by five main axes (Maeci e Mise, 2021):

Firstly, the continuation of the action to consolidate the governance of the sector of attraction of foreign direct investments;

Secondly, the development of a structured investment offer that enhances territorial excellence, the competitive advantages of the industrial system, the incentive and facilitation tools available (such as Development Contracts, SEZs, opportunities relating to industrial crises, in line with the PNRR within the Next Generation EU.

Thirdly, the creation of a promotional, scouting, and communication plan abroad (through the enhanced network of branches dedicated to the Attraction of Foreign Direct Investments of the ICE Agency), aimed at attracting quality foreign investments, particularly in sectors with high technological content in strategic infrastructures and strategic business functions such as R&D design, advanced manufacturing.

Fourth, the preparation of a document containing proposals for legislative and regulatory simplification aimed at effectively improving the investment climate, continuing the work initiated by the Interministerial Committee for the Attraction of Foreign Investments (CAIE).

Finally, the quarterly monitoring of the implementation of expected results and agreed initiatives.

2. Materials and Methods

By convention, the division into Regions is considered optimal for this study, Italy has 20 Regions, divided into 3 macro-regions (North, South, Center) with other categorizations as can be seen in the following figure which includes 5 macro-regions:

Table 2. Matrix construction and rationale (Elaborated by the author)

Field	Values	Rationale
Name of the Region	TEXT	---
Regione a Statuto Speciale (Special Statute Region)	YES or NOT	Sicilia, Sardegna, Valle d'Aosta, Friuli-Venezia Giulia e Trentino-Alto Adige are Italian Regions with special autonomous Statuses
"InvestIn-XXX," where XXX = Name of the region	TEXT: NO or WEBSITE LINK	The website "www.InvestIn-XXX," where XXX=Name of the region is the main gate to investment offer of a Region
General Search	TEXT	Search key "Invest in NAME OF THE REGION" in order to understand if there are private/public initiatives of investment promotion under the search key
ITA Search for Partner	TEXT Indicating how many firms are listed	ITA (Italian Trade Agency) website hosts a "Search for Partner" page open to companies looking for commercial partners
Dedicated website	TEXT: NO or WEBSITE LINK	If there is a dedicated website to Investment Attraction at Regional Level
Website Conditions	TEXT	Quality of the info available in the website and if the website is currently updated with useful information for investment promotion
Other organized entities	TEXT: NO or WEBSITE LINK	If there are parallel websites for the purpose of Investment Promotion

The idea behind the strategy definition of a regional website built in the form of "InvestIn + Name of the Region" is that according to the convention, this formula is currently used for the territorial offer of the Regions in the context of the attraction of direct investments and which constitutes a reference standard, as well as a functional good practice for local (and national) investment attraction agencies (IPA).

The comparative analysis of all the websites of this form for each Italian Region produces the knowledge of a communication phenomenon of the territorial offer that can be rationalized, standardized and made consistent with the vocation of the places, according to what has already been stated at the beginning of this document. The indication in the table of the status of a

Region (in case of special statute) is connected with the jurisdiction that each Region has on the subject of attracting investments.

The general search using the key "Invest + IN + Name of the Region" is a further crystallization of information as it serves to identify if there is further information in the network that does not fall on the dedicated web page www.InvestINNameOfThe Region and can convey information inconsistent with the mission of the Region in terms of attracting foreign direct investments. "ITA search for partner" in the Italian Trade Agency (ITA) webpage is a dedicated page within the ITA website dedicated to the search for foreign partner companies for Italian companies, Region by Region; this aspect is important to understand the two main axes: the promotion of the territory's offer and the promotion of local production, then understanding whether this opportunity is exploited or not by businesses.

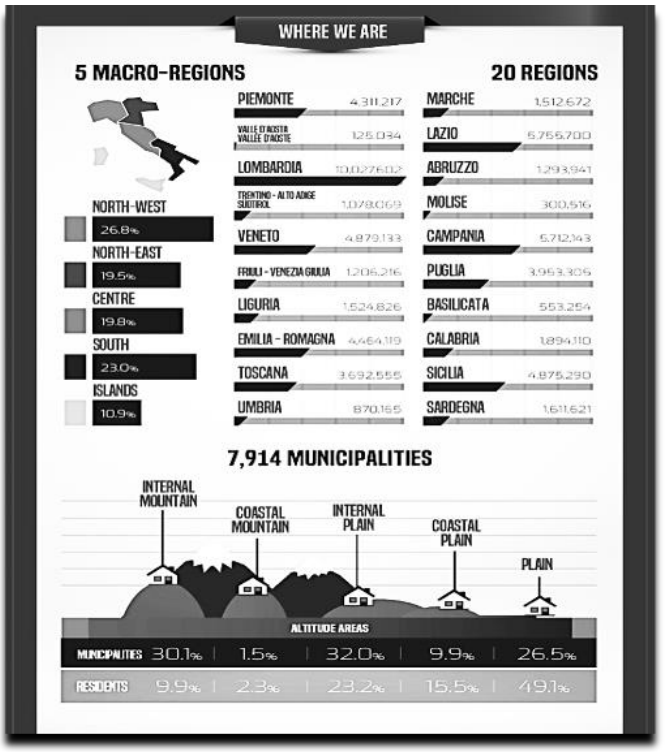

Figure 5. Italian Regions, numbers (ISTAT).

The presence of the site dedicated to the presentation of the territorial offer aimed at attracting foreign direct investments is the central part of the study, evaluating the presence of updated information and in a structure consistent with the nature of a portal towards the attraction of investments for the Region. The presence of other entities (both public and private) with internet pages that can be intercepted by a potential investor are mapped in this analysis as it is possible to understand the quality of the localization offer and the promotion of the territories.

3. Results

The 20 Italian regions were divided into 4 macro-areas (North-East, North-West, Center, South, Islands) according to the NUTS (Nomenclature of Territorial Units for Statistics) Regulation, and the following tables were drawn up according to the parameters established in the method with the aim of observing:

1. The coverage rate by country and by macro-zone of the "InvestIn-Name of the Region) web pages;
2. The quality of the pages (if any) for:
   a) Useful data for a potential foreign investor;
   b) Data update;

3. Public ownership of the web page;
4. Linking the web page to a public "One shop point" or to a public investment attraction agency (IPA);
5. Presence of information from a free Google search by entering "Invest-In-Name of the Region" in order to verify the organic nature of the information relating to the attraction of investments in the Region;

The following tables show the characteristics already mentioned that can characterize the territorial promotion of the Italian Regions. The study is focused on analyzing how well-rooted is the choice of a single web matrix "InvestInXXX" at the national level where "XXX = Name of the Region" which can characterize a research standard by foreign investors who can find uniform information right from the research and analysis, the quality of the information must also result, understood as coherent and updated information in order to attract foreign investors to its territory.

Table 3. North-West Regions (elaborated by the author)

Region	**Presence of a Dedicated Website to the Investment Promotion at Regional Level**	**General Search Result, Key:"Invest In XXX" XXX = Name Of The Region**	**Ita search for partner**	**Website directory**	**Website condition**
Liguria	Dedicated website for the investment Promotion managed by "Regione Liguria" with a focus on tax reduction for special types of investments and local investments promotion	Promotion of real estate properties by Real Estate companies and some results of discounted conditions for doing business into the Region	Presented 1 company in food sector under a: "search for partners" directory	www.lamialiguria.it	Updated website with few information and the scope is local events promotion
Lombardia (Lombardy)	Dedicated website for the Investment Promotion managed by "Invest in Lombardy" the special agency for investment promotion of the Region managed by Promos	Strong identification in the network of "Promos" and its activities.	not present	www.investinlombardy.com	Updated website with quality information about Investment attraction in the Region

Region	Presence of a Dedicated Website to the Investment Promotion at Regional Level	General Search Result, Key:"Invest In XXX" XXX = Name Of The Region	Ita search for partner	Website directory	Website condition
Piemonte (Piedmont)	Dedicated website for the Investment Promotion managed by CEIPIEMONTE the special agency for investment promotion	Strong identification in the network of "CEIPIEMONTE" and its activities.	not present	www.centro estero.org	Updated website with quality information about Investment attraction in the Region
Valle D'Aosta(*) (Aosta Valley)	No dedicated website but a directory inside the Regional Government official website	Promotion of financial and Real Estate investments, finance and services by private companies	not present	www.regione. vda.it	Standard page inside an institutional website with general information (only in French and Italian)

Table 4. Center Regions (elaborated by the author)

Region	Presence of a Dedicated Website to the Investment Promotion at Regional Level	General Search Result, Key:"Invest In XXX" XXX = Name Of The Region	Ita search for partner	Website directory	Website condition
Emilia Romagna	Dedicated website for the Investment Promotion managed by "ART-ER Attrattività Ricerca Territorio" the special agency (consortium) for investment promotion of the Region	Strong identification in the network of "ART-ER" and its activities.	Presented 1 company in food sector under a "search for partners" directory	www.investin emiliaromagna.eu	Updated website with quality information about Investment attraction in the Region
Friuli Venezia-Giulia(*)	Dedicated website for the Investment Promotion managed by "Invest in FVG" the special agency (consortium) for investment promotion of the Region made by different entities	Strong identification in the network of "Invest in FVG" and its activities.	Presented 1 company in food sector under a "search for partners" directory	www.investinfvg.it	Updated website with quality information about Investment attraction in the Region
Trentino Alto Adige(*)	Dedicated website for the Investment Promotion managed by Trentino Sviluppo, the special agency for investment promotion in Regione Trentino	Strong identification in the network of "Trentino sviluppo" and its activities	Presented 1 companies in food sector under a "search for partners" directory	www.investint rentino.it	Updated website with quality information about Investment attraction in the Region, managed by public bodies
Veneto	No dedicated website	Promotion of financial and Real Estate investments and services by private companies	N.A.	N.A.	N.A.

Table 5. Southern Regions (elaborated by the author)

Region	Presence of a Dedicated Website to the Investment Promotion at Regional Level	General Search Result, Key:"Invest In XXX" XXX = Name Of The Region	Ita search for partner	Website directory	Website condition
Abruzzo	No dedicated website at Regional Investment Promotion Agency	Promotion of real estate properties by major Real Estate companies	Presented 3 companies in food sector under a "search for partners" directory	NO	N.A.
Basilicata	Dedicated website for the Investment Promotion managed a private entity with public interest	Strong identification in the network of the regional agency and its activities in EU funding	not present	https://investinbasilicata.it/	Not fully updated website with general information about Territorial Marketing in the Region
Calabria	Dedicated website for the Investment Promotion managed a private entity	Promotion of real estate properties by Real Estate companies	Presented 3 companies in food sector under a "search for partners" directory	www.investincalabria.it	Flash Plugin no more available, no recent update
Campania	No dedicated website at the level of Regional Investment Promotion Agency	Promotion of real estate properties by Real Estate companies	not present	NO	N.A.
Molise	No dedicated website at the level of Regional Investment Promotion Agency	Promotion of real estate properties by major Real Estate companies and some results of discounted conditions for doing business into the Region	Presented 1 company in food sector under a "search for partners" directory	NO	N.A.
Puglia (Apulia)	Dedicated website promoted by a private company, offering services for locating business in Puglia region	Promotion of real estate properties by Real Estate companies	Presented 9 companies in food sector under a "search for partners" directory	www.apuliaforbusiness.com	Updated website with quality information about Investment attraction in the Region but not managed by public bodies

Table 6. Islands (elaborated by the author)

Region	Presence of a Dedicated Website to the Investment Promotion at Regional Level	General Search Result, Key:"Invest In XXX" XXX = Name Of The Region	Ita search for partner	Website directory	Website condition
Sardegna(*) (Sardinia)	Dedicated website promoted by the local government as Regional Investment Promotion Agency as a single contact point	Promotion of real estate properties by Real Estate companies and incentive for location of foreign pensioners as residents	Presented 4 companies in food sector under a "search for partners" directory	www.sardegnaimpresa.eu	Updated website with quality information about Investment attraction in the Region, managed by public bodies

Region	Presence of a Dedicated Website to the Investment Promotion at Regional Level	General Search Result, Key:"Invest In XXX" XXX = Name Of The Region	Ita search for partner	Website directory	Website condition
Sicilia(*) (Sicily)	Dedicated website promoted by a private company, offering services for locating business in Sicilia region	Promotion of real estate properties by Real Estate companies and promotion of services for locating business in Sicily by private companies	Presented 4 companies in food sector under a "search for partners" directory	www.investinsicily.com	Updated website with quality information about Investment attraction in the Region but not managed by public bodies

The following table shows the GDP by Region in Italy on 2019 data, illustrating: Lombardy, Lazio, Veneto, Emilia-Romagna, Piedmont as the top 5 regions of the ranking.

Table 7. Gross domestic product (GDP) in Italy 2019, by region (Statista on ISTAT data, 2021

Gross domestic product (GDP) in Italy in 2019, by region (in million euros)		
	Million Euros	**Area**
Lombardy	400744.30	NW
Lazio	200931	C
Veneto	165253.60	NE
Emilia-Romagna	163994.20	NE
Piedmont	138010.30	NW
Tuscany	119014	C
Campania	109504.10	C
Sicily	89024.80	I
Apulia	76072.40	S
Liguria	49897.50	NE
Trentino-South Tyrol	46559.70	NW
Marche	42137.40	C
Friuli-Venezia Giulia	38735.40	NW
Sardinia	34916.30	I
Calabria	33443.90	S
Abruzzo	32898.40	S
Umbria	23144.80	C
Basilicata	12901.90	S
Molise	6405.80	S
Aosta Valley	4877	NW

4. Discussion

Among the regions of the North West, Lombardy (the Region with the highest GDP at national level) is the one to present a more complete offer with a well-maintained and complete website, updated and which integrates information for investors ranging from information to investors in the Real Estate sector (foreign direct investments in real estate) and for investors who want to locate their production activities in the Region. Lombardy Region has a web directory corresponding to www.investinlombardy.com which corresponds to the standard of investment attraction agencies globally recognized. The Piedmont Region does not have a website of the

standard URL form “investInxxx” where xxx means: “name of the Region” but has a specific website for the attraction of investments with a link that leads to a project of the attraction agency of the local investment, while having an updated and complete website for attracting foreign investments. Liguria and Valle D’Aosta do not have a website in the standard form but have two web pages with distinct purposes respectively for Liguria a website dedicated to the promotion of the territory from the point of view of tourism and events and the Valle D’Aosta (Region a special statute) a page within the regional portal with general information and only in French and Italian. In the search for partners’ area, of which the ITA website dedicates a particular section, only Liguria has a registered company, belonging to the agri-food sector. The other Regions did not join the initiative.

Among the regions of the North East (characterized by the third and fourth regions with the highest Italian GDP, Veneto and Emilia-Romagna), it is noted that Emilia-Romagna has a website in the standard URL form dedicated to the promotion of investments and constantly updated with the useful information for foreign direct investors and a company is presented in the ITA database to search for commercial partners, also in the agri-food sector. Veneto does not have a website dedicated to attracting foreign direct investments or companies on the ITA platform for finding business partners. Friuli Venezia Giulia and Trentino Alto Adige have dedicated pages and in the standard URL form (InvestInXXX where XXX = Name of the Region) that are clearly referable to local agencies for the attraction of investments and are updated and with useful information for the foreign investor.

Among the Regions of the Center, Lazio has a site dedicated to the attraction of foreign investments, connected to the consortium for the attraction of foreign direct investments but it is not in the standard form for its URL and is not updated with useful information for investors foreigners. In the ITA database there is a company in the agri-food sector for the Lazio Region. Marche Region presents a site with a URL in standard format but the offer is limited to the promotion of some real estate assets within rural communities, without connection to organized foreign direct investment attraction policies. The Tuscany Region presents a website with URL in the standard format managed by the Invest in Tuscany agency, with updated information consistent with the needs of foreign investors. The Umbria Region also has an updated website, dedicated to attracting foreign investments and promoted by the local agency for attracting foreign direct investments, but the URL is not in standard format. In the database of ITA Toscana and Umbria present respectively 2 and 3 companies for the search of commercial partners in the agri-food sector.

In the Southern Regions, Basilicata and Calabria present sites with standard URLs that are not updated or fully functional and managed by private entities and not by regional agencies for the attraction of foreign direct investments. Abruzzo, Molise and Campania do not have any dedicated web resources in the form of a website dedicated to attracting foreign direct investments. The Puglia Region offers a website managed by a private entity that offers services to the foreign investor, this site is not connected with any local foreign investment attraction agency. The presence on the ITA database is very strong for Puglia (9 companies proposing themselves to potential commercial partners), strong for Calabria and Abruzzo (3 companies) and sufficient for Molise (1 company).

For the Islands, Sicily has a website with URL in the standard URL format but managed by a private entity and not connected to agencies for the attraction of foreign direct investments, presenting quality information on an updated site. The Region of Sardinia offers a website linked to the agency for the attraction of local foreign direct investments, updated but not in

standard URL format. Both Regions are present with 4 companies in the ITA database to search for commercial partners in the agri-food sector. It is therefore observed that only 5 Regions have a website with a standard URL in the form "InvestInXXX where XXX=Name of the Region" and that this is directly connected to the local agencies for attracting foreign direct investments, ensuring the correctness, consistency of information and updating of the web pages (Lombardy, Friuli, Trentino, Tuscany, Emilia-Romagna). The other Regions often have the characteristics present only partially. It is deduced that there is no connection between the presence of a coherent territorial offer connected to an agency for attracting foreign direct investments (IPA) and the GDP of the Region. There are private companies that have registered URLs in standard format, offering private professional services, filling a lack of foreign direct investment attraction agencies. The presence in the ITA database for the search of partners is characterized by the presence of exclusive agri-food companies which in no case exceed 9 units. It is noted that the presence of a website managed by a regional agency for the attraction of foreign direct investments and a URL in a standard format makes the search for information, even outside the dedicated site, much less dispersive and allows the investor to get to the activities of the regional agency and not to favor the dispersion of the potential investor. In a phase of attraction of the foreign direct investor, the organic presentation of information is fundamental, standardized as much as possible, perhaps according to a unique scheme in order to favor the comparison based on the vocations of the various territories, eliminating the real risk: the loss of contact (or lead) because the information sought is not organized or exhaustive.

Conclusion

The entrepreneur looking for localization in an Italian region must be able to compare multiple options, perhaps between regions with similar characteristics, after having already selected a shortlist of similar areas globally. It is noted that an organized and standardized offer is what Italy lacks in its regional expression, not every Region is presented in a manner consistent with a scheme equal to the other Regions, both because many Regions do not have platforms up to par (or are managed by individuals and not by local agencies) and because the message is related to the various expressions of Territorial Marketing and not to the attraction of foreign direct investments. The presentation of the territorial offer of "Invest in Lombardy" on its website can be considered as the most complete and modern in Italy, also in relation to the offer of the best-in-class foreign IPA, attracting foreign direct investments as the main goal both Greenfield Investments as Brownfield. The aspects of completeness are all respected: a standard format URL, a well-maintained and complete website, and a database for landing investments in the area, even in brownfield areas, and with an advanced area selection tool on territorial areas. The connection with Attract law for attracting foreign direct investments in Lombardia is clear and a website is a powerful tool for the FDI attraction of the Region. Subsequent studies should also investigate foreign regions for homogeneous areas and formulate a framework of contents that can be included in the various web pages so as to be able to integrate what has been implemented in this article and add the requests of potential investors studied in the Real Estate sectors (Celani, Ciaramella, & Lomacci, 2020) and applying methodologies relating to the selection of sites of interest (Bolshakov, Badenko, & Celani, 2018) in order to provide a system that uniquely understands the interests of the potential investor and that makes it possible to identify the best location in the area based on these

requests. The quality of the territorial offer according to the scheme of this research is not connected to the GDP per Region as reported in the table nor to the size of the Region but it is directly connected to the willingness of the IPAs at Regional Level to work on a standard baseline to promote their regional offer, starting from the URL of the website.

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