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**Business Strategy in
Emerging Markets:
Firm and Government
Perspective**

Carbon Management Solutions and CO2 Reduction Platforms for Businesses in Germany

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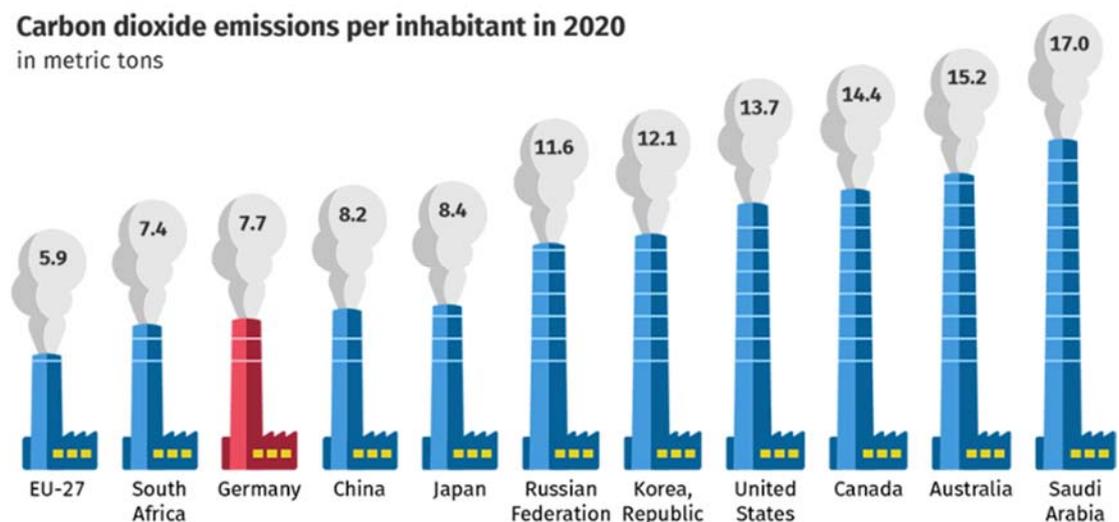
In 2022, global warming and climate disasters are inexorably changing the operating environment for large and medium-sized businesses. Carbon dioxide (CO₂) is the primary greenhouse gas emitted through human activities and is the primary driver of global climate change. According to EDGAR¹, Global CO₂ emissions reached a level of 36.0 billion tons in 2020. The G20 states were responsible for around 80% of these emissions. The largest carbon dioxide emitters among the G20 members were China, the United States and the EU.

The implication is that this will undoubtedly affect the strategies, management approaches and marketing actions of companies for years. In fact, this is already changing business methods, resulting in companies gradually trying to move towards more sustainable business strategies. Reducing carbon dioxide emissions is synonymous with lower energy costs. Energy costs money, so by reducing emissions and switching to cheaper, renewable energy, businesses can better manage their budgets. Over time, businesses will become more profitable through the simple changes they make today. The most developed countries in the European Union are phasing out the use of coal for electricity generation. Germany, for example, has been reducing its use of resources for the benefit of the environment for years. Under the Climate Action Programme 2030 and the new Climate Action Act² (Klimaschutzgesetz) the German government has made a binding undertaking to reduce greenhouse gas emissions by 55 per cent by 2030.

Germany is a country of advanced technology and environmental solutions. In 2020, Germany emitted a total of 728.7 million tons of CO₂ equivalents. This is roughly 71 million tons or 8.9% less than in 2019 and 41.3% less compared to the figure for 1990. These are the results of the finalized calculations that the Federal Environment Agency has submitted to the European Commission.

According to The Emissions Database for Global Atmospheric Research, Russia emitted 11.6 tons of CO₂ per inhabitant in 2020, which is 33.62% more than in Germany, which may indicate a significant difference in the approach of large industries to the production of products and goods.

Carbon dioxide emissions per inhabitant in 2020
in metric tons



Source: EDGAR/JRG

¹ The Emissions Database for Global Atmospheric Research

² German Federal Government, Bundes-Klimaschutzgesetz

As it is well known, German companies are required to follow national environmental standards in order to operate. Furthermore, customer requirements are becoming stricter with regard to environmental protection. Companies have a number of challenges before they begin to successfully manage their carbon footprint reduction. The main one is that the data is currently difficult to track, and this is becoming an increasing problem with forthcoming regulations - supply chain due diligence, known as «Lieferkettengesetz»³, and the border carbon tax.

The relevance in the implementation of platforms to calculate and reduce emissions is due to the decentralized nature of supply chain data. Certainly, long-term and high-impact climate action requires supporting many carbon reduction and removal methods. In Germany, there are a number of credible platforms to assess corporate social responsibility and sustainable procurement. Carbon reduction companies cover the topics of ESG⁴ reporting tools, carbon offsetting projects such as tree planting, CO2 reduction standards and certification of carbon credits, and the market for selling credits.

The most sustainable companies are Ceezer, Carbmee and Plan A. Young German companies and start-ups have also been actively launching in recent years. A platform from ClearCO2 plans to launch by 2023. It is an example of an emerging start-up for calculating and reducing carbon emissions in the food sector. The company offers a simple software platform to certify and sell carbon credits for suppliers of the food sector, so SME⁵ suppliers can get paid for their efforts in saving carbon emissions. Based on an analysis conducted by ClearCO2, 84% of small and medium-sized enterprises in Germany do not measure their carbon footprint. As a consequence, businesses can neither reduce their production emissions nor certify to show their customers that they are already using modern, environmentally friendly technology. Today, among global companies such as Ecovadis, operating primarily in Europe and the United States, there is a high level of quality and the use of the latest, high-tech methods to reduce greenhouse gas emissions from production facilities.

Based on the research conducted on the example of Germany, the conclusion can be drawn that the environment directly affects the behavior of companies and building business strategies. The environmental agenda has become part of modern business, which is the result of global climate deterioration in the world.

The demand for carbon footprint and carbon reduction platform services is projected to increase in the coming decades. In the future, in order to preserve natural resources and environmental sustainability, companies will have to resort to the services of platforms to reduce carbon emissions.

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Prospect for the Transformation of Asian Emerging Economies with Hybrid State Capitalism

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Abstract:

The process of the reproduction of economic systems, distinguished by a hybrid structure with a prevailing state-capitalist order, in a separate conglomerate of Asian countries has analyzed in the current period. Basing on the empirical available evaluations, with regard to the conglomerate of considered national economies the most significant fundamental competitive advantage presents still the preservation of a relatively low cost of production factors. By the author's argumentation, a vision of the prospect for the transformation of such national economies has supposed. The main conclusion concerns the possibility of successful adaptation of these economic systems to the expected fundamental changes, especially including those associated with the transition to sustainable overall social development.

Keywords: *emerging markets, national economies, state capitalism, competitive advantage*

1. Introductory remarks.

In the recent high-profile publications, three main components of the newly-minted state capitalism in emerging market economies (EME) are argued (Wood & Wright, 2015; Wright et al., 2021). First, institutionalized interaction between government organizations and business, when the state acts as a market consumer or, conversely, as a supplier of resources to the markets. Second, the state agents participate in various markets as investors. Third, the state uses weighty tools for the active interventions in economic life. Indeed, the active state economic policy (macroeconomic, structural, regional) presents the conductor of stability and normal functioning of many EMEs. Of particular importance for ensuring the positive dynamics of emerging markets has the direct state participation in large-scale infrastructure programs and projects (Sigma, 2019).

In most national economies with emerging markets, the public and mixed public-corporate sectors complement the private corporate sector and the entrepreneurial sector of small and medium-sized businesses (Marquis & Raynard, 2015). In fact, there is an imposition of heterogeneous institutional orders, reflecting the multi-layered structure of interactions between market and other agents.

In the context of the foregoing, an unambiguous statement is appropriate: in recent years, the national economic system in the existing EMEs has interpreted by researchers precisely as a hybrid one (Nolke, 2018; Okhmatovskiy et al., 2021; Ricz, 2021). It is fundamentally deviated from the traditional bipolar capitalist and socialist systems that existed in the past century.

Along with this, one cannot ignore the institutional divergence of the EMEs, primarily in relation to the degree of liberalization of their domestic markets and the importance of the state-capitalist order. It seems appropriate to single out three main conglomerates of Asian national economies that differ in their systemic structure.

In the first conglomerate, including a wide range of post-developing and after socialist countries, the institutions of state capitalism play a paramount role (Kurlantzick, 2016; Alami & Dixon, 2020). However their absolute domination seems unjustified. The state-capitalist institutional order (in its pure form) is not fully prevailing in any country complemented by other existing institutional orders primary due to the form of ownership. Apparently, the economic system of this conglomerate of countries, for the identification of which the abbreviation SCEME is used below, is rightfully identified as hybrid state capitalism.

Another conglomerate is made up of the national economies in which the institutions of state capitalism do not excel in comparison with the institutions of private entrepreneurship. This conglomerate includes the economies of Turkey, South Korea, Taiwan, Singapore, Saudi Arabia and a number of other countries. All these national economies are distinguished by their structure-forming dependence on the state of world market.

Finally, the significance of the Asian EME conglomerate is great, where the state-capitalist order and, in general, the systemic economic matrix have not been completely formed. Among these countries, it is appropriate to mention Iran, Pakistan, Bangladesh.

In order to study hybrid state capitalism phenomenon, the author focuses only on the SCEME conglomerate; moreover, not including China. The economic transformation of latter country has carry out in the most significant dependence on purely political drivers. The study of this kind of dependence requires a special approach, which has not yet been verified in current scientific publications.

2. Current exposition and short-term prospect.

First, let us refer to the results of previous study, concerning the considered conglomerate of national economies with prevailing state-capitalist order in the period 2000-2019 (Martynov, 2021). Their most significant competitive advantage concluded in the preservation of the relatively low cost of productive capital, labor, and especially primary resources, displays in the inertial growth of production capital and employment. It had turned out to be associated with an accelerated increase in output and profit. The formulated statement is confirmed by empirical evaluations of regression equations between the main variables - profitable output, production capital and employment. They demonstrate a high return on productive capital and employment in SCEME, in contrast to the situation in the mature western economies of USA, Germany and especially Japan.

We have to admit. The Covid-19 Pandemic has caused unprecedented damage to Asian emerging economies, many of which have been thrown back in terms of potential output for several years. However, regarding the observed prospect for these national economies optimistic expectations prevail. In their favor the ongoing revival in a vast number of EME in Asia, despite the diverse negative manifestations of the consequences of the Pandemic, testifies (Asian development, 2022; World economic, 2022; World Bank, 2022).

To date, in 2022, due to the continuation of the Pandemic and, to an even greater extent, the conflict in Ukraine, the emerging markets of Asian countries are hit by an unprecedented increase in world prices for energy resources and food, associated with an increase in other market prices (Lazard Asset, 2022). Without any alternative, these countries face with the need to conduct a tight monetary policy in order to curb inflation and ensure an acceptable macroeconomic situation.

In this regard, it seems logical to turn to the example of Malaysia, where the instruments of national stabilization regulation, independent from the IMF, have been successfully used for a long time. Here, the targeted maintenance of a low base interest rate is complemented by the implementation of a variety of instruments, including the necessary credit regulation, and the provision of subsidies and tax breaks to stabilize consumer markets (Economic outlook, 2021). Therefore the necessary preservation of economic activity has achieved under the restrictions caused by an extraordinary stabilization policy. Truth, a very likely consequence of the implementation of stabilization regulators may be some slowdown in economic dynamics in SCEME.

However, there is reason to believe that the observed structural price rise will relatively soon run out of steam in the context of expected exhausting military confrontation, rapid progress in the efficiency of resource consumption in the largest producing countries, China and India, and, in general, a tremendous decarbonization in the global economy. In case of overall stabilization in world economy, the advantages of emerging markets will continue to stimulate the assertion of

new markets and the influx of new entrepreneurs interested in attracting direct investment. The maximum prolongation of this process will be facilitated by the initiating activity of the state agencies using their capital for ensuring desired market shifts.

Apparently, dynamic consumer markets in SCEME will be able to successfully adapt to the expected stagnation or even decrease in the real wages of the majority of those employed, with a constant increase in their number. It will manifest itself in a worldwide steady growth in demand for inexpensive goods and, especially, services, and one can expect a multiplier effect of growth in domestic and external demand for these consumer goods. The example of China and most of the countries in Southeast Asia testifies firsthand in favor of such an assumed trend (OECD, 2020).

The same is true for intermediate goods and investment markets in SCEME. Here, the expected effect of cheaper products due to digitalization and other technological innovations will fully affect existing manufacturers. But they will be able to maintain their market positions through a constant increase in labor productivity and capital efficiency in the case of reproduction of the current low resource costs and wages by world standards.

Thus, the following assumption looks as substantiate: at the macro level, the return on inertial output factors is likely to remain approximately at the level in the period (2015-2019) before the Pandemic. Along with this, proceeding from the forecast (World Bank, 2021, 2022), in the post-pandemic period, emerging markets will experience a high growth in direct investment (domestic and foreign) and employment.

If the mentioned forecasts are fulfilled, it is appropriate to expect the restoration of the previous impressive inertial growth trends in the manufacturing and service sectors in SCEME, achieved in the past decade. The same applies to the return to high dynamics of labor productivity in the real sectors.

It is also reasonable to assume that the recovery of the inertial trend in output will be accompanied by the previous smooth changes in the distribution of income and capital in most considered economies. Additionally, population aging should be taken into account as a significant factor in reducing income differentiation.

What has been said about the inertial factors of development does not at all mean that the importance of imminent structural shifts in almost all economic sectors should be underestimated. As known, in the bygone period there was a significant decrease in the contribution of technological and institutional progress to economic output (TFP indicator), which fully affected the post-developing and post-socialist economies. However, in the coming five years, a long-awaited turning point has carried out, primarily associated with digitalization, the spread of robots and artificial intelligence. The economic effect of such transformational innovations should be projected on the basis of expected future trends, focusing on the actual results of the development of the leading countries as desired patterns.

In the national economies under consideration, significant favorable prerequisites for comprehensive digitalization and automation have arisen (Nguyen et al., 2021). We are talking about the high competitiveness of technological/information giant corporations, accelerating the diffusion of technologies, and the growth of educational potential. As a result, expectations are high for steady growth and high returns on domestic and foreign investment in the "new economy" segments.

It becomes urgent to accelerate structural reforms with the active participation of the state and the entire national business. According to researchers (High-Growth Firms, 2018), if structural reforms will successful in countries such as India, Indonesia, Malaysia, Vietnam, the Philippines and Thailand, there would gradually be a transition from a capital-intensive type of development to an innovative type in conventional economic sectors following China, South Korea, Taiwan and Singapore.

In addition, an increasing need for an initiating stimulating policy in its broadest sense has taken place, based on the use of the emerging national innovation systems (TECHNOLOGY AND INNOVATION REPORT, 2020). Financial and other government resources for stimulating

innovations, including imitating ones, seem quite sufficient in the majority of considered national economies. This kind of state intervention is intended to be supplemented by an active industrial policy, the institutional mechanisms for the implementation of which have also developed in hybrid economies with powerful state capital. In particular, public-private partnerships will play an exceptional role in the process of new industrialization / digitalization.

A special question concerns the upcoming shifts in the structure of the distribution of wages, entrepreneurial incomes and capital in hybrid economies with prevailing state-capitalist order. By all signs, there will be an ordinal change in the distribution structure due to the challenge of digitalization. It will primarily manifest itself in an increase in the differentiation of wages and other incomes. As a result, there will definitely be a need for a whole range of institutional innovations in the field of labor market regulation. They are designed to neutralize the negative factors of changes in the structure of employment, taking into account the extra significance of social restrictions specific to individual countries.

In general, it is reasonable to assume that the potential of the considered conglomerate of economies is self-sufficient in order to provide employment for the population in the new technological era. The likely preservation of a relatively low price of labor here allows hoping for a smoothly dosed reduction in personnel employed in industrial and other sectors in SCEME. Also, the possibility of stabilizing employment in those traditional sectors where the level of wages is obviously low can be realized.

In addition, according to experts, in a large number of SCEME with qualified educational potential, favorable conditions have arisen for the emergence of new professions as a direct result of automation and digitalization. Such as designers in digital services and blockchain technologies, experts in the use of energy of automated unmanned industries and robots, specialists in cyber security and ensuring the reliable functioning of artificial intelligence systems.

On a global scale, the significant dependence of SCEME on developed market economies is likely to continue. At the same time, their competitive advantages as growing national economies will probably strengthen.

Researchers predict further strengthening of the position of MNE in the largest post-developing and after socialist countries on the world stage (Cuervo-Cazurra, 2018, Panibratov & Klishevich, 2021). Under the expected parity of exchange rates the financial interest of these new giants in investment expansion abroad, especially in the markets of Asian countries, will remain very significant. Apart from, in all likelihood, the significance of state protectionism in relation to the "native" MNE will not weak in the foreseeable future.

3. The future turn to sustainable development.

A substantial feature of future progress concludes in sustainable development (SD) of the economy and society, which may already take place to the end of current decade (Martynov, 2021). Recent trends speak in favor of such an optimistic future. A very significant progress in terms of approaching the targets of sustainable development has been achieved in the ASEAN countries (ASEAN Development Outlook, 2021). In particular, various eco-social projects are currently being replicated in Indonesia, Malaysia, Vietnam, Laos, and Philippines, largely based on recognized Scandinavian experience. And already in the near several years successful diffusion of green and, in particular, circulation technologies in these countries has predicted (Nepal et al., 2021).

The powerful potential of public regulation, including at the local level, in SCEME is an objective prerequisite for a successful transition to sustainable economic and social development at national level. There are at least three weighty arguments in favor of this statement.

Firstly, the achievement of SD imperatives in terms of indicators of production and consumption of resources, the development of social sectors and the resolution of humanitarian problems is impossible without the active participation of non-profit civil organizations and the state itself.

Thus, the world experience of recent years confirms the key importance of public-private partnership in the implementation of environmental and many related projects in the countries of Southeast Asia.

Secondly, to a no lesser extent, state intervention is required to fulfill the conditions for a stable balance between the proportions of economic output and the distribution of income. The title role of the state as a systemic regulator still remains undeniable. In turn the stabilization monetary and financial policy is designed to be supplemented by solutions that initiate favorable shifts in the long-term development of economic and social sectors.

Thirdly, the state and its competent agencies play an exclusive role in fulfilling the conditions of adaptation as resilience to possible adverse changes. Suffice it to mention the paramount value of implementing an adequate state policy to neutralize climate shocks.

At the same time, in today's market realities, public regulation aimed at achieving sustainable social progress can be successful only if it is effectively complemented by private business performance. It is worth recognizing that, in general, there has been a profound shift in the activities of large corporations towards the recognition of the imperatives of sustainable development and the need to adapt to the impulses of unsustainable changes (S&P Global, 2021). In SCHEME, large corporations are also increasingly following the example of these companies (ASEAN Development Outlook, 2021; Sachs et al., 2021). Truth, judging by real experience, charitable activities in this field of big business is distinguished by a deliberately limited scale. The increase of this scale simply contradicts the goals of maximizing financial results and improving / maintaining a competitive position, which remain the main ones for successful modern corporations.

Also, the key partner of the state in the process of transition to sustainable development and its approval is small and medium-sized businesses. It is difficult to underestimate its possible contribution to achieving sustainable progress in the considered conglomerate of national economies. This, for example, is evidenced by the choice of consumers in India and the countries of Southeast Asia in favor of ecologically impeccable and exclusive food products and furniture items produced by individual entrepreneurs (Sachs et al., 2021).

A special question concerns the significant positive contribution to the resolution of sustainability problems in various sectors, which is already being made by the ecosystem business, operating on the principles of equality and transparency (Adner, 2017). In SCHEME, there is a significant expansion of the scale of the eco-systems business in its current recognized sense. Thus, the spread of successful eco-innovation systems in a number of ASEAN countries has gained universal recognition (Jintana et al., 2020). However, the potential increase in the weighty of this sector, which has mainly centered about digital platforms, in comparison with the large corporate and other sectors, seems to be notoriously moderate.

In the expected prospect it would be advisable to extend the framework Concept based on the integrative vision of the sustainability in Agenda2030 to the entire process of transformation in society as a social system. With respect to the countries with SCHEME the imperative of system sustainability has attainable through the interaction of all social agents, including corporate and other businesses. Nevertheless, the main responsibility in the constant ensuring the long-run sustainability put on the national state possessed wide possibilities to perform amid the preserving of a powerful state-capitalist order. Therefore the two floors positioning of sustainable overall social transformation as a process of system changes seems legitimate. First, it occurs in the sphere of stabilized national development, where the actors of public regulation albeit in close cooperation with national business are dominant. Only on this basis a successful transformation in the sphere of accelerated sustainable progress can take place, to a decisive extent conditioned by the initiative activities of the leading market and non-market agents.

4. Conclusion.

One can expect that the affirmation of the above indicated trends in structural changes will be associated with significant institutional improvements. In turn, as they gradually accumulate, a qualitative shift may occur. It will be expressed in a rapid approximation of the quality of institutions in the hybrid economies under consideration to the level of Western countries (Nguyen et al., 2018). This result would be achieved without frontal institutional liberalization as a necessary condition albeit deregulation and partial liberalization in selected markets in SCEME, accompanied by a reduction in the corruption "overhang", can bring very positive results. However, in comparison with majority of Western countries the ordinal excess of the state capital presence in SCEME is likely to store.

The author is fully aware of the sufficient skepticism regarding his research, which comes from an optimistic reproduction of the framework conditions for the long-run transformation of the considered conglomerate of national economies. Amid the events in Ukraine one should take into account the possibility of a negative scenario of world development in the coming decade. The danger of large-scale military conflicts, moreover, with the use of destructive thermonuclear and other weapons, remains very strong.

Nevertheless, there are good reasons to hope for the realization of a positive global development scenario in the end. This desired outcome is evidenced to a large extent by the choice of the ideology of sustainable social progress on the world stage in accordance with Agenda2030 adopted by the UN.

In view of the foregoing, it is legitimate to conclude about the possibility of the future transformation of a hybrid national economy with a prevailing state-capitalist component into a sustainably reproducible economy characterized by an efficient and simultaneously fair distribution of resources, incomes and capital. The existing institutions and other main attributes of Asian economies with a prevailing state-capitalist order has likely been viable in the face of future challenges, provided that an overall positive scenario of world development in the main fields of social action would take place despite of high-level obstacles.

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MNE Location in Global Cities through the Lens of four Economic Theories

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Abstract:

This paper analyses how location of multinational enterprises (MNEs) in global cities might be considered in terms of four economic theories: contract theory (CT), behavioral theory of the firm (BTF), new institutional economics (NIE), and transaction cost economics (TCE). The extant research has extensively applied NIE and TCE to study MNE location choice, while AT and BTF have remained rather uncommon. To determine the effect of global city characteristics on location choice we resort to the basic properties of global cities: global interconnectedness, availability of advanced producer services, and multicultural environment (Beaverstock et al., 1999; Goerzen et al., 2013). Additionally, we take into account agglomeration effects. The aim of this study is to show how the basic properties of global cities in couple with agglomeration effects might alter the propensity to locate foreign direct investment according to the aforementioned theories.

Keywords: *location choice, global cities, multinational enterprise, foreign direct investment, economic theories*

1. Introduction

Traditionally, the issue of MNE investment location choice has been considered on the country-level (Goerzen et al., 2013; Nielsen et al., 2017). However, in the last decade, a growing number of scholars has been indicating the need to conduct a more fine-grained research of location choice by zooming on the sub-national level (Blanc-Brude et al., 2014; Chakravarty et al., 2021; Iammarino et al., 2018; Nielsen et al., 2017). This trend was picked up so that numerous studies were dedicated to characteristics on the regional level. In particular, the impact of various types of distance between the home and host location of an MNE on the propensity to invest in a particular location has been studied based on U.S. states (Anderson, 2021; Pilka et al., 2022), EU regions (Basile et al., 2008), and Chinese provinces (Blanc-Brude et al., 2014).

It has been long evidenced that some locations across the world receive a disproportionately large amount of investment and not accidentally these places occur to be large cities, well embedded in the global flow of people, knowledge, and goods. Sassen (1991) in her seminal work theorized on the phenomenon of global cities and its constituents. Functionally, global cities might be defined as centers of command and control in the globalized economy. From the structural point of view, global have three basic properties: (1) good connectedness with other global cities and with the surrounding region; (2) availability of advanced producer services (APS), and (3) cosmopolitan environment, which facilitate the operation of MNEs

The aim of this paper is to analyze location choice from the point of view of four economic theories: contract theory (CT), behavioral theory of the firm (BTF), new institutional economics (NIE), and transaction cost economics (TCE). Thus, we make a twofold theoretic contribution. First, we extend the emerging theory on global cities within the IB field by adding and studying the impact of the agglomeration effects along with global connectedness, availability of APS, and cosmopolitanism; second, we show how distinct economic theories might be applied for the analysis of location choice.

2. Methodology

The extent to which the CT, BTF, NIE, and TCE have been used to study MNE location choice is different. We conducted a search in the SCOPUS database to find how many articles refer to one of these theories to study location choice. To this end, we used the following search

queries: “TITLE-ABS-KEY (“theory name” AND (“location choice” OR “internationalization”))”, where in place of “theory name” we entered “agency theory”, “behavioral theory”, “institutional theory”, and “transaction cost*.”

¹ By doing that we obtained the following results as of number of papers by theory (table 1). NIE and TCE are significantly more often applied to study location choice/internationalization than agency theory and behavioral theory.

Table 1. Number of papers found for each of the theories queried

Theory	Number of papers found
Agency theory	69
Behavioral theory	29
New institutional economics	210
Transaction cost economics	172

Additionally, we conducted a longitudinal analysis of publication activity on the topic per each of these theories from 1983 to 2021. The results are given in figure 1. They show that institutional theory has become an increasingly popular theory to study location choice/internationalization, whereas transaction cost economics is the earliest to and was the most used until 2015. The scope of application of agency theory grew in 2008-2016 but then started to decline. Such an arrangement indicates that institutional theory has the capacity to eclipse other theories, which, in turn, is fraught with lack of problematization on location choice/internationalization. In this paper we intend to show how different might be the focus of research depending on the theory applied.

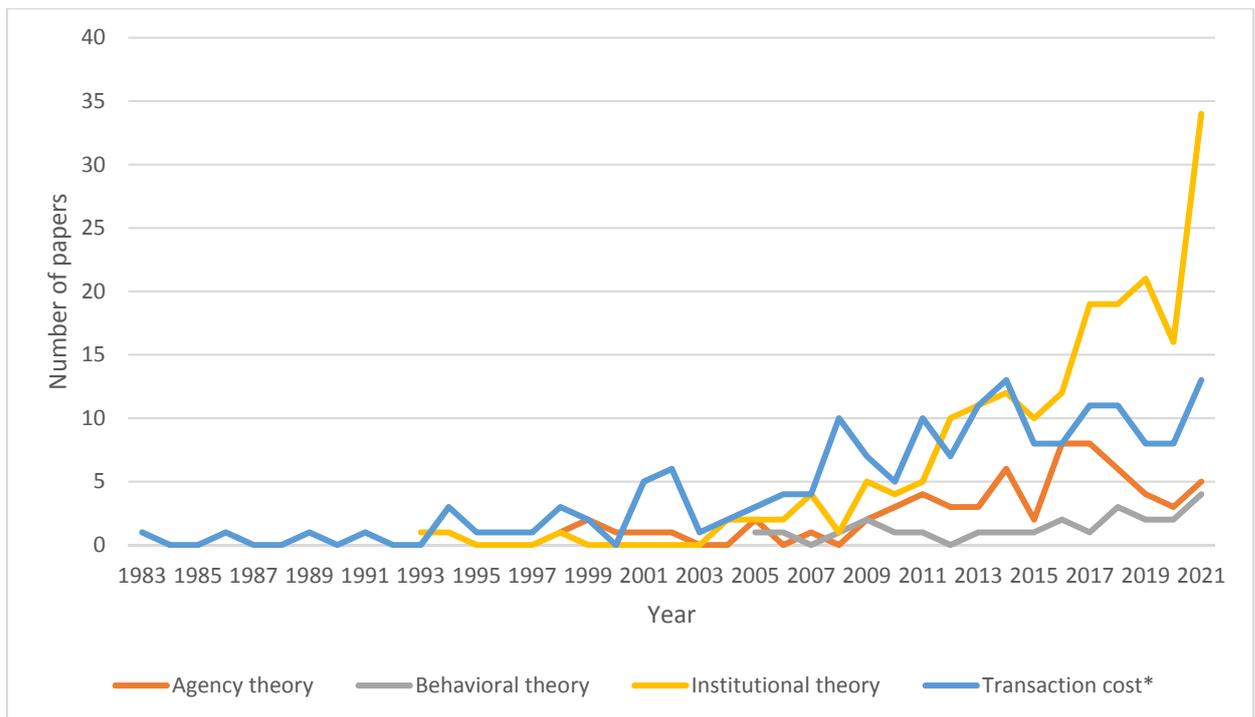


Figure 1. Papers per searched theory by year in the SCOPUS database

¹ We used “institutional theory” instead of “new institutional economics” because most of the authors do not go so far to explicitly define this particular strand; the convention is to refer to “institutional theory”. The same applies to TCE, where the authors are used to refer to “transaction costs”. Simultaneously, “contract theory” gave us only two results, whereupon we changed it for “agency theory”.

3. Agglomeration economies and diseconomies

Global city is characterized by a dense agglomeration of firms. This effect might have both positive and negative effects on MNE propensity to invest. The two common types of industrial agglomeration are Marshallian and Jacobs. Marshall (1920) investigated the impact of agglomeration within industry while Jacobs (1969) examined the effect of agglomeration of firms from various industries. The common externalities of Marshallian agglomeration list knowledge spillovers, availability of specialized services, variability of inputs, lower costs of supply, market information availability, pressure for innovation, access to infrastructure of public goods (Porter, 1990, 1998; Nielsen et al., 2017). It is to note that knowledge spillovers are generally negative for market leaders with increased innovation and vice versa for weaker firms (Shaver & Flyer, 2000). The positive effect of inter-industry agglomeration mainly consists in its increased entrepreneurial activity due to concentration of creative potential (Adler et al., 2019). One negative implication of location in global city is congestion associated with increased price for real estate. Therefore, benefits that promises location in global city should outweigh the increased costs relative to non-global city.

4. Contract theory and principal-agent problem

The contract theory can be used to analyze MNE location in global cities from the perspective of three different situations: establishment of subsidiary, HQ — subsidiary relations, and subsidiary — local partners relations.

4.1. *Establishment of a subsidiary*

The common ways to establish a foreign subsidiary are mergers and acquisitions (M&As) and greenfield investment (Tihanyi et al., 2005). In case of greenfield investment, the MNE experiences higher liabilities of foreignness due to lack of knowledge about the host location (Elango & Sambharya, 2004). Thus, MNE faces agency problem at two stages: (1) while resorting to consulting services that might provide incorrect information about the market and (2) while hiring employees and management, which is discussed next. In case of M&A, the MNE might be considered as the principal, and the seller of the subsidiary as the agent. Similar to the market for ‘lemons’ (Akerlof, 1970), the seller might know about hidden flaws of the subsidiary or risks in the market and conceal them to keep the price. Even if there are signals from the market, the non-local buyer may be unable to receive and interpret them.

Establishment of a foreign subsidiary follows two ownership structures, joint ventures (JVs) and wholly owned subsidiaries (WOS). JV implies participation of a local firm in subsidiary establishment. On one hand, this reduces MNE’s liabilities of foreignness. On other hand, its local counterpart might have an incentive to behave opportunistically and provide specific or biased information that will increase their profit on the expense of the MNE. Additionally, MNE investment is fraught with *hold-up* and *lock-in* problems where in case of contract breakup the MNE has to incur sunk costs.

The properties of global cities, in particular, stronger institutional environment, better access to information and local resources provide better incentives for greenfield investment and the establishment of WOS.

4.2. *HQ — subsidiary relations*

The agency problem for relationship between the parent MNE and the subsidiary is relevant for any entry mode. The management of the subsidiary might be considered as the agent of the HQ-principal, who has a particular set of interests in a given location; in correspondence to them, it delegates authority and responsibilities to the local subsidiary, whose management, in turn, may have its interests, inconsistent with the ones of HQ. In such case, their decisions may be incongruent with the goals of the MNE. To mitigate the opportunistic behavior of the subsidiary’s management the MNE may introduce monetary incentives such as performance-

related pay or various control mechanisms, implying collection of the information about the behavior of subsidiary management (O'Donnell, 2000).

However, in contrast to local facilities, monitoring costs for foreign facilities are higher due to geographical (increased transportation/connection costs), institutional (need to adhere to local laws and norms), and cultural (possible misunderstandings due to language barrier and differences in perceptions) distances. To cope with them, MNEs may resort to control outsourcing or the use of expatriates. While the former implies introduction of a third party in form of local firm, the latter helps to establish a link between the two cultures and mitigate possible misunderstandings.

Location in a global city is associated with lower geographic, institutional, and cultural distances, wherefore the monitoring costs are lower. This reduces the incentive for MNEs to resort to local expatriates (Dahms, 2019).

4.3. *Subsidiary — local partners relations*

Relations of the subsidiary with local suppliers/distributors can also be subject to agency problem. Lack of comprehensive information about available suppliers by the management of the subsidiary might lead to two types of undesirable situations. The first is when a bad supplier was contracted as a result of adverse selection (*ex-ante*). The second is when a good supplier was contracted but then commenced opportunistic behavior not able to cope with moral hazard (*ex post*). Both situations are also relevant for foreign investment. Thus, a foreign investor might underestimate risks due to lack of access to information both about the internal characteristics of the target firm and the external environment.

Global cities are considered to scale down liabilities of foreignness relative to other host country locations (Goerzen et al., 2013). *Global connectedness* implies that the principal has lower monetary and time costs to gather information about the activity of the agent and implement control mechanisms. The *cosmopolitan environment* of a global city contributes to the reduction of the agency problem through the increased opportunities for collection of the necessary information. *Agglomeration effects* of global cities inter alia manifest themselves in larger number of potential agents available. Competition pressures reduce their bargaining power and thus mitigate the hold-up problem. More severe competition between the agents may also result in more pronounced market signaling and therefore reduce the incentives for opportunistic behavior.

5. Behavioral theory of the firm

One of the key assumptions of the BTOF is satisficing behavior of firms. More specifically, a firm relies on performance feedback to equate it to the aspiration level and in case it is not reached it starts to spot the causes of underperformance (Surdu et al. 2021).

To illustrate how the characteristics of global cities can be studied in terms of BTOF we used four concepts: coordination of firm's stakeholders, problemistic search, learning by doing, and vicarious learning. Good connectedness with the outside world makes the face-to-face communication cheaper and easier and hence reduces the cost of coordination between stakeholders. In addition, it facilitates transfer of acquired knowledge within the MNE. Presence of APS in global cities might provide help of an independent party as an intermediary in negotiations between stakeholders. These firms may also be contracted for independent expertise (e.g., consulting) that will help the MNE to accommodate to the local market and increase the speed of learning by doing and vicarious learning. Cosmopolitan environment of global cities lowers the cultural distance between the foreign and the local stakeholders, which simplifies their coordination. For example, good level of English and intercultural awareness from both parties will mitigate the risk of miscommunication. Moreover, open-mindedness of local corporate elites fosters establishment of contacts with foreign MNE management. This can on one hand make the learning process easier and faster and on other hand provide the MNE with the non-open information about its competitors. Finally, inter-industry agglomeration increases the

competition pressure that, in turn, enhances the aspiration level and stipulates learning by doing. In addition, both inter- and intra-industry agglomeration provides opportunities for positive and negative knowledge spillovers that correspond to the vicarious learning concept in BTOF.

6. New institutional economics

NIE is a traditional field that provides theories for the analysis of location choice. Nielsen et al. (2017, p. 66) report that “there is general consensus that institutions (whether regional, national, or sub-national) shape the nature of business by providing the opportunities and constraints within which economic activity takes place”. MNEs have to operate in different institutional environments and generally prefer ones with strong institutions (Nielsen et al., 2017). Numerous studies apply the concept of institutional distance between the home location of the MNE and the location of investment to study how differences in their institutional environments affect the propensity to invest. As Chakravarty et al. (2021) emphasize, institutional distance is “a key determinant of FDI location choice” (p. 4).

NIE traditionally spots three pillars of institutions: regulative, normative, and cultural-cognitive, whereupon a firm gains legitimacy (Scott, 2013). Global cities in their essence have different institutional environment than other locations in the country. It is generally assumed to be stronger, more stable and business friendlier (Goerzen et al., 2013). Ethnic, linguistic, and religious diversity in a densely populated area fosters intercultural interaction that presupposes tolerance, cultural awareness, and empathy (Woods, 2018).

Good transport and information infrastructure facilitates international movement of people and knowledge and thus contributes to the cosmopolitan environment. MNEs may apply to APS to shape their operation in accordance with the local culture, laws, and norms, what increases MNE’s legitimacy. Cosmopolitan pro-market orientation of the local authorities provides opportunities for coordination of MNE activities with the needs of the region that can result in political embeddedness of the MNE. Cosmopolitan orientation of the normative institutions facilitates cooperation with local firms and infiltration into local corporate networks that also bring legitimacy. Tolerance and openness of local consumers reduces liability of foreignness and thus lowers entry barriers to the local market. Finally, agglomeration of MNEs enhances awareness of local authorities about implications of their operation and thus strengthens the institutional environment. Simultaneously, competition pressures encourage formation of stable and strong business culture. Both stronger regulative pressures and business cultures may have different effect on MNE propensity to invest depending primarily on its intentions (Roëll et al., 2022).

7. Transaction cost economics

Similar to NIE, TCE has been frequently used to analyze MNE location choice. This perspective assumes that among various alternatives the firm choose one that promises lower transaction costs (TC) (Williamson., 1991). Transactions can be defined as “the *ex-ante* costs of drafting, negotiating, and safeguarding an agreement and, more especially, the *ex-post* costs of maladaptation and adjustment that arise when contract execution is misaligned as a result of gaps, errors, omissions, and unanticipated disturbances” (Williamson, 1996, p. 379). TCE traditionally assumes three alternatives to organize economic activity: markets, hybrids, and hierarchies. Market transactions often imply formal, short-term, negotiated contracts. Hybrid transactions refer to a longer-term relationship in form of joint ventures, alliances, or partnerships. Hierarchical structure shapes the activities within one firm (Crook et al., 2013). With focusing on contractual agreements, TCE can be applied in couple with contract theory.

Good connectedness decreases the costs of information search, bargaining with personal involvement into multiple sessions, as well as supervision of the subsidiary. It also reduces the costs of investment associated with transportation of goods and people. APS may be contracted to monitor the subsidiary, collect necessary information, and help shape the organizational design in accordance with the local institutional environment. Additionally, they may be

contracted to act as intermediaries in negotiations with the state, the citizens, and other firms. Cosmopolitan environment lowers all costs associated with personal interaction due to lower institutional distance. These include search, information, bargaining, supervision, lobbying, PR, personal management, monitoring. At the same time, in some contexts authorities and citizens in global cities may have higher expectations about the behavior of MNEs, e.g., CSR activities, than elsewhere in the region. Finally, agglomeration of other firms is associated with competitive pressures that may depending on market conditions increase bargaining costs among MNEs that intend to contract local firms or decrease them in case there are many similar local firms seeking for contact with the MNE. Simultaneously, competitive pressures may increase the costs of defense against takeovers of skilled employees and management (negative knowledge spillovers) and the costs of bargaining with the state and the citizens, who may opt for a competitor with a better offer.

8. Conclusion

In this paper we showed how four economic theories, contract theory, behavioral theory of the firm, new institutional economics, and transaction cost economics can be used to study MNE location in global cities. In addition to international connectedness, availability of advanced producer services and cosmopolitan environment, traditionally used to describe global cities, we included the fourth property, agglomeration effects. These four characteristics determine the behavior of MNE and thus affect location choice. The results are summarized in table 8.

Table 8. Global city characteristics and potential foci of research within each of the four theories

	Connectedness	APS	Cosmopolitanism	Agglomeration effects
Contract theory	<ul style="list-style-type: none"> - Lower costs of agent control and coordination - Lower shift costs 	Outsourced expertise and control to the local branches of APS	Better availability of information about potential counterparts	Competition pressures on agents, higher bargaining power of the principal, lower shift costs
Behavioral theory of the firm	<ul style="list-style-type: none"> - Lower costs of stakeholder coordination - Easier knowledge transfer within the MNE 	<ul style="list-style-type: none"> - Opportunities for mediation in negotiations - Availability of independent expertise - Availability of consulting services may accelerate learning process 	<ul style="list-style-type: none"> - Lower cultural distance - Easier access to insider information about competitors through corporate networks - Learning is easier and faster 	<ul style="list-style-type: none"> - Higher competition pressure stipulates higher aspiration level - Higher competition pressure stipulates learning - Knowledge spillovers
New institutional economics	Accelerates reciprocal flow of people and thus contributes to cosmopolitanism	<ul style="list-style-type: none"> - Legal services help understand the local laws and deal with them - Consulting and marketing services help to 	<ul style="list-style-type: none"> - Opportunities for coordination with the regional authorities as well political embeddedness - More global values and norms 	<ul style="list-style-type: none"> - Experience of legal institutions of dealing with MNEs fosters stronger regulative pressures - Strong and

		increase legitimacy in the local market	decrease cost of accommodation and infiltration into corporate networks - Openness of local consumers and partners decrease liability of foreignness	stable business culture
Transaction cost economics	- Lower transportation costs imply lower costs of search, bargaining, and supervision - Reduced costs of investment and transfer	- Use of APS secures lower information and bargaining costs - Outsourcing may reduce costs associated with organizational design and monitoring - APS may help in setting up PR and GR agenda	- Lower search, information, bargaining, and supervision costs due to lower institutional distance - Reduced costs of investments in lobbying and public relations, personal management, and monitoring - Costs of bargaining with the state and the citizens may be lower or higher depending on the firm characteristics and market conditions	- Increased competitive pressure may increase or decrease bargaining costs depending on the market conditions - Competitive pressure may increase the costs of defense against takeovers - Competitive pressure increases the cost of bargaining with the state and the citizens

All these implications of global city characteristics in the light of these theories might be considered as directions for further research. Contract theory, together with TCE can be applied for finer-grained research on relationships between the headquarters and a subsidiary located in a global city in contrast to one located elsewhere in the region or on relationships of the subsidiary with other firms in the global city. BTOF can provide new insights into how the environment of global cities affects the decision-making process of the subsidiary. NIE has been common to analyze location choice. Yet, given that IB theory on global cities is in “emerging state”, as Chakravarty et al. (2021) contend, it can still be used to study the differences in institutional environment across global cities and in global cities as compared to other cities. Additionally, these theories can be used for a dynamic analysis of MNE operation at different phases of operation in a particular market.

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Personal Sanctions as a Proxy for Political Connections: Evidence from Russia

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Abstract:

The paper is devoted to the interpretation of personal sanctions imposed by the Western countries on the Russian richest entrepreneurs in two waves, i.e. 2014 and 2022 and its impact on political connections. Highly personalized nature of interactions between the Russian richest entrepreneurs and the ruler (the President) has the significance to make fortune in the Russian export-resource economy. The authors demonstrate that selective sanctions 2014 were against the «inner circle» oligarchs, who had the strongest political connections (highly personalized and credible) with the ruler. Sanctions 2022 were the total and they touched the richest entrepreneurs who were not from the «inner circle» but they were the «bridge» between the West and the ruler. New constraints are to force the richest entrepreneurs to make ultimate the choice between their Western assets and «lush life» and their connectedness to the national ruler.

Keywords: *foreign policy, personal sanctions, political connections*

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1. Introduction

International experience shows that political connections of big business play a key role in the realization of commercial interests in developed nations as well as in the countries with emerging markets (Nee and Oppen, 2010). These connections provide competitive advantages on the economic markets and allow major entrepreneurs to obtain privileged access to factors of production. Interplay between major entrepreneurs and government officials can be analyzed as a part of industry lobbying (Olson, 1965), when firms form narrow groups with special interest to push their proposals through the political-bureaucratic process in the legislative body. Cases of industrialized democracies show that big business uses political connections indirectly and it exploits the failures of the government to extract political rents (Monardi and Glantz, 1998; Claessens et al., 2008). Major entrepreneurs are directly involved in interacting with politicians and officials to regulate conditions for doing business in emerging markets. They use political connections directly that to design institutional environment favorable for firms performance.

Russia is one of the countries with emerging markets. Previous studies of the authors showed that entrepreneurs were to have political connections to do business in the regions, and even that to generate Schumpeterian innovations and to produce added value it was crucial for them to cultivate political connections with representatives of regional and local authorities (Levin et al., 2017). Political ties between entrepreneurs and local politicians and officials were highly personalized and this fact meant that all participants in political and economic interaction, i.e. political leaders, professional civil servants, owners and managers of large companies behave not in accordance with their formal social roles, but as persons included in a closed vertical social network. (Levin et al., 2021). The value of political connections in the Russian economy in historic perspective was revealed in the study (Levin and Sablin, 2020). It was highlighted that there were path dependence and lock-in effects in the processes of political, administrative and economic functions performing by politicized administrators and politicized entrepreneurs.

These actors are successors of Soviet party-political and economic nomenklatura to perform these functions.

High level of personalization and informality are characteristic features of connections between the government and big business in contemporary Russia. As S. Barsukova mentioned «under the slogans of legalizing the economy and fighting corruption, the administration found new informal ways to manage and control big business, assigning the «kings of government contracts» to implement projects as a marker of loyalty to the President's administration and a precondition for continued business success» (Barsukova, 2019). For major entrepreneurs to be engaged in the government projects and programs realization means to be politically loyal to the President as a ruler and to get formal and informal privileges in the Russian economy. However, political connections may not only to secure benefits but also they may be the source of risks and threats (Prasetyo, Nasution, 2022). Sanctions imposed by Western countries (USA, the EU) had personal dimension and impacted greatly to the behavior of the Russian richest entrepreneurs called «oligarchs». Further in the study we use the term «billionaires» that is equivalent with «major entrepreneur» and «oligarch», and means a person who is a holder of solid political capital/connections those allow him to actively seek and extract political rents on the economic markets, domestic as well as international ones.

2. Data and Methods

The personal sanctions against Russian billionaires were mainly related to Russia's foreign policy actions, namely 1) the «integration» of Crimea in 2014 and 2) a full-scale invasion into Ukraine in 2022. The motivation for the sanctions was that they were imposed against Putin's «inner circle», individuals who «have Putin's ear». Thus, Russian billionaires can be classified into 3 groups: under sanctions since 2014, under sanctions since 2022, and not sanctioned. Our data include information about assets of the wealthiest Russian for 8 years (2003-2010) before the dramatic turn in Russian foreign policy in 2014, collected from the ranking published in business journal Finance. Our approach is similar to the one used in (Grigoriev, Zhirkov, 2020). The rankings were based on expert evaluation of the total value of the individual wealth. The dataset is expanded with information about individual level sanctions imposed on Russian wealthy individuals from 2014 to 2022 year. Our hypothesis is that individuals who were later sanctioned enjoyed political connections in 2003-2010 that allowed them to increase their wealth significantly faster than those without connections (that is those who were not sanctioned in 2004-2022). We classify sanctioned individuals into two groups: billionaires sanctioned after 2014 but before 2022 and individuals sanctioned after 2022. We assume that the first group is the most politically connected individuals among Russian business elite, while the second group has weaker connections.

To estimate the association between belonging to the groups of individuals which were subsequently targeted by personal sanctions imposed by the US and the EU, we follow use panel GLS regression with standard errors clustered on the level of individuals. Observations are person-years indexed as $i=1, \dots, I$. Wealth individuals are grouped into 3 categories: under sanctions since 2014, under sanctions since 2022, and not sanctioned indexed $k=1, \dots, K$ and industries indexed $h=1, \dots, H$. Assets are modelled using sanctions groups, time, and industry:

$$\ln(Wealth) = \beta_0 + \sum_{k=1}^K \beta_{1k}(Sanctions)_{ik} + \beta_2(Time)_i + \sum_{h=1}^H \beta_{4h}(Industry)_{ih} + \varepsilon_i$$

Overall, we estimate the effect of belonging to the group of sanctioned individuals affected both asset level and asset growth.

3. Preliminary Results and Conclusions

We assume that Russian billionaires sanctioned in 2014 were the chosen members of the «inner circle» of the President (the ruler). One may note that this «inner circle» does not have fixed number of its members and its borders are very flexible according to the various factors (including the mood of the President). According to two waves of the Western sanctions (2014 and 2022) against the Russian richest entrepreneurs we may measure the level of significance and strength of political connections and to observe the dynamics of fortunes made under the President. For instance, his cronies G. Timchenko and A. Rotenberg as well as his former relative K. Shamalov were in the top five private beneficiaries of Russian government contracts in 2015. Rounding out the top five was I. Rotenberg (the son of A. Rotenberg). Personal sanctions 2014 had selective nature and they were against the «inner circle» oligarchs who were the cronies and the holders (but not the owners) of the most lucrative assets in the Russian economy. Sanctions 2022 had total nature and touched the Russian richest entrepreneurs who performed dual functions and played the role of «bridge» between the global markets (the source of the newest technologies and finances) and the national ruler. New constraints form the conditions for the «bridging» richest entrepreneurs to make the ultimate choice between the West and the national economy and the role of politicized entrepreneurs.

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Network Effects and Digital Protectionism: Market View of the Problem

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Abstract:

The article analyzes the influence of network effects on the growth of the usefulness of digital platforms. The concept of network effects has been used to study the process of digital protectionism. We have identified the level of positive and negative effects of digital protectionism. In general, the graphical interpretation indicates a decrease in the level of the platform's utility after the introduction of digital protectionism. This is connected both directly with a decrease in the network effect, and with a violation of established links between nodes. The aim of the work is to simulate the utility of the platform before and after the implementation of digital protectionism policy using the network effect concept, as well as various micro- and macro-modeling methods: perfect competition model, Forchheimer's dominant firm model assumptions, supply and demand model, and consumer preference model.

Keywords: *network effects, digital protectionism, externalities.*

1. Introduction

A firm's use of digital technologies enables the activation of direct and indirect network effects [Parker, Alstyne, & Jiang, 2016]. The scale of the network is a critical enabler of value creation and appropriation. In the era of digitalization, many states are returning to the use of protectionism, which in this case is called digital [Markova & Meleshkina, 2021].

The nature of digital protectionism is largely similar to protectionist policies in the traditional sense, but the scale of the digital economy, the volume of personal data collected and the global nature of digital markets create a more complex model of protectionism - involving mechanisms for protecting personal data, antitrust control over the presence of digital companies in the markets, and protection of the results of intellectual activity. In the article [Aaronson, 2019] the idea of digital protectionism is completely opposed to the foundations of traditional protectionism. Indeed, the products of the digital environment are mainly focused on information. Information is intangible and has no physical form, but it can still be traded, and some information is a public good. The properties of information make it difficult to establish international rules to limit digital protectionism without common norms and definitions [Mueller & Grindal, 2019].

The aim of the work is to simulate the platform utility before and after the implementation of digital protectionism policy using the network effect concept. The novelty of the work lies in: 1) study and modeling of the concept of digital protectionism from the point of view of the theory of network effects; 2) comparison of the network effect with market mechanisms (using the Forchheimer's model).

2. Literature review and theoretical foundations

Only 9 articles were found on the Scopus platform for the keyword "digital protectionism", 3 of which belong to researchers from Russia. The selected works have mainly dealt with the legal and political aspects of digital protectionism. However, all articles missed the factor of network effects and the role of established social contacts; the authors did not build microeconomic and macroeconomic models. Protectionism includes places of data storage, control of content, payment schemes and similar [Liu et al., 2022]. In this paper, Metcalfe's law

was adapted for analysis within the framework of market models, conclusions were drawn about the effectiveness or ineffectiveness of digital protection.

Digital platforms exist within microeconomic market models. According to [Thiel & Masters, 2015], one of the founders of PayPal, monopolies are the main engine of technological advancement in digital platforms. This is explained by the desire of the monopolist to receive stable monopoly income for many years. A business must start operating in the narrowest markets. So, Facebook was created for Harvard students. Network effects can reduce consumption among customers when the monopolist chooses optimal non-linear pricing [Lancieri, F. M. 2018]. The direction and extent of these distortions depend on the relative rates of change of marginal intrinsic cost and marginal network cost depending on the type of client [Sundararajan, 2004].

Robert Metcalfe's law states that "the value of the network increases in proportion to the square of the number of its users: n^2 " [Metcalfe & Boggs, 1976; Metcalfe, 1996]. In 2013 Metcalfe published an article where he recommended dividing the utility value of the network by 2: $n^2/2$ [Metcalfe, 2013]. These disagreements are associated with the logical development of the law itself, the emergence of new theories and practices, as well as the emerging DotCom bubble (1995-2001), which culminated in 2000 [Ofek & Richardson, 2003].

The network effect of a two-way market occurs when two groups of users create added value for each other [Rochet & Tirole, 2003]. Two-way markets (or networks) are those network markets (with embedded network effects) between two groups of users for which the purposes of using the network are different [Yablonsky, 2013].

3. Methodology

The methodology for further research consists of the following points: 1) research of market models, in particular the Forchheimer's model; 2) the study of marginal costs in the context of network effects; 3) simulation of digital protectionism.

The Forchheimer's dominant-firm model will be used as the main market model, where the following basic prerequisites exist: 1) the dominant firm has complete information about market demand and the aggregate supply function of competing firms, and also has a cost advantage [Llanes, Mantovani, & Ruiz-Aliseda, 2019]; 2) competing (follower) firms determine production volumes based on the price set by the dominant firm [Levitan & Shubik, 1972]. An understanding of the Forchheimer's market is necessary to introduce certain constraints and assumptions into the model.

Thus, competing firms act as firms in a perfectly competitive market and produce a volume of output such that their marginal cost equals the price set by the dominant firm [Edgeworth, 1897]: $P_L = MC_F(q)$. The dominant firm, knowing the market demand function $Q^D(P)$ and the aggregate supply function of competitors $Q^S(P)$, determines the residual demand for its products: $Q_L^D(P) = Q^D(P) - Q^S(P)$, which allows it to estimate the marginal revenue function $MR_L(q)$ and find the profit-maximizing volume of production q_L^* based on the condition $MR_L(q) = MC_L(q)$.

Forchheimer's dominant-firm model seems to be the most preferable for assessing market effects, since in the digital platform market there is usually one large dominant firm and several follower firms with a smaller audience. In Forchheimer's dominant-firm model, the demand and output of the leading firm and n firms in the competitive environment obey a simple relationship: $Q = Q_D(p)$. In the model below, the price will mean the dependence of the release (the platform's ability to function, its capacity) on the number of users (n). Followers take the price p and choose the volume of supplies (platform capacity):

$$q_i^*(p) = \arg \max \pi_i(p, q_i) = \arg \max (pq_i - TC_i(q_i)) \text{ by } q_i$$

Before analyzing the market, several assumptions must be made:

1) With an increase in the number of users, marginal cost (MC) decreases much faster than the growth of marginal revenue [Chu & Lee, 2020]. We note a few important areas in Fig. 1A. At the level of line 1, the marginal cost of acquiring a new user is extremely high. At the level of line 2, a fracture occurs, the audience becomes enough for the platform to start functioning normally, marginal costs begin to decline. At the level of line 3, the optimum is reached, here the marginal revenue is equal to the marginal cost (MR = MC). At the level of line 5, the digital platform is almost saturated, the functions and role of the supervisory authority are reduced, the platform becomes "self-governing" [Shastitko & Parshina, 2016].

2) An important concept in assessing market processes in the analysis of network effects is "critical mass". At this point, the value derived from using the product or service is greater than or equal to the price. In the marginal cost model (Fig. 1B), the critical mass corresponds to the intersection of the Metcalfe curve ($V_{Metcalfe}$) and the marginal cost curve (MC). "Added value" will mean the difference between the minimum required value ($V_{1(min)}$) and the optimal value ($V_{2(opt)}$).

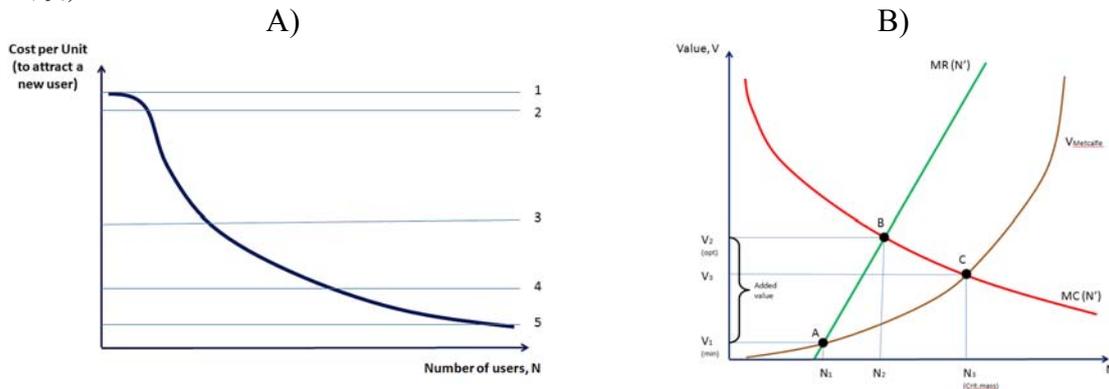


Fig. 1. A) Costs in the case of network effects; B) The model with the network effect. Source: built by the author

The optimal value will be understood as the point of intersection of the MR and MC curves. For the most part, this point characterizes the platform's break-even point and has value in market analysis. Minimum value ($V_{1(min)}$) - a value that reflects the required minimum value with the minimum required number of users (N_1). The minimum value shows at what value the platform begins to receive some funds. Next, we give a mathematical justification for this model. For the model (the point corresponding to the user level, for the convenience of calculations, we will introduce the point N_4 - this is the intersection point of the MR and V graphs in the upper part - this point is not visible on the graph):

$$PS_1 = \int_{N_2}^{N_3} (MR(N) - MC(N))dN + \int_{N_3}^{N_4} (MR(N) - V(N))dN$$

4. Findings: effects of digital protectionism

Protectionism in this case is interference in the market mechanism (in the system of "perfect competition"). The resulting surplus (PS_{new}), the protector will take for itself. Even though the largest player in the market will be eliminated, this will lead to the emergence of a local monopolist. In the case of a monopoly (albeit a local one), the monopolist seeks to take all the free consumer surplus (CS) for itself. Measures of digital protectionism, under certain conditions, can facilitate the entry of domestic startups into the market [Topornin, Pyatkina, & Bokov, 2021]. This happened, for example, in Iran, where Facenema and Soroush appeared in the absence of world-class competitors - Facebook and WhatsApp [Yalcintas & Alizadeh, 2020]. Here it makes no sense for the domestic platform to increase its marginal costs, so the MC curve shifts downward.

Marginal revenue, on the one hand, will be lower than in a situation without digital protectionism. This can be attributed to the loss of a significant audience to join the platform [Marel, 2019]. On the other hand, the protector company takes away the absolute consumer surplus. Thus, it is rather difficult to assess how the indicator will react after the introduction of protectionism. For simplicity, we will accept the fact that the marginal revenue remains unchanged. The movement of the Metcalfe curve to the right (with a decrease in the area under the new curve) is due to a decrease in the potential audience. The effect on the critical mass required depends on the degree of variability in the Metcalfe curve. Depending on how radically the position of the curve changes, the critical mass can either decrease (Fig. 2A), increase (Fig. 2B), or even remain at the same level (Fig. 2C). If the company with protectionism and reduced costs does not lose very much in utility, then the critical mass may decrease; if the decrease in utility is significant, then the company will need to attract more users in order to gain financial stability; if the decrease in utility neatly cancels out the marginal cost, then there will be no change in the context of the critical mass.

Different digital platforms are able to respond in their own way to interference with their networks and their effects. From the point of view of practice, various models of protectionism can be considered: from a complete ban on foreign platforms to “softer” methods of regulating the market through taxes, “slowing down” traffic, etc. Next, we will consider 2 options for protectionism: 1) a complete ban on the foreign platform; 2) increase in taxes.

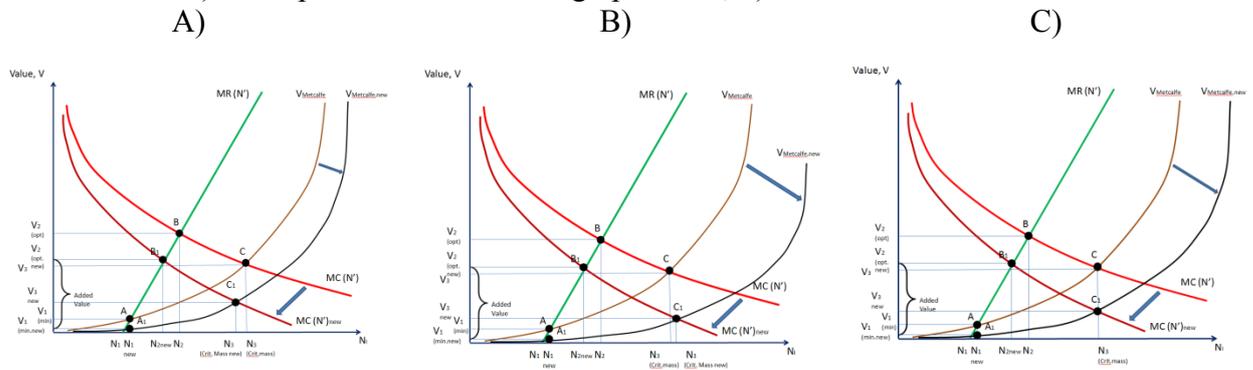


Fig. 2. Graphical interpretation of digital protectionism in Iran with variations in critical mass changes: A) decrease in critical mass; B) an increase in the critical mass; C) constant critical mass. Source: built by the author

The first option implies the complete elimination of the foreign platform, which frees up a certain number of users. The assumption must be made: most of the remaining users will go to the tread side. Users who will not go to other platforms are dead weight loss (DWL), the surplus of the losing side will take the tread. The second option involves transferring the surplus of the foreign platform in favor of the tread.

5. Conclusion

The analysis carried out in this study has a number of assumptions and shortcomings. Like many microeconomic theoretical concepts, it does not imply a deep immersion in empirical research. In subsequent works, it is planned to expand the mathematical base of the model.

Based on the study, the following conclusions can be drawn. Firstly, for market modeling, we use the Forchheimer’s model. The model assumes the presence of a dominant firm and several small firms that coexist in a perfectly competitive market. With the introduction of digital protectionism, conflicting results can be observed. With the artificial separation of the audience and the market, the potential usefulness of the platform is lost. For investors and advertisers, this is an alarming sign, since: 1) the results and speed of the future capitalization of the platform are questionable: a smaller possible audience coverage leads to slower growth in the future; 2) less motivation to buy ads, which reduces cash flows. On the other hand, the company

does not feel pressure from the dominant platform, and therefore takes the remaining surplus for itself.

Secondly, digital protectionism can both promote the development of domestic platforms and hinder them. Optimizing utility, value, and revenue in imperfect markets is extremely difficult. The paper emphasizes the importance of taking into account primary market factors before making any radical decisions. The study shows that with the wrong approach, DWL can be significant both in the case of a foreign company and in the case of a domestic company. Despite the versatility of the constructed model, different types of networks can behave differently. In further research, one can check the quality of market modeling and explore other methods.

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Fitting Strategies of Chinese Companies in Russia Under Sanctions

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Abstract:

Under the context of recent sanctions against Russia, the withdrawal of international companies from the Russian market has been attracting global academic attention. Noteworthy, firms from third-countries that do not support sanctions are remaining in the nation and attempt to capture the emerged market opportunities. Case in point, Chinese firms have sustained their normal trade relations with Russian partners. This study aims to identify how Chinese firms can optimize their operations in Russia. Based on empirical specifications collected from interviews with practitioners and academics, we have conducted a qualitative analysis. We find that firms should pay attention to the utilization of institutional support and social assistance and intensify innovation efforts. This research contributes to the international business literature through enriching the understanding of the influence of sanctions on firms' strategies in foreign markets. It also provides managerial implications for practitioners who are suffering from sanctions and try to find solutions.

Keywords: *Russia, sanctions, Chinese companies, fitting strategies.*

1. Introduction

The Western sanctions imposed on Russia have been the focus of global attention over the last few months, which dealt a catastrophic blow to the Russian domestic economy, adding to the sluggish market that has been in place since 2014 (Panibratov, 2021). Continually, the West strengthens sanctions to an unprecedented level with a full range of measures, including bans on investments and sovereign debt transactions, odd segments of Russia's links to specific advanced technologies, restrictions on transactions of high-end products and travel of target individuals, airspace closures, and SWIFT delisting (Strohecker, 2022). The isolation against the Russian economy poses challenges to its business sector, such as damaged logistic chains, restricted imports of high-tech products and components, and limited exporting channels (Osipovich, 2022). Noteworthy, the voluntary withdrawal of massive international companies from Russia seems more dramatic. Some companies have closed indefinitely, some have chosen to suspend operations, and others have just cancelled further expansion plans but maintained current operations (Sonnenfeld, 2022). After years of operating on the Russian market, world-renowned companies like Coca-Cola, Microsoft, and Apple announced their partial or complete cessation of operations in Russia.

On the contrary, numerous firms from third-countries, who are neutral on the imposition of sanctions, maintain normal operations in the Russian market (Horwitz & Goh, 2022). For instance, Chinese firms have been keeping their existence in the Russian market. However, for those from high-technology industries and Chinese state-owned banks, the Western has already condemned these firms for helping Russia in mitigating the effects of sanctions. Facing adverse external interruptions, legitimacy and stability of Chinese commercial activities are severely challenged. Therefore, it is vital to explore how Chinese firms can address challenges yielded by sanctions in the Russian context.

We found it valuable to investigate from the third-country perspective owing to the two following reasons. First, despite the fact that sanctions have been an increasingly important topic in international business community, scarcity persistently exists in the micro-level, more precisely, the countermeasures of companies in the organizational level. Second, imposing sanctions seems to be a major and reused tool for great nations to reach their political goals, but

business operations are those who suffering the most. Therefore, we deem it is necessary to clarify the picture and elucidate how sanctions affect companies' behavior. To solve the detected gap and problem, we pursue to answer the research question: *how Chinese companies can tailor their strategies and fit the sanctioned Russian market?* We address this research question through applying the contingency perspective and strategic fit approach, since the Russian market environment has been dramatically destroyed and firms need to implement appropriate strategies for adapting to the environmental dynamics.

2. Theoretical Background

Subjected to the market turbulence, the passive and reactive approaches, such as reducing the production (Argyres et al., 2019) and cutting employees' wages (Du Caju et al., 2013) hardly can achieve the desired result. Companies can deal with negative interference from outside by getting institutional assistance. Pond (2017) proves that under sanctions firms turn to the government for market protection policies, thus avoiding the drawbacks due to dysfunctional market mechanisms. Government-provided institutional capital is a key factor in the ability of businesses to endure the pressure of sanctions (Panibratov, 2021). Besides, Garg and Delios (2007) imply that creating a business group affiliation can improve international companies' chances of surviving in challenging circumstances. This agglomeration effect, which portrays companies bundled together to create a cluster, is highly presented by emerging market firms in overseas markets to overcoming negative effects of environmental dynamics (Liu et al., 2018). Additionally, businesses can still include innovations in their responsive tactics. In difficult economic circumstances, some businesses favor innovative strategies to build competitive advantages (Afshar Jahanshahi & Brem, 2020). Panibratov (2021) also claims that innovation activities by businesses are crucial in preventing the detrimental effects of sanctions.

Given what we have stated so far, the sanctions have dramatically disrupted the Russian market conditions, putting Chinese firms in Russia under unprecedented pressures. These firms are supposed to adjust strategies to fit the environmental dynamics. Therefore, we will apply the contingency perspective and strategic fit approach (Drazin & Van de Ven, 1985) to specify those contingencies and the methods for Chinese firms to integrate into the Russian market.

3. Method

The Russian market that is under sanctions serves as the study's context. At first instance, it is under both external and internal pressure caused by sanctions (Osipovich, 2022). However, the Russian market appears to be promising with numerous Chinese firms interested in it. Due to its current level of distinctiveness, the Russian market is well-equipped, and its contextual evidence has made important contributions to the current study (Corner et al., 2021). We therefore made the decision to explicitly contextualize the research (Tsui, 2004). Given the intricate and underappreciated nature of the present sanctions against Russia, as well as the consideration of applying the contingency perspective and strategic fit approach, it is necessary to conduct an exploratory qualitative analysis to clarify the picture (Gioia, 2021; Qamar & Child, 2021). This method makes it possible to investigate current occurrences when academics are attempting to provide "what" and "how" answers within the context of real-life situations (Yin, 1994).

To explore strategies of Chinese companies fitting sanctioned contingencies in the Russian market, we first collected primary information through 32 in-depth semi-structured interviews. Those interviews were performed in both Mandarin and Russian to guarantee cross-culture communication (Ryen, 2002). The informants who participated in our interviews included directors of local NGOs, academics, journalists, commentators and most importantly, business practitioners.

In addition, we screened and collected secondary data from publicly available database. The data sources included mainly latest articles from authoritative international news agencies, such as the Reuters (UK), Washington Post (US), TASS (Russia), and Xinhua (China). Besides, we also extracted Sino-Russian trading data from typical statistical databases, such as the Trading

Economics database, Federal State Statistics Service of the Russian Federation (Rosstat), and the 2021 Statistical Bulletin of Chinese Outward FDI (MOFCOM), in order to identify the main industries and sectors in which Russia and China has been cooperating intensively in recent years. Moreover, we still acquired a significant amount of pertinent commentary, news announcements, reflections, blogs, and organizational reports, which were cross-checked and triangulated primary data (Nielsen et al., 2020).

4. Findings

The first step in internationalization is always to understand the “rules of the game” in the target host markets (North, 1990). For businesses to make expansion decisions and establish legitimacy, it is essential to understand policy declarations and legal frameworks (De Villa et al., 2015). In the meanwhile, pro-market institutions can efficiently support commercial activity (Tang, 2021). In this case, Chinese firms in the Russian market ought to process a solid institutional capability and build political ties with governments, so that institutions could help them. Fortunately, Chinese firms do not find this to be a particularly challenging process. Relations between China and Russia in the modern period are still largely cordial; both nations uphold the ideology of win-win cooperation and work together to establish an ideal institutional setting for international trade. Russia and China signed a joint declaration in May 2015, officially announcing the alignment of the Chinese Belt and Road Initiative (BRI) with the Eurasian Economic Union (EAEU); the two sides jointly promote the integration of the Eurasian region (Bossuyt & Kaczmarek, 2021). Moreover, the two heads of state met during the opening ceremony of the Winter Olympics in Beijing on February 4th, 2022, and signed a total of fifteen documents on cooperation in the fields of trade, environmental sustainability, science and technology, sports, space, digitalization, etc. (Ma, 2022).

Friendly interstate relations have consistently produced favorable operating circumstances for Chinese businesses (Stronski & Ng, 2018). Both Russia and China provide sufficient institutional support, paving the way for firms to expand and operate. Understanding Russian business rules and utilizing current policy supports are Chinese firms’ main concerns. A mature institutional competence for utilizing institutional capital and legitimate business operations must be developed in order to achieve this. Chinese companies could implement non-market strategies to build their political ties (White III et al., 2021). Except for measures such as lobbying and involving local stakeholders, undertaking corporate social responsibility (CSR) is probably the most desirable strategy in the current Russian market (Steblyanskaya et al., 2021).

Chinese companies can also benefit from informal aid by creating or joining local business networks. Chinese companies are intended to create a network of connections when entering uncharted markets or dealing with challenging circumstances, utilizing the “*Guanxi*” (Chinese word, means relationships) as a springboard to receive market information and sustain operation (Du et al., 2021). For Chinese firms, engaging in business activities and exchanging information within their networks are simultaneous: participating and communicating in social gatherings, in parallel, formulating vertical partnerships or joining peer-commercial projects (Liu et al., 2018). For example, large Chinese MNEs will attract small private firms to the host market. This generates linkages between MNEs and small firms, as well as supports of MNEs to them. Likewise, business newcomers will see guidance from remainders in the Russian market. This phenomenon is common among Chinese firms operating abroad. Identifying and leveraging social networks has become an effective way for Chinese companies to internationalize and perform smoothly in host markets (Kostova et al., 2021).

Remarkably, units involved in the Russia-based Chinese business networks are not limited to companies from China. Members of the network also continue to include people, companies, and organizations from the host nation (Russia) (Rechberg & Guo, 2019). It can be done through hiring local workers, making friends with peer businesses, or forging strong alliances with upstream and downstream enterprises. In the sanctioned Russian market, both purely Chinese

and mixed Russian Chinese networks will be broader and the connections within networks will be stronger (Sandano et al., 2019).

The last choice for Chinese firms that all of our informants have emphasized is the promotion of innovation activities (Panibratov, 2021). For them, encouraging creative activities is an essential part of their strategy to fit the sanctioned contingencies of Russian market. Firms operating in global markets strive to innovate their products to make their goods more appealing, improving their competitiveness and market share (Li et al., 2021). But this is not the same as we understand from practitioners' feedback. Product innovation can help a company succeed, but it may not be the best strategy for a market that is undersupplied as a result of sanctions. The current Russian market is in dire need of substitutes to fill the market gap. Comparatively, production innovation plays a more decisive role in controlling the risk of being sanctioned. In order to reduce external dependency, Chinese firms should implement production innovation and avoid using raw materials, components, technology, or equipment from the countries that initiated the sanctions in the manufacturing of their exports to Russia. Besides, the potential for business process innovation in cross-border trade when applying digital platforms is equally attractive. Russian e-commerce platforms, such as the "Ozon" and "Яндекс Маркет", could see a large number of stores starting to sell Chinese goods soon. Russia has numerous skilled personnel in computers, and Chinese Internet companies have more advantages in terms of capital and management experience; innovation strategies could be the most effective approach for Chinese firms to fit the sanctioned Russia.

5. Conclusion and contribution

Sanctions have devastated the Russian economy, Chinese companies can maintain their operations and fit the detrimental market environment through leveraging institutional and social assistance and implementing innovation approaches. The present paper contributes to the international business literature by focusing on the current sanctioned Russian market and exploring the fitting strategies of Chinese firms to the adverse contingencies. We discuss and present the idea of critical capabilities inhibiting Chinese Firms' decision-making in the Russian market, advancing the strategy literature through adopting the contingency perspective and strategic fit approach.

For managerial implications, our results suggest practitioners cultivate capabilities to build political ties and derive institutional capital; and to leverage informal supports and build friendly social linkages; promoting innovative activities to ensure the market security and improve firms' operational performance. This set of solutions is well suited to the currently sanctioned contingencies and provides meaningful guidance for the Chinese business activities.

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The Impact of Corporate Environmental Responsibility on Enterprise Value - Empirical Evidence from China

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Abstract:

This paper takes Chinese steel enterprises from 2011 to 2021 as a research sample, and based on stakeholder theory, examines the impact of corporate environmental responsibility on enterprise value. Empirical research shows a significant positive correlation between corporate environmental responsibility and enterprise value. At the same time, green innovation plays an intermediary role in the relationship between corporate environmental responsibility and enterprise value. This paper expands the research on the influencing factors of enterprise value and the economic consequences of corporate environmental responsibility. It provides valuable inspiration and empirical evidence for sustainable corporate development.

Keywords: *corporate environmental responsibility, enterprise value, sustainable corporate development*

1. Introduction

China's economic development has entered a new normal. The government actively promotes the development of a green and high-quality economy, emphasizing that the economy should not be developed at the expense of resources and the environment. As the main force of economic development, enterprises must change their development concepts and seek new development paths.

The proposal of corporate environmental responsibility (CER) originated from the publication of "Silent Spring". People are aware of the seriousness of environmental issues and have begun to consider environmental protection issues while maximizing the wealth of shareholders. George Enderle (1998) proposed CER as a formal concept. He believes that the scope of corporate social responsibility should be expanded. Companies must not only assume traditional responsibilities, but also aim at sustainable development to reduce pollution and protect the environment as their responsibilities [3]. Since the introduction of CER, in order to reveal its economic connotation, scholars have continuously explored the impact mechanism and economic consequences of fulfilling environmental responsibility. Existing studies have found that factors such as institutional pressure [4], the heterogeneity of institutional investors [6], and the attributes of the top management team [11] will affect the level and quality of CER performance. CER will affect the cost of capital [2], employee behavior [14], and customer loyalty [12]. Russo and Fouts (1997) believe that the optimization of environmental policies by enterprises can help improve the reputation and prestige of enterprises, bring competitive advantages to enterprises, and thus increase enterprise value [7]. However, the research on the relationship between CER and enterprise value is still exploratory. Most empirical studies lack consideration of the mechanism between the two. Because of this, this paper takes Chinese listed steel companies as research samples, and studies the impact of CER on enterprise value based on stakeholder theory and signaling theory. In addition, innovation plays an important role in improving a company's competitive advantage, and continuous green innovation can help reduce environmental burdens and achieve specific ecological sustainability goals. Therefore, green innovations in R&D may play a mediating role between CER and enterprise value.

2. Main body of the paper

2.1 CER and enterprise value

The enterprise fulfills its environmental responsibility and enhances enterprise value by integrating influencing resource elements. In the sense of economics, it is believed that the process of enterprises fulfilling environmental responsibility is essentially the process of integrating resource elements. A good resource integration ability is conducive to the realization of value creation and the enhancement of the core competitiveness of enterprises [8].

Enterprises' fulfillment of environmental responsibility can promote the integration of social, information, technological and financial resource elements. Firstly, enterprises' fulfillment of environmental responsibility can promote the integration of social resource elements of enterprises. From a stakeholders' perspective, an enterprise is a collection of multi-stakeholders in society. With the continued prominence of environmental problems, stakeholders are paying more attention to environmental protection. According to the stakeholder theory, enterprises must not only pursue profits but also ensure that the adverse effects of pollutants before they are discharged are minimized in the production process [10]. Business owners hope enterprises can earnestly fulfill their responsibilities to safeguard their interests better. Investors and other stakeholders also believe that companies that fulfill their environmental responsibilities have better prospects. Numerous stakeholders control most of the social resources of an enterprise. Faced with their strong demands for environmental issues, if the enterprise fails to meet the requirements, it will inevitably be negatively evaluated and strongly opposed by stakeholders, which will ultimately affect the economic performance of the enterprise. Therefore, the behavior of fulfilling environmental responsibility will affect the recombination of corporate social resources through stakeholders, and further affect enterprise value.

Secondly, the fulfillment of corporate social responsibility promotes the integration of corporate signal resources. According to the signaling theory, there is a problem of information asymmetry between enterprises and stakeholders such as external investors. Enterprises can convey information that can represent the development prospects of enterprises to the outside world through various behaviors, so as to win the recognition of the capital market [15]. By compulsorily or voluntarily releasing environmental information, especially high-quality information disclosure, on the one hand, an enterprise will convey a responsible image, which can form a green reputation. On the other hand, the enterprise can obtain the support of many stakeholders, including government management departments, investors, enterprise employees, and consumers, to enhance its competitive advantage and value [1].

Thirdly, the fulfillment of environmental responsibility by enterprises will lead to the integration of technical resource elements and financial resource elements. Fulfilling environmental responsibilities is bound to be accompanied by a large investment in technical resources. The increase in corporate green innovation will bring about the integration and reconfiguration of technical resources. At the same time, the increase in technology investment will also increase the cost of enterprises, which in turn prompts enterprises to integrate and reallocate internal financial resources. Therefore, the fulfillment of environmental responsibility by enterprises will affect the integration of social, information, technological and financial resource elements, thereby affecting the direction of total element resource allocation. This affection will change the original resource allocation model, which is conducive to realizing a new round of value creation and enhancing the competitiveness of enterprises.

Hypothesis 1: there is a significant positive correlation between CER and enterprise value.

2.2 The mediating effect of green innovation

Enterprises need knowledge, capital and other resources to carry out innovation activities. Enterprises' fulfillment of environmental responsibilities can provide basic guarantees for R&D and innovation in all aspects of enterprises. Firstly, the fulfillment of environmental responsibilities by enterprises can accumulate moral capital, create a green reputation, and

improve corporate credit for enterprises. These advantages can help enterprises to reduce the risk assessment of creditors, ease the financing constraints, bring more investment and financing, and create innovative opportunities. Secondly, fulfilling environmental responsibility can help enterprises win consumers' trust, improve consumers' loyalty, and expand consumer groups. Feedback from consumers on products and services can help companies generate new ideas for developing new products. Thirdly, the performance of CER can reduce the cost of government environmental regulation and promote a good relationship between enterprises and the government so that enterprises are conducive to obtaining environmental protection subsidies, land and bank loans. Fourthly, fulfilling environmental responsibility can attract and retain outstanding talents for enterprises and gain the human capital advantage of R&D and innovation. Based on the above viewpoints, this paper believes that the fulfillment of CER is helpful for enterprises to win the inflow of "reputation", "capital", and "talents" and then encourage enterprises to carry out technological innovation activities.

Environmental responsibility can increase enterprise value by promoting corporate innovation. Firstly, environmental responsibility can bring differentiated products and services to the enterprise while significantly improving the innovation performance of the enterprise, so as to differentiate the enterprise's brand image, product design and efficacy, product quality and service. This kind of differentiation will help enterprises to expand their market share, improve their profitability, and make them more competitive among their peers. Secondly, the innovative activities of "energy saving and emission reduction" carried out by enterprises to fulfill their environmental responsibilities can improve the utilization rate of enterprise resources. Innovation in the production process can improve the production efficiency of enterprises, and innovation in waste discharge can improve the comprehensive utilization efficiency of waste. In the long run, these changes can reduce business costs and improve product quality. To sum up, this paper argues that green innovation can achieve a "win-win" effect between the environment and the enterprise, and is an intermediary between CER and enterprise value. This paper makes the following assumptions:

Hypothesis 2: there is a significant positive correlation between CER and green innovation.

Hypothesis 3: Green innovation plays a mediating role between CER and enterprise value.

The research model of this paper is shown in Figure 1.

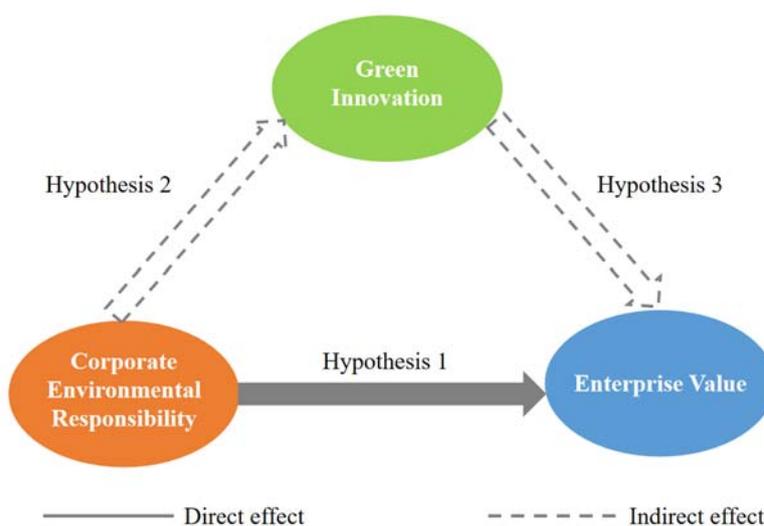


Figure 1. Research model

3. Method (including sample and measures description)

3.1 Research design

3.1.1 Sample selection and data sources

This paper uses the financial data, analyst data and CER data of 46 listed steel companies in China from 2011 to 2021 as the research sample. The reason for choosing the steel industry is that, on the one hand, the industry occupies a pivotal position in the national economy. On the other hand, this industry belongs to the heavy pollution and high energy consumption industry, so fulfilling CER and realizing transformation and upgrading has become a top priority. The CER data is collected manually, and the social responsibility scores are from hexun.com. The scores include the comprehensive content of five aspects: shareholder responsibility, employee responsibility, supplier-customer responsibility, consumer rights responsibility, and environmental responsibility. This paper uses the environmental responsibility score to measure CER. In addition, this paper also uses the environmental and sustainable development data of listed companies published by CSMAR to measure environmental responsibility. The innovation data comes from the patent application data of listed companies published in the CNRDS database. Enterprise value, analyst, financial, and other fundamental business data are sourced from the CSMAR database.

3.1.2 Variable definition and measurement

(1) Explained variable

Enterprise Value (Tobin's Q). Referring to the existing research [9], the enterprise market value is used as a proxy variable of enterprise value, and Tobin's Q is used to measure it. Tobin's Q refers to the ratio of the company's market value to the replacement cost of assets. It not only reflects the company's past performance but also represents the company's expectations for future development.

(2) Explanatory variable

Corporate Environmental Responsibility (CER). Referring to the research of Zhang Y. et al. [13], this paper uses the environmental responsibility score published by third-party organizations as the proxy variable of environmental responsibility in the regression analysis part. The higher the score, the better the performance of environmental responsibility.

(3) Mediating variable

Green innovation (Innovation). Patents can be used to measure the innovation capabilities of enterprises. China's patent system divides all patents into three categories: invention patents, utility model patents and design patents. This paper draws on Li et al. [5], takes the total number of patent applications of companies as an indicator to measure the innovation ability of enterprises, and uses the natural logarithm of the total number of patents to measure.

(4) Control variable

This paper reviews relevant literature and finds that company size, age, and financial performance will impact companies' fulfillment of environmental responsibilities and enterprise value. In order to ensure the reliability of the research results, this paper selects the following variables as control variables based on the existing research (see Table 1): Company Age (Age), Company Size (Size), Debt Leverage (Lev), Return on Total Assets (ROA), Company Growth (Growth), State Owned Enterprise (SOE).

Table 1. Variable definitions

Variable type	Variable name	Variable code	Definition
Explained variable	Corporate Value	Tobin's Q	Tobin's Q = Combined Market Value / Replacement Costs
Explanatory variable	CER	CER1	Use the ER score published by hexun.com to express
		CER2	Whether to disclose environmental and sustainable development information published by CSMAR, 1 for disclosure, 0 otherwise
Mediating variable	Green innovation	Innovation	Use the natural logarithm of the total number of invention patents published by CNRDS to represent R&D innovation
Control variable	State Owned Enterprise	SOE	1 when the actual controller is state-owned, otherwise 0
	Company Growth	Growth	Growth rate of business
	Return on Total Assets	ROA	Ratio of net profit to total assets
	Debt Leverage	Lev	The company's asset-liability ratio
	Company Size	Size	Logarithm of total assets at the end of the year
	Company Age	Age	Fiscal year - year of establishment + 1

3.1.3 Model building

To test Hypothesis 1, this paper builds a model:

$$Tobin's\ Q = \beta_0 + \beta_1 CER + \sum \beta_k Controls_i + \varepsilon \quad (1)$$

In order to test the mediating role of innovation (Hypothesis 2 and Hypothesis 3), this paper further constructs two models:

$$Innovation = \beta_0 + \beta_1 CER + \sum \beta_k Controls_i + \varepsilon \quad (2)$$

$$Tobin's\ Q = \beta_0 + \beta_1 CER + \beta_2 Innovation + \sum \beta_k Controls_i + \varepsilon \quad (3)$$

In the above model expressions, Tobin's Q represents the explanatory variable enterprise value. CER stands for the explanatory variable corporate environmental responsibility. Innovation represents mediating variable green innovation. Controls represent all control variables, and ε represents the random error term.

3.2 Empirical analysis

The descriptive statistics of the main research variables in this paper are shown in Table 2.

Table 2. Descriptive statistical analysis

Variable	Average value	Median	Maximum value	Minimum value	Standard deviation
Tobin's Q	1.682	1.350	11.453	0.691	0.902
CER1	3.530	0	28	0	7.259
CER2	0.361	0	1	0	0.384
Innovation	2.870	2.825	8.548	0	1.520
SOE	0.480	1	1	0	0.451
Growth	0.159	0.100	2.878	-0.901	0.377
ROA	0.019	0.021	1.100	-1.896	0.410
Lev	0.401	0.410	2.011	0.031	0.209
Size	22.578	22.476	28.419	18.130	1.499
Age	7.591	7.580	7.502	7.499	0.001

The explained variable's average, maximum and minimum values (Tobin's Q) are 1.682, 11.453, and 0.691, respectively. It can be seen that the overall level of the value creation ability of Chinese listed steel enterprises is still relatively weak. The difference between the maximum value and the minimum value is large, indicating that there is large individual heterogeneity in the value creation of Chinese steel enterprises. The average, maximum and minimum values of the explanatory variable (CER1) are 3.530, 28, and 0, respectively. It can be seen that the environmental performance of Chinese steel companies is still at a relatively low level, and the performance levels of different corporate environmental responsibilities are far from each other. CER2 represents a dummy variable in the sample, and the average value of CER2 is 0.361, indicating that more companies in the sample do not fulfill their environmental responsibilities than do them. The average, maximum and minimum values of innovation (Innovation) are 2.870, 8.548, and 0, respectively, reflecting that there is also a large gap in R&D capabilities among different steel companies in China. The descriptive statistics of the remaining control variables are also listed in the table, and we will not repeat them here.

4. Empirical results and conclusions

4.1 Empirical results

This paper uses panel data regression analysis to empirically test models (1) - (3), as shown in Table 3.

Table 3. Multiple regression analysis

Dependent variable	Model (1)	Model (2)	Model (3)
	Tobin's Q	Innovation	Tobin's Q
CER 1	0.006***	0.006**	0.005***
	(2.587)	(1.634)	(2.601)
Innovation			0.038***
			(2.598)
SOE	0.048	-0.279***	0.099**
Growth	0.009	-0.001	0.187***
ROA	-0.380	0.026	-0.520**
Lev	-0.089	-0.591***	-0.414***
Size	-0.299***	0.565	-0.183***
Age	1.140***	80.450***	-5.581
Number of samples	46	46	46
R*R	0.189	0.257	0.162

Note: The symbols *** and ** indicate the case of $p < 1\%$ and $p < 5\%$, respectively. The data in parentheses are the t values of the main variables.

The results in the first column show that the regression coefficient of CER1 is $0.006 > 0$, and it is significant at the 1% level ($t=2.587$, $p=0.000$, $p < 0.01$), indicating that CER is significantly positively correlated with enterprise value. Hypothesis 1 is verified. Columns 2 and 3 test the mediating effect of green innovation. The results of the second column show that the regression coefficient of CER on innovation is $0.006 > 0$, and it is significant at the 5% level ($t=1.634$, $p=0.01$, $p < 0.05$), indicating that CER can promote positive innovation. The results in the third column show that the regression coefficient between CER and enterprise value is $0.005 > 0$, and it is significant at the 1% level ($t=2.601$, $p=0.000$, $p < 0.001$). The regression

coefficient of green innovation and enterprise value is $0.038 > 0$, and it is significant at the 1% level ($t=2.598$, $p=0.00$, $p<0.01$). The regression coefficient of CER in Hypothesis 3 is smaller than the regression coefficient of Hypothesis 1, which proves the research hypothesis of this paper, indicating that green innovation plays a mediating effect between CER and enterprise value.

Through the above regression analysis, all three hypotheses are supported.

4.2 Conclusion

Taking China's listed steel companies as research samples, this paper empirically examines the relationship between environmental responsibility and enterprise value on the basis of theoretical analysis, and explores the intermediary role of green innovation on CER and enterprise value. This study provides a theoretical contribution to the economic consequences of CER. Through the research of this paper, the following inspirations are drawn. Firstly, this study proves that it is worthwhile for enterprises to fulfill CER and promote "green enterprises". CER and business performance can be achieved simultaneously, not in opposition. Therefore, fulfilling environmental responsibilities by firms can become a breakthrough in the transformation and upgrading of enterprises. Secondly, green innovation acts as a mediator between CER and enterprise value. Enterprises can take the road of green sustainable development through active innovation, which not only fulfills their environmental responsibilities but also helps to enhance their competitive advantage.

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Managing Human Resources and Talents in Turbulent Times

Do Employee Soft Skills Influence Their Engagement in Organizations? Insights from Industry and Academia

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Abstract:

Scholars and practitioners have recently shown a rising interest in researching soft skills in different contexts, such as Information Systems related jobs, leadership, and education and training. At the same time, companies are increasingly promoting employee engagement, especially in the current period of crisis and instability. This work aims to study this topic from the employee soft skills perspective. In particular, we investigate the relation between employee soft skills and their engagement in organizations. Hereby, we differentiate between commercial and non-commercial organizations and bring in an international context by conducting our study in two countries. Taking an acknowledged European skills framework as a basis, we scope our research to such soft skills as teamwork, communication, and conflict behavior and adapt an established survey to measure them. For measuring employee engagement, we implement a well-established Gallup approach. Using correlation analyses, we study the influence of the three selected skill sets on the expression of employee engagement under consideration of the organization type and country.

Keywords: *Soft Skills, Teamwork, Conflict Behavior, Communication, Employee Engagement*

1. Introduction

To stay competitive and survive in the current times of crisis and instability, organizations are obligated to focus on their most valuable resource, namely employees. Companies are forced to take steps to create specific training programs to raise staff motivation and engagement, fostering favorable relationships with employees (Yakimova and Pushkina, 2018). In this context, one could consider employee engagement as a personality quality already at the job interview level, for example, while estimating their soft skills. Hence, this study has been initiated to determine the influence of the soft skills of employees on their engagement in organizations, i.e., the relation between soft skills and engagement.

2. Theoretical and methodological background

Soft skills, a notion getting much traction in recent years, describe personal transversal skills such as social aptitudes, language and communication ability, friendliness and teamwork ability, and other personality attributes that characterize interpersonal connections. As a rule, soft skills complement hard skills or competencies to accomplish a specific task or activity (Cimatti, 2016). In contrast to hard skills, i.e., content expertise, soft skills are historically related to managing people. Whereas hard skills have always been a primary focus of HR managers, soft skills as a competence essential for individual, team, and organizational success (Parlami and Monnot, 2018) have been increasingly getting the attention of researchers and practitioners (Singh Dubey and Tiwari, 2020). Addressing such personal characteristics as teamwork, effective communication, and conflict management, soft skills significantly impact the quality of products, services, organizational processes, and workers' lives (Cimatti, 2016). Hard skills are task-specific, and soft skills are applied in various situations.

Giving credit to the importance of soft skills studies, one can differentiate between the following research directions: (1) research and practical efforts on the classification approaches, i.e., development of various skills frameworks such as European Skills, Competences and

Occupations classification (ESCO) (European Commission, 2022), (2) research on soft skills in specific subject areas like soft skills in Information Systems and Software Engineering (Florea and Stray, 2018; Pospelova *et al.*, 2021), (3) research aimed at the approaches to train soft skills such as educational games (Dell'Aquila *et al.*, 2017) or project-based learning (Vogler *et al.*, 2018), (4) both hard and soft skills research directions focused on the skill sets for various purposes, for example, information security managers profiles (Haqaf and Koyuncu, 2018).

At the same time, employee engagement has been of interest to managers for years and has recently gained value due to extreme competition and economic recession worldwide. In addition to multiple literature reviews, research and practice have traditionally paid much attention to investigating the relation between the engagement and performance of employees (Kompaso and Sridevi, 2010). However, as the demand has grown, also has the research variety. Currently, the following main research trends can be distinguished: (1) defining engagement, for instance, as a distinct and particular concept consisting of knowledge, emotion, and behavior (Saks, 2006), (2) measuring engagement, like an approach by Gallup (Little and Little, 2006), (3) factors influencing engagement (Sundaray, 2011). The latter can be further split into (i) organization-related factors such as already mentioned performance (Kompaso and Sridevi, 2010), (ii) personality-related factors, like various personality traits (Young *et al.*, 2018), and (iii) specific factors, for example, Covid (Chanana and Sangeeta, 2021) or different countries (Li *et al.*, 2021).

If one considers engagement and soft skills in one context, several works can be mentioned, such as (Bloch Jensen, 2012; McGonegal, 2020; Rao, 2016) researching soft leadership skills advantageous for engaging employees. Further, (Haas, 2020) recommends increasing employee engagement by developing soft skills such as leadership, communication, and teamwork. (Young *et al.*, 2018) perform a study to determine the workers most likely interested in their work. Hereby, the focus lies on eight personality traits: conscientiousness, neuroticism, extraversion, agreeableness, openness to experience, proactive personality, and positive and negative affectivity.

Summarizing the above, we note that employee soft skills can potentially influence work engagement. Accordingly, in the present paper, we aim to *study the relation between employee soft skills and engagement empirically*, answering the following main research question (MRQ): *do employee soft skills influence their engagement in organizations?*

Based on this main goal and RQ, we define the following sub-goals and RQs:

G1, RQ1: *identify those selected soft skills most and less influencing engagement, i.e., how do selected soft skills influence employee engagement?*

G2, RQ2: *compare the level of engagement in organization types, i.e., does organization type (commercial, non-commercial) influence employee engagement?*

G3, RQ3: *compare the level of engagement in different countries, i.e., does a country context influence employee engagement?*

In preparation for our survey, we first identified the main soft skills to scope the study, i.e., teamwork, communication, and conflict behavior, while adapting the already mentioned ESCO framework and research outcomes by (Haas, 2020). To measure teamwork, the “Teamwork” scale was adapted based on the standardized German questionnaire “Bochumer Inventar für berufsbezogene Beschreibung (BIP)” (Hossiep and Paschen, 2003). To assess communication skills, V. F. Ryakhovsky’s test was used with necessary adjustments in the wording to fit the topic and objectives of the study. Finally, for conflict behavior, the intra-group conflict analysis questionnaire presented by Lehmann-Willenbrock (Lehmann-Willenbrock *et al.*, 2011), adapted to the topic and objectives of the study, was implemented. Accordingly, on average, 15 statements per each soft skill measured on the four-point scale from “completely disagree” to “completely agree” were implemented in the questionnaire.

Further, a well-known Gallup approach of 12 yes/no questions was used to measure engagement (“Gallup’s Q12 Employee Engagement Survey - Gallup”, n.d.). The final socio-demographic part of the questionnaire addressed questions about the demographic characteristics of the respondents. The questionnaire was implemented in Google Forms and translated into two

languages: Russian and German for Russian and German participants correspondingly. In both countries, participants from commercial and non-commercial organizations were involved in the survey. **The main dependent variable was employee engagement.** The study was conducted in the period of April-May 2022.

3. Results and conclusions

IBM SPSS Statistics data processing program was used to analyze the collected data. Average values with standard deviation were calculated for the variables. A paired Student's t-test was used to evaluate the influence of employee soft skills on the main dependent variable. Spearman's rank correlation method was used to estimate correlation links between employee soft skills and engagement. The differences were considered statistically significant at $p < 0,05$.

The main characteristics of the two groups are summarized in Table 1.

Table 1. Characteristics of the groups of the study

Characteristics	Russia	Germany
Gender distribution, number of respondents:		
men	24	21
women	40	41
Age distribution, number of respondents:		
20-24 years old	7	1
25-29 years old	6	9
30-34 years old	5	17
35-39 years old	16	10
40-49 years old	9	17
50-59 years old	11	5
over 60 years old	10	3
Level of education, number of respondents:		
academic degree	2	15
higher (specialist, master)	37	32
bachelor degree	12	6
secondary education and other	13	9
Form of business activities of the organization in which the respondent is employed:		
commercial	46	20
non-commercial (social, cultural, educational, spiritual, charity, etc.)	18	42

In the course of the analysis, statistically significant differences were found in the influence of employee soft skills on their engagement between groups in Russia and Germany ($p \leq 0.05$) (see Table 2). This allows us to answer RQ1 and RQ3. An observable influence of the soft skill "Teamwork" on employee engagement in both countries was demonstrated. For the Russian organizations, the influence was identified as "moderate" ($k = 0.43$, $p = 0.021$) on the Cheddock scale, and, for Germany, as "noticeable" ($k = 0.61$, $p = 0.050$). A moderate influence of the soft skill "Communication" on the employee engagement was observed for both Russia ($k = 0.41$, $p = 0.001$) and Germany ($k = 0.34$, $p = 0.030$). A discrepancy was identified in the influence of the "Conflict behavior" skill on engagement: although the correlation coefficients are weak for both countries, there is a negative influence in the case of Russian employees ($k = -0.15$, $p = 0.040$), in contrast to German employees ($k = 0.13$, $p = 0.025$).

Table 2. Correlation analysis results of the influence of employee soft skills on their engagement

Employee soft skills	Correlation with engagement			
	Russia		Germany	
	Correlation coefficient	<i>p</i>	Correlation coefficient	<i>p</i>
Teamwork	0,43	0,021	0,61	0,050
Conflict behavior	-0,15	0,040	0,13	0,025
Communication	0,41	0,001	0,34	0,030

The next step was to analyze the influence of the form of business activities of the organization in which the respondent is employed (commercial and non-commercial) and their engagement. Accordingly, it was found that the analysis results of the two countries are relatively similar for the employee engagement of non-commercial but different for commercial organizations (see Table 3).

Table 3. Employee engagement in Russia and Germany in relation to the form of business activities

Form of business activities	Average value of employee engagement	
	Russia	Germany
Commercial organizations	7,06±3,74	8,67±2,25
Non-commercial (social, cultural, educational, spiritual, charity, etc. organizations)	8,94±3,08	8,77±2,48

Further, following the G2 and G3 as well as RQ2 and RQ3, the correlation between employee soft skills and their engagement in commercial and non-commercial organizations has been calculated. The results are presented in Figures 1 and 2.

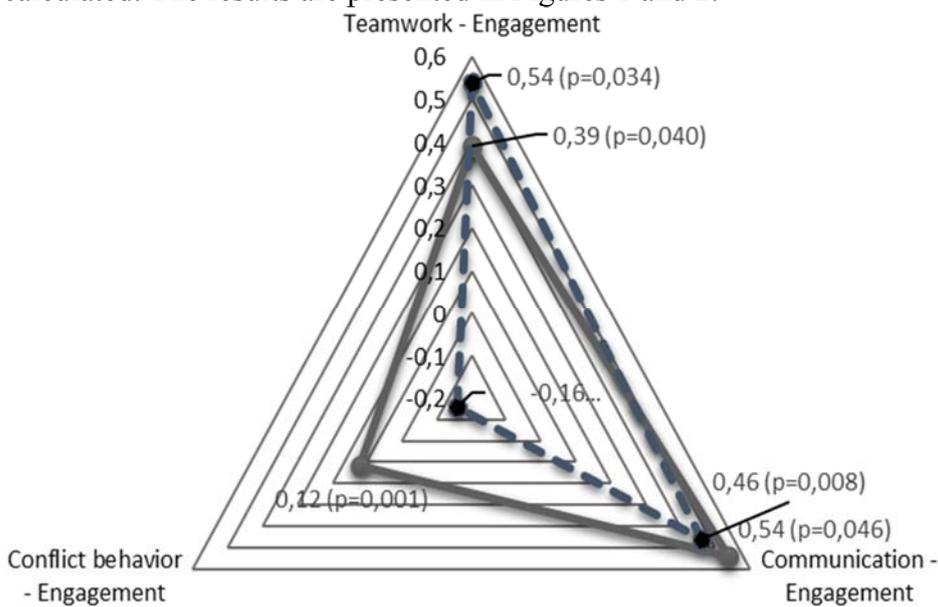


Figure 1. Correlation analysis results of employee soft skills influence on their engagement in commercial organizations in Russia (solid line) and Germany (dashed line)

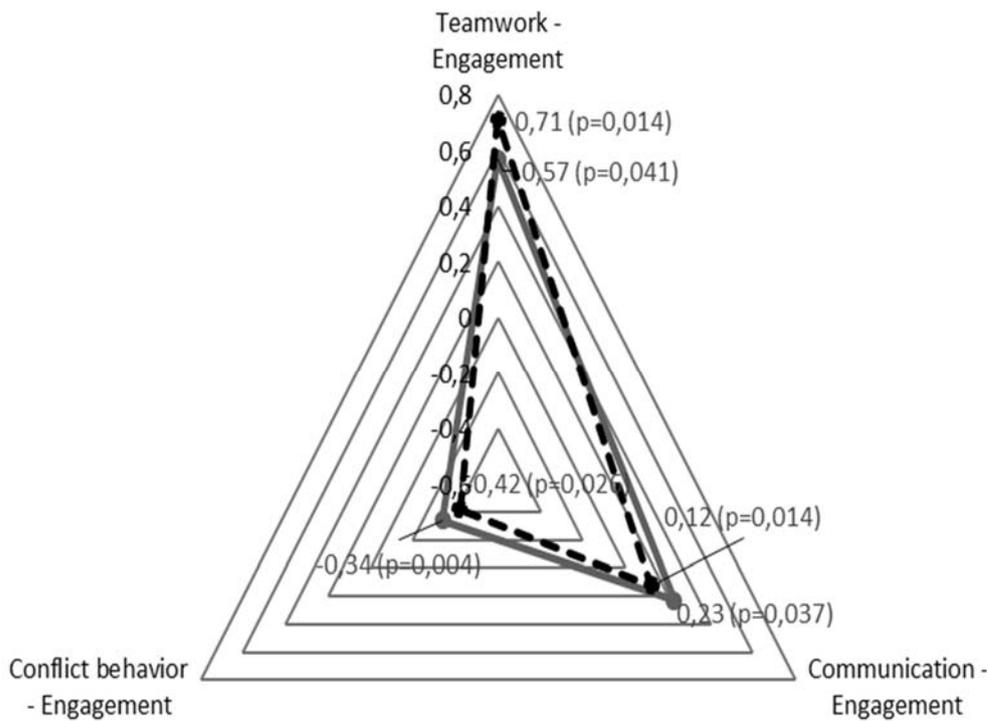


Figure 2. Correlation analysis results of employee soft skills influence on their engagement in non-commercial organizations in Russia (solid line) and Germany (dashed line)

According to the obtained profiles of employee soft skills influence on their engagement in commercial and non-commercial organizations (Figures 1 and 2), it can be stated that in non-commercial organizations of both Russia and Germany, the employee soft skill “Teamwork” has the most significant influence on their engagement ($k = 0.71$, $p = 0.014$ and $k = 0.57$, $p = 0.041$, respectively). The employee soft skill “Conflict behavior” has shown a negative influence on their engagement in organizations of both countries ($k = -0.34$, $p=0.004$ and $k = -0.42$, $p=0.026$, respectively).

In the case of commercial organizations, the analysis results slightly change. For Russia, “Communication” has demonstrated the greatest influence on engagement ($k = 0.54$, $p = 0.046$), whereas less significant effects are identified for “Teamwork” and “Conflict behavior” ($k = 0.46$, $p = 0.008$ and $k = 0.039$, $p = 0.040$, respectively). In Germany, the employee soft skill “Teamwork” ($k=0.54$, $p=0.034$) has been shown to be important for their engagement, similarly to the values of non-commercial organizations. If compared to non-commercial organizations, “Communication” appears to be more significant for engagement ($k = 0.46$, $p = 0.008$), and “Conflict behavior” has a weak but negative influence ($k = -0.16$, $p = 0.003$).

We assume that the observed differences in soft skills influencing employee engagement are due to various reasons. In fact, we are confronted with different cultural and historical employment backgrounds, which may be reflected in different profiles of soft skills demanded in organizations and consciously developed by employees. As a result, this has an impact on their engagement.

Further, soft skills profiles obtained for non-commercial organizations engaged in educational, spiritual, social, and other activities have similarities for both countries, while they vary, albeit partially, for commercial organizations. Commercial organizations are likely to create different requirements for their employees, reflecting the specifics of doing business in a particular country. This way, various soft skill profiles for an effective worker engaged in the work process are established. In the case of non-commercial organizations, we detected similarities in the influence of soft skills on engagement in both countries. We suggest that this is due to a similar set of values in the employees’ work performance in these organizations.

To sum up, this study aims to identify the influence of employee soft skills on their engagement in organizations. This way, the work contributes to a better understanding of those factors influencing engagement. Such knowledge can be used as a basis for training programs to increase employee motivation. A comparative analysis of the survey results from the two countries showed the similarities and differences in the profiles of employee engagement as related to their soft skills.

This work serves as a starting point for a more extensive study implying a larger sample size, which will allow applying more accurate analysis methods, and considering other soft skills like time and stress management as well as critical thinking.

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Role of Employee Resource Groups in Fostering Gender Inclusion: Consequences for Progress in Career Tracks

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Abstract:

The research is motivated by the issues women often face during their career progress, caused by the childcare commitments. Due to a “stalled revolution” in a social gender-related agenda women treat choices leading to opting out (withdrawing from the labor market) or refusal from leadership positions as their own, thus companies can only empower female employees to be proactive in career strategies. Self-initiated affinity groups became one of the possible tools that companies might apply for such empowerment. However, this trend is still new and few companies in Russia are aware of it and tried it in practice. We decided to conduct a case-study analysis of two self-initiated groups: “Selfmama” in Moscow and “Leika” in Chelyabinsk to answer the question: how can self-initiated affinity groups help women with childcare commitments fostering their career progress in Russian context? We plan to analyze single initiative and its role in career progress of its participants. We refer to a multiple case design to compare experience of several regions: comparing previous stage conducted in Moscow and the coming stage that will happen in Chelyabinsk in November-December. The team organizing both stages is the same, which helps in gaining homogeneity of intervention. Findings might be interesting for companies which look for vital instruments for gender inclusion, interested in intrinsic methods for gender diversity.

Keywords: *affinity groups, SIG, self-initiated groups, career track, gender studies, Russia*

1. Introduction

“Stalled revolution” means that women were faster in accepting “second shift” through dedicating part of home time for work, while men are slower in sharing home responsibilities and employers are even slower in adjusting work conditions for women (Craig, Lyn, 2007; Ashwin, Isupova, 2018). This leads to women voluntary refusal from higher career steps. Boros (2022) suggested that interventions helping in overcoming related issues should cover several levels: (1) socialization; (2) family-level interventions; (3) organisational policies; and (4) societal policy/governance levels. The second aspect is the most ethically sensitive and unreachable for employers. However, companies might foster intrinsic empowerment of employees for needed adjustments.

Current research is analyzing newly emerging trend for Russian business context – self-initiated employee resource groups, which could be internalized by companies in a form of employee resource groups to foster gender inclusion in an ethical way. The research question: how can employee resource groups help women with childcare commitments in Russia to foster their career progress?

We plan to conduct case-study in two regions of Russia: Moscow and Chelyabinsk to find answers to the following questions: 1) How do women in Russia define intrinsic empowerment and what motivates them to increase it? 2) What is the list of feasible career micro-strategies for women with childcare commitments in Russia and key obstacles on their way? 3) What is the

nature of self-initiated affinity groups in Russia and what is their role in women career progress?
 4) Is there regional difference between Moscow and Chelyabinsk and what causes it?

We keep social constructionism perspective, assuming that (a) “Multiple realities are constructed through our lives experiences and interaction with others”, and (b) description of “reality is co-constructed between the researcher and researched, and shaped by individual experiences” (Creswell and Inquiry, 2007, p. 21). For coding, as an outcome of literature review, we prepared a list of frames of reference, suitable for tracking career progress and self-initiated groups formation. We suppose that case-study will help to tune existing frames of reference to the selected context. For this purpose we start interviews with open questions and proceed with reference to the selected frames, using principles of the analytical coaching (Piskarev, 2022).

2. Theoretical background

2.1. Self-help affinity groups as a form of intrinsic empowerment

Empowerment is often treated as an ability of self-help (Thomas and Pierson, 1995) and thus self-help groups are perceived as valuable intervention for boosting women intrinsic empowerment through extrinsic empowerment strategy, relying on four steps (Karl, 1995) (Table 1):

Table 1: extrinsic empowerment frame of reference

transformative action	building awareness
increased participation and decision-making power, also known as voice	building capacity

Adopted from Karl (1995)

There are many synonyms to this phenomenon. For example in research conducted in Indian rural areas and some other countries, like Ethiopia refer to it as “Self-Help Groups” (SHG). The term “*identity-based employee resource groups (ERGs)*” appeared in US. Researchers treat such groups as voluntary employee-led learning communities, social identity-based affinity groups (Green, 2018), previously also known as “caucus”, “employee networks”, “employee councils”, “employee forums”, “employee thematic boards”, “business resource groups”. They usually foster advocacy, engagement, voice and visibility, promoting higher diversity and awareness of their needs, helping its members with mentorship, career progress, development, networking, scholarship, retention through formal and informal interventions within for-profit organization where they exist. Companies might involve them in policies development, marketing campaigns, innovations, e.g. product development.

Theory wise research of ERG refers to social learning theory, specifically, the communities of practice (CoP) framework (Wenger,1998). In general CoPs are any groups united by a domain, community, and the practice. Distinct domain is formed by shared goals, competencies and strategies. Community requires mutual engagement, joint enterprise, and shared repertoire, affected by shared identities and vision. The practice means engagement of each individual, collective experiences and history. The generated repository of knowledge is shared across all members and with their surrounding (Table 2).

Table 2 Paradigm of CoP frame of reference

Practice	Enthusiasm
Community	Domain

Adopted from Wenger (1998)

Social identity theory also gained high role in this stream (Friedman and Craig, 2004). It implies three social-psychological processes: social categorization (e.g. having childcare commitments), social comparison and social identification (relates to self-esteem and group status) (Table 3). However, there are certain fear behind ERGs from managers (Friedman, 1999), which should be taken under control.

Table 3 SIT as a unifying lens to study ERGs frame of reference

social identification	differentiation from others
social comparison	social categorization

Adopted from Tajfel and Turner (1985), Welbourne et al. (2017)

Summing up, self-initiated groups foster intrinsic empowerment, thus companies by referring to them might help women with family-to-work spillover without a need to directly interfere in private life, keeping ethical norms and boundaries.

2.2. Career strategies and opting out

Women balancing different roles might face situation of conflict between identities, which strongly affects their career progress motivating opting out (Socratos et al., 2016). Opting out (Belkin, 2003) was traditionally perceived as a full withdrawal from the market. However, recently it became reassessed from the mindful perspective of reflexive agency, when a woman leaves behind masculine career path strategies and follows a female way, consisting of the four micro-strategies (Table 4).

Table 4 Women micro-strategies for career success frame of reference

keeping in touch with professional networks.	redefining career success,
renegotiating working conditions,	transcending boundaries,

Adopted from Biese and Choroszewicz (2019)

Firstly, women realize they realized poor value of high salary or promotion comparing to what they sacrifice – involvement into family roles, enjoy motherhood or have meaningful work responsibilities. Secondly, women realized that not only job interferes in family life, but they also can bring family to work, integrating child-caring responsibilities into professional role, which boosted their authenticity and freedom over own schedule. Thirdly, they discussed opportunity for a remote work or part-time involvement. Professional network allowed to delegate extra responsibilities in time of overlapping. This list could be prolonged by the observations from the research of proactive person-environment fit in career-tracks domain, e.g. Proactive Career Behavior Scale by Strauss et al. (2012): Career planning, Proactive skill development, Career consultation, Network building; or Proactive Career Behaviour by Hirshhi et al. (2014): career engagement, career planning, self-exploration, environmental exploration, networking, vocational identity, self-efficacy, job satisfaction, career satisfaction.

Mainiero and Sullivan (2006) introduced Kaleidoscopic career model for women, opposing it to linear track for men (Table 5).

Table 5 Priority in career progress frame of reference

authenticity	no agency, linear path
balance	challenge

Adapted from Mainiero and Sullivan (2006)

Feeling of authenticity depends on alignment between values and behaviors. Feeling of balance is related to different identities. Challenge reflects level of difficulty, responsibility, control, and autonomy. All these aspects affect career-related decision-making, explaining opting out.

In Russian analytical coaching discourse, there several additional frames of reference, suitable for assessing career strategies, assuming that both men and women might adjust their career trajectories according to the level of personal development, motivation, and other factors (Piskarev, 2022) (Table 6-10).

Table 6 Self-actualization frame of reference

self-realization	self-knowledge
self-presentation	self-determination

Table 7 Motivation frame of reference

I love	I can
I obliged	I want

Table 8 Ikigai frame of reference

mission	vocation
passion	profession

Table 9 Personal project frame of reference

destiny	form
surrounding	values

Table 10 Action frame of reference

game	work
creativity	labor

Summing up, literature review allowed to develop 5 referent frameworks for further coding narratives within the case-study, which we supplemented with a predefined list of frameworks empirically tested for the Russian context.

3. Methods and research design

Sample information. Selfmama is a multination social consulting project, which was initiated in 2014. During these years it conducted 13 Forums with above 100 000 participants and career consultation for above 100 women with childcare commitments; holds career club and

accelerating project; develops own library with narratives from different role-models and conducts research. One of the forums was specially devoted to men. Our key focus will be placed on the career consulting initiative, as it gives more insights about the reasons behind issues, which women face throughout their career path. We will analyze the survey filled in by the participants, semi-structured interviews with the consultants and participants, social networks of the participants – their narratives to the external environment and narratives produced by

In Chelyabinsk Selfmama is partnering with Leika. This self-initiated group was created in 2016 and combined initiatives for business-oriented mothers with events for kids and other family members. In November-December 2022 coaches and career mentors will conduct career consultations for 75 women with childcare commitments from Chelyabinsk additionally to prior 100 mothers from Moscow. Comparing same initiative in two different settings will help to increase the scope for generalizability of the findings.

Thus, we referred to a purposive sampling, narrative interviews, field notes were used to obtain participants' and volunteers' perspective on how individuals within the group perceive empowerment. For triangulation, findings were supplemented with the analysis of social networks of the respondents and their feedback for the program.

For a case-study we follow Eisenhardt (Javaid, Hyder, 2018) and Yin (2009) methodology. We start interviews with an open question about the initiative and the experience of dealing with it. After that we will proceed with the methodology developed within analytical coaching perspective (Piskarev, 2002): we will show ten frames of reference and will ask to allocate each mentioned statements to one of the quadrant, stimulating additional reflection on the nature of the studied phenomenon and emerging of additional statements.

4. Empirical results and conclusions

We assume our research will contribute to three streams, related to gender inclusion, self-initiated affinity groups and career tracks proactiveness, treated from intrinsic empowerment perspective, by exploring the ability of such groups to deal with stalled revolution and exploring the phenomenon of SHGs.

Practical implications lie in the explored ability by the companies to internalize such initiatives separately or through empowering internal affinity groups.

Further research might utilize quantitative methods reaching women with childcare commitments in Russia disregarding their affiliation with the companies or affinity groups to improve generalizability of the findings.

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Global vs Local Careers Taxonomy: through the Lens of Type of Student and a Destination

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Abstract:

Career studies literature suggests that careers become more boundaryless and more global (Baruch and Reis, 2016). Students, the agents of the choice of the career, is not a monotonous cohort anymore. We add to the discussion the student's typology proposition for the career choice to further develop the global careers discourse. Based on Social cognitive theory (SCT) we develop student's global vs local career taxonomy to contribute into understanding of adults' career development and career decision making. Our contribution offers a two-dimensional taxonomy, with one dimension being *the type of student* and another dimension being *the career destination*. Based on introduced dimensions the *Global vs Local careers taxonomy* of 8 possible career types is suggested. The conceptual taxonomy is empirically tested with data from 404 students. We show that global career choice would prevail above local career choice for each of the student's types. Our findings contribute into deeper understanding of career decision making and broadens our comprehension of the variety of global vs local careers by different types of students. The study develops the future research agenda for career development researchers and practical agenda for universities and MNC practitioners.

Keywords: *Career Intentions; Intention to work abroad; Global vs Local career; Career Type; International Students*

Introduction

Recent discourse in the career studies literature suggests that careers become more boundaryless and more global (Baruch and Reis, 2016). Students, the agents of the choice of the career, is not a monotonous cohort anymore. Deep understanding and realistic reflection of the current students' body for career development purposes is a critically needed step in providing a relevant career preparation and support for the students, but also a valuable tool to support students with the best possible career fit which allows for a successful career and realisation of personal and professional potential. The body of research with the main focus on students' career development constantly grows (e.g. Ayoobzadeh et al., 2021; Hou et al., 2018; Gu, 2009). Growing body of research with focus on students' career choice discusses mainly vocational and subject matter dimensions, such Auyeung & Sands (1997) focus on accounting students careers' decisions; Santric-Milicevic et al. (2015) focus on determinants of international careers of nursing graduates. At the same time only a few students career studies raised the decision-making question regarding the destination. Musumba et al. (2011) study factors influencing career location preferences of international graduate students in the United States and shows that career opportunities and social climate are the most critical factors for all. Hof (2019) studies the young Europeans who moved to two global cities – Tokyo and Singapore and shows that decisions to build careers in Asia are linked to professional aspirations and to the idea of accumulating of a social and a cultural capital. Veitch's et al. (2006) findings show that medical graduates tend to undertake careers in non-metropolitan settings. So, while we noticed that growing number of students career development papers talk about the factors affecting the choice of the destination (Hof, 2019), still the wholistic and comprehensive career typology based on students type and destination doesn't exist. In expatriate literature extensive body of research does focuses on career mobility, global mobility, development of global, regional, ethnocentric, host-country career (Baruch and Altman, 2002; Briscoe and Finkelstein, 2009; Doherty et al., 2013). Majority

of those studies have organisations/MNCs in focus and those papers focus on career decisions/relocations made at the organisational level for organisational purposes (Tharenou et al., 2015). Thus, our study assist current students (a future expats) in their own career development and career planning strategies.

Thus, our contribution offers a two-dimensional taxonomy, with one dimension being a type of student and another dimension being a career destination. Based on given dimensions we propose Global vs Local careers taxonomy with 8 possible career types. Suggested taxonomy greatly contributes to the discussion of global career opportunities and students career trajectories. We contribute to the traditional view of students' career development which doesn't differentiate between the types of the students when considering a career choice. Our conceptual taxonomy is empirically tested with quantitative survey data from 404 students from two countries and qualitative data from the students journaling comments contribute to our deeper understanding of career decision making for local vs global careers. Paper discusses practical and theoretical implications, as well a number of limitations of the current study. Paper concludes with the key sound messages of future agenda for a career development researchers and with clear stated contribution for universities and industry practitioners.

Theoretical concepts

Students typology for career choice

Expatriate management literature and practice don't treat all employees in unified ways and different types of employees, such as *home-country nationals*, *host-country nationals* and *third-country nationals* are specified for research and practice purposes (e.g. Jain, et al., 1998; Kang and Shen, 201). In an education domain the dual classification still prevails: classification on domestic (local) vs international students (e.g. Ayoobzadeh et al., 2021; Bozionelos et al., 2015; Hou et al., 2018). This traditional divide is chosen mainly based on the convenience of citizenship criteria for financial purposes (course fee), operational purposes of data processing and admissions (different admission documents, deadlines and processes). The prevailing majority of students' career development studies utilize this dual classification. Thus, Hoe et al. (2018) examined the relationships between career and cultural characteristics among international and domestic students at a large university in the US. Schweisfurth and Gu (2009) show that international students do experience many more transitional and adaptive challenges that domestic students do not experience, such as culture, learning, education, and language shocks. Ayoobzadeh et al. (2021) studies domestic and international students in Canada and argue that challenging experiences can potentially make international students stronger and change their perceptions of what they want to achieve in their future careers based on their heightened levels of maturity and self-confidence.

At the same time when it comes to the students' career development decision making more inclusive classifications started appear in the literature, such Singaravelu, et. al. (2005) studies the variation of degree of certainty of career decisions between Asian international, non-Asian international, and domestic students. Luzzo (1993) studies the perceived career barriers by variety of ethnic groups, namely African Americans, Hispanics, Caucasian, Americans, Filipinos and Asian Americans. Gim (1992) focuses on how environmental factors, such as family, culture, and community, have been found to influence the career development behavior of several key ethnic minorities in the United States. While cultural and ethnic aspect of studies are important and deserve future attention, one of the main tasks and contributions of our study is (1) to bring into consideration the factor of the *students' status* based on crossed borders and cultures and (2) to extend the students typology from binary (domestic/international) to more inclusive one, that more carefully reflects the changing societal and cultural situation.

With the rapid globalization of the international education traditional binary classification doesn't fit anymore to the much richer reality of international education. In our study we are suggesting the theoretical contribution of considering more relevant students' classification that includes three students' types: 1) Local students; 2) Dual-home students; 3) International

students. We define suggested terminology: (1) “Local students” means regular domestic students who identify themselves primarily with this domestic local culture of the University (*example of it could be a regular Australian student at the University of Sydney (20 y.o.) who was born in Australia and spent the most of the life in Australia*); (2) a new added category “Dual-home students” mean students who administratively could be both domestic or international, but students who have culturally and geographically two home countries, (country of origin/birth and a new acquired home country). They normally came to the current country of study since significant period in life, which is longer that period of study itself and those students typically identify himself/herself with at least two distinct cultures – with the original home culture and with the new home culture (*example of it could an Indian student (20 y.o.) at the University of Sydney who moved to Australia, when she was 12, so she spent the first 12 years in India and the recent 8 years in Australia and equally identifies herself as Indian and Australian*); (3) under classification “International student” we understand regular international students, who came to the country of study primarily for the purposes of study, with no early cultural identification with this country of study (*example of it could be an Indian student (20 y.o.) in University of Sydney, who spent all life in India and has moved to Sydney for the purposes of study several months before the study period commences and has a full identification of himself as an Indian student*). This richer and more realistic classification is important, because it sheds the light on the actual situation in the student’s domain. While even this newly suggested typology doesn’t specify and allows to distinguish the full variety of multicultural upbringing options, at least suggest classification will cater for the dominating majority of cases. With more detailed and specified classification scholars and practitioners will be much properly equipped to understand better and to support career aspirations of presented cohorts of the students.

Career destination: Local destination, New home destination, Global destination

Contemporary careers present unpredictable challenges for individuals, organizations, and societies. Among the major developments in the study and practice of careers are the increased dynamism of the global labor market system and the ever-growing globalization of careers (Baruch and Reis, 2016). Global careers are those that span two or more countries and may take a number of forms (Baruch et al., 2013). Certainly, global careers involve boundary crossing - at least geographical and cultural boundaries (Baruch and Reis, 2016). Debates on a career type and its classification has been a long-time theme in a career development field with the dominating focus and dominant classifications addressed to expatriate managers (e.g. Baruch et al., 2013). In terms of global careers types expatriate managers have traditionally been classified from the organization’s perspective: previous classifications have used the manager’s country of origin (home, host, or third) or the home office region (the United States, Europe, Japan) as the standards for comparison (e.g. Jain et al., 1998; Kang and Shen, 2018). Others have used the manager’s international assignment’s length of time, or frequency of traveling, as the classification criterion (Banai and Wes, 2004). *Global careers* may come in various types and forms, with several dimensions helping to draw distinctions across different types of global careers (e.g., Baruch et al., 2013). Sullivan and Arthur (2006) explored the physical versus psychological boundaries and looked at what it means for those concerned to cross the different types of boundaries. However, the focus on geographical and career mobility across borders is not analyzed (Baruch and Reis, 2016). Also we found that previous research on International work focused on the reasons why individuals choose to include an international component into their career trajectories and which types of individuals are more likely to make this career choice. Our study goes beyond personal level and focuses on **a career types choice**. Shaffer et al. (2012) accept their limitations and encourage researchers to develop a broader and more theoretical view of global work experiences that goes beyond the current focus on expatriation. It moves us to the terminology of local vs *global* career, the terminology that is intuitively deeply understood by the students. We based our study on a very wide definition of a local career that is “*a career that develops mainly in a home country*” and a global career “*the career that crosses*

borders and demands the employee to live and work physically beyond the borders of a home country”. Two critical differences between those polar options are the condition of crossing the home country border and the crossing the culture (see Table 1). To develop future research directions on global careers, we are suggesting the following 3 types of destinations for the purpose of Local vs Global careers: (1) *Local destination*; (2) *New home destination* (new country of study/life); (3) *Global destination* (third country) (see Table 1).

Global vs Local careers taxonomy: through the lens of type of student and destination
Table 2. Global vs Local careers taxonomy: type of students vs destination

Students	Local Students	Dual-homes students	International Students
Destinations			
Local	(1) Local Career	(2) Local Career (go back To country of origin)	(3) Local Career (go back home)
New Home - Global (new country of life/study)	---	(4) New home Global Career (in a country of life/study)	(5) Global Career
Global	(6) Global Career	(7) Global Career (Third-Country)	(8) Global Career

A clear identification of eight career options based on destination and a type of students allows students, academics, education practitioners and consultants to provide the best possible support for the students to prepare them to the career and to facilitate the best match; It matters because dual-homes students will be exposed and aware of three potential options and will be supported to explore the full potential of truly global careers. Empirical testing of the taxonomy will be discussed in the results section. It leads us to the formulation of the second hypothesis:

Methodology

Occupational choice and the related decision where to live are among the most important career decisions and business students show a high receptivity to international careers (Wang and Bu, 2004). Students represent the next generation of managers (Tharenou, 2003). Focus on students reveals vocational preferences at a time individual face an important career-decision (Remhof et al., 2013). Participants were 404 students close to graduation (44% males, 56% females) enrolled in Business & Economics degree during February 2020 – November 2021 at one of the G8 universities in Australia (equivalent of an Ivy-leagues in the US) and at one of the top-3 leading Business Schools in Russia

Theoretical implications

Our study makes several theoretical contributions to the internationalization of business education as well as to the students’ career development and career choice domains.

First, we extend Social Cognitive Theory to our newly suggested typology of the students: Local, Dual-home and International students and emphasize the importance of various experience paths students develop at pre-study period which affect their career intentions.

Second, we suggest the Global vs Local Careers Taxonomy where distinguish between eight career type options based on a student type and based on a destination choice. A clear identification of eight career types based on destination and a type of students allows students, academics, education practitioners and consultants to provide the best possible support for the students to prepare them to the career and to facilitate the best person-career match for them.

Third, we show that all eight types of suggested Local vs Global career choices are supported by empirical data and we show that global career choice would prevail above local career choice for each of the student's types

Practical implications

Our study makes several theoretical contributions to the internationalization of business education as well as to the students' career development and career choice domains.

First, we provide practitioners who work in academia, government or industry with the first well-developed taxonomy of local vs global careers, which can serve as an excellent tool for deeper understanding of students' previous international experience and its influence on students motivations, drives and international career intentions. Outcomes of the study could be included into career developmental programs at the Universities so students can make more informed decisions about types of careers that exist and about possible variety of career choices. This allows them to make the best choice that matches the individual characteristics the most.

Second, our study shows that actual students' intentions on global careers do differ with real percentages of local and international students who disembark on international career. It could be due to serious lack of preparation for truly global careers, or due to "illusionary glasses" which project much more positive seamless image of a global career, so when the first challenges appear it disarms many students and moves away from building a global career. We argue that the importance of realistic expectations along with a proper preparation to a global career should be emphasized.

Third, with massive percentage of students intended to build international careers, we show the importance of thinking about brain drain issues for local economies and provide stronger incentives for all types of students to contribute as graduates into local economies.

Conclusion

Thus our paper brings a visible theoretical and practical contributions to the career development literature in the students context, namely by suggesting the Global vs Local Careers Taxonomy with eight career type options based on a student type and based on a destination choice. Higher attention to more precise student's types contributes to the increase and precision of student's identity. Career development in a student context is a critically important part of the global mobility domain and career development scholars and international education researchers are invited to build on a current study and continue this important conversation.

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Passion for Work in Game Development Industry

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Abstract:

Passion for work is internal motivation of software developers which is being exploited by game development industry notorious for crunch leading developers to burnout and leaving the industry. However, the relationship between crunch and intention of developers to leave their workplaces remains unclear. We have explored the connections between passion for work, crunch, burnout and intention to leave companies or/and the game development industry using a mixed-method approach with seven in-depth interviews and a survey among 96 game developers. In contrast to the previous results, we found that passion for work was related to the current workplace rather than profession per se. Exhaustion as a component of burnout is connected to all aspects of crunch but does not affect developers' intentions to leave the workplaces or industry. Lengthy crunches lead to intention to leave the industry and cynicism which in turn leads to intention to leave the workplaces and industry.

Keywords: *passion for work; crunch; burnout; intention to leave; game development industry*

1. Introduction

Video games are the leading entertainment and media industry (PricewaterhouseCoopers, 2022) and notorious for their exploitative working conditions (Bergstrom, 2022; Peticca-Harris et al., 2015) which have been titled as crunch. Crunch reveals constant and unpaid overtime in the largest and most famous companies in the game industry (Campbell, 2019; Schreier, 2016, 2018, 2019, 2020). Researchers state that crunch and its negative effects lead to developers' burnout (Chung, Kwon, 2020; Cote, Harris, 2021; Edholm et al., 2017; Peticca-Harris et al., 2015) and result in loss of developers who are leaving the industry (Edwards et al., 2014). However, the relationship between crunch, burnout and intention of developers to leave companies or/and industry remains unclear. Passion for work as a main industry characteristic (Chung, Kwon, 2020; Peticca-Harris et al., 2015) that needs further research. Relying on the previous research results, we aim to understand the relationship between passion for work, crunch, burnout, and intention of developers to leave companies and even the video game industry.

2. Conceptual framework and development of hypotheses

One of the main characteristics of game developers is their passion for work which is regarded as intrinsic to people in creative industries (Campbell, 2020; Opara et al., 2019). While passion for work makes developers more attractive candidates in the labour market, this intrinsic motivation makes them vulnerable (Banks, Hesmondhalgh, 2009; Consalvo, 2008) because management systems exploit it through 'neo-normative control mechanisms' which position work as playing activities (Peticca-Harris et al., 2015). Substituting work relationships with a play, culture of passion along with other factors build crunch into the new normality of a gamework (Cote, Harris, 2020). While there are cases of developers crunching out of their own desire and will because of their passion for work (Edholm et al., 2017), other employees can feel obligated to be there with them either because of teamwork (Schreier, 2020) or because of neo-normative corporate culture mechanisms of control (Peticca-Harris et al., 2015).

Burnout is one of the most frequent consequences of crunch (Peticca-Harris et al., 2015; Edholm et al., 2017; Chung, Kwon, 2020; Cote, Harris, 2020, 2021). Quantitative study

conducted among game developers (Mendes, Queiró, 2020) showed that exhaustion as a part of burnout is positively correlated with working hours per week. To summarise, we observe that developers passionate for work are lured by managers into working long hours which produce crunch. Crunch is notoriously known as a reason for burnout. We can also come to the conclusion that lower passion for work can induce burnout. Summarising, the following hypotheses need to be examined:

Hypothesis 1 (H1). Passion for work is positively related to crunch.

Hypothesis 2 (H2). Passion for work is negatively related to burnout.

Hypothesis 3 (H3). Crunch is positively related to burnout.

Hypothesis 4 (H4). Relationship between crunch and burnout is mediated by passion for work.

The top reasons for willing to leave the game industry contain 'better quality of life' (39%), 'pay and hours' (15%) and 'burning out' (15%) (Edwards et al., 2014). However, only 21% of the developers reported that they are planning to leave the industry (Edwards et al., 2014). Recent quantitative research depicts 10% of the developers have intention to leave the industry now or soon (Mendes, Queiró, 2020), but the results don't address the connection between intention to leave the industry and crunch per se. So even though there seems to be a lot of agreement that crunch causes many developers to leave (Cote, Harris, 2020) or consider leaving the industry (Edholm et al., 2017) it's still unclear how exactly crunch affects outflow of developers out of organisations in particular and of the industry as a whole and what role burnout plays in these relationships. To sum up, the connection between burnout caused by crunch and intention to leave, first, an organisation, and second, the industry, should be investigated. That's why the following hypotheses are proposed:

Hypothesis 5a (H5a). Burnout is positively related to developers' intention to leave the game industry.

Hypothesis 5b (H5b). Burnout is positively related to developers' intention to leave their workplaces.

Hypothesis 6a (H6a). Crunch is positively related to developers' intention to leave the game industry.

Hypothesis 6b (H6b). Crunch is positively related to developers' intention to leave their workplaces.

Hypothesis 7a (H7a). Relationship between crunch and intention to leave the game industry is mediated by burnout.

Hypothesis 7b (H7b). Relationship between crunch and intention to leave the workplace is mediated by burnout.

Other reason why crunch is prevalent mentioned by researchers is the creative industry per se as a major factor of managerial complications (Cote, Harris, 2020). While in research we found references to a creative nature of the gamedev profession and industry, one of the major issues pointed by our respondents of the in-depth interviews conducted is a perceived control of time. We also suggest that game developers' work being creative (Sotamaa, 2021) brings issues of developers' time management and their perception of time control which are worth being investigated. It resonates with Edholm et al. (2017) analysis of 'postmortems' where 'Planning/scheduling' and 'Feature creep/Excessive scope' were the most common issues in companies, which experienced crunch. Creativity by its definition demands meeting criteria of novelty, usefulness and surprise (Simonton, 2013), which requires experimentation and risk taking as employees need to test new ideas and approaches (Baucus et al., 2008). This uncertainty limits the ability to standardise production and accurately forecast creative activities (Steiner, Pretenthaler, 2015). In other words, the more the product is perceived as creative, the

more developers need to perceive that they feel their level of creativity to make the work done. That leads to the following hypotheses:

Hypothesis 8 (H8). Developers' creativity is positively related to crunch.

Hypothesis 9 (H9). Perceived control of time is negatively related to crunch.

The hypotheses are presented in the following theoretical framework (Figure 1).

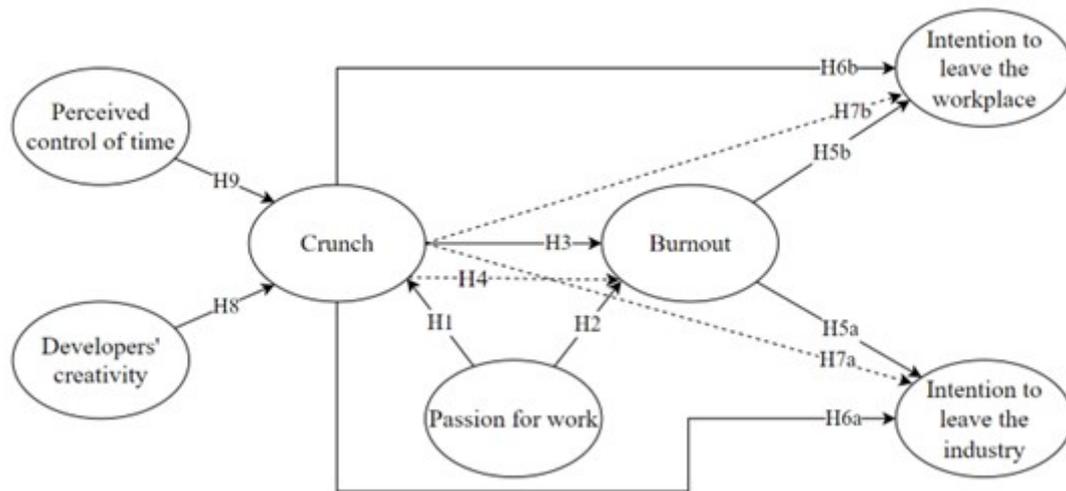


Figure 1. Theoretical framework. The dashed line suggests a mediation.

Method

The mixed-method approach was used to answer the research question and check the hypotheses. At the first step, literature review was carried out. In parallel with the literature review, from April till May 2021, seven in-depth interviews with managers and producers in start-ups, small and large Russian and international companies were conducted. The results of the interviews had shed light on peculiarities of the game industry and helped us demarcate the main constructs. We developed a framework showing connections between the constructs ‘passion for work’, ‘crunch’, ‘burnout’, ‘intention to leave the workplace’, ‘intention to leave the industry’, and operationalise them to develop a survey. Using the results of the interviews, we also added a ‘perceived control of time’ and ‘creativity’ (Furnham, Bachtiar, 2008; Zampetakis et al., 2010) to check mediating roles of the constructs.

At the second step, we conducted a quantitative study via online 41-item questionnaire and identified the relationship between the constructs of the model. Based on (Cennamo, Gardner, 2008; Chen et al., 2020; Edwards et al., 2014; Furnham, Bachtiar, 2008; Salmela-Aro et al., 2010; and Zampetakis et al., 2010), we adapted, validated and tested questionnaire to conduct our study. Apart from the previous research models, we deliberately split the construct ‘intention to leave the industry’ into two ones such as ‘intention to leave the company’ and ‘intention to leave the industry’ to find out what connections between the constructs described above can help companies leverage developers’ turnover within the company. The convenience sample was 96 developers working for video game companies in Russia. We use exploratory factor analysis and correlation analysis as main approaches to verify the constructs and test the framework developed (Picture 1) and further modify it in accordance with the results obtained. We also test mediations using bivariate and multiple regressions (Sobel test).

The survey was carried out using Google Forms. Motivation letters with a link to the online questionnaire was distributed in 9 specialised communication channels for game developers. Money incentives or paid publications were not used. All respondents were informed that their participation is completely voluntary and confidential. Pilot survey was conducted from

January till February 2022 and the period of data collection was from March to April 2022. A large proportion of respondents (32.2%) were managers (including producers, team leads), followed by game designers (including scriptwriters, UX / UI designers; 22.9%) and programmers / software developers (19.8%). The final sample consisted of 28 female and 68 male respondents, the median age of the sample was 28 years, with the average work experience of 5.1 years. Similar data were obtained in larger studies among developers in Russia, Ukraine and Belarus (ValuesValue & InGame Job, 2021).

Empirical results and conclusions

The results of our research (Figure 2) are described below. There was no significant correlation between passion for work and any of the aspects of crunch or components of burnout, so H1 and H2 were rejected. All three aspects of crunch such as duration of crunch, number of crunches and perceived overtime were found to be correlated with exhaustion, while cynicism correlated only with the length of crunch. Still, H3 was accepted. H4 was also accepted because there was a full mediation of the relationship between length of crunch and cynicism by passion for work according to regression analysis. No other mediations between crunch and burnout components occurred.

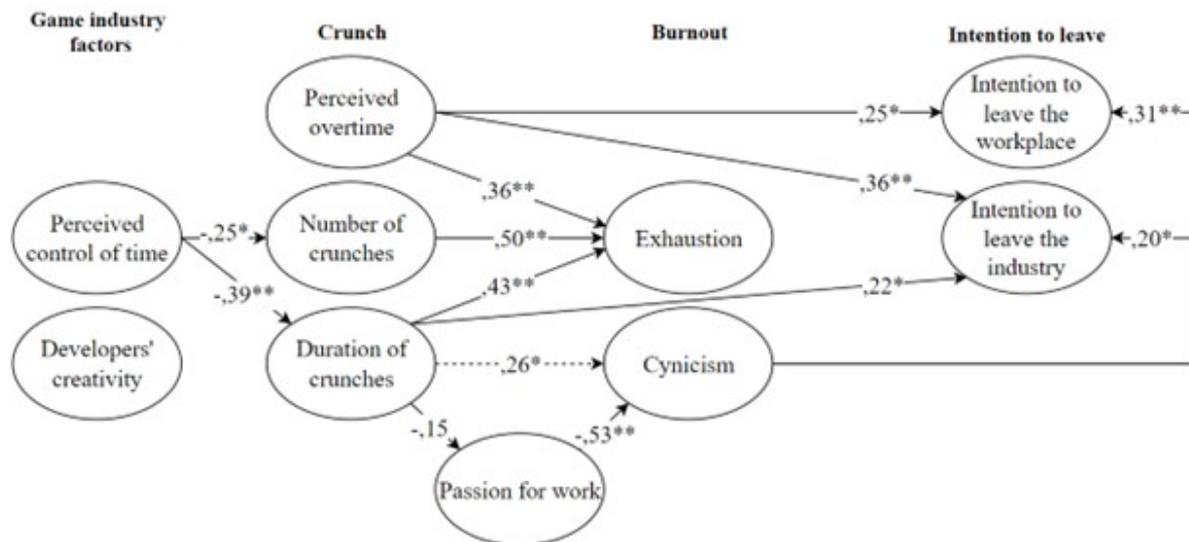


Figure 2. The results of the study.

Cynicism was found to be positively correlated with both intention to leave the game industry and the workplace. So even though there was no connection between exhaustion and intention to leave the industry or intention to leave the company, both hypotheses 5a and 5b were accepted. Also both intention to leave the game industry and the workplace were positively correlated with perceived overtime, while length of crunch correlated only with intention to leave the game industry. Still H6a and H6b were accepted. H7a and H7b were rejected as there was no significant mediation of the relationships between any crunch aspects and intentions to leave the game industry or workplace by burnout.

Creativity was not correlated with any aspect of crunch so H8 was rejected. H9 on the other hand was accepted because perceived control of time negatively correlated with two aspects of crunch: their length and frequency.

The fact that H1 and H2 were not supported and H4 was supported made us look at the 'passion for work' from a perspective of Self-Determination Theory (Gagné, Deci, 2005) and interpret it as an extrinsic autonomous motivation related to a certain company rather than a measure of intrinsic passion for work (Campbell, 2020; Opara et al., 2019; Banks, Hesmondhalgh, 2009). Looking at the 'passion for work' measured as an accepted coherent behavior (Gagné, Deci, 2005), obedience to crunch got a feasible explanation.

Despite the statements that burnout leads to developers leaving the industry (Edholm et al., 2017; Edwards et al., 2014), we found only direct connections between the components of crunch (perceived overtime and duration of crunches) and intention to leave the organisation and intention to leave the industry. The only component of burnout, cynicism, supported previously stated ideas that burnout leads to intention to leave the organisation and the industry (Cote, Harris, 2020, 2021; Mendes, Queiró, 2020; Scheurle, 2021).

We also suggested that the construct 'perceived control of time' would help us understand if developers felt that they had a choice to control the time in the projects they were involved in as a measure of autonomy (Gagné, Deci, 2005). The fact that hypothesis H9 was supported makes us believe that in order to fight the crunch issues, we should look at it not only from the point of management but also from the side of developers' ability to allocate time to perform the tasks.

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The Core Role of HRM in Maintaining the Company's Sustainability in the VUCA Environment

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Abstract:

The modern business environment is characterized by four strong negative factors, which are reflected in the abbreviation VUCA - volatility, uncertainty, complexity, ambiguity. Each of the factors creates obstacles in achieving the goals of companies. Together, they create chaos in which it is easy to lose managerial bearings and succeed. In the VUCA environment, the task of maintaining the sustainability of the company becomes a priority. The relevance of this study is determined by the role of HR practices in maintaining the company's stability in a turbulent environment and using opportunities for development. The purpose of the study is to substantiate the importance and integrated approach to HRM as a condition for maintaining the sustainability and development of the company under the influence of the challenges of the time.

Keywords: *VUCA-world, HRM, strategic approach, sustainability of a company, potential development.*

Introduction

The market environment has always been characterized by dynamism and competitive competition, in which, as is known, the strongest players win. Recently, the business environment has acquired the features of turbulence and chaos. The features of the modern business environment are revealed by the abbreviation VUCA - volatility, uncertainty, complexity, ambiguity. That is why companies need sustainability to survive and develop.

In recent years, the interest of management theorists in the sustainability of companies has increased, but there are still many "white spots" in this area, which determines the relevance of this study.

The purpose of the study is to substantiate the importance and integrated approach to HRM as a condition for maintaining the sustainability and development of the company under the influence of the challenges of the time. The results of the study. Using the methodology of system analysis, the features of the manifestation of VUCA factors in modern Russian realities are revealed, the place and role of HRM in maintaining the stability of the company is determined, and HR practices that contribute to the growth of the potential of companies in a turbulent environment are demonstrated.

2. Materials and Methods

The research methodology is based on general scientific methods: synthesis, analysis and description. The theoretical and methodological basis of this study is based on a systematic analysis of relevant literature on the topic, in particular the impact of the VUCA environment on the activities of companies and approaches to sustainability. The empirical base is based on the content analysis of available literature, publications and current research on the topic of Russian features of turbulent environment and sustainability development, as well as on the practical experience of the author as managerial consultant.

The modern environment was first described as VUCA in 1987 by Warren Bennis and Bert Nanus. Bob Johansen used the concept of VUCA for business to show the main threats that have a strong impact on companies and require solutions and new competencies [1].

So, from the point of view of experts, what is a VUCA environment? First, rapid, sudden, large-scale and unpredictable changes. Secondly, the uncertainty of both the present and the future caused by the complexity of interpreting the available data and understanding the consequences. Thirdly, the continuous action of many factors that form chaos. Fourth, the

destruction of the usual rules, the lack of awareness about the development of the situation and the ability to predict the future.

At the same time, experts say that it is possible to keep control in the VUCA environment and even use the emerging opportunities. It is only necessary to apply effective tools of strategic analysis and best practices of human resource management.

In particular, when monitoring the environment, all VUCA factors are divided into component parts, since each dangerous factor has its own causes and requires special solutions. It is also a practice to get rid of the feeling of losing control of the situation. Johansen developed the VUCA threat response model, which is based on a number of interrelated postulates:

1. Do not resist changes, accept them as a fact. Find the right goal and unite your teams around a vision of the future. At the same time, teams should have flexible tactical goals and freedom to maneuver.
2. Develop environmental monitoring and analytics to develop new approaches to responding to VUCA risks. Conduct an analysis of the internal environment to understand the strengths and weaknesses. Simulate different situations and develop scenarios.
3. Improve internal communication, involve teams in development and decision-making.
4. Support the flexibility, adaptability and initiative of teams. Create a stimulating environment for innovation and development.

The company's sustainability is manifested in its ability to achieve its goals and maintain its potential despite adverse circumstances. Sustainability is demonstrated mainly by companies that use a strategic and integrated approach in their management, rely on guaranteed resources, learn quickly and consistently carry out organizational changes [2].

It is the strategic approach that makes the company more secure in the VUCA world, since it assumes the variability of the external and internal environments of the company, uses tools to monitor and anticipate the development of the situation [3]. A strategic approach to human resource management allows you to create strong teams based on shared values and effectively use organizational resources to achieve success [4].

3. Results

HRM plays a key role in achieving the company's stability in a turbulent environment. It is the best practices that are strategic and complex in nature that determine the preservation of sustainability and even the development of companies. These practices are associated with the creation of stimulating teamwork, initiative and innovation of human resources. A successful strategy in a turbulent environment is based on choosing the right goal related to creating value not only for consumers, but also for human resources. In the latter case, the company creates synergy based on organizational culture, which serves as a "secret sauce", which provides prioritization and turbocharging in decision-making.

The complexity allows companies to quickly, co-ordinate and effectively carry out large-scale changes necessary to adapt to a turbulent situation. Complexity is manifested in maintaining the balance and interconnection of a number of key components of the company, namely:

- *financial sustainability*, which is achieved not only by relying on guaranteed resources, planning and budgeting, but also by balancing short- and long-term financial goals;
- *operational sustainability*, which is aimed at maintaining the reliability of production and logistics, as well as buffering threats by reserving inventory;
- *technological sustainability*, which is achieved through timely investments in reliable, secure and flexible infrastructure;
- *organizational sustainability* aimed at preserving the company's human capital, maintaining the stability of the personnel of key categories of personnel and developing their competencies;
- *reputational sustainability*, which is achieved through loyalty to values and principles and is manifested in the absence of a gap between the declaration and actions;

- *sustainability of the business model*, contributing to the successful adaptation of the company to turbulent changes, support of the innovation portfolio and entrepreneurship [5].

The analysis of successful companies allowed experts to conclude that stability is maintained by companies that have not only short-term indicators, but also long-term ones aimed at becoming stronger, and not just surviving [6]. In the VUCA environment, it is possible to maintain sustainability in the medium and long term with a strategy of development and both human resources and organizational potential development. Development is achieved by maintaining a balance between quick wins, which are necessary to maintain and develop team confidence and maintain staff motivation for results, medium-term successful projects and long-term ones, on the success of which the strategic advantage of the company in a competitive environment depends. The core factors are learning organization and talent management system.[7].

Systematic and consistent application of best management practices, such as lean manufacturing, performance management, agile, team coaching and teamwork ensures development through gradual and continuous increases, which also contributes to sustainability in a turbulent environment. Long-term sustainability in the VUCA environment requires priority in the development of the company's potential. The potential of a company is primarily understood as the potential of its human resources. Success in a turbulent business environment can only be achieved in companies with expert competencies in various fields: from digital marketing, digital transformation of business processes, creation of logistics chains, formation of an eco-system and to agile team management and crowdsourcing [8]. The development of the human resources potential is carried out through continuous improvement of their management practices, which includes the creation of a rapid response system to challenges, which may include a set of proven actions:

- continuous improvement of internal and external environment monitoring;
- involvement of a wide range of managers and experts in the development and decision-making, the institution of permanent meetings;
- creation of a mechanism for verifying solutions, identifying potential shortcomings or overly optimistic forecasts;
- creation of a crisis center to solve problems and overcome destructive events;
- transparent principles of work as guidelines for decision-making;
- consensus in the selection of trigger points for rapid response to emerging situations.

While authoritarian leadership, inconsistency of actions, abrupt changes of priorities with the expectation of explosive success rather lead to a loss of stability and the development of man-made chaos. The lack of management attention to the development of the company's potential in a crisis often leads to the creation of its own VUCA microenvironment. Turbulent changes and related crises have a negative impact on staff. In particular, experts pay attention to the following patterns of human behavior:

- they experience fear, anxiety, confusion and disorientation;
- there is a tendency to individual and collective optimism, which increases the likelihood of wrong decisions;
- the struggle with instability takes a lot of time and effort, emotionally exhausts people, which, in turn, leads to burnout, loss of self-confidence and loss of motivation for results.

The turbulent environment also has a negative impact on the organizational climate, in which the level of trust in information sources decreases, contradictions and conflicts arise between employees, decision-making paralysis often occurs, organizational culture and management practices degrade, which together poses a threat to long-term goals and deprives the company of sustainability.

4. Discussion

This study did not provide answers to all the questions related to human resource management roles for maintaining stability in a turbulent environment. In particular, it is necessary to conduct research on the experience of Russian companies in solving problems related to the sanctions impact on the Russian economy from the leading countries of the world, the growing shortage of qualified personnel and the dominance of authoritarian leadership.

5. Conclusion

So, despite the fact that the VUCA environment gives the impression of a powerful destroyer of the sustainability of companies, the right approach to managing the company as a whole, and human resources in particular, can mitigate the effect of destructive factors and even find new opportunities for business development. The expert community has already studied the experience of the best companies in achieving success in the VUCA environment, identified a number of patterns and developed practical recommendations. Consistent use of these recommendations in practice will allow Russian companies to success fully cope with the challenges of the time.

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Marketing in the Era of Turbulence

The consumer's Emotional State as a Factor of Buying Behavior Predictability

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Abstract:

The share of purchases defined as impulse purchases has been increasing steadily in Russia. A lack of understanding of the nature of impulse purchases might negatively affect both consumers and companies. The paper aims to identify the relationship between the consumer's emotional state and impulse purchases of food products and contribute to predictability of consumer buying behavior. Structural equation modeling in R was used to develop and test the model. The research confirms that negative emotions significantly influence the sensitivity and impulsivity of both female and male consumers. Positive emotions, in contrast, demonstrate statistical significance with men solely. The findings can be explained by the consumer's desire to reduce emotional tension and improve emotional state.

Keywords: *Consumer behavior, Impulse purchases, Emotional consumer, Food products, Consumer buying behavior predictability.*

Acknowledgement

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1. Introduction

The factors influencing consumers' buying behavior are diverse and cover observable and implicit consumer behavior. Product location, promotions, and other external elements are associated with and can motivate spontaneous purchases. The implicit motives and behavioral psychology of impulse shoppers is a more complex area which is actively explored (Parsad et al., 2021). In Russia, attention to the nature of impulse buying has begun to grow in recent years. Analytical reports by Deloitte (2020) reveal the main trends in the consumer behavior of Russians, showing that impulse purchases began to be increasingly prevalent among the population.

Under the influence of specific emotions, consumers are more likely to make purchases. In this way, food choices can become oriented towards creating positive experiences and working to reduce tension (Rick, Pereira & Burson, 2014; Lee, 2015; Horvath & Adiguzel, 2018). The poor predictability of impulse buying behavior, caused by a lack of information can have a negative impact on companies in the long run (Japutra et al., 2019). Moreover, the problem of undisciplined food consumption is most common and acute among young people aged 18 to 25 (de Mattos et al., 2018; Scott et al, 2020).

The nature of impulse buying is an area that has been little explored and is attracting more attention from researchers in Russia. The psychological characteristics and behavior of impulse buyers remain underexplored, which can have a negative impact on the emotional and material state of consumers. Thus, the aim of this research is to identify the influence of the consumer's emotional state on impulse food purchases.

2. Theoretical framework and hypotheses

2.1 Buying behavior: impulse and planned purchases

The relationship between the propensity to make impulse purchases and certain personality characteristics has been given a close attention in academic studies over the last 30 years (Eysenck, 1993; Flight et al., 2011; Tett et al., 2013).

Impulse buying behavior can be caused by low levels of self-control and spontaneity (Punj, 2011). He also suggests that this type of shopping can be attributed to a mild form of addiction, which is often provoked by negative emotions (Harnish et al., 2019). Darrat et al. (2016) examine the relationship between impulse and compulsive types of shopping behavior, and compulsive-impulse behavior (the tendency to make impulse purchases as one of the main reasons for developing compulsive shopping behavior). In this context, impulse buying behavior is sudden, spontaneous, caused by internal and external factors at the moment of making purchases, while compulsive buying behavior is uncontrollable and addictive (Cherrier & Ponnor, 2010; Punj, 2011). Spontaneous purchases in some cases can help to overcome negative emotions and improve mood and emotional state (Darrat et al., 2016).

In our research impulse buying behavior is considered in terms of the definition given by Rook (1987), which is the most frequently cited in recent articles (Iyer et al., 2020; Harnish et al., 2021; Parsad et al., 2021). Impulse purchases are purchases made as a result of spontaneous desire, which manifests itself under the influence of the emotional states of the buyer and external stimuli that provoke internal conflict.

2.2 Factors of impulse buying behavior

In the literature there are largely similar views on the nature of impulse purchases, which makes it possible to identify several groups of factors influencing it.

Gallagher et al. (2017) consider an increased level of anxiety inherent in an individual as one of the main preconditions for impulsive buying behavior. In addition to feeling anxious, Darrat et al. (2016) also highlights the tendency to escapism. In this context, impulse buying can be rationalized by consumers as a reward for themselves. The development of addictive behavior can be influenced by individual psychological characteristics and disorders that suppress emotional states, an innate predisposition, and individual vulnerability associated with reduced self-control (Iyer et al., 2020; Kimiagari & Malafe, 2021).

Kacen et al. (2012) consider making impulse purchases from the point of view of the occurrence of an impulse at the moment of being in the store. They conclude that advertising and promotions attract the attention of consumers, however, the trigger for impulse purchases is the characteristics of the product itself (e.g., lower price, product properties, the attractiveness of packaging).

Kimiagari & Malafe (2021) also confirm that impulse purchases can be driven by external triggers, in particular those that create a feeling of a limited product, the short duration of the promotion, and the uniqueness of the offer. The authors are convinced that external triggers have the greatest impact on consumers, and this especially affects advertising campaigns (Ayub & Zafar, 2018).

2.3 Relationship between emotional state and impulse purchases of food products

Many studies prove a positive correlation between the type of eating behavior and the propensity for impulse purchases. Spontaneous food purchases might be the result of emotions and internal experiences, depending on the characteristics of eating behavior (de Mattos et al., 2018; Harnish Harnish et al., 2019; Parsad et al., 2021). In addition to emotional tension reduction, food can also provide comfort, and tranquility (van Strien et al., 2019). This is particularly reflected in the behavior of “emotional eaters” people who consume more food under stress (Aoun et al., 2019). Recent consumer behavior studies on eating behavior and eating habits identified emotional eating, restrictive eating, cognitive restriction, binge eating, and external eating behavior (Conner et al., 2004; Aoun et al., 2019; Bilici et al., 2020). Sweets is one of the most popular product

categories, consumed under stress, anxiety, and negative emotions to improve the emotional state (Wallis & Hetherington, 2009; Spinelli et al., 2014; van Strien et al., 2019).

Bilici et al. (2020) investigated emotional states and the contexts of different eating behaviors and concluded that men are more prone to emotional consumption under positive emotions, and women are more likely to consume under negative emotions. The tendency to consume food as a way of coping with emotions might be caused by adopted cultural patterns of behaviors (Harnish Harnish et al., 2018; Harnish Harnish et al., 2019; Tarka et al., 2022). Numerous studies show that women are more prone to impulsive shopping (Lee et al., 2009; Harnish et al., 2021; Tarka et al., 2022) and are more likely to engage in emotional eating behavior (van Strien et al., 2019; Aoun et al., 2019; Bilici et al., 2020).

People who suffer from binge eating generally show spontaneous buying behavior as well (de Mattos et al., 2018; Harnish et al., 2019). According to de Mattos et al. (2018), this connection may arise because of a lack of self-control and the desire to “accumulate” (both calories and goods). Impulsive consumer behavior and some eating disorders (e.g. bulimia, compulsive overeating, orthorexia) may have common psychological roots, in particular low self-esteem, anxiety, self-doubt, and the desire to meet societal standards regarding appearance (Harnish et al., 2019). Overeating and impulse purchases might be a tool for emotional tension reduction and stress relief (Lins et al., 2021).

Based on the research background, we suggested that:

1. Impulse food purchases can be used by consumers in Russia as a coping strategy for emotional tension reduction and stress relief.
2. Women are more prone to make impulse food purchases under negative emotions, while men are more likely to make impulse food purchases in a positive emotional state.

3. Method

Qualitative and quantitative techniques are combined to meet the objective of the research. The empirical study is based on the literature on impulsive buying and the psychological aspects of eating behavior. At the stage of qualitative research, 15 in-depth interviews were conducted to identify consumer insights and the cultural characteristics of Russian consumers. At the stage of quantitative research, a survey was conducted, and the data were analyzed using the structural equation modeling method in R.

The survey sample consisted of 375 respondents Russians aged 18 to 25, living in cities with a population of 1 million people or more. In accordance with the purpose of the study, the survey included aspects affecting the psychological characteristics of Russian consumers (the ability to recognize their own emotions, impulsivity, emotional instability, the impact of stress on their nutrition, and the perception of food in general), consumer behavior in the context of a depressed emotional state/stress, or a positive mood, external stimuli (discounts/promotions, packaging), and demographic characteristics (gender and age).

4. Empirical results

4.1 Factors in making impulse food purchases by Russian consumers

In the exploratory factor analysis, the maximum likelihood extraction method was applied to all data with the oblimin rotation. Of the 51 indicators included in the analysis, 37 were excluded, since the factor loading values were less than 0.5. 14 indicators were used for further analysis. The total value of the Kaiser-Meyer-Olkin criterion was 0.75, and the Bartlett sphericity test showed $\chi^2 = 1873$; $df = 91$; $p < 0.001$ for the sample of 375 people, which is sufficient to develop a model. As a result, 6 factors were identified that explained approximately 63.92% of the variance.

This factor structure was evaluated using confirmatory factor analysis in R. It corresponds to the required quality indicators (Kline, 2005): GFI = 0.967 (rec. value ≥ 0.95); CFI = 0.979 (rec. value ≥ 0.9); TLI = 0.965 (rec. value ≥ 0.95); RMSEA = 0.045 (rec. value < 0.08). Each of the

obtained factors is characterized by sufficient reliability: Cronbach's alpha ≥ 0.7 , average variance extracted (AVE) ≥ 0.5 , compositional reliability (CR) ≥ 0.7 (Table 1).

Table 1

Measurement model			
Factor	Compositional Reliability (CR)factor	Average Extracted Variance (AVE)	Cronbach's Alpha
F1. Overcoming negative emotions (Gallagher et al., 2017; van Strien et al., 2019; Tarka et al., 2022)			
1.1 Evaluate what behavior is typical for you when you are experiencing negative emotions/ stress: <i>Buying "extra" products.</i> 1.2 Evaluate what behavior is typical for you when you are experiencing under negative emotions/ stress: <i>Overeating.</i> 1.3 Evaluate how much the suggested action can improve your mood in times of sadness/ <i>depression/stress: Eat something.</i>	0,76	0,57	0,80
F2. Sugar cravings (Wallis & Hetherington, 2009; van Strien et al., 2019; Spinelli et al., 2014)			
2.1 After a hard day at work/school, you need to go to the grocery store. [...] Estimate the probability that your basket will contain: <i>Something sweet.</i> 2.2 At the end of the working/school day, you were told some happy news. You decide to go to the grocery store, buy something to "celebrate". [...] Estimate the probability that your basket will contain: <i>Something sweet.</i> 2.3 If you buy something on impulse, then most often it's: <i>Something sweet.</i>	0,79	0,66	0,79
F3. Experiencing positive emotions (Rick et al., 2013; Iyer et al., 2020; Parsad et al., 2021)			
1.1 When you are in a good mood, how often do you: <i>Go shopping for clothes.</i> 1.2 When you are in a good mood, how often do you: <i>Go to a cafe / restaurant.</i>	0,78	0,64	0,78
F4. Visual appeal (Ayub & Zafar, 2018; Iyer et al., 2020; Kimiagari & Malafe, 2021)			
4.1 After a hard day at work/school, you need to go to the grocery store. [...] Estimate the probability that your basket will contain: <i>Something with a bright and eye-catching design.</i> 4.2 At the end of the working/school day, you were given some happy news. You decide to go to the grocery store, buy something to "celebrate". [...] Estimate the probability that your basket will	0,83	0,70	0,81

contain: <i>Something with a bright and eye-catching design.</i>			
F5. Planned purchases (Aoun et al., 2019; Dhandra, 2020; Tarka et al., 2022)			
1.1 At the end of the working/school day, you were told some good news. You decide to go to the grocery store, buy something to "celebrate". Estimate the probability you will make an unplanned purchase. 1.2 After a hard work-/school day, you need to go to the grocery store. Estimate the probability you will make an unplanned purchase.	0,76	0,61	0,75
F6. Impulsivity (Iyer et al., 2020; Kimiagari & Malafe, 2021; Lins et al., 2021)			
6.1 Estimate how often you do something spontaneous under the influence of emotions. 6.2 Estimate your tendency to make impulse purchases.	0,73	0,58	0,73

Source: results of the empirical study

The factors extracted can be characterized as follows:

1) Overcoming negative emotions

It includes indicators that reflect strategies for coping with negative moods. Emotional consumption and impulse food purchases can be used as a way to cope with negative emotions (Aoun et al., 2019; Harnish Harnish et al., 2019; Lins et al., 2021), sometimes unconsciously. Food in such situations is used to overcome emotions as a result of a lack of self-control (Conner et al., 2004; Aoun et al., 2019; Bilici et al., 2020).

2) Sugar cravings

This factor also characterizes also the emotional function of sweet food (Wallis & Hetherington, 2009; Spinelli et al., 2014; van Strien et al., 2019). Going through a difficult emotional state, people tend to impulsively buy and consume sweets due to personal preferences or learned cultural patterns.

3) Experiencing positive emotions

Describes impulse food purchases as a practice to reinforce positive emotions. Consumers may not perceive such purchases as impulsive if they are not followed by regrets because of a negative consumer experience (Bilici et al., 2020). Buying a product or service with positive emotions might be recognized by consumers as a reward and a self-care practice (Rick et al., 2013; Darrat et al., 2016).

4) Visual appeal

This factor characterizes packaging design as a factor that can attract attention and stimulate unplanned purchases (Ayub & Zafar, 2018; Kimiagari & Malafe, 2021).

5) Planned purchases

The factor describes the degree of planning of the food purchase, that is, it characterizes the consumer's perception of the purchase as planned or spontaneous.

6) Impulsivity

It characterizes the role of individual impulsivity in relation to purchasing decisions (Iyer et al., 2020; Lins et al., 2021).

4.2 The model of the relationship between emotional state, impulsivity, and planning of food purchases.

Following the assumption of differences in the frequency and factors in impulse purchases between men and women, a multigroup model was developed (GFI = 0.994; df = 94, (p-value = 0.064); CFI = 0.988; TLI = 0.98; RMSEA = 0.035). The model adopted demonstrates the relationship between emotional states and the tendency to impulse food purchases.

F5. Planned purchases, was considered as a dependent variable which represents whether the purchase is likely to be planned or an impulse. The independent variables were F1. Overcoming negative emotions; F2. Sugar cravings; F3. Experiencing positive emotions; F4. Visual appeal and F6. Impulsiveness. Table 3 presents the report on testing the relationship between emotional state, impulsivity, and planning of food purchases using SEM.

Table 3

Structural model measurements with gender distribution of respondents

Influence	Gender	Beta	p-value
Total effect: F3 ->F5	Male	-0,244	0,018
Direct effect: F3->F5	Male	-0,443	0,000
Indirect effect: F3->F6	Male	0,256	0,013
Indirect effect: F6->F5	Male	-0,173	0,018
F6->F5	Female	-0,248	0,018
F1->F6	Male	0,467	0,000
	Female	0,614	0,000
F3->F4	Male	0,361	0,000
	Female	-0,047	0,446
F1->F2	Male	0,408	0,000
	Female	0,345	0,000
F1->F4	Male	0,349	0,000
	Female	0,323	0,000

Source: results of the empirical study

5. Results and discussion

Emotional arousal, both positive and negative, increases the respondent's sensitivity to the visual attractiveness of the product. Impulsivity works as a mediator between overcoming negative emotions and purchase planning. Male respondents are more likely to incur expenses more easily, experiencing positive emotions, while, for women, this relationship proved insignificant. This can be interpreted as follows: the process of overcoming negative emotions by male representatives is expressed in an increased desire to sugar cravings and impulsiveness of actions, which can lead to impulse purchases of sweets. The fact that, during the interviews, many male respondents denied the tendency towards impulsive behavior may be explained by the conflict between its desirability and the perceived masculinity of their social role. Making purchases, inspired by positive emotions, can be considered as generosity, which is more consistent with the desired social image. Making an inexpensive spontaneous purchase is perceived by respondents as an appropriate and supportive emotional action (Bilici et al., 2020). A different trend was identified in the behavior of female respondents. The effect of experiencing positive emotions on the buying behavior of women proved insignificant. Thus, the planning of food purchases is directly negatively affected by impulsivity, which is influenced by negative emotions. Under the influence of stress and negative emotions, women also tend to consume sweets and to become more sensitive to the visual characteristics of products. Moreover, women try to reduce anxiety, stress, and sadness by consuming food, particularly sweet food (Harnish et al., 2019) and their negative emotions increase the consumption of sweets. Negative emotions directly affect women's impulsivity, which has a negative impact on the planning of purchases.

6. Conclusion

Based on the results of the empirical study, both direct and indirect influences of factors on the perceived planning of a purchase were demonstrated. The adopted model confirmed the differences in the purchasing behavior and decisions of males and females. The significant influence of the emotional state as a factor in making impulse food purchases was proved using multigroup SEM.

The results of the study confirmed the assumptions formulated based on the results of the literature review, namely that (1) impulse food purchases can be seen as a coping strategy with stress and undesirable emotions; (2) women are more prone to make impulse food purchases under the influence of negative emotions, while men are more likely to make impulse food purchases under the influence of positive emotions; (3) sweets work as the food category most often consumed under the influence of impulses.

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User-generated Content in E-commerce Decision-making: Literature review

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Abstract:

This study aims to describe the scientific field of the user generated content (UGC) research through the bibliographic literature review. The current paper will help to find the gaps in the literature and propose new areas for the research. Specifically, this article tries to find the connection between consumer decision making process in online and the UGC which can affect the purchase decision. A bibliometric approach is used in the current paper which consists of the 169 articles collected through the Scopus from 2006 to 2022. Based on the most frequently used keywords there were detected 4 clusters: “Decision-making based on online-reviews”, “Computer science and review helpfulness”, “Trust and UGC in e-commerce”, and “Purchase decision and information quality”. This work is one of the first ones which investigate the published works about consumer-decision making process in e-commerce and tries to connect it with the content published by the other consumers.

Keywords: *User generated content, e-WOM, E-commerce, consumer decision making.*

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1. Introduction

Due to the development of the technologies and coming into the new digital era more and more people start using Internet daily. The trend of spending more time online can be also observed in the consumer-to-consumer (C2C) content where people publish their textual or visual comments in social networks, blogs, online shops, and others. Some research demonstrate that consumers trust to the different types of user-generated content (Archak, 2011). Thus, during the purchase process they can read comments to the product and make their own decision based on the information provided online by the other consumers (Dhar & Chang, 2009).

The literature on user-generated content primary focuses either on methodological approaches towards the calculation of different effects on sales (e.g., machine learning techniques, sentiment analysis, natural language processing) or on studies of specific areas or products (e.g., hotels, restaurants, movies). Current paper will not limit the study only on those subareas but will summarize the knowledge about consumer generated content through several decades. There were several systematic reviews about the topic of UGC, but they did not cover the interdisciplinary research in economics, IT, management, social sciences, and others. This paper will answer the following research questions in order to systematize the knowledge:

- RQ1. How did the topic of UGC in e-commerce decision-making developed over time?
- RQ2. Which countries lead in the number of published articles in UGC literature?
- RQ3. What affiliations / institutions lead in the research topic of UGC in e-commerce decision-making?
- RQ4. What are the most cited papers on UGC in consumer decision-making process?
- RQ5. What are the most important keywords and topics used by authors in UGC research?

2. Research methodology and sample description

The methodology in the current article was adjusted from Anand et.al. (2021) to analyze bibliography in quantitative way to conduct bibliographic review. As a result, 4 steps-methodology have been applied:

1. Database choice
2. Query development
3. Articles selection (inclusion and exclusion criteria)
4. Analysis of the database
 - a. Scopus metrics (using Excel software), RQ1-RQ4
 - b. Network analysis (using VOSviewer software), RQ5

The primary interest for the author is not to only systematize the knowledge about the user generated content but to find the connections with purchase behavior and directing the findings to the new online world reality (e-commerce). To solve this goal, it was decided to choose Scopus database to extract all relevant for the subject topics. Figure 1 demonstrates the logic of solving the next 2 stages (2nd and 3rd).

First, there were written three requests in order to create the dictionary of synonyms and keywords for the major object of interests: UGC, consumer decision making and e-commerce. The results of search on Scopus gave 40 683, 85 141 and 280 331 results accordingly. As a result, the database with 171 documents have been delivered.

Afterwards, according to the 3rd step several exclusion criteria have been applied. First, the database was limited to the English language of the documents what resulted in 169 documents. This result became the basis for the current analysis.

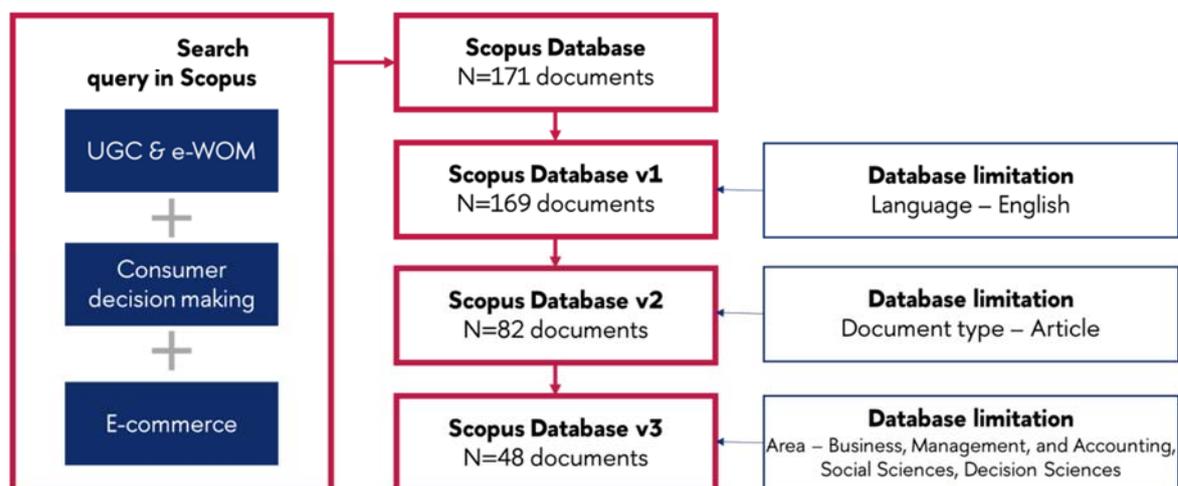


Figure 1. Methodological approach summary
Source: created by the authors based on Scopus database

However, additionally to conduct the systematic literature review the Scopus database can be decreased with the use of several criteria (type of publication, subject area). Thus, the usage of such exclusion criteria as “document type”=article give the decrease of the database to 82 articles (48.5%). The limitation to 3 subject areas such as Business, Management, and Accounting, Social Sciences, and Decision Sciences results in 48 documents which can be used for the systematic literature review.

3. Bibliographic literature review findings

3.1 How did the topic of UGC in e-commerce decision-making developed over time?

According to the Figure 2, we can observe the rapid growth of publications on UGC in e-commerce decision-making started in 2014-2016 years. From 2016 each year the number of publications is increased. It can be associated with the technologies which are developing over time and the shift of consumer behavior towards online. Another reason is that during the last year the society have experienced with Coronavirus-19 pandemic and had to change their normal habits and practices. As a result, the number of online sales was significantly increased in

many countries.

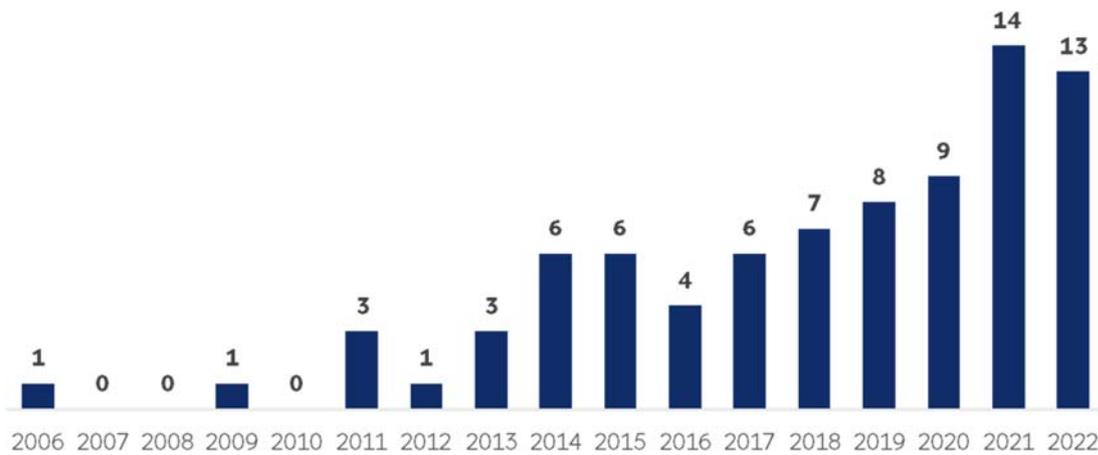


Figure 2. Number of publications in the dataset per year
Source: created by the authors based on Scopus database

3.2 Which countries lead in the number of published articles in UGC literature?

The analysis of countries from which publications originated help the researchers to identify the right context, representation of the study and the interpretation of the results. The database which was collected for the current article shows that there are 14 countries which are above the threshold of minimum 3 publications (see Figure 3). Thus, the highest number of publications were in the United States, China, and India. To these three countries come 41% of all publications about user-generated content in e-commerce decision-making. This highly correlates with the economic development of the countries and technical equipment available for the people.

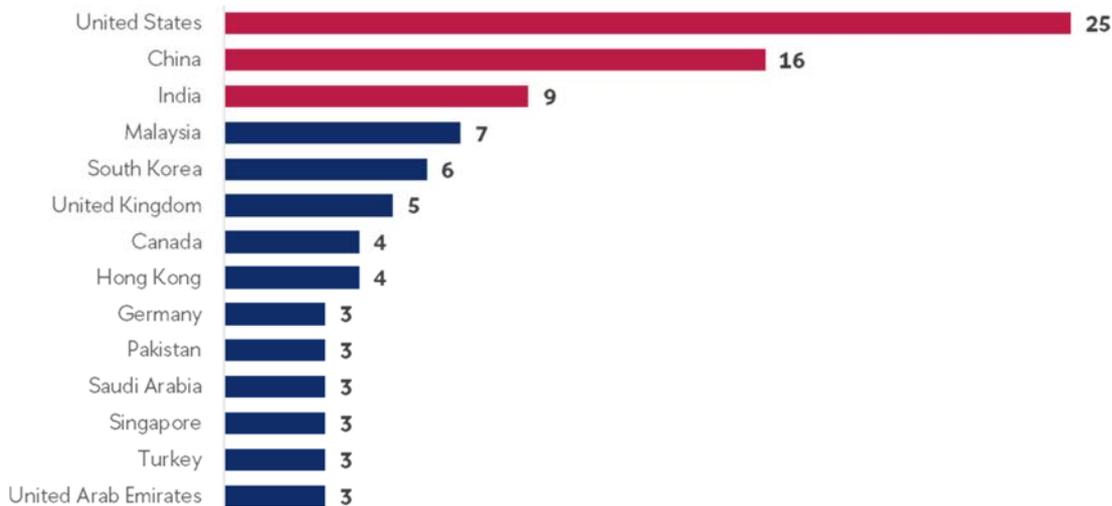


Figure 3. Distribution of documents by leading countries (min 3 publications)
Source: created by the authors based on Scopus database

For the researchers in the United States one of the most important topics is information taken from online reviews about product or services. Specifically, the researchers study the role and helpfulness of such reviews for making a purchase (Siering et al., 2018, Lu et al., 2018), develop the methodological and technical approaches towards analysis of big data collected from online reviews (Singh & Tucker, 2017), evaluate the effects of those review on sales (Wang et al., 2022, O'Reilly et al., 2018).

The first article in China regarding consumer reviews value for consumer decision making in online was published in 2014 by Zou et al. The authors studied positive and negative reviews and concluded that they matter only with adjustment of consumer expertise in the product or service.

Number of research affiliated with India has significantly increased during the last years starting from 2018. The researchers observed that UGC may be a negative moderator between product evaluation cost and customer loyalty (Zhang et al., 2018). Additionally, there was increased the number of publications about sentiment analysis and rating with their influence on decision-making process of the customer (Nandal et al., 2020, Kumar & Parimala, 2020).

3.3 What affiliations / institutions lead in the research topic of UGC in e-commerce decision-making?

Answering RQ3, it can be mentioned that the highest level of contribution has been done from the leading universities, such as Western Michigan University and Universiti Sains Malaysia. The same as with geographical analysis the leading universities / affiliations are primarily from two continents: Asia and America.

3.4 What are the most cited papers on UGC in consumer decision-making process?

The summary of the most cited papers is presented in Table 1. The majority of them have been written during the previous decade and have already become the most influential in the field. The key value which can be observed from the mentioned articles is that the authors try to develop such a model which can help to explain how user-generated content and specifically online product reviews can influence on consumer decision and as a result on sales.

For instance, Korfiatis et al. (2012) have found that readability of the review is more helpful for the consumer than the length of the text left by other users. Also, it proved by Zhang et al. (2018) that perceived informativeness and perceived persuasiveness influence the consumer decision-making, but the level of helpfulness and influence of the review is different for all customers.

Figure 4 shows the major contributors to the field based on the amount of articles written by the same author. Nilashi wrote the articles in 2013, 2021 and 2022. The contribution has been done in medical tourism online reviews and tourism industry (eco-friendly hotels). There was developed the prediction model based on fuzzy clustering and text mining approaches.

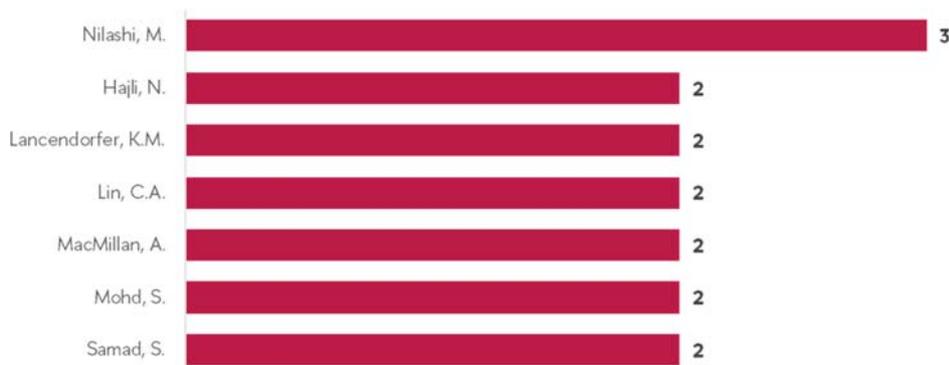


Figure 4. Distribution of documents by leading authors (min 2 publications)
Source: created by the authors based on Scopus database

Table 1 - Top 10 highly cited papers on UGC and e-WOM online decision-making between 2006 and 2022

<i>Author(s)</i>	<i>Year</i>	<i>Journal</i>	<i>Topic/Focus</i>	<i># Citations</i>
<i>Korfiatis, N., García-Bariocanal, E., Sánchez-Alonso, S.</i>	2012	Electronic Commerce Research and Applications	Evaluation of content of online reviews (e.g. length, readability) for the helpfulness for the consumer	356
<i>Zhang, K.Z.K., Zhao, S.J., Cheung, C.M.K., Lee, M.K.O.</i>	2014	Decision Support Systems	Consideration of online reviews (specifically, source credibility and perceived quantity of review) on consumers' decision making	316
<i>Steffes, E.M., Burgee, L.E.</i>	2009	Internet Research	Influence of EWom forums for students to decide and comparison to the other sources of information	309
<i>Hu, N., Koh, N.S., Reddy, S.K.</i>	2014	Decision Support Systems	The effects of ratings, sentiments, and sales on sales	268
<i>Hsu, C.-L., Lin, J.C.-C., Chiang, H.-S.</i>	2013	Internet Research	The effects of blogger recommendations on customer's online shopping intentions	192
<i>Lee, J., Park, D.-H., Han, I.</i>	2011	Internet Research	The effects of online consumer reviews used in the advertisement by the marketers on purchase intention	177
<i>Krishnamoorthy, S.</i>	2015	Expert Systems with Applications	Evaluation of linguistic features of online reviews for the helpfulness for the consumer	134
<i>Siering, M., Muntermann, J., Rajagopalan, B.</i>	2018	Decision Support Systems	Evaluation of online product review (signaling environment effects) for the helpfulness for the consumer	119
<i>Shan, Y.</i>	2016	Computers in Human Behavior	Evaluation and comparison of self-generated and system-generated content to evaluate the credibility of online reviews	102
<i>Lin, X., Wang, X., Hajli, N.</i>	2019	International Journal of Electronic	Evaluation the role of social commerce trust in consumer decision-making process	92

Commerce

Source: created by the authors based on Scopus database

4.5 What are the most important keywords and topics used by authors in UGC research?

First, in order to conduct systematic literature review in the business literature it was decided to check the hypothesis about the distribution of articles by subject area. Figure 5 demonstrates that 29% of articles belong to the field of Computer Science. It can be explained by the variety of research which aims to develop mathematical prediction or explanatory model of future behavior of the consumer or sales. Due to the fact the consumers leave a lot of content online the researchers deal with big datasets which require specific skills. The next three groups take 36% of all articles which are dealing with business and managerial problems. These three subject areas are the interest for the current research because consumer decision making, and user generated content are in the focus for these domains.

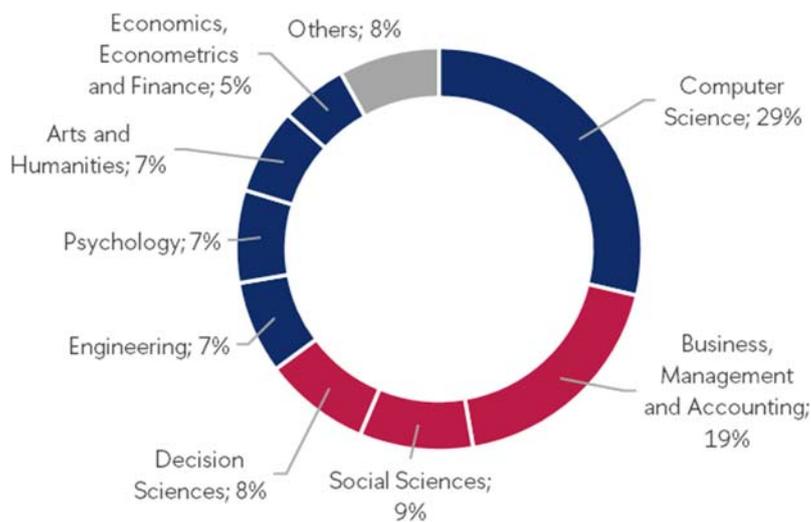


Figure 5. Distribution of documents by subject area

Source: created by the authors based on Scopus database

In order to answer RQ5, all the keywords from 169 articles were downloaded in VOSviewer. Based on the dataset of 169 documents there were observed 594 keywords. There was set the threshold of 3 as the minimum number of occurrences of a keyword. Based on these limitations there were left 51 keywords. One of them (fuzzy set) was excluded from the analysis due to the specificity of the term. As a result, 50 observations were left.

The results are summarized in the Figure 6. We found 4 clusters which can describe the UGC and online decision-making.

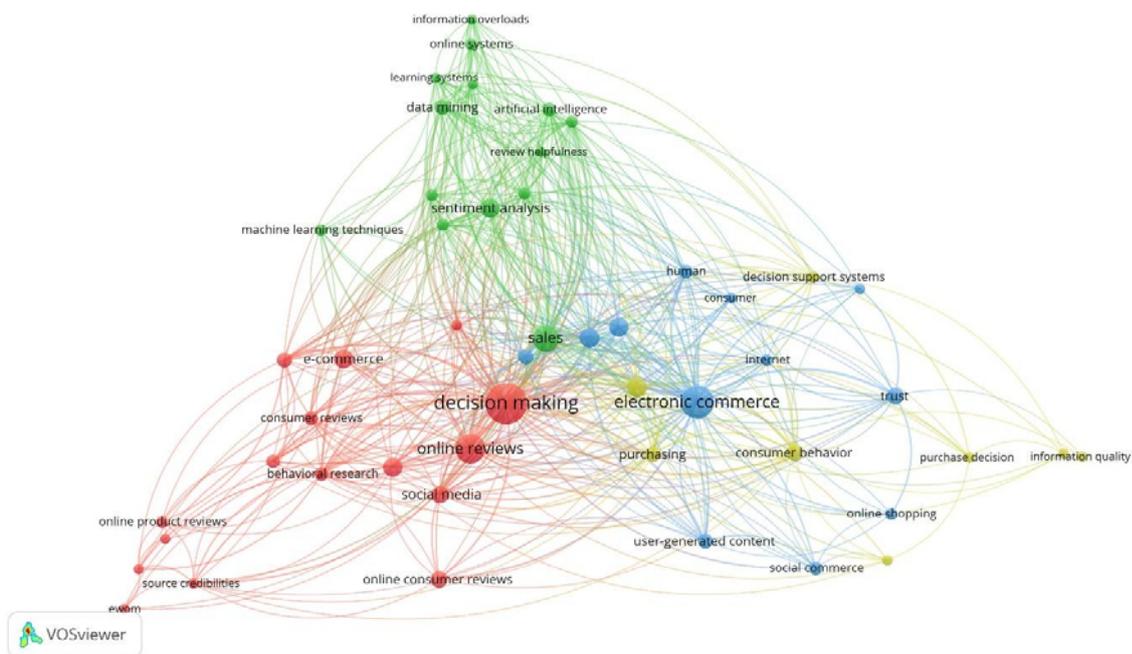


Figure 6. Keyword co-occurrence map of UGC in e-commerce decision-making
Source: created by the authors based on Scopus database

First cluster (red) “Decision-making based on online-reviews”

Decision-making is the major interest for the scientists from such subject areas as Decision sciences, Behavioral sciences. The primary focus of such research is to evaluate the role of online reviews, online product reviews for the decision making. Besides, there are also other factors which can influence the consumer decision-making: course credibility, social media, ewom.

Second cluster (green) “Computer science and review helpfulness”.

This cluster describes the research about the methodology and models which help to explain the review helpfulness and predict sales. Such methodologies and techniques are: data mining, artificial intelligence, sentiment analysis, machine learning.

Third cluster (blue) “Trust and UGC in e-commerce”

This cluster describes the other perspective to the same topic: consumer perspective. Since user-generated content belongs to C2C paradigm, it is crucial to understand the consumer’s motives, intentions and behavior. Thus, the researchers investigate into the field of trust and perceptions of the consumers to understand and explain their decision- making during online shopping. This cluster is the closest one to the studied topic. Later (in the future publication) we are going to conduct systematic analysis primarily on these articles.

Fourth cluster (yellow) “Purchase decision and information quality”

Purchase decision may also be influenced by the perceived risk and information quality. For this cluster the researchers are primarily from Economics and business area who are trying to evaluate such models with these factors.

Figure 6 shows the development of the major keywords over time. The research of e-commerce was started earlier than possible. Afterwards, with the spread of e-commerce and online shopping the researchers started to focus on consumer reviews and consumer decision-making. However, the trend of the last years is about user-generated content in the field of e-commerce and online consumer-decision making.

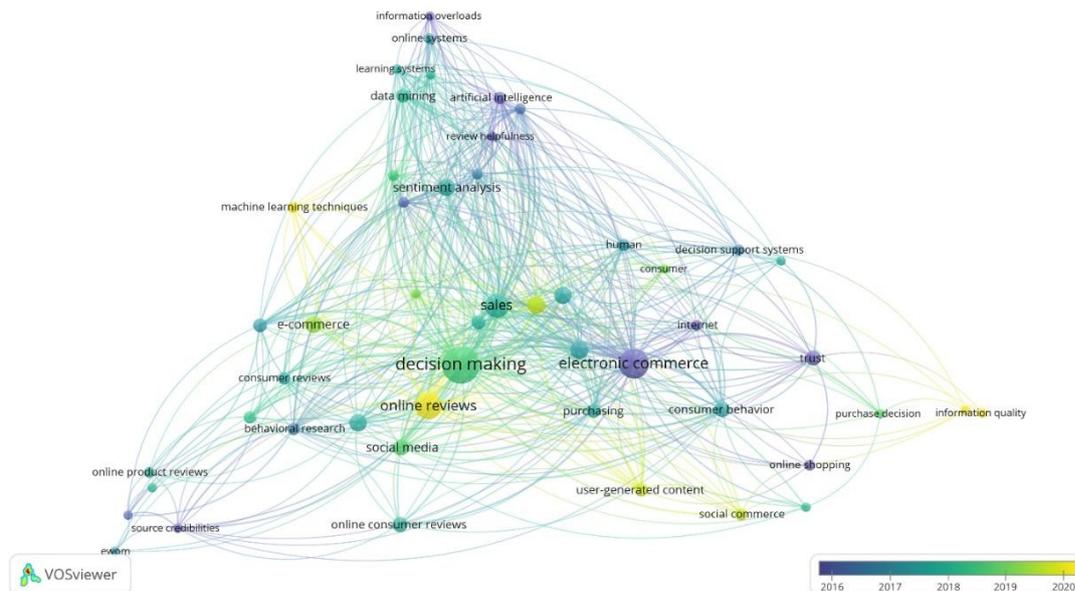


Figure 6. Development of prevalence of keywords of UGC in e-commerce decision-making
Source: created by the authors based on Scopus database

4. Conclusion

In this paper, the author presents the results of one of first one qualitative research based on bibliographic data on the topic of usage of user-generated content during e-commerce decision-making. As a result of the study, the author proposed the clusterization of the user-generated content in the context of consumer decision making in e-commerce. The identified clusters can be used as a trend or subtopic to understand the consumer's behavior better in accordance with the field of the researcher.

The study has several limitations: the sample size is not small enough to conduct systematic literature review which could give more valuable and qualitative information about the existing literature in the area of Business research, Social sciences, and Decision sciences. Additionally, the methodology of the current research could be expanded, specifically with machine learning techniques of topic modelling and clusterization based on the whole corpus of the texts. Finally, the author of the research did not make classification or systematization of all studied documents in a single source of information.

However, these limitations are the directions for the future research. It is already planned to improve the methodology and add several methods to check the hypothesis about the trends over time and the development of the specific subtopics over the past decades.

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Influence of Engagement in the Local Community on Satisfaction with the Tenant Mix of the Shopping Center and its Preferences over Competitors: Results of the Empirical Study

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Abstract:

This article is based on the results of the empirical study conducted in spring 2022. The goal of the study was to identify differences between the consumers of the shopping center engaged and not engaged in the local community (on the example of two neighborhood shopping centers in St. Petersburg – “Cosmos” and “Avenue”). The results of the study (sample size - 228 respondents) showed that engaged and non-engaged consumers practically do not differ in terms of socio-demographic characteristics, however, the frequency of visits and the average time spent in the shopping center among engaged consumers are significantly higher. Engaged consumers are more satisfied with the tenant mix of the shopping centers both in general and in certain categories of goods, and services. Engaged consumers are more likely than non-engaged to prefer shopping in the shopping center under study than shopping in another neighborhood or non-neighborhood shopping centers. It was also found out that engaged consumers respond to the survey questions in more detail, which makes them more useful to the company when conducting market research. The results of the empirical study can be used to develop marketing strategies for the relationship of Russian shopping centers with consumers of varying degrees of engagement in the local community.

Keywords: *shopping center, engagement in the local community, empirical study, satisfaction, correlation and regression analysis*

1. Introduction

Today, the effects of the pandemic and the current economic situation pose serious challenges for the retail industry. However, the biggest part in the transformation of the role of shopping centers in the market has been played by the expansion of online shopping. Because of it, the format of the so-called "neighborhood" shopping centers is becoming increasingly popular. Consumers there can not only visit numerous chain stores and supermarkets, but also use additional services (dry cleaning, hairdressing, etc.), especially the exclusive ones (for example, sports section or game play for a child), which are difficult or impossible to use online. This, in turn, determines the importance of the development of relationships between neighborhood shopping centers and consumers. An analysis of the practices and marketing strategies of such shopping centers showed the need to conduct an empirical study of the relationship between satisfaction with the representation of retail outlets (services) of various categories and the preferences of the studied shopping center over different categories of competitors: other neighborhood shopping centers, non-neighborhood shopping centers, as well as online shopping. For neighborhood shopping centers, due to the specifics of their activities, the development of communication and relationships with the local community is becoming more and more important, which leads to the additional goal of the current study, namely, determining the role of engagement in the local community in the preference of the studied shopping center over different categories of competitors.

2. Main body of the paper. Method (including sample and measures description)

An empirical study was carried out on the basis of the neighborhood shopping centers "Cosmos" (Moskovsky district of St. Petersburg) and "Avenue" (Vyborgsky district of St. Petersburg). An empirical study was conducted through an online survey using a questionnaire created in the Yandex Forms service. The sample was formed on the basis of the social network Vkontakte and was quoted according to the following socio-demographic variables:

- gender,
- age,
- occupation, education,
- number of children,
- place of residence within the city.

The control behavioral variables in the study were:

- frequency of visits to the studied shopping center (average number of visits per month),
- average amount of time (in minutes) spent in the shopping center per 1 visit,
- average amount of money (average check) spent in the shopping center per 1 visit.

Based on the goal of the study, the sampling was carried out the following way:

- firstly, the subscribers of the official groups of "Cosmos" and "Avenue" in the social network VKontakte were asked. The task was to survey consumers who are more likely to be engaged in the local community. For the shopping center "Avenue" this number was 2448 subscribers, for the shopping center "Cosmos" - 1845 subscribers.

- secondly, the subscribers of the official groups of apartment complexes located near "Cosmos" and "Avenue" were surveyed (except for people subscribed to the shopping center groups). The task was to ask consumers, on the contrary, who are more likely not to be engaged in the local community. For "Avenue" shopping center, these are "Shuvalov Heights" apartment complex (1167 subscribers), as well as "Lake House" (150 subscribers), "Ozerki Style Tower" (155 subscribers), and "Pragma House" (561 subscribers). For "Cosmos" shopping center, these are "Piter" apartment complex (4515 subscribers), as well as "Dominanta" (917 subscribers), "Kremlin Stars" (2986 subscribers), "Zvezdny" (6779 subscribers), and "Defense" (2428 subscribers).

The survey was conducted from March 17, 2022, to April 15, 2022, taking into account the limit on sending messages provided by the social network (no more than 20 messages in 12 hours). The questionnaire was sent only to users who are visitors to the shopping centers in question. This information was clarified when sending an invitation letter.

Thus, the total number of questionnaires sent was 2190 questionnaires for subscribers of the "Avenue" shopping center group and nearby apartment complexes (the questionnaire return rate was 3.3%) and 6853 questionnaires for subscribers of the "Cosmos" shopping center group and nearby apartment complexes (the questionnaire return rate was 2,3%).

The final sample consisted of 228 respondents with the following socio-demographic characteristics:

- gender: 78.1% - women, 21.9% - men,
- age: from 18 to 65 years, average age - 36 years (SD= 10.7 years),
- presence of children: the average number of children under 15 y.o. is 1.

Engagement in the local community was assessed by the degree of agreement (on a 5-point Likert scale) with the following statements: [1 - 5]

2.1. I attend events organized by the shopping center (for example, workshops, competitions, etc.);

2.2. I visit the official website of the shopping center, read news about the shopping center;

2.3. I am subscribed to the shopping center community in at least one of the social networks;

2.4. I participate in the life of the shopping center community on a social network (like, comment, participate in discussions, respond to stories, etc.);

2.5. I send my friends information related to the shopping center (information about events, promotions, competitions, news about the opening of new stores, etc.);

2.6. I recommend / ready to recommend the shopping center to my friends.

The last question assessed not only the general willingness to recommend shopping center, but also the willingness to recommend outlets of various categories of goods and services, such as “household appliances”, “clothing and footwear”, “perfumes and cosmetics”, etc. The focus of the current study was not to assess the attractiveness of specific shopping center tenants for consumers, but to assess satisfaction with the representation of specific categories of goods and services in the shopping centers under study.

The basic hypothesis was that respondents who highly (4 out of 5 and more) rated the degree of their agreement with all the statements from the list can be identified as engaged in the local community. To test this hypothesis, a hierarchical cluster analysis was carried out, the input variables were 6 statements indicated above.

The best clustering result, according to the cluster agglomeration matrix, was obtained by selecting 5 clusters, 2 of which are outliers for 1 respondent (it is worth noting that 59 respondents were forced to be excluded from the clustering procedure, since they found it difficult to answer one or more clustering questions).

Table 1 provides a brief description of the 3 significant clusters obtained as a result of the hierarchical clustering procedure according to the degree of their engagement in the local community.

Table 1 - Brief description of 3 significant clusters by the degree of their engagement in the local community

Average scores on a 5-point scale	Cluster 1	Cluster 2	Cluster 3
2.1. I attend events organized by the shopping center (for example, workshops, competitions, etc.)	2,09	1,21	4,57
2.2. I visit the official website of the shopping center, read the news about the shopping center	1,93	1,07	4,29
2.3. I am subscribed to the shopping center community in at least one of the social networks	4,79	1,09	4,71
2.4. I participate in the life of the shopping center community on a social network (like, comment, participate in discussions, respond to stories, etc.)	1,76	1,06	3,86
2.5. I send my friends information related to the shopping center (information about events, promotions, competitions, news about the opening of new stores, etc.)	1,68	1,18	4,57
2.6. I recommend / ready to recommend the shopping center to my friends	3,31	2,62	4,64
<i>Cluster size</i>	<i>68 respondents (29,8% of the sample)</i>	<i>85 respondents (37,3% of the sample)</i>	<i>14 respondents (6,1% of the sample)</i>

Table 1 shows that the number of “absolutely engaged consumers” (highly rated all of 6 statements) is small (see Cluster 3). At the same time, representatives of the rather numerous Cluster 1 highly rated a number of statements characterizing their engagement (especially regarding the subscription to social networks of the shopping centers and the readiness to recommend the shopping center to their surroundings). In the aggregate, representatives of Cluster 1 and Cluster 3 (82 respondents in total) can be attributed to the group of consumers in

this or that way engaged in the local community. Representatives of the most numerous cluster 2 (85 respondents), on the contrary, gave a low rating to all statements on engagement, and can be classified as a group of consumers who are conditionally not engaged in the local community.

To achieve the goal of the study, it is necessary to conduct a comparative analysis of the group of engaged and non-engaged consumers. Table 2 presents their socio-demographic and behavioral characteristics.

Table 2 - Comparative analysis of engaged and non-engaged consumers

	Customers engaged in the local community	Customers not engaged in the local community
Gender	12,2% - male 87,8% - female	25,9% - male 74,1% - female
Average age	37,2 y.o. (SD= 9,6)	34,7 y.o. (SD= 8,9)
Number of children 15 y.o. and younger	1,24	0,80
Average frequency of visiting to the shopping center (times per month)	8,8 (SD= 8,5)	5,7 (SD= 7,4)
Average time spent in the shopping center (min.)	71,2 (SD= 59,4)	41,8 (SD= 28,2)

Table 2 shows that the socio-demographic profile of engaged and non-engaged consumers is largely similar (with some predominance of women with children among engaged consumers), at the same time, behavioral characteristics (frequency of visits and average time spent in shopping centers) are significantly higher for engaged consumers.

3. Empirical results

The assessment of satisfaction with the representation of retail outlets, and services in the shopping center also differs significantly for engaged and non-engaged consumers (both in general and for most of the individual assortment categories, see Table 3).

Table 3 - Comparative analysis of satisfaction with the representation of retail outlets, and services in the shopping center for engaged and non-engaged consumers (scores on a 5-point scale)

	Customers engaged in the local community		Customers not engaged in the local community		Sig.
	Mean	SD	Mean	SD	
1.1. Satisfaction with the representation of retail outlets, and services in general	3,70	,762	3,39	,974	0,026
1.1.1. including outlets in the category "supermarkets"	3,61	1,326	3,21	1,514	0,076
1.1.2. including outlets in the category "clothing and footwear"	2,98	1,091	2,78	1,238	0,291
1.1.3. including outlets in the category "cosmetics and perfumery"	4,06	,925	3,79	1,087	0,087
1.1.4. including outlets in the category "children's goods"	4,50	,734	4,01	1,153	0,002
1.1.5. including outlets in the category "goods for sports and recreation"	3,43	1,196	3,08	1,341	0,106
1.1.6. including outlets in the category "household goods"	2,28	1,117	2,31	1,300	0,888

1.1.7. including outlets in the category "household appliances and electronics"	3,53	1,288	3,08	1,474	0,042
1.1.8. including services in the category "food"	3,61	1,205	3,44	1,349	0,387
1.1.9. including services in the category "entertainment for adults"	2,54	1,286	2,14	1,239	0,064
1.1.10. including services in the category "entertainment for children"	3,75	1,253	3,31	1,316	0,05
1.1.11. including services in the category "sports"	4,44	,904	3,88	1,313	0,004
1.1.12. including services in the category "beauty and health"	3,76	1,038	3,49	1,235	0,168
1.1.13. including other services (for example, dry cleaning, pharmacy, etc.)	3,70	1,159	3,59	1,246	0,575

Table 3 shows that there are significant differences between engaged and non-engaged consumers, both in general in terms of satisfaction with the representation of retail outlets in the shopping center, and for certain categories of retail outlets (supermarkets, cosmetics and perfumes, children's products, household appliances and electronics, entertainment for adults, entertainment for children, sports).

An additional correlation and regression analysis made it possible to establish that the overall satisfaction with the representation of retail outlets for engaged consumers is formed, first of all, by satisfaction with such categories of services as "cosmetics and perfumes", "entertainment for adults", "entertainment for children", and for non-engaged consumers - satisfaction with such categories of services as "household goods" and "food".

The next block of questions, on which it is possible to compare the answers of engaged and non-engaged respondents, is a series of questions devoted to the preference of the analyzed neighborhood shopping center over different categories of competitors, namely:

3.1. I prefer the analyzed shopping center to another neighborhood shopping centers (examples were given separately for the "Cosmos" shopping center and the "Avenue" shopping center)

3.2. I prefer the analyzed shopping center to non-neighborhood shopping centers (for example, "Gallery", "Mega", etc.)

3.3. I prefer visiting the analyzed shopping center to online shopping (for example, through an online store, mobile application, etc.)

Similar questions were also asked in the context of individual assortment categories (see Table 3).

The results of checking the differences between engaged and non-engaged consumers are presented in Table 4; methods of descriptive statistics, as well as correlation and regression analysis were used to carry out the calculations.

Table 4 - Comparative analysis of engaged and non-engaged consumers regarding the preference of the studied shopping center over different categories of competitors

	Customers engaged in the local community	Customers not engaged in the local community	Sig.
3.1. I prefer the analyzed shopping center to another neighborhood shopping center	Average score – 2,91 General preference is formed by preference of the following categories of goods and services – clothing and footwear, children's goods, household goods, beauty and	Average score – 1,99 General preference is formed by preference of the following categories of goods and services – no (model is not significant)	,000

	health (R2 = 69.5%)		
3.2. I prefer the analyzed shopping center to another non- neighborhood shopping center	Average score – 2,64 General preference is formed by preference of the following categories of goods and services – supermarkets, clothing and footwear, cosmetics and perfumes, children's products, household goods (R2 = 78.7%)	Average score – 1,88 General preference is formed by preference of the following categories of goods and services – supermarkets, clothing and footwear, sports, beauty and health (R2 = 72.8%)	,001
3.3. I prefer visiting the analyzed shopping center to online shopping	Average score – 2,29 General preference is formed by preference of the following categories of goods and services – supermarkets, clothing and footwear, goods for sports and recreation (R2 = 75.6%)	Average score – 2,03 General preference is formed by preference of the following categories of goods and services – supermarkets, cosmetics and perfumery (R2 = 66.5%)	,225

Table 4 shows that consumers engaged and non- engaged in the local community differ significantly in their preferences for the studied shopping center over other neighborhood shopping centers, as well as over non-neighborhood shopping centers. At the same time, there are no significant differences in their preferences over online shopping.

In conclusion, it is necessary to check how strong is the relationship between satisfaction with the representation of retail outlets, goods and services in the shopping center, and the preference of the analyzed shopping center over competitors of various categories (separately for consumers engaged and not engaged in the local community). It was found out that for the engaged consumers, their satisfaction with the representation in the shopping center of specific categories of retail outlets, and services determines their preference for the studied shopping center over other neighborhood shopping centers, but for those who are not engaged - their preference over non-neighborhood shopping centers. As for the preference of the studied shopping centers over online shopping, the connection between satisfaction and preference turned out to be insignificant for both engaged and non-engaged consumers.

4. Conclusions

The empirical study made it possible to draw the following conclusions regarding the differences between consumers engaged and not engaged in the local community on the questions of their satisfaction with the representation of outlets, goods and services of various categories in the neighborhood shopping centers, and the relationship between satisfaction and the preference of the studied shopping centers over competitors of various categories:

- Engaged consumers visit shopping centers 50% more often and spend 70% more time per visit.
- Engaged consumers are more satisfied with both the tenant mix of the shopping center as a whole and the representation of outlets, and services of all the studied categories (except for “household goods”, for which the average satisfaction rating for engaged and non-engaged consumers is almost the same). Also, SD shows that the engaged consumers are more similar in their assessments than the non-engaged ones.
- Engaged consumers are more likely than non-engaged to prefer shopping in the shopping center under study than shopping in another neighborhood or non- neighborhood

shopping center (there are no significant differences between the consumers engaged and not engaged in the local community in preferring online shopping).

- For the engaged consumers, their satisfaction with the representation in the shopping center of specific categories of retail outlets, and services determines their preference for the studied shopping center over other neighborhood shopping centers, for those who are not engaged - over non-neighborhood ones.

Moreover, in the results of the empirical study, it is worth noting the following: as part of the questionnaire, respondents were asked 2 open-ended questions:

1.2.1. What outlets, in your opinion, are lacking in the studied shopping center?

1.2.2. What services, in your opinion, are lacking in the studied shopping center?

Engaged respondents have given more meaningful, detailed answers to these questions, while non-engaged respondents have given just brief comments or the wording “everything is fine”. This thesis suggests that engaged consumers are more useful for the company when conducting marketing research, as they can provide more detailed information.

It is also worth noting that when answering a series of similarly worded questions (regarding satisfaction, engagement, preferences over different categories of competitors), non-engaged consumers have given more similar answers than engaged ones, which may be indirect evidence that they think less about questions and give less reliable answers than engaged consumers.

As a prospect for further analytics, we can note the possible division of engaged consumers by types of engagement, which should lead to the development of various marketing strategies for the relationship of Russian shopping centers with consumers of varying degrees of engagement in the local community.

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Impact of Firm-generated Social Media Content on firm's Profitability

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Abstract:

Social media content makes a significant impact on the financial performance of companies. This article deals with various characteristics of firm-generated social media content that affect company profitability. Previous studies use a limited set of firm-generated content metrics: only the presence of particular topic and content volume are considered. This study extends the understanding of economic effect of firm-generated content by examining additional content characteristics, such as content type, vividness, interpost duration and time of publication. We use random effects regression to model firms' profitability. We considered 161 Russian companies and their online publications on Russian social network Vkontakte during 2017-2021. Results demonstrate that content type, content vividness and interpost duration make no significant impact on firms' profitability, whereas time of publication does: firms that publish content from 4am to 8am have higher profitability. These findings are useful for firms seeking to improve their content strategies in social media.

Keywords: *social media, content strategy, firm-generated content, profitability.*

1. Introduction

Social media could be defined as “a group of Internet-based applications that allow the creation and exchange of user generated content” (A. Kaplan, M. Haenlein, 2010, p. 61). Content is defined as “any material made available for sharing online, including photographs and videos, news and entertainment” (D. Chanler, R. Murray, 2016).

Social media has been proven to have an impact on the financial performance of companies (A.-S. T. Olanrewaju et al., 2020). It is used by firms as a tool to provide information for consumers (Cioroianu, 2021), investors (K. Byun and J. Oh, 2018; W. Zhang, 2021) or society (N. Zhang, 2021), thus increasing information awareness for the counterparties and boosting firms' financial performance. Financial performance of a company could be both affected by the online content created by either user or a company (user/company generated). User-generated content could be the comments posted online, user response (“likes”, “reposts”), public news. Firm-generated content could be any messages posted online by the company: on company official website, news website, or its official social media page. Both kinds of content create value for firms.

We examined the literature dedicated to economic effects of user-generated content. User sentiment towards the firm is a very impactful user-generated content characteristic. It is an opinion of customers, investors or counterparties expressed in social media towards the firm that could affect market price (Y. Xiaolan et al., 2020), return on investment (D. C. Broadstock and D. Zhang, 2019), stock volatility (F. Audrino et al., 2020), co-movement with the market (R. Ding et al., 2020). The sentiment towards whole market of the firm could also affect individual firms' price (D. C. Broadstock and D. Zhang, 2019). The effect itself is not constant and varies over time (H. Chi-San et al., 2017).

Not only the sentiment of user-generated content affects the firm, but also its volume. X. Zu. et al. (2019) found that the input intensity of stock forum posts related to firm boosts its stock price informativeness, thus rising a firm's value. Amount of comments and posts related to particular company affects its competitiveness (B. Lányi et al., 2021). R. Ding et al. (2020) noticed that the increased number of non-professional analysis of a firm («social media

coverage») reduces firm's stock comovement with the market. Investors' attention indicated in volume of google searches and publications on Twitter may change stock volatility (F. Audrino et. al., 2020). So content volume an important factor that could affect firms' financial indicators.

After that we examined the literature about the effect of firm-generated content on firms. We wanted to identify content characteristics that make economic impact on firms. Some of the studies are devoted to investigating influence of specific firm-generated publications. K. Byun and J. Oh (2018) found that announcements about a company's corporate social responsibility activities increase its shareholder value and improve the firm's future operating performance. Although the authors considered the effect of traditional media, we believe their results could be applied to social media. I. Cioroanu et. al (2021) noted that a firm's statements about initiated blockchain development cause anomalies in its stock prices. Some authors applied topic modelling technique: A. Majumdar and E. Bose (2019) demonstrated that publications about company's products raise firm's market value; A. Estrella-Ramon et. al. (2019) found that high-quality content with emotional appeal increases brand equity, and that the volume of the content makes no effect.

Other studies related to content strategy observed the effect only on user activity (likes, shares, comments, amount of followers), not considering economic effect. However, we still investigated them as user activity is able to affect firm financial performance. These studies often refer to content type as a factor that influences user response (K. Chauhan and A. Pillai, 2013). Some researchers found out content vividness also has an impact (N. Kordzadeh and Diana K. Young, 2020; B. Annamalai et. al., 2021). Other works demonstrate that publication time (Vamsi K. Kanuri et. al., 2018), interpost duration (N. Kordzadeh and Diana K. Young, 2020), as well as valence (A. Estrella-Ramon et. al., 2019), interactivity, novelty and consistency of the content (T. Wondwesen, 2015) could affect user response.

2. Body

Our aim is to identify firm-generated content characteristics that impact firms' profitability. Overall, the influence of firm-generated content on user reaction is well examined in the literature, however, there is a limited understanding of the effect on firms' financial performance. The goal of our research is to expand this understanding by considering additional features of firm-generated content that could affect firm's economic characteristics, and by taking into account the moderation effect of user-generated content.

We would like to emphasize that researchers often used Twitter as the only source of data for their studies, disregarding other social media websites (Facebook, Instagram and country-specific social networks). We assume that the results could be very different for other social media platforms because Twitter is a non-traditional social media – it imposes restrictions on publications (maximum 280 characters) and its audience is peculiar. We will use more traditional Facebook-like social media platform without such restrictions. Finally, our dataset will be more comprehensive as we collect larger amount of data through public API (application programming interface) provided by the platform.

Our research questions are the following. Firstly, does the profitability of the firm depend on content vividness, publication time and interpost duration? Secondly, is the effect of firm-generated content on firms' profitability moderated by user reaction? We are confident that our research would help to better understand the economic effect of firm-generated content.

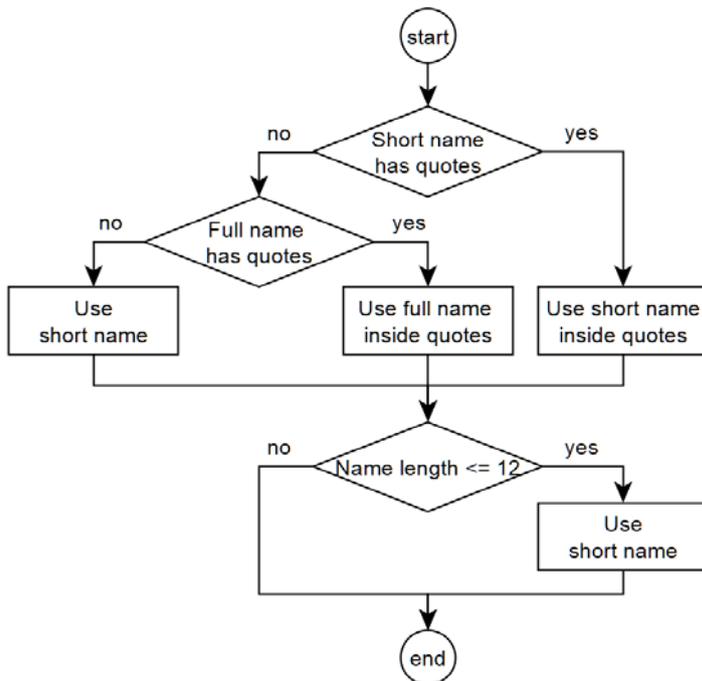
3. Method (including samples and measure description)

To understand how firm-generated content affects firms' profitability we take several steps. First, we take Russian firms' economic indicators during 2017-2021 from SPARK-Interfax database and exclude fictional and inactive companies. Then we search for their official social media pages on social media and download firm-generated publications. After that we process

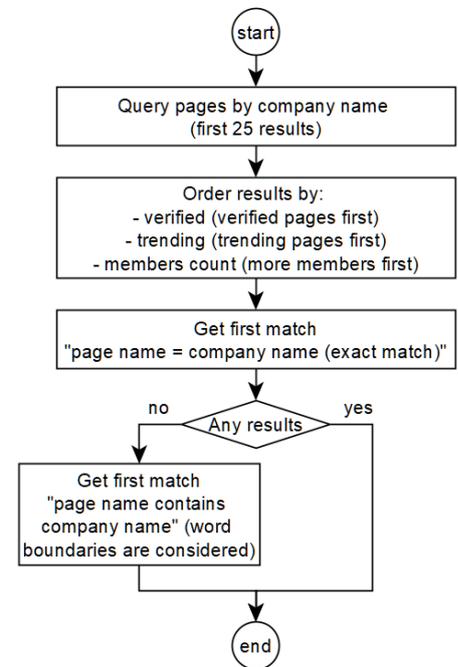
downloaded publications and compute yearly publication statistics for each firm. Lastly, we regress firms' profitability on these indicators.

Firms' economic indicators were extracted from SPARK-Interfax database. We filtered the database by the following conditions. Firstly, firms should have high reliability level – we used a special scoring (provided by database) that shows the level of reliability of firms and set its threshold to 60 percent - this way we exclude all “one-day” or fake firms from the sample. Secondly, firms need to have at least 2 workers over 2 consecutive years in 2017-2021 so only active firms are considered. Thirdly, firms should have a website. We extracted a sample of 8520 companies (final sample used in the research consists of 161 companies).

As *Vkontakte* is one of the major Russian social media websites (Zemlyanskaya et. al., 2018), we decided to use it as a source for publications. After we matched each company with their official social media page (pic. 1-2), all firm-generated publications were downloaded using API (application programming interface) provided by *Vkontakte*. We downloaded a sample of ~3 million online publications.



Pic. 1. Preprocessing company names algorithm.



Pic. 2. Matching company with its official page algorithm.

Several features were extracted from firm-generated content using text mining. We built a regression with the following formula:

$$y = a + b_1Weblink + b_2Attachments + \sum c_nTime + b_3Interpost + b_4Likes + CV + e,$$

where y is the profitability (year gross profit) of the firm. *Weblink* is a binary attribute that depicts whether a web link is present in the publication; *Attachments* shows amount of media attachments (images, videos, audio) to publication. *Time* is a binary attribute that shows whether the publication was done during specific time of day (a 4 hour interval) – there are total 6 variables that represent full 24 hour time span. *Interpost* is the delay between publications (in hours); *CV* are control variables that explain profitability; e is the error term. All content characteristics were aggregated to year averages; binary attributes (*Weblink* and *Time*) were aggregated to show percent of publications where the value is positive.

4. Empirical results and conclusions

	Estimate	Std. Error	t-value	Pr(> t)
const	-2.474	1.441	-1.717	0.089
log(expenses)	1.000	0.059	16.900	16***
Interpost	-4.55e-5	7.03e-5	-0.647	0.519
Weblink	0.845	0.599	1.412	0.161
Attachments	0.075	0.115	0.649	0.518
Hour0_4	-1.022	1.464	-0.698	0.486
Hour4_8	3.171	1.545	2.052	0.042*
Hour8_12	-0.294	1.022	-0.287	0.774
Hour12_16	0.091	1.073	0.085	0.932
Hour16_20	-0.194	1.191	-0.163	0.871
Likes	0.008	0.007	1.101	0.273
F(10,122)	Prob > P	R2	Adj-R2	
30.261	2.22e-16	0.713	0.689	
Unbalanced Panel: n = 133, T = 1-4, N = 322				

Table 1. Regression results

We estimated random effects regression (table 1). Economic effect of all content characteristics was insignificant except publication time (at 0.05 significance level). As can be seen from the model, the more publications are released from 4am to 8am, the higher the profitability of the firm. We could make the conclusion that companies that strive to develop a profitable online content strategy, should take into account when to publish content, and focus on releasing content during the morning.

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Operations Management and Business Informatics

Factors Affecting the Value co-creation Process in Russian Retail Companies with the Use of IoT Technology

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Abstract:

The main objective of the study is to develop a conceptual model that would explain how factors influence the process of co-creation of value with the consumer in retail using IoT, and what the consequences of this process are. Through the analysis of previous studies, five factors are identified as influencing the process of value co-creation: ease of use, presence, digital literacy, aesthetic appearance, and functionality. Then, hypotheses and research model are formulated. The research has a practical and theoretical investment that can be used by the stakeholders of the retail business and for further research in marketing using IoT technology.

Keywords: *Internet of things, value co-creation, marketing 4.0, retail.*

1. Introduction

The Internet of Things has recently become a hotly debated topic in scientific and professional circles. The development of this technology could serve as a new stage in the technological revolution. Many industries are already making extensive use of IoT devices in their day-to-day operations of companies. For example, industries such as agro-industry, manufacturing, and medicine. However, in retail, this technology has not yet been fully embraced, especially in the marketing strategies of companies. The use of IoT has great potential for developing marketing communications, and tools and improving the customer experience. On the other hand, IoT brings with it many challenges that will need to be addressed in the future when the technology is deployed. It is important to note that any technological solution must deliver more value and be more cost-effective than its nontechnological counterpart. Moreover, according to the IoT forecast, the amount of connected IoT devices will reach about 27.1 billion with a CAGR of 15% by 2025 (IoT analytics, 2022). The Internet of Things is used in many industries, but one of the most significant industries is retail (Pantano and Timmermans, 2014). Because in retail, IoT can be integrated into all processes from logistics and supply chain, inventory, and product quality control to customer interaction and customer experience improvement. That is why retailers can create an entire IoT ecosystem to help consumers make decisions. Moreover, according to analytics the global internet of things in retail market size was valued at USD 31.99 billion in 2020 (Markets and Markets, 2021). Also, in 2020, the retail and commerce industry accounted for about one-fifth of the revenue in Russia's Internet of Things (IoT) market, the highest proportion among all industries.

Since, according to marketing 4.0 and service-dominant logic, the focus for companies in their interactions with the customer is now the process of shared value creation. Because the focus has now shifted from the product, which used to have value in itself, to the process of value co-creation, which is where the value for the customer lies. Thus, value co-creation occurs when the consumer interacts with the IoT in retail, which can facilitate technology adoption and duration of use. According to the marketing 4.0 theory value co-creation process is one of the most important focuses of marketing activities today. It suggests people are seeking a chance to interact with a company and a product and share their experiences. Product opinions are formed not only on the basis of product quality and attributes but also on the supplementary services linked with a product. As a result, marketing is keeping up with new trends and attempting to pay more attention to consumer contact with a company through a value co-creation process that

helps to share and improve the experience. (Bonamigo et al., 2021). However, it is important to understand what factors affect the process of value co-creation in retail using IoT and what the implications are for the consumer and the retail company. That is why the aim of the study is to develop and validate the conceptual model explaining factors affecting the value co-creation process and outcomes of the value co-creation process for IoT technology in Russian grocery retail.

To reach this goal it is important to answer the following research questions:

RQ1: What factors have an influence on the value co-creation process with IoT in Russian retail in the B2C context?

RQ2: What are the outcomes of the value co-creation process in Russian retail with IoT in the B2C context?

RQ3: How do factors influence the value co-creation process with IoT?

RQ4: How value co-creation affects the outcomes?

2. Internet of things and marketing in retail

2.1. Retail digitalization

The role of digital tools in retail is now growing. The digitalization of retail is happening both online with e-commerce, and moreover, physical shops are also using digital tools to interact with customers, control deliveries and reduce cash losses through accurate analytics. It is important to note that physical shops play a big role in retail, as they serve not only as a space for exchanging goods, but also as a way to interact with customers, build long-term relationships and loyalty, and create a brand value. Moreover, physical shops are still of great importance to retailers, as it is in these stores that most sales are made. Customers are already using various apps within physical shops to get product information, average price and customer reviews. Moreover, digitalization has changed the way people communicate and navigate in physical space. This is a huge opportunity for retailers to interact and get data from customers. Since those companies that accurately analyze big data are able to predict consumer behavior, thereby reducing costs and increasing sales (Hagberg, Jonsson, Egels-Zandén, 2017).

It is important to note in which aspects the digitalization of retail is taking place. Firstly, many functions that used to be performed by employees can be done independently by customers using mobile apps and smart devices in-store. This reduces or combines the roles of the employee in the shop through automation. Secondly, the introduction of smart technologies such as IoT, AI, big data and so on has optimized business processes, reduced costs, and led to the development of retail marketing strategies to maximize the impact of high-tech.

For retailers, digital transformation requires more than merely updating information or expanding e-commerce platforms. Instead, it starts with the client and implements rapid data flow, deep digging and value creation, iterative cycles, and reconstruction via deep digital integration with business, operations, management, and other relationships. the new digital environment and value chain (Werner et al, 2019).

Retail will also use digitalization, intelligence, and visualization of all communications in the future to suit consumers' requirements for variety, quality, and uniqueness. When confronted with enormous opportunities and difficulties, conventional organizations must first recognize the shift and then consider how to alter their course (Mostaghel et al, 2022).

This research looks at the areas of digitalization of retail and how new technologies are improving the retail experience.

1. Traffic decentralization. With e-commerce traffic dividends at an all-time high, traffic leads are rapidly being categorized, organized, and socialized. Own media, public, social, IP, internet celebrity, and other traffic has replaced initial website traffic.

2. The scene's substance. New technologies such as big data and artificial intelligence are maturing in the age of smart retail. To accomplish conversion and consumption, retail will engage with consumers through diverse content scenarios, completely extend in terms of time

and place, and interact with customers through many terminals and touchpoints. At any time, the scene may be seen and touched (Xu et al, 2021)

3. Excellent service. Users' requirements for products, services, and experiences are getting more diversified and personalized in the context of modernised consumption and different consuming situations. If service providers at all levels wish to build meaningful engagement and interaction with consumers, they may now rely on special offerings as well as standardised products and services. Products and services in a digital retail environment might be not just basic product configurations, but also personalized and special configurations given via a thorough understanding of consumer demands.

4. Product personalization. Furthermore, digital technology is utilized to gather market demand based on changing customer preferences, and C2M back-end customisation is used to control the manufacturing side. In this approach, consumer and production channels are opened, and unique items are given to fulfil consumers' particular product demands (Pallant, Sands, Karpen, 2020).

5. Gain knowledge about digitization. From the standpoint of the user, digital transformation with complete connectivity results in a digital experience. The user's path to digital retail purchasing, such as entering, visiting, and exiting the store. The behaviour of users will be captured and analyzed using digital interactive goods and smart devices to efficiently direct the investigation of deeply entrenched user interests, demands, and products. Also, as service optimization, one-to-one marketing, and so on. Thus, digital experiences are about optimizing the experience and re-extracting value for the user, not only properly gauging demand (Reinartz et al, 2019).

6. An intelligent supply chain. Intelligent marketing to assist consumers is mostly expressed in a. Locate various target consumers accurately and deliver attentive services, b. The intelligent supply chain for suppliers. Help suppliers transition from the traditional model to a "sales-based purchasing" model by implementing intelligent customisation, intelligent pricing, intelligent warehousing, intelligent replenishment, and intelligent distribution, among other things, through demand forecasting, c. Intelligent market insights. It may create user pictures, analyze products, and give additional features those potential consumers may require.

2.2. The concept of marketing 4.0 and its connection to IoT

Examples of marketing 4.0 tools are inbound marketing, content marketing, search engine optimization, social media marketing and email marketing. It is critical to recognize that in marketing 4.0, both offline and online operations must be merged. Because digital engagement alone is insufficient in the digital economy. Furthermore, companies must be more adaptable to market developments and client expectations. Marketing 4.0 employs both machine and human interaction to optimize marketing operations and connect with customers. It is critical to recognize that there is a significant movement from conventional to digital marketing, which necessitates a change in traditional marketing methods.

As a result, the market segmentation and tagging procedures that are key to brand development have changed the emphasis from vertical to horizontal relationships. Brands must now locate communities that share common values and features, combine them into segments, and then target based on these characteristics. It is critical for companies to cultivate positive relationships with their consumers while also meeting the needs of their target audience. As a result, customers should now believe that the brand is aligned with their value offer. Furthermore, in the age of digital technology and social media, businesses must remain loyal to their standards and select the appropriate positioning. Brands must adhere to their basic principles and build their marketing efforts on them (Shah, Murthi, 2021). As a result, the traditional 4p model must be modified to meet the demands of today's customers. When a company decides what product to offer and at what price: product, location, it must also decide how to market it: location, advertising. Buyers nowadays value brand connection, therefore the 4c model (which comprises stages such as co-creation, currency, community activation, and communication) is recommended (Kotler, 2016). Co-creation is a new technique of developing a

product in the digital economy where the client may be involved at all stages. Furthermore, the usage of IoT technology improves the experience of creating a product. It is a collaborative process between a company and its customers. The company develops a product or service with the help of its customers. The customers help in the development of the product or service by providing their ideas, suggestions, and feedback. The company uses feedback to improve the product or service. The concept of co-creation was first introduced by Prahalad and Ramaswamy in their book *The Future of Competition: Co-Creating Unique Value with Customers*. The book discusses how companies can create unique value for their customers by involving them in the development of the product or service. The concept of co-creation has been gaining popularity in recent years. Many companies are using co-creation to develop new products and services. Some of the companies that have used co-creation include Coca-Cola, Nike, Lego, and Procter & Gamble. There are many advantages of co-creation. Some of the advantages are:

1. Helps in the development of new products and services.
2. Helps in improving the quality of the product or service.
3. Helps in reducing the cost of development.
4. Helps in increasing customer satisfaction.
5. Helps in building the brand image.

According to Mark Taylor, Denis Reilly, and Chris Wren, many firms use consumer data at all phases of product development. Furthermore, the author claims that many IoT users are more satisfied with their products than they were before they employed the technology. This connection enables them to respond to client demands more rapidly and to develop more effective communication for long-term partnerships and collaborative value creation. Moreover, the co-creation process allows customizing the product or service settings that also improves customer satisfaction and experience.

The internet of things is a system of interconnected devices, people, and data. The IoT is a network of physical objects that are embedded with sensors, software, and other technologies that enable them to collect and exchange data. The IoT has the potential to transform the way businesses operate and interact with customers. It can help businesses to improve efficiency, optimize operations, and create new customer experiences. The IoT can also be used to create new marketing opportunities. For example, businesses can use the IoT to collect data about customer behavior and preferences. This data can be used to create targeted marketing campaigns and personalized offers. The IoT can also be used to create new sales channels. For example, businesses can use the IoT to connect with customers through smart devices such as thermostats, refrigerators, and cars. The IoT presents both opportunities and challenges for businesses. The opportunities include the ability to create new customer experiences and optimize operations. The challenges include the need to manage data privacy and security concerns the internet of things is still in its early stages, and it is evolving rapidly. Businesses need to stay up to date on the latest IoT developments and trends to ensure they are able to capitalize on the opportunities and address the challenges.

The use of IoT devices helps companies interact with the customer at all stages of the customer journey: pre-transaction, transaction and post-transaction. In the pre-transaction stage, devices provide underlying product information as well as send personalised offers based on previous purchases. In the transactional phase, IoT devices help automate the buying process (self- service checkouts, smart carts, smart shops). In the post-transaction phase, IoT can increase customer satisfaction by suggesting how best to use the product. In addition, IoT can send notifications when a customer needs to replace or refill a device. (Hoyer, Droschke, 2020)

Moreover, IoT technology can be used for the development of a new product design, IoT technology with a mobile app can serve as a communication channel between the consumer and the company. In this way, the manufacturer can make recommendations in real-time and respond to customer enquiries. This interaction increases customer loyalty and contributes to greater

product satisfaction. Since current marketing strategies focus more on intangible aspects related to the product, this interaction with the customer can be a competitive advantage. Moreover, the timely communication and response to customer enquiries allow customers to participate in the product improvement process.

It is important to understand that Internet of things technology as a combination of the physical and digital world helps to use customers' data in a relevant way. With this smart technology, marketers can improve data analysis and get real-time information. Also, the companies are able to communicate with customers in real-time and improve their products and services on real feedback and demand.

It is important to note that much of the research describes the implementation of digital technologies in a company's marketing strategy. However, the research studies studied do not answer the question of the implications and drivers for consumers of using IoT in retail value co-creation and what are the outcomes of the value co-creation process for customer and companies in retail.

3. Methodology

3.1. Selection of the initial framework

This study draws on a theory about marketing 4.0 and the process of value co-creation as one of the most important components of marketing today. Furthermore, the study is based on the theory of S-D logic, which is a new paradigm for exchange in markets and the main thesis is that service is the foundation for exchange and that customers are the creators of shared value. Previous research proves that customer experience is a driver of the co-creation of value.

S-D logic is a product-oriented alternative to the standard G-D logic of economic trade and value determination. The evolution of S-D logic is inextricably tied to the evolution of market research and strategies, which are currently at a stage in which the process of co-creating value with the customer and including them in the relationship with the firm is fundamental. Whereas conventional G-D logic is focused on the production and distribution of goods and considers value exclusively as an exchange between customer and firm, it does not take into account the process of contact with the consumer. This notion was prevalent during the usage of traditional marketing tactics centred on product attribute extension rather than contact and engagement with the customer (Lusch, Vargo, 2008).

3.2. Selection of factors

Previous research indicates that customer experience is a key source of co-creation of value in retail. The previous study in the field of digital marketing and customer experience has revealed that the primary drivers for the shared value creation process are simplicity of use, functionality, appearance, and familiarity throughout use. Many experts, however, emphasize the importance of the consumer's general digital literacy and feel that this driver may have a substantial influence on the process of value co-creation. As a result, we employ all of the aforementioned elements in our research. Furthermore, the researchers point out that crucial outcomes of the value co-creation process include the duration of usage of the firm's services, happiness with the services obtained, and word-of-mouth spread of information about the organization among potential clients.

Hypotheses and research model

Based on the f selected factors the following hypotheses were formulated:

H1 - Ease of use has a positive impact on the process of value co-creation

H2 – The superior functionality of IoT in retail has a positive impact on the process of value co-creation

H3 – The superior IoT functionality in retail has a positive impact on overall customer satisfaction

- H4 - The aesthetic appearance of an IoT device positively influences the process of value co-creation in retail
- H5 – Presence has a positive impact on the process of value co-creation with IoT in retail
- H6 –Digital literacy has a positive impact on the process of value co-creation in retail
- H7 – The value co-creation process has a positive effect on customer satisfaction in retail with the use of IoT.
- H8 – Value co-creation has a positive effect on the continuity of using IoT technology in retail.
- H9 – Customer satisfaction has a positive effect on the continuity of use.
- H10 – Continuity of use of the IoT device in retail has a positive effect on word-of-mouth
- H11 – Value co-creation process with IoT in retail has a positive effect on word-of-mouth

Partial least squares (PLS-SEM) analysis was implemented to test research hypotheses.

4. Empirical results and conclusions

The results show that the proposed research model has a good explanatory power to predict Value co-creation, satisfaction, continuity of use and word-of-mouth. The results show a strong causal relationship except for H2, i.e., the effect of Functionality on Value co-creation. Through the work done, the factors that influence the process of value co-creation in retail using the Internet of Things technology have been identified. Moreover, the consequences of this process have been established. It was also possible to analyse the relationship between all the variables. Thus, this study identifies which factors have the greatest impact on the use of IoT in retail. Moreover, how the process of value co-creation using new technologies affects customer satisfaction with the shopping process, and how it contributes to increased word of mouth about the experience.

Because of technological advancements, merchants may now leverage new ways to communicate with customers in order to promote and add value to continuing client relationships. The drivers of value co-creation and longevity of usage for IoT retail technology were investigated in this study.

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What Communicative Skills are Developed with the Help of VR? Possible Answers on the Basis of two Pilot Studies

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Abstract:

From naive usage of virtual reality (VR) technologies in teaching, by 2022 researchers are coming to more accurate application of educational models and learning objectives setting. However, a gap between structured usage of such technologies in teaching hard skills and vague understanding of its usage for developing soft skills is still existing.

On the materials of two pilot studies, held in Spring and Summer 2022, on the samples of students of two leading Russian Universities (UTMN and SPbU) with partly similar design a research collective has looked, what aspects of teaching public speaking, and difficult conversation can be better developed with VR technologies. Results of informant's surveys were analyzed, and assumptions were made based on key differences and existing literature.

Keywords: *soft skills training, public speaking skills, VR in education.*

1. Literature review.

Introduction of VR technologies in education has been a fad of the last two decades, taking its place in various industries; however, most skills to which VR technologies have been adapted are hard skills related to different types of physical activity, with VR trainings of soft skills being comparatively underdeveloped (Huang, de la Mora Velasco & Haney, 2022; Muszyńska-Lanowy, 2021) until the last 2-3 years, when the CoViD-19 pandemic and related work onlinezation boosted development of using such technologies for training soft skills (Beutell, Kuschel & Lepeley, 2021; Ziyatdinova & Bezrukov, 2020).

This fast introduction of VR technologies in teaching soft skills, however, lacks detalization of what skills and what exactly VR technologies based exercises would be more effective to teach and in what context.

Existing research of using VR in teaching soft skills work basicly with the general level of skills or on skills classification by the criterion of application (from that point of view, research is usually divided into such main groups of skills as negotiations, teamwork, presentation skills, and emotional intelligence) then by criteria related to psychological and physiological microfoundations of the skills (Radianti et al., 2020).

Considering the strengths of VR as a method of soft skills teaching, evidence shows that trainees can show more empathy toward the VR communication bot in comparison to a role playing actor (Kleinsmith et al., 2015), and introverted people can keep up the conversation without subjective discomfort for a longer period of time (Stănică et al., 2018).

Most evidence present in literature draws heavily on traditional features of VR, such as immersion, and with it a focus on learning, presence, which gives confidence in the situation, and human-sized space, which allows to rely not only on the content of the conversation, but also on the features of the interaction. with virtual characters. Also important, however, is the creation of a safe environment – reduced risk of losing face in communication, subjective comfort, ease of access, and presumably lower anxiety. Finally, a possible feature may be a reduction in the duration of training.

From the methodological point of view, most studies of communication skills are based on informants' subjective assessment of the skills development (including skills as such, confidence in using the skills, and comfort of learning using the VR technologies (e.g., Kleinsmith et al., 2015; Kickmeier-Rust, Leitner & Hann, 2020)). Main results of such studies mostly show that the VR format is very comfortable for teaching communication skills, and increasing confidence in use of the developed skills. However, questions arise, firstly, of how these skills could be decomposed into more specific skills of lower level, and secondly - of how does this confidence correlate with objective skills development (taking into account the difficulty of objectively measuring such subjective and context-dependent thing as communication skills, but still). In the studies described in the current thesis, we are going to answer the first question; the second question lies within the main directions of further research development.

2. Methodology of the research.

Both studies have been conducted in Spring and Summer of 2022, with respondents being students of two leading Russian Universities: University of Tyumen (UTMN) and Saint Petersburg State University (SPbU).

A sample of UTMN study consisted of 57 first year students taking the "Topic of the First Year" course, of the age 17-19, 23 male and 34 female. The students have been asked about their public communication skills self-assessment, and then divided into three groups with similar average level of the skills, undergoing soft skills (namely, foreign language presentation) training on the basis of three different methodologies.

The **group T1** underwent 3 sessions of 10-20 minutes length with the usage of the VR simulator.

The **group T2** was undergoing self-study, making exercises on development of key presentation skills (visual contact with the audience, speech quality and purity, minimization of the parasite words usage) without time limitations.

The **group T3**, in its turn, was undergoing two 180 minutes length group training sessions under a professional trainer supervision. After study, the informants underwent a presentation assessment by an independent jury, and then finally filled a feedback form.

The SPbU study had a sample of 34 students of a Saint Petersburg University Graduate School of Management (GSOM SPbU) of an age 17 to 25, 23 female and 11 male; participation in the study was voluntary and took place in an extracurricular time. The informants have been divided into three groups by a random choice. All the three groups began their study with reading theoretical materials of difficult conversation on the basis of the DEEP (Direct, Empathetic, Earnest and Productive) method (Schumann, 2017; CHRO Conversations, 2018). Then the groups underwent practical study using the following techniques:

- the **group S1** underwent a dialog simulation in immersive virtual reality (communication with a bot).
- the **group S2** used chatbot simulation on the laptop .
- the **group S3** was communicating with an actor using a scripted training scenario.

After the study, the informants have been checked in a phone conversation for application of the DEEP principles in communication, and have filled feedback forms.

3. Results and discussion.

The results of the UTMN study show that, at least according to the informants' subjective assessment, the VR simulator in comparison to other teaching methods gives better results in developing the following components of the presentation skills:

- Attention concentration;
- Interaction with the audience.

In the SPbU research, again according to the informants' subjective assessments, the VR simulator in comparison to another methods gives better results in developing the following components of the difficult communication skills:

- Concentration of attention;
- Stress level control.

Although the design of the two studies is to an extent different, on a considerably high level of generalization the results are showing similarities that require discussion.

The results regarding attention concentration are supported by literature (Jung et al., 2020; Zhao et al., 2021), showing evidence that the higher environment immersivity and sense of presence allows VR to be an effective instrument of developing skills that require higher concentration or individual work without disturbing factors.

However, if the concentration is better for an individual in a VR environment without real collocutors, it can be questionable whether it will be of the same level in a real environment with real distracting factors. To some extent a suggestion that it will be like that is supported by the fact that the UTMN results are also showing the effectiveness of VR for developing the skills of interaction with the audience, that are requiring the ability to overcome distracting factors in a real-world communication.

This ability to overcome distracting factors can be compared to the stress level control as a second parameter demonstrated by the SPbU study results as developed by VR better than other methods. Although in the SPbU study the stress level control was measured as an informant's subjective understanding of stress level while doing the suggested exercises, this parallel (as all the parameters in both studies have been measured as the informants' subjective assessment) is worth mentioning, requiring further research on transfer of concentration and stress level control skills developed in VR into real-life communication, as well as certain practical recommendations.

In a practical level it can be said that the results of the two compared pilot studies allow recommending VR for teaching the presentation skills with greater effectiveness for people with introverted personality feeling fear toward communication leading to stress and concentration difficulties.

4. Limitations and further research development directions.

The methodologies and results described in this paper are of the pilot studies with small sample sizes and rather simple research methodologies; however, the preliminary findings can show directions for further research development.

The limitations of both studies – and, thus, these further development directions that are related to overcoming these limitations - can be divided, thus, into these related to the research sample and to the research design.

The main limitation of the first of the above mentioned categories is surely the considerably small size of the research samples: even the overall quantities of participants in both the UTMN and SPbU studies is close to the lowest possible sample sizes for statistical representativeness according to usually accepted standards, not to say about the sizes of the subgroups undergoing various teaching procedures.

Thus, a most obvious direction of research development related to that limitation would be the sample increase (either in case of continuing any one of the described two studies, or of continuing both), that would allow greater statistical significance of the results as well as greater possibility to look on the control variables (e.g., gender, age, students' learning major (or professional occupation in the case of adding grown-up professionals samples), etc.).

Limitations of the second kind are related to the pilot nature of the studies and thus rather general hypotheses: comparison of VR with other teaching methods as such is a rather limited and overly general research design, necessary to be further developed into more specific research designs developed for looking at more detailed research questions.

Among such questions, the first coming into mind looking at the results of the pilot studies - as is described above - is the question of whether the concentration of attention and the stress control successfully developed by teaching with VR simulation are transferable into reality with real-life distracting factors. So, research designs can be developed considering a combination of a VR training and real communication with objective control of communication (e.g., presentation of difficult dialog) quality and psychological or even physiological parameters.

Adding objective metrics to further research designs is an obvious generation of further research development in general, considering not only concentration and stress control, but other communication parameters (e.g., reaction flexibility, content quality, argumentation logic, etc.).

Specific research questions for further research with usage of both subjective and objective research methods can be, e.g., the following:

- why exactly does VR enable better development of skills of interaction with the audience: is it just because the VR environment allows imitating interaction with bigger audience, or is it because it does train specific psychological traits disregard of the virtual audience size and other specific parameters?
- what exactly does enable lower stress levels in the VR environment: is it just absence of real collocutors, or is it a specific psychological and physiological reaction to the VR environment elements?
- what social interactions can be more efficiently and effectively trained in VR in comparison with the others?

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Innovations in Faculty Professional Development: Case in Artificial Intelligence

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Abstract:

This study describes a case of design and implementation of a professional development program for the faculty engaged in teaching courses within artificial intelligence (AI) domain in universities in Russia. We discuss the rationale behind methodological choices made during the development and delivery of the program; further, we present visual models used in the design of the program and conclude with the evaluation of the program.

Keywords: *artificial intelligence, pedagogical design, ontological approach*

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1. Program outline and implementation

Though artificial intelligence (AI) has recently been getting increased attention, a clear shortage of higher education experts is observed in the field of artificial intelligence (AI), big data, and other promising areas of computer science. In response to the said shortage, International Scientific and Methodological Center was established at St Petersburg University in the end of 2019. The primary goal of the Center is to disseminate the best international practices of training, re-training, and internship of advanced digital economy personnel in the fields of mathematics, informatics, and technology. The advanced training program "Artificial Intelligence" (academic director of the program is T.A. Gavrilova) was designed and implemented as a part of the aforementioned mission of the Center.

The said program focuses on the broad coverage of matters in the rapidly developing field of AI. The goal of the program is to dispel myths and misleading expectations, as well as to reveal the state of the art in research and industrial technologies of this branch of informatics. The target audience of the program are course instructors, researchers, and graduate students of higher education and research institutes engaged in teaching technical disciplines and scientific research in areas close to computer science and interested in the problems of AI. In this paper we analyze the results of the first batch of the program participants who graduated in 2020 within the framework of the MNMC project.

The advanced training program "Artificial Intelligence" consists of three parts, i.e., (1) five courses (topics listed below), (2) a series of open webinars and round-table discussions (topics also listed below), and (3) final defense of a graduation project. The task of the final project was to design their own course on AI.

Leading researchers of St Petersburg University, Moscow and foreign specialists were invited to teach at the program. Due to COVID-19 restrictions, the first iteration of the program was performed in a fully remote mode. One positive impact of the remote mode was the opportunity to engage leading educators in the program.

The program was delivered within the period of four months and combined synchronous and asynchronous learning activities. Course materials (handouts, slides, home assignments, cases,

course readings) were accessible for the participants via Moodle, where students also submitted their final projects.

The five courses included in the program are:

- “Symbolic Artificial Intelligence.”
- “Neural network technologies.”
- “Deep learning.”
- “Natural language processing and speech recognition.”
- “The use of digital tools in teaching: theory and practice.”

In addition to the lectures, practical assignments, consultations, independent work, and computer workshop, learning activities included invited lectures, webinars, round tables, experience exchange sessions. The following topics were discussed at the open webinars, among others:

- 1) "Intelligent systems in medicine: reality, myths and prospects", Dr. med. Kobrinsky B.A. (FRC "Informatics and Control" of the Russian Academy of Sciences, Moscow)
- 2) "AI in the pharmaceutical industry", Ph.D., Efimenko I., Doctor of Technical Sciences, Khoroshevsky V.F. (Semantic Hub company, Moscow)
- 3) "Google Dataset Search: Building an open ecosystem for dataset discovery" Natasha Noy, PhD (Google Research Center, USA)
- 4) "Preparing the ground for AI – Data and Information Integration with Knowledge Graphs" Professor Zeren Auer, PhD (Director of the Technical Library of Germany, Leibniz University) and some other.

Round-table discussions, among others, were on the following topics:

- 1) Tushkanova O.N., Candidate of Technical Sciences, "Experience of Research and Teaching at the Polytechnic University" (St. Petersburg)
- 2) Muromtsev D.I., Candidate of Technical Sciences, "Experience of Research and Teaching in ITMO" (St. Petersburg)
- 3) Maksimova A.Yu., Candidate of Technical Sciences, "Mivar Intelligent Systems" (Donetsk)
- 4) Uglev V.A., Candidate of Technical Sciences, "Fixation of copyright on knowledge bases and data sets for training of AI algorithms" (Krasnoyarsk)
- 5) Bronfeld G.B., Candidate of Technical Sciences, "Technology of direct superimposition of knowledge" (Nizhny Novgorod)
- 6) Babenko A.A., Candidate of Technical Sciences, "Software complex of leakage of graphic tools" (Volgograd)
- 7) Sychev O.A., Candidate of Technical Sciences, "System of generation of educational tasks for students" (Moscow)

About one third of the program participants for the reported period were either candidate of science or PhD degree holders. Out of 65 initially enrolled participants, 50 affiliated with 21 universities in Russia defended their final projects.

2. Program design approach

In Russia, the tradition of teaching courses in AI dates back to almost 30 years ago. Since the establishment of the Russian Association of Artificial Intelligence in 1988, AI courses have been successfully taught by the leading experts in this field for the students of technical and humanitarian universities in Moscow, St. Petersburg, Novosibirsk, Vladivostok, Tomsk, and other cities. To date, several textbooks (both domestic and translated), e.g., [1-5], have been published. However, the comparison of the monographs and textbooks on AI published in Russia [6-13] clearly shows that their structural approaches differ significantly. This difference is partly

due to the interdisciplinary nature and the breadth of the problems of AI and partly due to the rapid paradigm shift in this young domain. Besides, this variety of the approaches is largely due to the differences in the views of scientific schools and research fields.

This article discusses program design based on the ontology-based framework. We believe that such a design approach allows to some extent for mitigating the subjectivity and imbalance of AI courses currently taught in higher education institutions.

Ontology-based Program Framework

The concept of "ontology" is defined in a variety of ways. One of the definitions of ontology was given by Tom Gruber: "An ontology is a specification of conceptualization" [14]. Nicola Guarino defines ontology as follows: "Ontology is a formal theory that limits possible conceptualizations of the world" [15]. Both definitions use the concept of "conceptualization", which in turn requires a definition. Hence, a more detailed definition could be: "Ontology is such a specification of a subject area or a formal representation of it that includes a dictionary of indexes of domain terms and logical expressions that describe what these terms mean, how they relate to each other, and how they may or may not be related to each other" [6]. In general, the structure of a light-weighted ontology is a framework or a structured vocabulary of the main sections of the subject area.

The most common type of relationship used in all ontologies is the categorization relation, i.e., assigning the elements to a certain category. If the structure of a program (or a course) is approached as an ontology of the subject area, then two approaches are clearly distinguished (Figs. 1 and 2): (1) teaching a course as an overview ("broad" ontology of AI); (2) teaching a course in depth ("deep" ontology of AI).

We believe that students will benefit from the widest possible courses, since this approach allows to shape a diverse palette of skills and competencies of students, which can be further modified in accordance with the focus of their degree. This approach, however, has a number of opponents who object to what they consider to be a "superficial" presentation of the discipline.

While developing the proposed program, course designers adhered to the visual ontological approach in the development of educational ontologies [16]. This visual ontological approach was consistently used for detailing and designing course materials for all the five courses of the program. This approach is characterized by visual display of the structure of the ontology in the form of mind maps or concept maps. So, two types of ontologies were introduced in the program: (1) organizational-methodical and (2) educational-didactic.

Organizational-methodical ontologies included:

- a. methodological models - for example, maps of training programs, profile maps and areas of study;
- b. knowledge maps about the organization of the learning process - for example, exam preparation cards; maps of evaluation criteria; maps of the organization of library work; cards reflecting the structure of the final attestation work.

Educational-didactic ontologies included:

- a. conceptual models – for example, maps of basic concepts, ideas, approaches, personalities, scientific schools;
- b. structural models - for example, the content of individual complex concepts, schemes of organizational structures, architectures, platforms, logistics schemes, etc.

Modern research in AI is conducted mainly within two paradigms. One of the paradigms is based on the development of knowledge graphs and semantic technologies, this direction is called "Symbolic AI" or a "black box". In the proposed program, this paradigm was represented by the courses "Symbolic Artificial Intelligence" and "Natural Language Processing and Speech Recognition". The second paradigm includes modeling of artificial neural networks and machine learning. This paradigm was represented with "Deep learning" and "Neural network

technologies” courses. The course on the specifics of distance learning (DO) and digital learning technologies was introduced additionally due to the revolutionary changes in learning technologies in the era of the pandemic. Fig. 1 reflects the structure of the program.

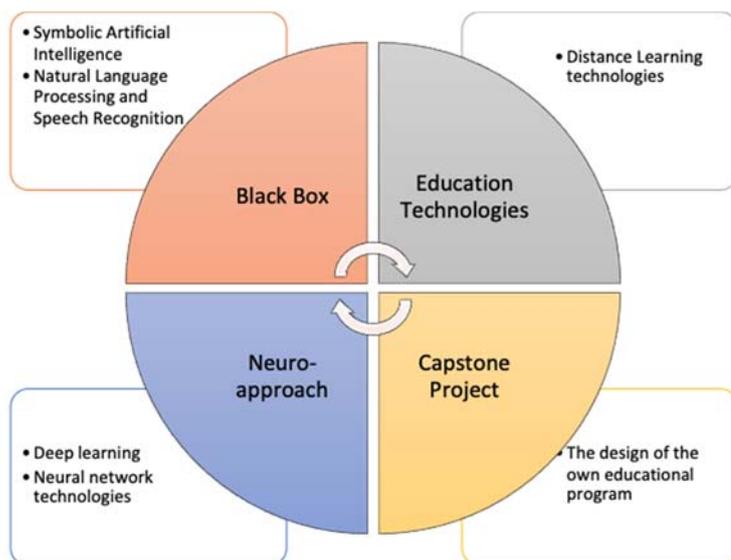


Figure 1. Program framework

Program results and conclusion

On the completion of the program, the participants were surveyed. The survey intended to collect feedback by way of open questions. The feedback from the audience showed that this professional development program was generally successful and highly appreciated. Besides, the program participants showed exceptional discipline and activity during training as well as while writing up their graduation thesis, which was the design of their own course related to AI.

The ontological approach to the design of the training program allowed to create a holistic and systematic view of the contemporary structure of AI domain among the participants, which required a fairly broad outlook and skills of visual-analytical thinking of the program participants. The design of such an informative methodological resource (in other words, the "field of knowledge" [18] or a conceptual framework [19]) was preceded by a laborious process of coordination of views on terminology, definitions, and basic paradigms in the team of the course instructors.

Overall, the program has contributed to the dissemination of the experience accumulated in Saint Petersburg University and its partner institution in training students and retraining of researchers, instructors, and graduate students of educational organizations in Russia.

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Effective Filtering Procedures for Multi-criteria Decision-Making in Operation Management

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Abstract:

The paper presents an approach to formalizing the procedures for filtering alternatives in multi-criteria choice models on a discrete set of decisions. Appropriate procedures may be required in operational management when we need to analyze a large number of alternatives. The proposed filtering procedures are formalized on the basis of strict binary relations by majority and/or minority principle. The proposed procedures will significantly reduce the number of considered alternatives. Numerical illustrations are given in the format of the following well-known and widely used selection criteria: scalar, geometric mean and ideal point.

Keywords: *multi-criteria decision-making, filtering procedures, binary relations*

1. Introduction

An urgent decision-making problem for the tasks of operational management in emerging markets is finding an acceptable balance of various interests of participants in economic processes. The search for the best solution and the selection of alternatives can be significantly difficult due to the need to take into account many different constraints and indicators. Their number may determine the multi-criteria nature of decisions. In addition, when optimizing, it is necessary to deal with a large number of analyzed alternatives. Thus, in the format of such tasks, the urgency of improving methods for choosing the best solution for many criteria increases. At the same time, one of the approaches to improve the efficiency of such solutions will be the possibility of a significant reduction in the number of analyzed alternatives.

2. MCDM- methodology

To make multi-criteria decisions in world practice, as a rule, the MCDM (*multiple criteria decision-making*) methodology is widely used [Thakkar, 2021]. At the same time, in the case of multicriteria problems, it is on a discrete set of solutions that methods from a special subsection of MCDM called MADM (*multi-attribute decision making*) are more often used [Tzeng, 2011]. In such situations, formalized procedures for eliminating inefficient alternatives can be of great help. This will make the procedures for such a choice (in optimization) more accessible and less time-consuming.

At the same time, many modern methods of multi-criteria choice, taking into account the preferences of *decision makers* (DM), may have limitations on the number of analyzed alternatives. In particular, in the format of the analytical hierarchy method [Ларичев, 2008; Саати, 2008; Ho, Xin. 2018.], with an excessively large number of alternatives and large dimensions of the matrices of pairwise comparisons, the solutions may turn out to be formally inconsistent. In particular, this means that such an optimization approach cannot be used. As we can see, there is a need for special approaches to the formalization of filtering procedures for the analyzed alternatives, which allow maintaining the efficiency and quality of decisions made.

2.1. Majority filtering.

We now present simplified and convenient procedures that can be used to filter alternatives. In particular, we will talk about a special approach based on binary relations [Алескеров, Хабина, Шварц, 2017; Aizerman, Aleskerov, 1995]. This approach will be

formalized on the basis of the so-called majority [Герامي, Борисова, Гусев, Шидловский, 2017; Гусев, 2020; Brodetskiy, Gerami, Gusev, 2021.] and/or minority filtering.

With majority filtering, only those alternatives (in the format of a multi-criteria optimization problem) will remain, for which the following will be performed. They must be majorants, moreover, according to at least one of the considered particular criteria. Accordingly, this approach to filtering will require the implementation of the following procedures.

1. Determining the coordinates of the *utopian point* (UT) with the best values for each particular criterion.

2. For each particular criterion, the search for alternatives is implemented, in which the value of the corresponding particular criterion coincides with the required UT coordinate.

3. All alternatives found in the format of the previous paragraph are recognized as majorants (as we see, if the above requirement is realized according to at least one particular criterion).

4. At the same time, the found majorant alternatives and only they remain for the implementation of the procedures for further analysis to select the best solution. Of course, the remaining alternatives are eliminated, that is, they do not pass the filtering.

In other words, after the implementation of the indicated majority filtering procedures, only those alternatives remain that fall into the list of the best, at least according to one particular criterion.

2.1. Minority filtering

With minority filtering, the difference consists in the following feature. It is precisely those alternatives that will be minorants [links] that will be excluded according to at least one of the particular criteria under consideration. Accordingly, as we see, the implementation of the following procedures will be required.

1. Determining the coordinates of the *anti-utopian point* (AUT) with the worst values for each particular criterion.

2. For each particular criterion, the search for alternatives is implemented, in which the value of the corresponding particular criterion coincides with the desired AUT coordinate.

3. All alternatives found in the format of the previous paragraph are recognized as minorants (as we see, if the above requirement is realized according to at least one particular criterion).

4. At the same time, the minorant alternatives found and only they are removed before the implementation of the procedures for further analysis to select the best solution. Of course, the remaining alternatives are preserved, that is, they are filtered.

In other words, after the implementation of the specified procedures of minority filtering, only those alternatives that are worse in at least one particular criterion are eliminated.

3. Numerical examples of the implementation of majority and minority filtering

Let's consider the problem of multi-criteria choice, when it is necessary to find the best alternative among six alternatives (A_1 - A_6) that have scores according to five particular criteria (C_1 - C_5). All private criteria are required to be minimized (the original optimization problem has the form: $C_j \rightarrow \min, j=1, \dots, 5$). The initial data of the problem are presented in Table 1.

Table 1

Initial indicators of partial criteria

Alternatives	Partial criteria and their indicators				
	C_1	C_2	C_3	C_4	C_5
A_1	37	84	20	81	10
A_2	38	65	21	32	25

A_3	38	60	25	32	25
A_4	35	25	21	42	30
A_5	35	40	23	41	30
A_6	38	20	20	16	55

3.1. Optimization after the majority filtering

To implement the majority filtering in Table. 2 find the coordinates of UT. After that, we mark those alternatives for which the values of particular criteria coincide with the coordinates of the UT, at least by one particular criterion. The results are presented in table. 2.

Table 2

Alternatives	Indicators of alternatives by partial criteria				
	C_1	C_2	C_3	C_4	C_5
A_1	37	84	20	81	10
A_2	38	65	21	32	25
A_3	38	60	25	32	25
A_4	35	25	21	42	30
A_5	35	40	23	41	30
A_6	38	20	20	16	55
UT	35	20	20	16	10

Thus, let us note the following majorants (they are highlighted in Table 2):

- for partial criterion C_1 - alternatives A_4 and A_5 ;
- for partial criterion C_2 - alternative A_6 ;
- for partial criterion C_3 - alternatives A_1 and A_6 ;
- for partial criterion C_4 – alternative A_6 ;
- for partial criterion C_5 – alternative A_1 .

As you can see, after filtering, only the following alternatives remain for further optimization: A_1 , A_4 , A_5 , A_6 . Their indicators are given in Table. 3. As it is known [Ларичев, 2008; Бродецкий, Гусев, Шидловский 2020], in case of multi-criteria optimization, one must first discard from consideration alternatives that turn out to be not Pareto optimal. In this case, all presented in the table. 3 are Pareto optimal.

So in Table. 3, optimization procedures are implemented according to three selection criteria [Бродецкий, Гусев, Шидловский 2020]:

- scalar, the procedures of which provide for finding the sum of indicators of partial criteria (and choosing an alternative with the smallest such sum);
- geometric mean (and the choice of the alternative with the smallest such indicator);
- an *ideal point* (IP), when the distance from each alternative (in the space of partial criteria values) to UT is found, and the alternative with the smallest such indicator is selected; the specified distance is sought as the square root of the sum of the squared differences of the corresponding coordinates of the alternative and UT.

Table 3

Selection the best alternative-majorant

Alternatives	Indicators of alternatives by partial criteria					Selection criteria indicators		
	C_1	C_2	C_3	C_4	C_5	Скаляр-ный	Средн. геометр.	ИТ
A_1	37	84	20	81	10	232	34,71	91,24
A_4	35	25	21	42	30	153	29,71	33,20
A_5	35	40	23	41	30	169	33,08	37,87
A_6	38	20	20	16	55	149	26,62	45,10
YT	35	20	20	16	10			

It is easy to see that the results of the selection will be as follows. According to the scalar criterion and according to the criterion of the geometric mean, the alternative A_6 turns out to be the best. In addition, according to the IP-criterion, alternative A_2 will be recognized as the best.

3.2. Optimization after the minority filtering

To implement minority filtering in Table. 4 find the coordinates AUT. After that, we note those alternatives for which the values of particular criteria coincide with the coordinates of AUT, and at least by one particular criterion. The results are presented in Table 4.

Thus, we note the following minors:

- for partial criterion C_1 - alternatives A_2 , A_3 and A_6 ;
- for partial criterion C_2 - alternative A_1 ;
- for partial criterion C_3 - alternatives A_1 and A_6 ;
- for partial criterion C_4 – alternative A_1 ;
- for partial criterion C_5 – alternative A_6 .

The indicated minorant alternatives should be removed from further optimization procedures. Only the following two alternatives remain: A_1 , A_4 . Their performance is given in Table. 5.

Table 4

Search for minorants

Alternatives	Indicators of alternatives by partial criteria				
	C_1	C_2	C_3	C_4	C_5
A_1	37	84	20	81	10
A_2	38	65	21	32	25
A_3	38	60	25	32	25
A_4	35	25	21	42	30
A_5	35	40	23	41	30
A_6	38	20	20	16	55
AYT	38	84	25	81	55

Let's take a look at the selection results. Taking into account the minority filtering by the scalar criterion, by the geometric mean criterion, as well as by the IP-criterion, the alternative A_4 becomes the best. As you can see, the transition to minority filtering has changed the choice for

the scalar criterion and the geometric mean criterion. For the IP-criterion, the choice remains the same.

Table 5

Selection the best alternative after excluding minorant alternatives

Alternatives	Indicators of alternatives by partial criteria					Selection criteria indicators		
	C_1	C_2	C_3	C_4	C_5	Scalar	Geometric mean	IP
A_1	35	25	21	42	30	153	29,71	1,00
A_4	35	40	23	41	30	169	33,08	15,13
YT	35	25	21	41	30			

For ease of comparison, the optimization results with regard to the presented approaches to filtering, as well as without such filtering procedures (by the way, in order not to increase the amount of work, they are omitted) are shown in Table. 6.

Table 6

Features of the choice of alternatives before and after filtering procedures

Selections criteria	Without filtering	After majority filtering	After minority filtering
Scalar	A_6	A_6	A_4
Geometric mean	A_6	A_6	A_4
IP	A_4	A_4	A_4

As you can see, in the format of the considered multi-criteria optimization problem, the majority filtering retained the best alternative (for all considered selection criteria). With minority filtering, the best choice was retained only for the IP-criterion.

4. Conclusion

The report proposes procedures for special filtering of alternatives in the format of multi-criteria optimization problems, which correlate with operational management tasks. Namely, the possibilities of implementing the procedures of majority and minority filtering, respectively, are considered. In practice, the proposed procedures can significantly reduce the number of alternatives considered, which will reduce the cost of various resources for optimization. The proposed approaches can be in demand by municipal and regional governments, as well as in business.

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Ethical Issues for AI-Solutions in Business: Hype or..?

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Abstract:

The abstract considers the issues of ethics in the solutions on the basis of artificial intelligence (AI) with regards to modern business environment. The author believes that the so-called 'ethical' challenges that find their practical implementation in AI solutions in various types of discrimination have already become a serious threat both for the IT-developers and for the companies that apply such tools in their everyday business practice. The recent years have witnessed an unprecedented growth in the number of cases when the ignorance to the ethical bias in AI solutions resulted in financial and reputational damage. To help business community overcome such challenges, the author, on the basis of the analysis of the corpus of practical, provides three suggestions regarding more active introduction of ethics in AI solutions and, on the other hand, avoiding the so-called 'ethics washing' as a potentially dangerous practice which impedes technological and business development.

Keywords: *AI ethics, artificial intelligence, technologies in business, business ethics*

1. AI Market: Lucrative Prospects and Expensive Biases

Today, the global market of artificial intelligence (AI), with a projected growth from \$432 billion in 2022 to \$900 billion by 2026 [International Data Corporation 2022], cannot but amaze with its prospects in the near future. At the same time in the Russian Federation the AI market volume is predicted to amount to 555.1 million dollars by 2024 [TAdviser 2022] (however, other forecasts look even more optimistic, assuming the market growth of up to 160 billion rubles [Ministry of Digital Development, 2019]). Correspondingly, the companies increase their expenditures on the implementation of AI solutions with the hope to gain a stable financial position in the future and, most importantly, remain competitive in their markets. For instance, according to the survey in the United States, more than a third of high-margin companies spends on AI from \$51 to 100 million, and seven out of ten organizations spend \$1 million or more of their budget on AI [Venturebeat 2022] (and this does not include smaller companies where spending on AI solutions, in most cases, exceed \$50 thousand per year).

There is no need to say that the abovementioned figures and prospects for the development of the AI solutions market are staggering. However, today various actors (gradually, but quite confidently) interacting within the AI ecumene are asking questions related not only to the financial prospects for the implementation of these solutions but also to the ways of how to make AI solutions more 'responsible' in terms of the moral and ethical attitudes of the relevant target audiences. One can, of course, argue that ethical issues in business have always been considered a kind of semantic load, which, under favorable circumstances, could also be monetized. However, the current practice demonstrates that underestimating (or completely ignoring) the ethical issues that various TA's care about when interacting with AI solutions in education, medicine, litigation, or recruiting leads not only to reputational, but also to significant financial costs. This can be seen in the results of a joint survey by DataRobot and the World Economic Forum, in which the participants declare that the presence of biases in data has already cost them the loss of income (62% of respondents), customers (61%) or employees (43%), and some of them (35%) suffered serious financial costs caused by lawsuits [DataRobot 2022]. Moreover, 6% of respondents were forced to admit that underestimating data biases in AI solutions led to significant damage to the company's brand, the biggest cost for the business today. On the other hand, behind the dry descriptions of cases of cultural and ethical failures of AI algorithms are dozens of real people who have lost their jobs, their good name, and sometimes their lives. The

resulting multimillion-dollar lawsuits and reputational losses, directly related to the inclusion of data filled with racial, national, gender and cultural biases in AI algorithms, clearly do not allow businesses to regard this problem as of secondary importance and not related to the financial stability of companies.

2. Key Challenges to Ethics in AI Solutions

First of all, it is important to emphasize that, for this paper, AI ethical issues are considered in regards of the so-called narrow (weak) AI characterized by the limited use of data, depending on who created or processed it. Hence, one of the main problems in the development and further operation of an "ethically correct" AI solution is the significant subjectivism of the concepts of "morality". At the same time, as researchers today admit, it is impossible for any developer to get rid totally of their own cultural stereotypes when creating an appropriate AI solution, which, as a result, will unambiguously contain a set of cultural associations and prejudices of actors (developers primarily) [Caliskan, 2017, p. 184]. At the same time, the norms and values of the respective TA's will not always coincide with the cultural characteristics of the developers, and, in some cases, seriously contradict them. Accordingly, it is not possible to talk about the possibility of a unanimous opinion on the same concepts of "good" and "evil". It is not surprising, therefore, that all this causes a natural negative reaction both from developers who are being blamed for the "unethical" behavior of AI algorithms and from the business community, which is trying to find the right balance between community expectations and preventing the rise in the cost of innovative solutions. The global survey conducted by the Pew Research Center puts the concern about the generally accepted terminology of AI-ethics at the top of the list of the main problems in creating AI solutions that meet the ethical expectations of various actors. Other anxieties voiced by respondents also cast doubt on whether ethics may soon become an important issue when working on AI solutions. First of all, the main players in the market (large corporations and governments in general) are not very concerned with such issues themselves, preferring other criteria for evaluating the effectiveness and importance of the corresponding product or service. Finally, developers and businesses are absolutely right by stating that an excessive focus on resolving ethical issues in AI solutions will lead to a serious increase in the cost of the latter (even collecting the most diverse data means additional costs) and, as a result, to the final defeat in the technological race. It should be recognized that such fears are clearly not unfounded, and, as a result, the lack of clear answers to the questions above means that ethical issues continue to be sacrificed in the process of constant competition in the technological market. This is exactly the answer to the question of whether most AI systems will be based on ethical principles by 2030 by almost 68% of practitioners (including the heads of the largest IT companies) within the above question [Pew Research Center, 2021].

Finally, even the creation of an AI solution that could turn out to be as ethically correct as possible may not mean that its creators will not receive the same reproaches after some time as the developers who ignored the moral aspect in data processing. Today there are serious concern about the so-called 'ethics greenwashing' which can replace the process of searching for the balance between ethical expectations and the real-life situation, thus discrediting totally the very idea of AI-ethics. An illustration of this is Microsoft's attempt to fix the epic fail with the Tay chatbot by launching the Zo chatbot, an important characteristic of which was maximum neutrality in relation to the most sensitive topics for users (religion, race, etc.), while all concepts associated with individual cultures (from their history to positive judgments about them) fell under the ban. As a result, the new chatbot was accused of censorship, narrow-mindedness, and... insufficiently ethical behavior [Stuart-Ulin 2018 (2022)].

3. Case Study and Conclusions

In an attempt to develop recommendations for a more balanced consideration of ethical factors in the development of AI solutions, the author analyzed a corpus of 24 practical cases collected from open sources over the period from 2017 to 2022. Cases were divided into groups in the following areas: medicine, law and litigation, education, and recruitment. The development of

each case was tracked in open sources (including lessons learned from it for other companies), on the basis of which a conclusion was made about what has changed for a particular area in terms of the "ethical" implementation of AI solutions over a five-year period. All this allowed the author to come to the following conclusions:

1) In the field of healthcare, the number of cases of unethical interpretation of data by AI algorithms remains quite high; however, testing has become more thorough in recent years (which, given the scope, is not surprising). Prejudices are connected, first of all, with the insufficient representativeness of the data in relation to the racial / national or gender affiliation of the person being tested. At the same time, medicine remains the only area where it is virtually impossible to find in the public domain the name of the project or the company that made such mistakes (there are only general description of cases).

2) Over the past three years, the number of cases of “unethical” use and interpretation of data in AI solutions in the field of education has increased significantly. In many ways, this was due to the COVID-19 pandemic, when, in order to save the educational process, it was sometimes necessary to put into practice not fully tested technologies. As a result, racial and social biases embedded in AI solutions have had a negative impact on the results of the most important assessment exams in the US [Reeves 2021] and the UK [Coughlan 2020], or, for example, when objectively considering a low GPA for university admission [Burke 2020]. Moreover, there was a case when an ethical bias in terms of income or place of study affected several thousand people in various countries (certification under the International Baccalaureate program in 2020 [Evgeniou 2020]). At the moment, the penetration of AI technologies in education continues to grow dynamically, which is likely to lead to the emergence of a considerable number of cases when the ethical component leads to significant conflicts.

3) Within the realm of litigation and law enforcement, after the COMPASS and HART scandals, discriminatory prospects based on the use of biased data seemed to be significantly reduced. However, a new scandal soon followed with the PredPol system (2018-2021), which continued the unethical activities of its predecessors, thus raising again the question of the correctness of using of such solutions in the field of law enforcement [Sankin 2021]. However, the developers of some new systems claim that they were able to take into account previous mistakes and that their systems have passed (and are passing) the most serious ethics test (although even in this case there are those who seriously question such claims) [Simonite T. 2019].

4) The field of recruitment continues to present a fairly serious ethical challenge for AI solutions. The history of Amazon's AI recruiting tools, accused of gender discrimination, has had little effect on the positive dynamics of the emergence of new AI solutions in this area. To date, applicants continue to complain about gender and age discrimination, as well as about ableism. However, the developers of such solutions tend to respond rather quickly to criticism regarding the ethical inconsistency of their products, which in fact strengthens the reputation of the brand.

4. Solutions and Proposals

In an attempt to resolve the issues about how AI solutions can best meet the ethical expectations of their respective target TA's, experts (both in business and in academia) offer various solutions. In relation to the distant future of AI products, it seems possible to talk about a certain convergence of human and machine behavior, which is already being recorded today by some scientists who note that a person surrounded by mechanisms imitates the behavior of electronic machines which, in their turn, acquire more and more human characteristics [Mazzara 2021]. Moreover, there is also the possibility that AI-based systems are beginning (albeit on a short-term basis) to influence the wider human culture [Brinkmann 2022], which, in principle, could resolve many of the current ethical discrepancies. However, all these transhumanist ideas do not solve the current problems that continue to negatively affect the development of AI solutions in industry and service.

First of all, it seems necessary to assist businesses and developers in developing methodological solutions for the formation of datasets with diverse and maximally free from ethical prejudices data. To date, the author is a member of a group that develops such methods by order of enterprises. These instructions contain not only recommendations on creating such datasets, but also a selection of practical cases, on the basis of which business customers can form a clear understanding of what a specific bias in a data set means and, most importantly, what the consequences of ignoring this problem.

Further, it can be interesting to develop the methods for a preliminary cultural and ethical audit of AI solutions. As part of these decisions, the author is participating in the working out of the foundations for the so-called cultural and ethical "red teaming". It should be noted that the classic red-teaming technique itself has long been very successfully used to find weaknesses in IT solutions, and it can be assumed that it can be reworked in order to identify weaknesses in forecasts and assumptions regarding the correct interpretation of the cultural and ethical intentions of customers and users. The main task of such teams (either formed within the company or a specially trained and specially certified third party) should be a simulated scheduled verification of an AI solution from the point of view of its most adequate subsequent normative-value perception by the relevant target audience.

Finally, it is important to intensify the creation of an institution of specialists in cultural and ethical facilitation in the process of implementing AI solutions. The presence of a trained certified expert mediator, who can help actors detect cultural and ethical contradictions when implementing a project and not allow ethical consideration transform into 'ethics washing', allows developers and customers not only to receive professional assistance, but also, most importantly, to significantly reduce the time and financial costs of independently conducting ongoing ethical AI audits for the solutions.

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Big Data and Firm-level outcomes: Literature Review Analysis

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Abstract:

Due to its superior value delivered to customers, competitors, and the supply chain, big data (BD) has recently drawn significant attention from academics. Recent evidence suggests that BD is a major determinant of firm performance and has the potential to be a key factor in determining a firm's competitive advantage. Only a few attempts to unify this material have been attempted, and it is still fragmented. This paper seeks to remedy this problem by analyzing the literature and conducting a systematic literature review that investigate the relationship between big data and firm performance with emphasis on small and medium enterprises (SMEs). The article made it possible to identify business BD capabilities, key characteristics of BD, business value that firms can generate from investing on big data, and factors surrounding big data that promote high performance. The indirect effects of BD on firm performance provide proof that there is a set of factors that can mediate this relationship. Additionally, findings point that BD positively affects the performance of firms, and this relationship is contingent upon the environmental context. This article provides a deeper understanding and recommendations for further study of BD in SMEs.

Keywords: *big data, firm performance, firm outcomes, firm innovation, firm strategy, SMEs, systematic review.*

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Introduction

Nowadays big data is present everywhere, in private and public spheres, from mobile technologies to banking services, passing by cryptocurrencies, public services like water or electricity, social media, supply chain analytics, customer analytics, among others. Examples of big data applications can be found in all the industries; Uber uses big data to predict spikes in the demand and variation in the driver availability; airlines optimize fuel consumption applying analytics to the big data generated by weather conditions, passengers, and cargo weights; Netflix uses big data to predict success of future series based on customer interaction with the platform; hospitals use big data to make recommendations to the patients based on past cases and their correlation in demographic traits, genetic profiles, cancer types (Maroufkhani et al., 2020).

In the recent years, there has been an increasing interest on big data and business analytics in management literature; mainly from companies which are always looking for generate new insights into consumers, competitors, and supply chains (Ghasemaghaim, 2021). Estimates indicate that the global big data and business analytics market size was valued at

\$198.08 billion in 2020 and is projected to reach \$684.12 billion by 2030 (Borasi et al., 2021). Big data has become a popular tool in most of the industries, but very little research has been done to understand the challenges of using this tool for managerial decision-making. Interest in this research direction has been increasing during the last three years.

Big data in this study is considered as high-volume, high-velocity and/or high-variety information assets that demand cost-effective, innovative forms of information processing that enable enhanced insight, decision making, and process automation (Gartner, 2022) beyond the

capability of traditional data methods associated with storage, processing, and analysis (Appelbaum et al., 2017a, 2017b; Bihl et al., 2016). It is needed to broaden the discussions about big data applications in the industry and its implications in management research. Since digital technologies have changed traditional economic and business concepts, information goods have a catalytic impact on real-time decision making; very few research of that impact has been done. Especially, empirical quantification and theoretical grounding of its effects on firm-level outcomes are not clear still (Obschonka & Audretsch, 2019).

Investments in new technologies used to be expensive, and companies expect a significant return of them. When a firm implements BD applications in its operations, there is at least the assumption that it should be a relationship between BD applications and the final performance of the organization. Prior to going deeper in the literature about this topic, it is valuable to highlight the fact that most of the articles analyzed here found a direct relationship between the implementation of BD and the performance of the companies. Different authors, different countries, different ways to get the data, and findings have some points in common. The relationship is so evident that many articles created mathematical models of it.

Theoretical background

Firms have spent significant effort in building their capabilities for enhancing their ability to process big data which could have several advantages for firms (Davenport & Harris, 2017; Ghasemaghahi & Calic, 2019). Recent articles suggest that investing in Big Data poses many issues and challenges (Tarafdar, Gupta, & Turel, 2013). Challenges in big data implementation include data integration complexity, getting started with the right project, architecting big data system, lack of skills or staff, data ownership or other political issues, lack of business sponsorship, dealing with real time data, cannot build a compelling business case, poor data quality, cost is too high, among others.

The big data, the analytics applied to it, and the presentation of the results impact positively the creation of business value for the firms and their customers. Firms are using big data and business analytics to improve their products and services and support smart decision-making; it is a competitive advantage in the market (Cheng, M., et al, 2021); this new perspective indicates increased advantage accrued to monitoring and enhancing consumers' digital engagement for a firm. Analysis of BD gives a deeper view of consumer behavior, market, and even internal processes in the company. Huge amount of data is generated every minute in all the companies, analyze it and discover patterns is a competitive advantage.

Methodology

This review identifies and synthesizes articles that study the relationship between big data and firm-level outcomes. The current study uses the SCOPUS database as a source of articles. Within it, we limit our search to journal articles only, eliminating conference papers, book chapters, reviews, conference reviews, and editorials.

As keywords we use: big data, and firm performance; applying truncation with “*”. We look for papers that use these keywords in title, abstract, and keywords¹.

Applying the boolean search, the results in SCOPUS lists 129 documents.

Results

Descriptive analysis

Figure 1 shows the distribution of articles by year of this search. It is evident in the figure that there is a growing interest in this topic during the last decade.

¹ TITLE-ABS-KEY (("big data" AND ("firm* performance" OR "firm* outcomes" OR "firm* innovation" OR "firm* strategy"))) AND (LIMIT-TO (DOCTYPE , "ar")).

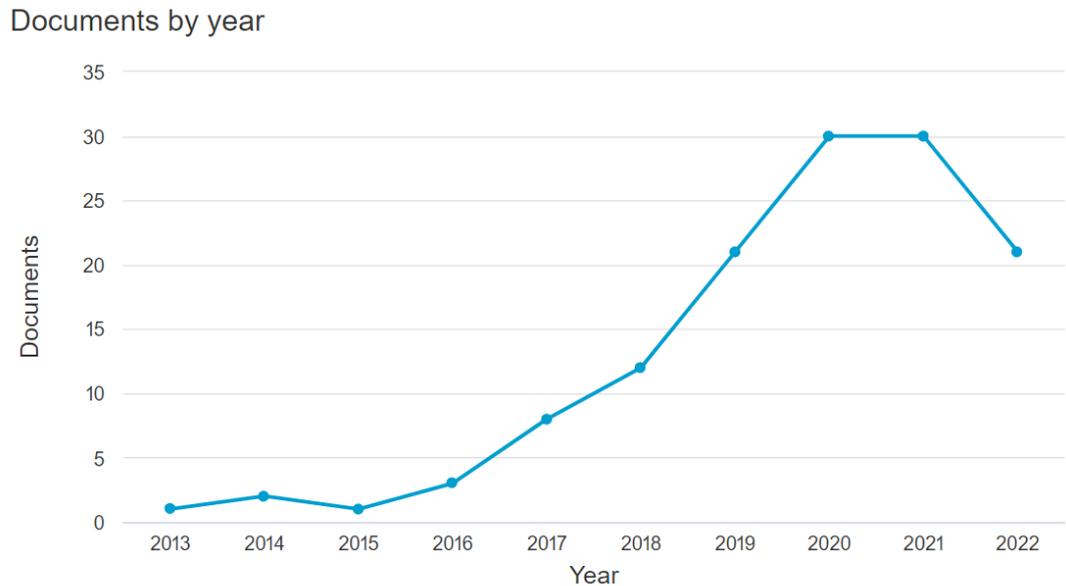


Figure 1. Distribution of articles by year

Figure 2 illustrates the distribution of the publications by the affiliations of the authors. Authors from the United States, China, and UK are the most interested in the research of the relationship between BD and the outcomes of the companies.

Documents by country or territory

Compare the document counts for up to 15 countries/territories.

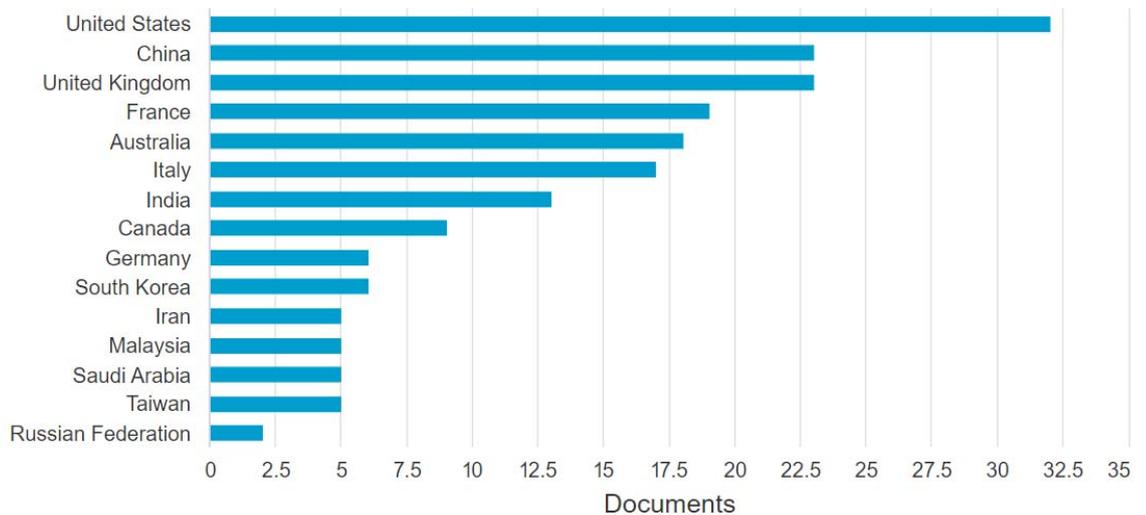


Figure 2. Distribution of articles by the affiliations of the authors

Business and management is the main area where the topic is investigated as it is shown in the Figure 3 (36.8%); decision sciences and computer sciences also make a significant contribution (16.9% and 13.9% subsequently) to the research of the relationship between big Data and firm performance. Other areas of research contributed less than by 10% each to this stream of literature.

Documents by subject area

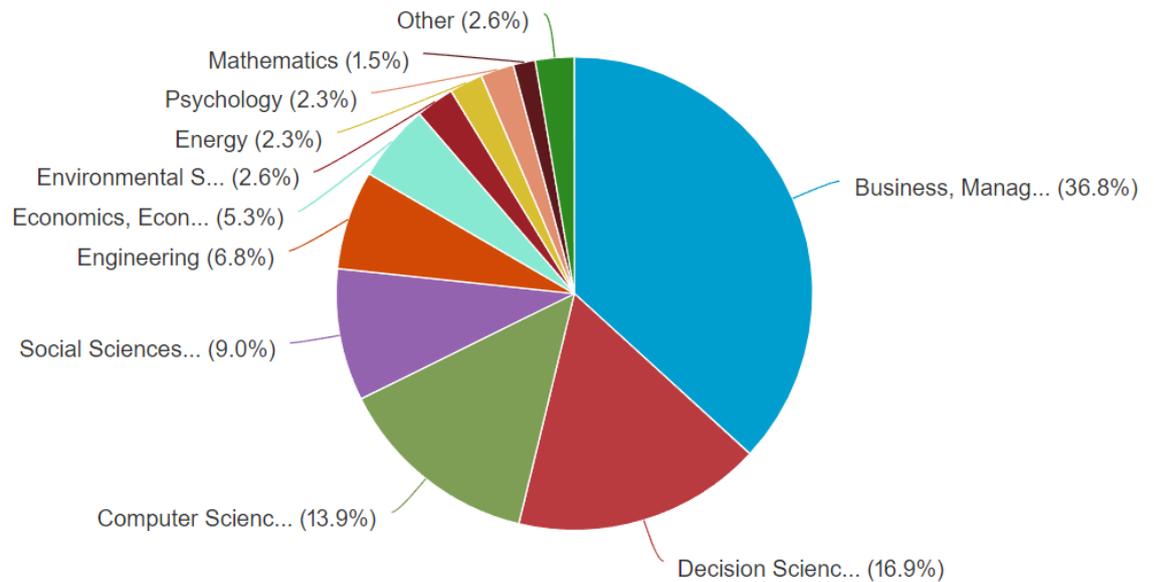


Figure 3. Articles by area listed under the keywords “firm* performance” and “big data” inSCOPUS

Some of the articles were eliminated of the list after reading the abstracts, introduction, and main findings. They were eliminated from the study because it was found that they are irrelevant for this study. At the end the list was reduced to 36 articles that meet the expectations. The main reasons why some of the articles were found irrelevant are: the source of data is not clear and they talk about some theoretical issues but without solid data, there is not a solid methodology clearly explained, poor analysis of management theories, poor findings and conclusions, among others. BD is a hot topic and many publications has been done last years, but not many articles develop a serious and solid theoretical background, not many articles get data from the industry, and very few create models.

The journals where these 36 articles were published are presented in the Table 1.

Table 1. Journals where the articles selected were published

Journal	Number of Articles Published
Journal of Business Research	5
Information and Management	4
International Journal of Information Management	3
International Journal of Production Economics	3
Journal of Enterprise Information Management	2
Management Decision	2
Technological Forecasting & Social Change	2
Applied Science (Switzerland)	1
Big Data	1

Canadian Journal of Administrative Sciences	1
Information Systems Frontiers	1
Int. J. Production Economics	1
International Journal for Quality Research	1
International Marketing Review	1
Journal of Business Analytics	1
Journal of Management Information Systems	1
Journal of Product Innovation Management	1
Journal of Science and Technology Policy Management	1
Journal of Strategic Management	1
Mathematical Problems in Engineering	1
Review of Managerial Science	1

The findings of the authors have a great diversity and differ from one to each other, but there are common factors. Most of them found a connection between investments in big data technologies and firm performance; some of them focus on specific technical characteristics of BD while others focus on managerial or financial aspects of the big data investments. The most important factor that was stated by all the papers is that the performance of the company could be enhanced with the implementation of big data technologies.

The articles include data from different industries such as manufacturing, marketing, transportation, IT, business analytics, among others. Some of the articles focus on specific industries, but most of them take data from all industries. Most of the articles select firms from list as Fortune 200, or any other ranking of the stock market. In that way, few of the articles are dedicated to SME. Quantitative research is dominant in this selection of articles, direct data coming from surveys is frequently analyzed. In order to measure the impact of BD technologies they use parameters such as operational efficiency, business growth, financial results, market performance, and customer satisfaction.

The conditions under which big data investments produce business value have been the subject of numerous studies. The mixed method approach by Mikalef and colleagues (2019b) demonstrated four distinct patterns of factors related to big data analytics (technology, processes, people, and organization) that contribute to high performance. A meta-analysis encompassing ten years of study by Oesterreich et al. in 2022 revealed evidence that BA social elements including organizational culture, managerial skills, and human resources have a stronger impact on business value.

Theory helps to explain phenomena that is empirically testable, article from the sample based on specific management theories for the construction of the theoretical background. Table 2 shows the frequency of the most used theories in the articles selected.

Table 2. Theories developed in the articles selected

Theory developed	Number of Articles
Resource Based Theory (RBT)	11
Organizational Learning Theory	2
Information Theory	1
Holistic Thinking Theory	1
Dynamic Capability Theory	2
Contingency Theory	2
Complexity Theory	1
Ambidexterity theory	1

The most frequently used theory is RBT, as in such papers big data is considered as a resource that help a firm to develop and get higher performance outcomes. RBT is useful to explain how the resources of the organization can lead to differences in the performance in the same industry.

Moderators of the BD-performance link

The external environment has a significant impact on the relationship between BD and performance (Vitari and Raguseo, 2020, Zhu et al., 2021). According to Vitari and Raguseo (2020), this association is stronger in a resource-rich setting. Zhu et al. (2021), on the other hand, looked at the moderating impact of industry environmental variables.

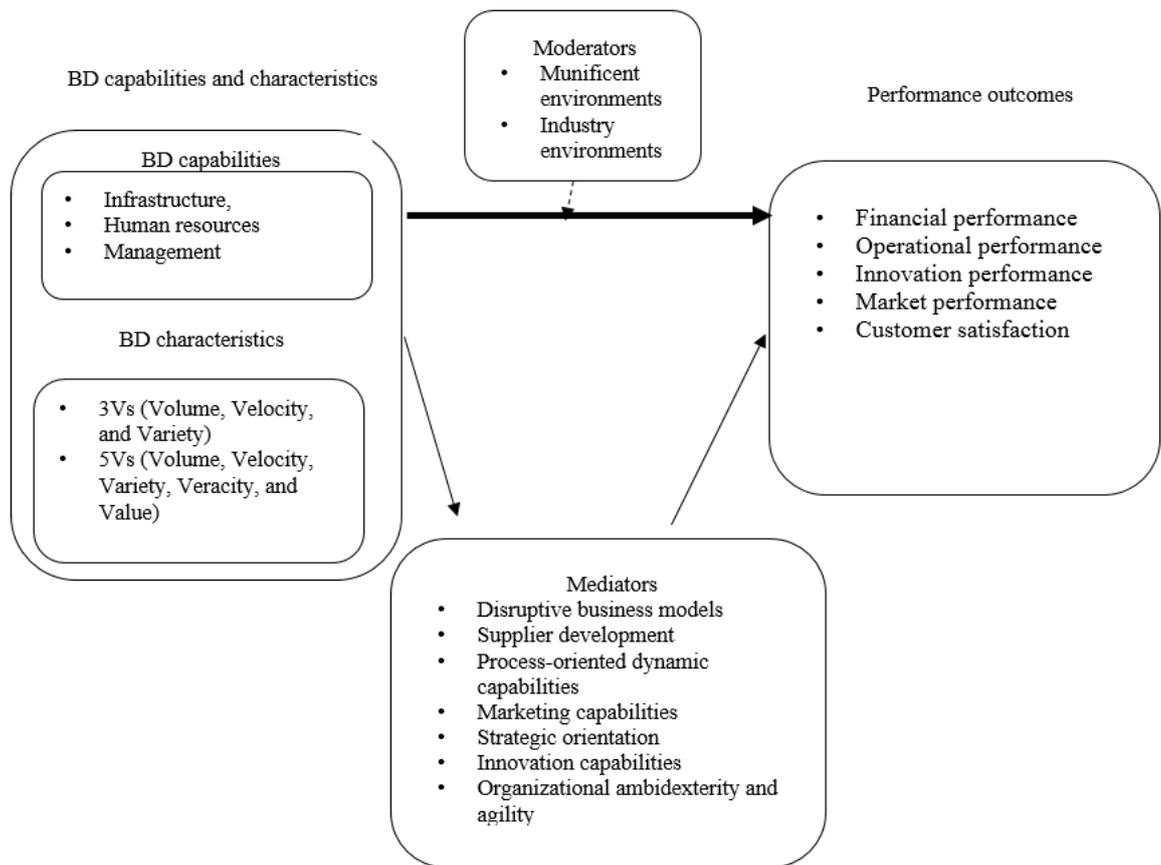


Figure 4. Structure of the findings

Discussion

Businesses must adapt to the rapidly changing business environment by adjusting their behavior and strategy in order to prevent performance declines. To succeed in today's dynamic global environment, it is essential to be able to successfully use new technologies and have access to a large amount of information on market developments (Gu et al., 2021), that's why academics and practitioners have focused heavily on big data (Yasmin et al., 2020). Although there have been substantial breakthroughs in our understanding of the effects of big data on performance, in this study we try to concentrate on the most recent trends in the literature on the subject.

The traditional business and economic paradigms have been put to the test by the rapidly changing digital economy. The market's reliance on trustworthy and fast information services is rising quickly as a result of the movement and analysis of enormous amounts of user-generated data within and across industries (George et al., 2014), which explains why business and

management are the main areas of study for our subject.

It emerges from the finding that there is both a direct and indirect relationship between BD and firm performance. Without any mediating effects, BD has an effect on a firm's performance. This finding is in agreement with our study's finding which showed that BD improve financial performance (Huang and al., 2020; Ji-fan Ren et al., 2017; Maroufkhani et al., 2020a,b; Vitari and Raguseo, 2020; Wamba et al., 2017; Yasmin et al., 2020), market performance (Huang and al., 2020; Ji-fan Ren et al., 2017; Maroufkhani et al., 2020a,b; Olabode et al., 2022; Vitari and Raguseo, 2020; Wamba et al., 2017; Yasmin et al., 2020), operational performance (Yasmin et al., 2020), business performance (Gu et al., 2021), innovation performance (Ghasemaghaei and Calic, 2020; Usai et al., 2021), operational efficiency and business growth (Zhu et al., 2021). Müller et al. (2018) conducted a thorough analysis of the BDA solutions owned by 814 businesses and came to the conclusion that live BD assets are linked to significant increases in a firm's productivity. Online media big data was the subject of a recent study by Qin et al. (2020), which found that it is strongly related to both short- and long-term corporate performance. Initial evidence emerging from our literature confirms the potential for BD to significantly enhance firm performance.

The contingencies that explain the extent to which BD affects firm performance have been looked in a number of studies. One of the first and most significant identified contingencies is the external environment. Vitari and Raguseo (2020) looked at the moderating impact of environmental characteristics on the relationship between BD business value and firm performance and came to the conclusion that this relationship is stronger in generous environments where opportunities exist and resources are available. On the other hand, Zhu et al. (2021) investigated the moderating effect of industry environmental characteristics on the relationship between BD and firm performance and came to the conclusion that BD has a greater impact on operational efficiency in less dynamic and complex environments, while the relationship between BD and firm growth is more pronounced in more dynamic, complex and rich environments.

The studies that have been reviewed have led to several ways that BD has been conceptualized in research; the most widely utilized of these is the claim that BD captures organizations' management, infrastructural, and human resource capabilities. Some research investigated the link between BD capabilities and business performance (Yasmin et al., 2020). According to Yasmin and colleagues' research from 2020, infrastructure capabilities are the most crucial among all BD capabilities and are closely associated to firm performance, confirming earlier research that found improved financial and operational performance and successful BD adoption depended on an effective combination of a firm's infrastructure, human resources, and management capabilities (Mikalef et al., 2019a). Drawing from a wide range of sources, Korherr and Kanbach (2021) stated that the human resources and capabilities are necessary to successfully implement BD in an organizational context. While Maroufkhani et al. (2020 a,b) assert that the three key contexts of technology, organization, and environment are what determine whether BD is adopted, furthermore, technological and organizational factors are more important factors to consider if SMEs are to benefit commercially from BDA adoption and improve their performance. Businesses must prioritize technology, organizational, and environmental factors in order to successfully deploy BD. If organizations want to achieve their goals of improved performance, they must give the correct BD capability top priority. Furthermore, support from top management is essential for building an environment that encourages firms to adopt new technology. Serious challenges must first be overcome by management and decision-makers if BD is to be successfully implemented in businesses.

Conclusions

The present systematic literature review responds to our research question by thoroughly examining the relationship between the concept of BD, including its main characteristics, capabilities and business value, and firm performance. To fully exploit the potential of big data

investments and realize business performance gains, the results of this study suggest an increased need for firms to place emphasis beyond gathering massive amounts of data to integrate various types of data in real time, as well as to build capabilities to analyze and predict data trends for strategic decision making.

In general, we could say that a better understanding of the effect of big data on firm's outcomes will enable enterprises to allocate their resources in a better way to improve their performance.

Corporate Carbon Neutrality under Conditions of Low Market Development

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Abstract:

In the circumstances of active global temperatures growth, the only chance to prevent irreversible climate change is going commonly CO₂-neutral. For businesses it is further complicated by the low market development and the lack of standardized, non-sector-specific solutions that could help overcome national market borders. This paper investigates climate strategies of international companies and thereby presents a pool of commonly accessible solutions. The study focuses in particular on carbon offsetting as a method to indirectly compensate for unavoidable emissions by financing the CO₂ reduction achieved elsewhere, its constraints and areas of development, as well as cases of both vertical and horizontal collaborations aiming to expand the range of accessible solutions while lessening the financial load. The study can be helpful as an entry point for businesses with limited resources but willing to start acting.

Keywords: *climate change, decarbonization, carbon offsetting*

1. Introduction

Climate change, basically deriving from global mean temperatures rise, has recently become a common matter of concern. According to the Paris Agreement [8] and Intergovernmental Panel on Climate Change (IPCC) Special Report [5], the consequences of global temperatures rising up to 1.5 degrees Celsius from pre-industrial ones and above will be fatal for both the environment and humanity as a whole. Least developed countries are expected to be affected in particular as the most vulnerable communities [6], but the overall adverse effect is going to be widespread [12]. It is hardly disputed now that the global warming is anthropogenic, caused predominantly by inadequate volumes of greenhouse gases emissions, among which carbon dioxide (CO₂) is prevalent. The only chance to limit global temperatures growth sufficiently is to cut net global CO₂ emissions to zero, or, in other words, become commonly carbon (or climate) neutral – which means that the amount of CO₂ emitted must be equal to the amount that is somehow sequestered from the atmosphere [5]. As businesses account for a great deal of global emissions, the decarbonization of business activity is becoming crucial and widely required to maintain competitiveness [4, 7]. In the circumstances of low market development and thus in need of costly customization of rare sector-specific solutions, there is no standard approach to be used by a company willing to comply. It is national borders as well that prevent many companies from engaging themselves into climate actions: it comes often almost impossible to make use of state-of-the-art technologies [3, 9]. There might be multiple reasons behind that: lack of specific infrastructure, large-scale options available only, expensive customization of a technology to fit into current background, and many more. In most cases such processes demand not only financial resources to be implemented, but also high level of awareness and skill from the side of management. It is apparently a bigger problem for a smaller company, especially the one that is not international and cannot therefore make use of experience and resources of a department from a more developed country. Companies operating on emerging markets only can be therefore even less likely to contribute. It is getting quite clear that a standardized set of generally applicable methods is needed for business to start acting in case it does not possess enough time and resources to opt for a specific technology. We have attempted to form such a tool by classifying the solutions based on the source of emissions, on the one hand, and on the time horizon of climate strategies on the other.

2. Theoretical and practical background

The first dimension is based on a concept of scopes, first presented in a Greenhouse Gas Protocol. The concept classifies emissions into three main categories: scope 1 includes emissions that occur directly as a result of a certain business activity, such as fuel combustion. Scope 2 comprises emissions that appeared during the production of electricity that was consumed by a company; these are indirect emissions that the company should take responsibility for, as electricity production is generally associated with a significant amount of emissions. Finally, scope 3 includes other indirect emissions that are associated with the product but cannot be clearly attributed to a certain business activity. For example, purchased raw materials production and product utilization by an end customer should be addressed as scope 3 emissions [2].

The second dimension is based on the stage of business climate strategy development [1]. On a tactical stage current operations and products are getting less harmful – for example, by implementing a waste segregation system; it does not affect the methods and operations themselves. Transitional stage implies the company works on altering the way business is done, for example by incremental solutions such as increasing energy efficiency of machinery or getting rid of plastic packaging, as well as innovating actions such as implementing a brand new, less carbon intensive technology. On a transformational stage, however, carbon neutrality becomes a goal; the company seeks opportunities to eliminate all possible sources of CO₂, including indirect ones.

3. Research method

In order to develop such an instrument, we have investigated 20 global climate strategies of companies from various economic fields, both manufacturing and service ones. We then categorized the actions performed by companies according to the scope of emissions, which depends on the extent they are associated with company's operations, and the time horizon of decarbonization activities.

Table 1. Classification of common decarbonization solutions

	Tactical now	Transitional next	Transformational final
Scope 1 Direct emissions	On-site electricity On-site heating & cooling	Alternative means of transport Alternative fuels (biofuels) Carbon offsetting	Insetting Natural climate solutions (NCS) Carbon dioxide removal (CDR)
Scope 2 Electricity production	Renewable power purchase agreements (PPAs)		Carbon capture and storage (CCS) Standards for suppliers
Scope 3 Other indirect emissions	Reuse and recycling	Sustainable aviation fuel (SAF)	

First of all, the overall climate strategy is the same for all the companies: they have set a climate neutrality goal with a particular target year, which is usually 2030 to 2050, and the goal is expected to be achieved through the elimination of controllable emissions and compensation of those unavoidable. Sector- or even company-specific solutions significantly differ and were not included in this study. It appeared that the most well-known common technologies, such as renewables, both purchased and on-site, electric vehicles, biofuels and other alternatives, are used or planned to be used by almost every participant. The transformational phase, however, mostly does not include any direct solutions due to the absence of possible ones. In other words, there is usually no common way for a company to eliminate all the emissions directly. All the investigated climate strategies thereby imply cutting down emissions where it is possible, then

using offsetting schemes to compensate for otherwise unavoidable emissions. While the implementation of even a common solution of alternative fuel and recycling is industry-specific, the offset solutions can be generalized and implemented in any sphere.

4. Perspectives and constraints of carbon offsetting

Carbon offsetting is the mechanism that allows to outsource the process of CO₂ reduction to another player located elsewhere with certain abilities to accomplish such an action but lacking material resources to do so. Usually, the scheme is carried out via so called carbon project. Any carbon project must be strictly verified by an authorized third party that can confirm and measure the potential effect of the project implementation. The effect may be achieved by using natural resources, such as forest – so called natural climate solutions, or using innovative technologies such as carbon capture and storage, implying direct extraction of CO₂ from the air or fume. As soon as the action has been completed, the effect can be sold to the customers in a form of a carbon credit on each metric ton of CO₂ avoided or sequestered from the atmosphere. The main condition for a project to be verified is additionality, or the inability to operate in the absence of credit purchases – the sale of credits must be the only source of financing for the project [10]. Such a scheme is highly valuable for undeveloped markets' players, as it enables them to overcome the national market barriers and yet contribute to combating climate change. It is worth mentioning that, even though the compensated emissions still occur locally while avoided or sequestered elsewhere, the global emissions volume reduces. When determining climate changes there is no such term as local level: the scale of potential climate crisis is global only. In other words, it is generally irrelevant where exactly the emissions decrease occurred as long as it has occurred at all; it is clear that offsetting will not help to clean the atmosphere locally, but it does not diminish the effect on the global level.

There are, however, some restrictions to be taken into account. Voluntary carbon offsetting is by default non-regulated, thus leaving it for companies to decide, whether the certain amount of CO₂ emissions may or may not be avoided directly before buying the offset credits. Furthermore, there is a possibility to simply purchase credits in a pre-target year, thus formally achieving carbon neutrality even with no considerable changes in operational activities. Another problem lies in a cheap price of credits, making it much less harmful for a company to compensate for the emissions than to invest in their avoidance. The main fact underpinning the problems mentioned before is the lack of transparency on both sides. As the project gets created and verified, there is almost no open information on the verification method and the reason for the announced effect. Since there is no centralized body of verification of carbon projects or regulated audit processes for operating verification bodies, it is hard to ensure credits' additionality. There is therefore almost no possibility to distinguish between credits except for the price, which makes it insignificant what kind of credit will be included in a climate actions plan. As we investigated the climate strategies of global companies, very few examples of transparent information were found on what type of credits will be or is bought and what was the verification body to measure and state the effect. As companies care mostly about the very fact of purchase, buying the cheapest credits available is enough to satisfy stakeholders. The risks of investing in a non-additional low quality carbon credit grows, and trustworthiness of the whole system gets undermined. A few cases of non-additional credits issuance revelation are known as well; considering this all, it comes as no surprise that the level of trust to a system of carbon offsetting is quite low.

Considering the possibility of a full compliance – meaning that any company offset what it cannot avoid – within the current conditions listed above a sharp increase in price is anticipated as soon as demand goes bigger than supply; as we mentioned that companies do not see the difference apart from the price clearly due to the lack of transparency, their desire to use offsets might be expected to decrease. Moreover, growing demand is likely to cause the creation of lots of non-additional credits to make them cheaper and more accessible. Will the price of credits go

up or will there be a great deal of low-quality credits – in any case it is not likely that such a scheme will make an actual difference in terms of emission decrease [11].

The opposite situation implies full transparency of all the processes involved in a carbon credit issuance and cancellation. Shorter supply is anticipated as there are predominantly high quality credits left, which is also reflected in an average price that apparently gets bigger due to the changes in operations. Direct solutions, such as renewables or other innovations to reduce emission on site, can be examined on an equal basis or be even cheaper than credits, thus ensuring usage of the latter for truly unavoidable emissions only. This is likely to alleviate the effect of growing both demand and prices near the target year and yet the scheme is likely to gain more trust from players, as well as customers.

5. Collaboration perspectives

As it was mentioned before, the lack of transparency raises opportunistic behavior motivation and cut the carbon neutrality effect. It is true for carbon projects created elsewhere and credits sold to a customer that has no relation to the project itself. However, during the case study we have found curious examples of collaboration activities in both vertical and horizontal directions. The main reason under such projects is the resource intensive nature of the latter. A good example for that is a CCS project, which is yet large-scale only, thus very expensive, and, as a matter of fact, not really applicable to a single enterprise – even a carbon intensive one. More deeply, it demands a quite big amount of space, advanced distribution system so that the captured CO₂ is transported to the storage effectively, and many more details. There are cases of a joint CCS project implementation. Not only does such project allow companies to decrease their own CO₂ emissions while sharing costs with another player (even a competitor), but also implies a much higher level of transparency: an owned carbon project must be verified by a third party as well as an ordinary one; moreover, while the owners of the latter are usually not known to the society and customers of credit buyers, companies acting sustainably almost always do that publicly.

The abovementioned case of collaboration can be described as a horizontal one, meaning that it is created by companies within a particular market. However, there are worth mentioning cases of vertical collaborations as well. For example, some airline companies enter into an agreement with a supplier of aviation fuel, under which they purchase so called sustainable aviation fuel – a kind of a biofuel with considerably smaller carbon emissions. Investments from a large buyer help the supplier to maintain costly production, develop, and scale it. More interesting, that in some cases more than two players get engaged into such a collaboration: for example, we have found a case of a consulting company relying heavily on business travel of its employees that entered into such an agreement with airlines whose services they use.

Another scheme that is getting popular with companies willing to go sustainable is called insetting and implies creating a carbon project within its own value chain – for example, it might be a reforestation project. In a broader sense a CCS project can be also explained as an example of insetting as in other situation the effect might be sold in a form of carbon credits. However, in the circumstances of the full compliance that was examined before, a carbon project can operate and sell credits only after company has gone carbon neutral itself.

Finally, some companies set some sustainability standard and goals to their suppliers to reduce scope 3 emissions and encourage the suppliers create their own climate strategy, or even refuse to work with a supplier that does not meet the standards. Sometimes it is a very important opportunity for a supplier as they may be willing to comply but lack financial resources as well as the skills needed; a collaboration with a more aware customer can help to solve these both issues.

6. Conclusion

Carbon insetting and collaborations are mostly a part of a transformational stage, although some of the instruments might be helpful on the earlier stages. By including decarbonizing activities into a value chain or just taking them under control allows business to avoid risks associated with market volatility, as well as with other parties involved, thus eliminating problems with transparency and ensuring quality. In other terms here we are talking about the integration instead of outsourcing due to the uncertain market on this stage of development. Nevertheless, carbon offsetting is still an important phase helping companies to understand processes better without investing too much in the beginning. It is also important that none of the inner activities can be fully decarbonized by itself: any technology, even based on clean energy and fully recyclable, has some life cycle emissions that should be covered as well in order to reach climate target. That is the point where offsetting becomes essential.

As a result of the study, a classification and descriptive analysis of commonly accessible climate solutions was presented. As the company sets its climate targets, the tool proposed can be of assistance in case there is limited possibility for it to implement technologically specific solutions. The offered classification tool may be helpful as a starting point, providing generalized data on global best practices to be used as benchmarks.

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Proactive Project Scheduling Policies with Stochastic Activity Durations

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Abstract:

The paper explores proactive policies for stochastic resource-constrained project scheduling problem (SRCPSP) with stochastic activity durations. An extended activity-based policy (ABP) is proposed. Using the policy allows to reduce the average duration of the project. The research is carried out using simulation modeling based on the project database PSPLIB.

Keywords: *project management; scheduling policy; resource-constrained; stochastic activity durations; SRCPSP*

1. Introduction

It is known that one of the most popular tasks for the entire existence of Project Scheduling is the generation of the shortest project schedule in terms of limited renewable resources, which cannot be solved in real practical situations. Therefore, in practice, heuristic algorithms are being developed that would make it possible to find, if not optimal, then sufficiently close to it solutions. The effectiveness of these methods is high, their application allows reducing the total duration by more than 25% in each 4th project. Moreover, the implementation of these algorithms does not require additional costs and resources and is achieved by determining the correct order of execution of the project.

In this work, the assumption is added to the original statement of the problem that – each project activity has a stochastic duration, and the objective function is the mathematical expectation of the duration of the project. A class of such models is commonly referred to by the acronym SRCPSP. In practice, it is necessary to solve just such a task, especially when the project is the creation of some innovative product.

Let's define the SRCPSP problem more rigorously. Let's (A, I) – is the project, in which $A = \{a_1; \dots; a_N\}$ – is the set of its activities, $I = \{(a_i; a_j) \mid a_i \rightarrow a_j, \text{ где } a_i, a_j \in A\}$ - is the set of interrelations between activities, which are represented by simple precedence relation:

$a_i \rightarrow a_j$ – is the simple precedence relation. It means that i-activity precedes j-activity, so j-activity can't start until the i-activity is finished. The precedence relations define the topology of the network model of the project.

Now let's introduce resource constraints. Let's assume that the company that carries out the project has a certain number of types of renewable resources (for example, employees of different specialties) who will perform the activities of the project: R_1 – number of 1-type specialists, ..., R_K – number of K-type specialists. To perform each activity of the project, a certain amount of resources of each type is required (possibly zero), i.e. each i-activity uses r_{ki} renewable k-resource for each k. It is required that at each moment of time the sum of all resources that are used in the activities of the project does not exceed the number of resources available to the entire company:

$$\sum_{A(t)} r_{ki} \leq R_k, k = 1, \dots, K; \text{ for each } t$$

In this notation $A(t)$ – is the set of activities (subset of A), which are executed at a time t. In the deterministic RCPSP problem, it is assumed that the duration of each project activity is known and equal to d_1, \dots, d_N . In this case we can reformulate this problem as an integer linear programming one.

Let's introduce the last element of the SRCPSP model. Assume that the duration of each activity d_i is a stochastic value with some probability distribution. In this situation, a certain set of rules is needed that will minimize the expected duration of the entire project.

The solution to this problem is to determine at each moment of time t (at the beginning of the project or after the end of any of its activity) which activities should be started taking into account the actual duration of the previous ones and the actual loading of resources. The totality of all such decisions is called a **schedule policy** or **schedule strategy**. Ultimately, the policy matches the vector of durations of all project activities $(d_1; \dots; d_n)$ with the vector of the beginning of these activities $(s_1; \dots; s_n)$. Finding such an optimal (or at least suboptimal) policy is a complex process that has not yet been reduced to simple rules like those used in deterministic RCPSP.

It should be noted that today there are few models and methods that allow solving such problems. This topic has been actively developing relatively recently. The fundamental works appeared in the 80s [Möhring, Radermacher, 1984], after their publication it took more than 10 years for this field of knowledge to begin to develop actively. Therefore, it is no exaggeration to say that this is the task of the XXI century.

Several factors contributed to the intensive development of such models: a) active development of metaheuristic methods created for RCPSP and its generalizations; b) creation of the critical chain scheduling (CCS) method by E. Goldratt in 1997; c) significantly increased power and availability of computer technology.

It should be noted that the critical chain method is probably the only method from this group that has become really widespread in practice and has managed to enter the project management standards like PMBoK. In the near future, a similar success of another method of solving similar problems is hardly possible.

During the carrying out of the project, it is required to apply the policy at **the decision-making points**, which are defined as follows: the beginning of the project and the end (actual) of all its activities. This is due to the fact that between two points defined in this way, the resource utilization is constant, because we assume that during the execution of each work, its resource requirement does not change; we also assume that the total number of resources available in the project does not change throughout the project. If it is necessary to relax these restrictions, then the decision points will be determined by the release time of occupied resources.

The simplest example of a policy can be a activity-based priority policy (ABP), which is implemented by applying a direct parallel scheme for generating an RCPSP schedule using a certain list of activity priorities, in which priority values are determined by the value of the total activity slack, which, in turn, is calculated based on the critical path method without taking into account resource constraints. Many policies are studied in [Davari M., Demeulemeester E. 2019; Chen, Z. et al., 2018; Van de Vonder S., 2008]. When using such a policy, at each point of decision-making, we estimate the available amount of resources, form a list of activities that can begin to be performed at that moment (i.e. all the predecessors of these activities have already been finished and the required amount of resources is less than available) and we start those of them that have the highest priority (i.e. the minimum value of the full slack of activity, recalculated taking into account the work performed, but without taking into account limited resources). However, the use of such a policy is associated with several significant drawbacks:

- a) probabilistic distributions of activity durations are not taken into account in any way (and their influence, as experiments show, can be very significant).
- b) going through all possible combinations of activity priorities with a parallel scheme does not lead to obtaining all possible schedules, i.e. optimal schedules may not fall into the set of our feasible solutions.
- c) there are anomalies described by Graham back in 1966 [Graham, 1966], which consist in the fact that when using such a policy, it is possible to increase the duration of the project due to the removal of the precedence relation, or the addition of additional resources, or a decrease in the duration of activity.

The last two points are related to each other and are explained by the fact that in order to obtain an optimal solution (in a deterministic RCPSP), sometimes it is not necessary to start all the activities that can simultaneously begin at some point in the implementation of the project, whereas the delay of one of the activities will lead to the fact that already at the next step it will be possible to increase the utilization of resources.

To correct these disadvantages of using a parallel scheme, it is proposed to use a **stochastic serial schedule generation scheme (SS-SGS)**, which differs from the parallel one only in that if the priority of i-activity is greater than the priority of j-activity (i.e., i-activity is in the priority list to the left of j-activity), then $s_i \leq s_j$. As a result, a policy that uses such a scheme with some list of priorities is called a **activity-bases policy (ABP)**. To date, such a policy is the easiest to implement in practice, even for large projects.

2. Extended activity-based policy

Let's consider an algorithm for calculating the expected duration of a project using some policy. To do this, we use simulation modeling with the number of *nscen* runs. The selected policy for dynamic scheduling will be applied on each run.

We will assume that the probability distribution law of the random variable of the duration of each project activity is known, which means that mathematical expectation and variance are known. This will give us the opportunity to calculate the so-called **average project**, which is obtained by solving a deterministic RCPSP in the case when the duration of the activities is equal to their mathematical expectation. The following distributions are considered in the literature: uniform, beta, triangular, normal (bounded on the segment) and exponential. The differences in the results for each of the above distributions turn out to be insignificant. However, the approximation of the duration of activity by an exponential distribution significantly increases the expected duration of the project.

Here is an algorithm for applying the policy to calculate a single dynamic schedule:

1. Setting as the initial values of the durations of all the activities of the project the mathematical expectations of their durations.
2. $t = 0$ (start of the project)
3. Adding to the set D_t all activities that have no predecessors.
4. While $D_t \neq \emptyset$ do:
 - a. $S_t = Policy(D_t; t)$ – selection of activities from the set D_t , which should start at the time t according to the *Policy*.
 - b. If $S_t \neq \emptyset$, then schedule these activities and remove them from the set D_t .
 - c. Go to the next decision point – the moment of time t .
 - d. Add to the set D_t new activities, which can start at the time t .

The set D_t is the set of activities, which can start at the time t according to preceding relations (without taking into account resource constraints); $S_t \subseteq D_t$ is the set of activities, which have been scheduled at the time t .

Let's consider the individual parts of the above algorithm in more detail. Item 4.c involves moving to the point in time when at least one unit of the resource is released, i.e. it is potentially possible to start performing another activity. This time should be calculated from at least all the actual endings (obtained using a random number generator for all activities before the start of generating the dynamic schedule) of activity performed at a time t .

The key element of the algorithm is features of applying the policy. We will limit ourselves only to ABP policies based on the use of activity priorities. However, we propose to separate priorities based on the value (VB, value-based) and on the list of activities (LB, list-based). So, if we keep in mind the full slack of activity as a priority value, then there will be probably a lot of activities that has the same priority, which will give us additional flexibility in scheduling, compared to the rigid SS-SGS scheme based on the position of activity in the priority list (no pair of activities has equal priorities). If we consider the formal definition of the ABP policy, then it allows only LB priorities, so in the case of VB priorities, we can talk about an

extended work priority policy (XABP, Extended ABP). It should be noted that XABP can only be used with a parallel P-SGS scheme, because for SS-SGS there are such values of activity priorities that it will be impossible to implement within the framework of the applied generation scheme.

In the result, the next policies will be tested:

- I. SS-SGS with the definition of a list of activity priorities based on heuristics RCPSP
- II. P-SGS with a pre-defined list of priorities, based on heuristics RCPSP
- III. P-SGS with dynamic priority calculation (XABP)

3. Method

To conduct research, we will use a set of projects J120 (600 projects, 120 activities in each project and 4 types of limited renewable resources) from the PSPLIB database [Kolisch, 1996], which contains deterministic RCPSP models, therefore it is necessary to replace the deterministic duration of each activity of each database project with a random variable distribution. Let's assume d is the deterministic duration of activity, then the following distributions will be used:

- a) U1: uniform distribution on the segment $(d - \sqrt{d}; d + \sqrt{d})$ with variance $d/3$
- б) B: beta distribution on the segment $(d/2; 2d)$ с дисперсией $d^2/16$
- в) U2: uniform distribution on the segment $(0; 2d)$ с дисперсией $d^2/3$

As is known, the use of a beta distribution for modeling a random variable of the duration of work, taking values on the segment $[a; b]$, involves the use of the following approximate formulas:

$$\mu = \frac{a + 4m + b}{6}; \quad \sigma = \frac{b - a}{6}$$

where: μ is the mean, σ is the variance, m is the mode.

The general principle of obtaining stochastic durations from deterministic ones is that the mathematical expectation of a random variable of duration must coincide with the initial deterministic value. Therefore, for the beta distribution, the average value is $\mu = d$, bounds: $a = \frac{d}{2}, b = 2d$ allow to determine the mode $m = 7d/8$ and the standard deviation $\sigma = d/4$.

Simulation modeling with 100 iterations was used to calculate the expected duration of each project (i.e. 100 different variants of its schedules were calculated for each project). The average value of the obtained durations was used as an estimate of the mathematical expectation. Then the deviation of the expected duration of the project from the optimal value of the duration obtained by solving a deterministic RCPSP for a project whose duration of work was set to an average value was calculated and a number of these deviations were analyzed on a set of J120 out of 600 projects.

As a basic method for determining priorities, the 4 best (among RCPSP rules) priority rules were used: LST, SLK, MTS, WCS together with a forward parallel generation scheme. All rules use the information obtained by applying the critical path method to the average project without taking into account resource constraints. LST – the less late the start of activity, the higher its priority; SLK – the smaller the full slack of activity, the higher its priority; MTS – the more complete followers of activity (direct and transitive), the higher its priority; WCS is a hybrid rule proposed by R. Kolisch [Kolisch, 1996], which is a generalization of SLK.

4. Empirical results and conclusion

As a result, it was found that, as in deterministic RCPSP, the priority rules based on which priorities for SS-SGS and P-SGS were calculated have the same relative effectiveness, i.e. if rule A is better than rule B for RCPSP, then the same statement is true for each SRCPSP policy.

Another interesting result was the absence of dependence on the type of distribution of random variables of the duration of work, but a clear dependence on the variance for any policy was revealed. Table 1 presents the expected deviations from the optimal deterministic duration (RCPSP column) for 4 different rules applied together with a forward parallel schedule

generation scheme to generate priorities used by a policy with a stochastic serial SS-SGS scheme. It is seen that the results using the uniform and beta distributions are close, but significantly differ from the U2 distribution with a larger variance.

Table 1. SS-SGS: average deviation of expected project durations

	U1	B	U2	RCPSP
LST	24,1%	24,3%	44,7%	10,50%
SLK	31,2%	31,6%	53,4%	17,00%
MTS	26,1%	26,4%	47,1%	12,30%
WCS	23,7%	24,0%	44,3%	10,10%

The real surprise was the absolute dominance of the XABP policy over the policy using the SS-SGS scheme (table 2). The use of the P-SGS scheme turned out to be generally more effective than SS-SGS. The absoluteness was checked as follows: for each of the 600 projects studied, the average values obtained by XABP-policy and SS-SGS were compared. SS-SGS has never allowed us to get even the same average deviation, all the values turned out to be larger, similarly for comparing XABP with P-SGS, but only for the most effective rules.

Table 2. XABP: average deviation of expected project durations

	U1	B	U2	RCPSP
LST	12,9%	13,1%	20,0%	10,50%
SLK	19,0%	70,2%	25,2%	17,00%
MTS	14,3%	14,5%	21,0%	12,30%
WCS	12,5%	12,7%	19,6%	10,10%

Figure 1 shows a histogram of the distribution of a random value of the percentage deviation of the expected duration of projects (with the distribution of U1 duration of work and the basic LST rule for determining priorities). Note that the policy has little effect on the variance of this random variable, the main influence is related to mathematical expectation. This means that almost every project has received significant benefits from the use of the XABP policy.

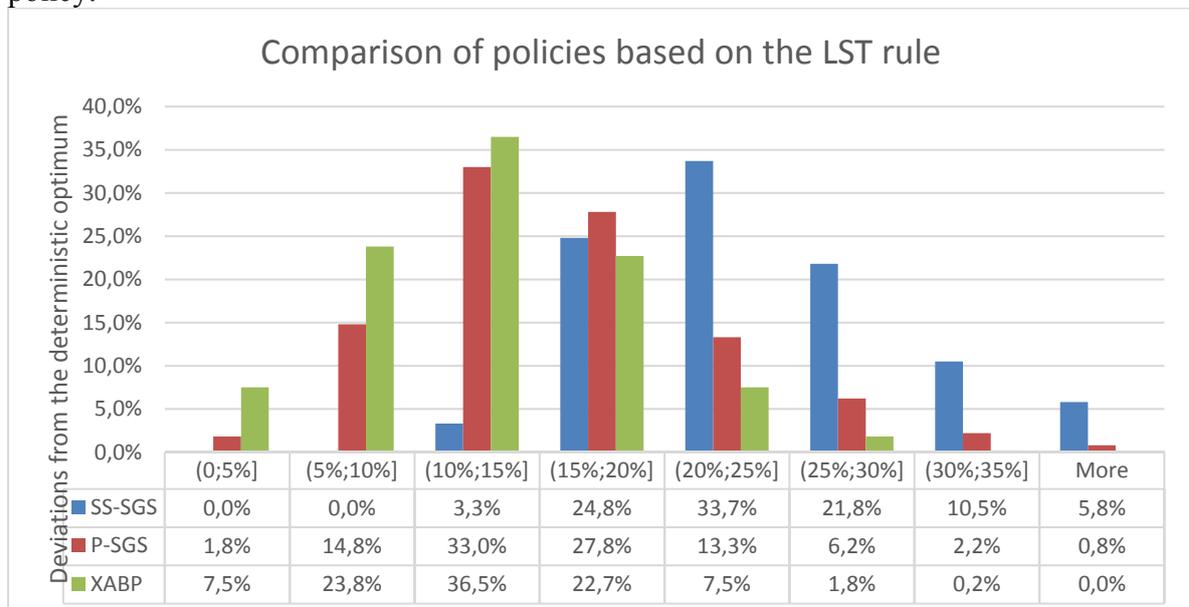


Figure 1. Distribution of the average deviation when using different policies

Variants of the simplest and most practical scheduling policies for SRCPSP are considered, and their relative effectiveness is investigated. The most advantageous was the XABP policy proposed by the author, which is a modification of the parallel scheme for forming an acceptable schedule in a deterministic RCPSP.

The results are obtained for simple one-pass RCPSP heuristics used as the basic ones to determine the policy for SRCPSP. Perhaps the use of more complex multi-pass methods will make adjustments to the use of the policies considered. On the other hand, a significant effect can be expected if dynamic priorities are calculated using probabilistic distributions of random variables of the duration of the project. But this is a subject for further research.

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Science and Development in Current Circumstances on the way to Digital Agriculture in post-Soviet Countries

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Abstract:

This paper investigates the need to enhance priority research on digital agricultural technologies in relation to and in synergy with the digital transformation needs of agricultural companies. The author outlines possible ways to strengthen the implementation of domestic developments and Public-Private Partnerships in the digital development of sectors of the economy, particularly agriculture, to effectively meet the challenges of turbulent times.

Keywords: *Digital technologies, Agriculture, R&D, Agriculture companies, post-Soviet countries.*

1. Introduction

The use of advanced information and communication technologies at the current stage of scientific and industrial development is a paramount necessity, both for the scientist and the businessman. The synergy between Import Substitution Industrialization (ISI) and parallel imports is achievable through the establishment of chains of engineering structures and technology transfer centers, R&D and co-financing, an appropriate sectoral legal framework and the achievement of sustainable development indicators. Successful full-scale digital transformation is only achievable if there are effects on companies, integration structures, clusters and regions as subjects of legal relations. Stakeholder activation takes the form of participation in investment and innovation projects, activities of government strategies and S&T programmes.

2. Discussion

Leading global and regional expert and research agencies and companies (McKinsey, PWC, EY, Statista, ResearchAndMarkets, IDC, Fortune Business Insights, ГидМаркет) confirm the further development until 2025-2030 of the third, digital industrial revolution and the start of the fourth industrial revolution. The main characteristics of the transformation are new types of production based on cyber-physical systems, global production networks, digital services, and the analysis and use of big data and artificial intelligence methods. Digital technology is a key area of research in the science and technology development plans of the US, EU, China and the Russian Federation.

In Russia, the national programme "Digital Economy of the Russian Federation" (2018-2024), allocates six federal projects: "Regulatory regulation of the digital environment", "Information infrastructure", "Human resources for the digital economy", "Information security", "Digital technologies", and "Digital public administration". [4]. The Presidential Decrees have introduced the projects "Artificial Intelligence", "Development of Human Resources in the IT Industry" and "Provision of Internet Access through Satellite Communication Development". For example, the results of the federal Digital Technologies project include: (1) development and implementation of Roadmaps for the development of promising "end-to-end" digital technologies; support for high-tech companies – leaders developing products, services and platform solutions based on end-to-end digital technologies for the digital transformation of priority economic sectors and social sphere primarily based on domestic developments; (2) creating demand for digital technologies, products, services and platform solutions; (3) creating digital platforms to implement research.

The Republic of Belarus is moving towards a knowledge and innovation-based economy model characterized by automation of all productive activities and widespread electronic

interaction in the spheres of business, business-state and business-consumer. The development and implementation of information technologies is supported by the State Programme "Digital Development of Belarus", 2021-2025, some projects of the State Programme for Innovative Development, the State Science and Technology programmes "Digital Technologies and Robotics", 2021-2025, "Cybersecurity", 2021-2025. The five-year plan is to create information systems capable of integration into a single digital platform; digital twins for real objects and processes; decision support systems for product lifecycle stages; industrial robotics systems; artificial intelligence systems for industrial, social and public administration tasks; monitoring and management systems based on Internet of Things technologies; big data analysis systems for companies; systems for the provision of electronic information and communication services; systems for the intelligent analysis of biomedical data; medical information systems; intelligent technologies and decision support systems for disease diagnosis and prevention; scientific, cultural and historical digital resources [9].

State digital strategies formed in the Central Asian republics. The implementation of the Digital Kazakhstan Programme 2018-2022 is carried out in five areas: (1) "Digitalization of Industries" – transforming traditional industries using technology and opportunities to increase productivity and capitalization; (2) "Transition to a Digital State" – transforming the state infrastructure to provide services to people and businesses; (3) "Digital Silk Road" – developing high-speed and secure data transmission, storage and processing infrastructure; (4) "Human capital development" – transformations covering the creation of a creative society and the transition to a knowledge economy and (5) "Creating an innovation ecosystem" – creating conditions for the development of technological entrepreneurship with sustainable links between business, academia and the state, introduction of innovation into production [5].

The Republic of Uzbekistan has adopted the Digital Uzbekistan 2030 Strategy, which envisages a number of measures related to the introduction of digital technologies in telecommunications, public services, industry, healthcare, and the state cadaster [6]. More than 1,600 projects for the digital transformation of regions and sectors, including agriculture, need to be implemented by the end of 2022 [7].

As can be seen, there is a commitment to the digital development of economic, government and social sectors in four countries. However, due to national and management differences, there are gaps in timing and scope of admission, structure and project funding.

The next generation digital agriculture system is evolving and expanding. The most prominent and sought-after areas in the development of higher-tech manufacturing are: robotic complexes and systems, the Internet of Things (IoT) and Big Data, virtual, augmented reality (VR/AR), cybersecurity and privacy, artificial intelligence (machine and deep learning), linking the above technologies and methods. Farmers use precision farming, aerospace and geo-information technology, electric and unmanned vehicles, and the development of information management systems within sub-sectors, production and marketing stages of agricultural products in addition to those mentioned.

Unfortunately, agricultural companies have amongst other economic activities the lowest ICT development indicators. For example, in the Republic of Belarus, the indicator "Organizations with a website" is 38.3% or only 380 bodies. Also, agriculture, forestry and fisheries have the lowest percentage of access to maximum internet speeds above 100Mbit/s – 4.6%, and about half of all companies (45.8%) use the internet with a maximum data transfer rate of 1.9Mbit/s or less. The number of IT professionals in agriculture is one of the lowest by economic activity and the lowest among the locomotive sectors, at 175 [2].

Agricultural companies need to start by rethinking their business processes and identifying suitable digitalization tools, with careful expertise. IoT-based forecasting may be an excellent solution. New-format management solutions based on centralized data collection processes from pieces of equipment via a local system with a distributed network can prevent excessive use of resources and deviations in the technical condition of equipment and prolong its

lifecycle. These processes reduce the risk of sudden production stoppages due to faults, reducing production expenses.

Through participation in programmes, farms and regions are already using technology and/or software and hardware to achieve the effects of increased crop and livestock productivity, in line with the digitalization strategies [11] and pilot projects [1].

However, most post-Soviet transition economies are experiencing difficulties on the road to agricultural transformation. For example, barriers to the use of IoT include technological (existing service, delivery and planning systems do not provide for the introduction of Big Data tools), human resources issues related to IT training, management issues (lack of common standards and cross-platform conflicts – IT and telecom systems are difficult to integrate with each other, lack of new solutions that can replace existing ones, given their high autonomy). Also, the legal aspects of the implementation of individual digital solutions and/or a set of technologies in agriculture are declarative and non-specialized.

3. Method

In the post-Soviet countries, research on the use of information technology has shown a positive trend [9]. It has been facilitated by the entry of public and private R&D investments, as well as the surge in demand for information and communication technologies among actors in various sectors of the economy, at a time of global spread of coronavirus-induced diseases. In addition, the use of advanced technology improves productivity and resilience in the face of climate change and the emerging special isolationist economic environment.

More than 5,350 papers on advanced information and communication technologies in agriculture have been published in the PИИЦ database over the last 20 years [8]. More than half of these papers are published in scientific journals. In agriculture, there are five main areas of research: Precision Farming, Remote Sensing, GIS and IoT. Among the most productive organizations are institutions of the Russian Federation. This is the Russian State Agrarian University – Moscow Timiryazev Agricultural Academy, Agrophysical Research Institute, Federal Scientific Agroengineering Center VIM and Kazan State Agrarian University. Organizations of the Republic of Belarus, Kazakhstan and Ukraine are represented to a lesser extent. As can be seen, a significant part are universities, where research is carried out, including by students, to protect their educational programs, which indicates significant disagreements between the direction of scientific research and the interests of agribusiness.

4. Results and conclusions

In the face of external pressures from the largest economies of the post-Soviet countries, it is important to streamline the chains of cooperation between state structures and private business, research institutions and industry, and to build new channels of cooperation through the creation of new structures in the field.

The main lines of action to address and anticipate the challenges ahead could be:

1. to encourage and systematize research and development in the field of digital technologies that are in the public interest and business needs (Kazakhstan's programming regulations are an example of commitment);

2. co-financing of the scientific and implementation stages from budgetary sources and organizations' own funds (the system of implementation of science and technology policy is built in Belarus);

3. development of flexible instruments for subsidizing, deposit insurance and long-term lending to small and medium-sized producers that start the digitalization of business processes and use ICT (some financial instruments based on the American model are already being tested in Uzbekistan);

4. antitrust regulation of major players in the digital market;

5. the formation of science, technology and innovation infrastructure institutions responsible for digitalisation and accountable to the state regulator of science and technology;

6. organise and deliver low-cost and/or low-budget literacy courses and disseminate successful digitalization experiences.

Projects involving investment in digital development can be implemented on a Build-Own-Transfer model [3]. Under this model, the government ensures that businesses can implement projects for a period specified in the contract in order to make a profit. At the end of this period, the company transfers ownership of the project to the state. The project implementation period does not usually exceed the duration of state programmes and priority innovation areas. Viability Gap Funding can also be useful to finance projects and make agricultural projects more commercially attractive. However, the participation of domestic R&D organizations in the structure of value chains should be a prerequisite for such agreements.

Therefore, in order to digitally transform and implement joint scientific and technical projects in post-Soviet countries, it may be possible to exchange experiences of legislative regulation, as well as to jointly study the practice of co-financing projects involving, among others, resident investors from BRICS and SCO countries.

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Public Sector Issues

Corporate Social Responsibility in Modern Professional Sports Organizations in Russia: the Case of Football Clubs

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Abstract:

This research is focused on perception of corporate social responsibility (CSR) activities in professional sports organizations in Russia. With the growing influence of sports and sports organizations, people are becoming more and more interested not only in the results of their favorite teams, but also in what they do for the society. Using the example of football teams, we hypothesize that CSR has a positive effect on both the club identification and the club's reputation, and thus creates a link between the club, its players, and the society. Our study is aimed at developing an understanding of how the audience perceives a football club and its CSR activities, as well as identifying the role of CSR in sports organizations and providing relevant policy recommendations. Such an understanding should help sports organizations better develop their growth strategies, as well as provide the government with a heads-up on how to support these organizations.

Keywords: *corporate social responsibility, team identification, football club, spectator's perception, behavioral intention*

1. Introduction

Nowadays, corporate social responsibility (CSR) has become an increasingly important priority for commercial organizations. In the field of sports, the application of socially responsible programs has gained momentum over the past decade [Breitbarth et al., 2015].

Due to the omnipresence of sports, sports organizations have become big businesses themselves and, thus, they are influential members of the global community [Walker & Kent, 2009]. At the same time findings of [Ráthonyi-Ódor et al., 2020] clearly show that the sports world is consciously shifting towards realization of sustainable development, which requires a comprehensive reconnection of sporting society and an increase in awareness to achieve the efficient and successful integration of CSR activities into sport. Moreover, the “star power” of the well-known athletes and the connections of sport teams and local communities may provide new perspectives for the study of CSR [Walker & Kent, 2009].

According to a recent research of Sports Browser (2022), football is at the top of the list of most popular sports with more than 3 billion fans all over the world. It is played by more than 250 million players in over 200 countries.

Engagement of such a large number of people leads to substantial economic and social impact, which can be expressed in stimulation of inclusion and integration. To prove this fact, a UEFA program called Grow developed a Social Return on Investment model that quantifies both the positive social consequences of football and its overall economic impact [The Sustainability Report, 2021]. This model can be described as “form of cost benefit analysis that attempts to quantify and place monetary value on social bridge”. According to the SROI model, it is calculated that there are 8.6 million registered footballers from 25 countries that generate a cumulative €39.5 bn in positive economic, social and health impacts.

In Russia football is also the most popular kind of sport. More than 3 million people play it, and it is a basic sport in 60 Russian regions [RIA News, 2022].

However, the new season (2022/2023) of the Russian Football Championship began with a decrease in match attendance. The Football Premier League became the first Russian tournament to be entered with a Fan ID. Now Fan ID is needed to visit arenas in five cities:

Ekaterinburg, Sochi, Samara, Rostov-on-Don and Nizhny Novgorod. After the adoption of the law on the fan's passport, many fans refused to attend matches of the Russian championship. The total attendance of five matches with the Fan ID system was 34088 spectators (average 6818 people per match). 3 matches of the same tour, but without using Fan ID, gathered 65724 people (average 21908 people per game) [RBC, 2022].

So, football has a significant social power, and therefore the CSR in sports organizations (in football clubs in this case) should be considered as a link between the organization and the audience and as a thing that, by causing emotions, can influence behavioral intentions.

Thus, this study aims at developing an understanding on how CSR activities in professional sports organizations are perceived by people and how they affect people's attitude and behavioral intentions towards the organization, as well as providing relevant policy recommendations.

2. Theoretical framework

2.1. Literature review

The key concept in our research is "corporate social responsibility in sports". It stems from the fact that due to the unique role of sport in society and an increased recognition of the ability for sport to address social issues, there is a close integration between CSR and sport [Walters, 2009]. Sport has the power to captivate and unite individuals within communities and create environments for contributing to social capital.

According to [Smith & Westerbeek, 2007], there are 7 unique features of sport's social responsibility:

1. Mass media distribution and communication power.
2. Youth appeal.
3. Positive health impacts.
4. Social interaction.
5. Sustainability awareness.
6. Cultural understanding and integration.
7. Immediate gratification benefits.

Speaking about the categories of team CSR initiatives that are proposed to encapsulate CSR activities for professional sport teams, the following ones may also be included [Walker & Kent, 2009]:

1. Philanthropy.
2. Community involvement.
3. Youth educational initiatives.
4. Youth health initiatives.

Football being the most popular sport in the world, provides a forum for connecting the passion of the game to the endeavors of individuals by encouraging them to take part in various CSR movements, transforming all the factors of CSR into a service for society and the environment [Ráthonyi-Ódor et al., 2020].

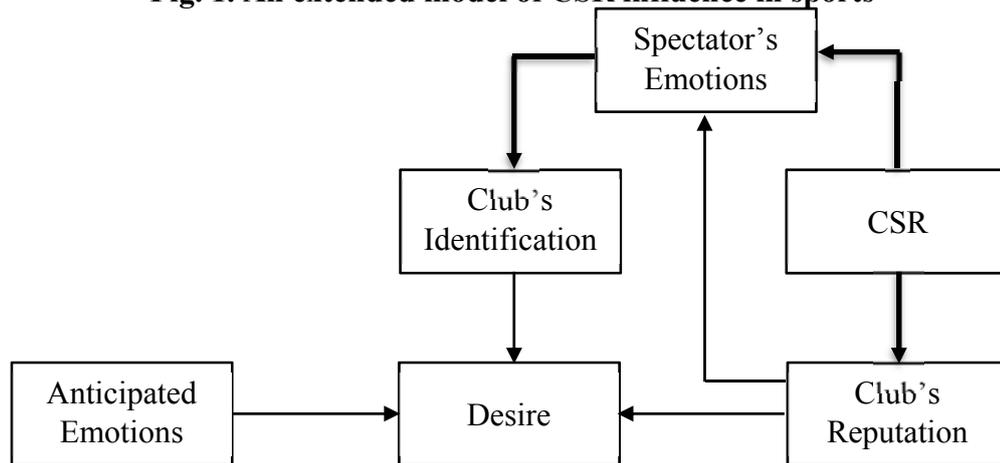
In addition, findings of the study of the relationship between spectators' emotions, satisfaction, and behavioral intentions at football games provide evidence that emotions like joy have a positive direct effect on satisfaction, as well as an indirect effect on behavioral intentions, via satisfaction [Biscaia et al., 2012].

It means that emotions evoked by the socially beneficial activities of the team can positively influence people's opinion of the team and their behavioral intentions. This assumption is supported by the recent research of [Ullah et al., 2021] that found a positive influence of the spectators' perceptions of corporate social responsibility on their team identification.

2.2. The theoretical framework

Based on the above-given literature review, we presume that CSR should be considered within a model (see Fig. 1) that connects it both with the club itself and the club's fans' behavior.

Fig. 1. An extended model of CSR influence in sports



Source: authors' design

The presented model has the following principal elements:

- *Anticipated emotions* – positive or negative emotions based on spectator's expected outcomes of an intended attending or watching matches prior to actually executing it.
- *Desire* – motivational aspect, which is expressed in the desire for any interaction with the club: visiting / watching its matches, events, etc.
- *Club's Identification* – personal commitment of a spectator who being emotionally involved associates themselves with the club.
- *Spectator's Emotions* – emotions resulting from spectator's favorable or unfavorable perception of the club's activities.
- *CSR* – known CSR activities that are implemented by the club.
- *Club's Reputation* – a collection of opinions and views about the club based on its history, activities, results, interactions, compared to its closest competitors.

So, our principal **research hypotheses** are as follows.

RH1: *CSR has a direct positive effect on Club's Reputation (controlling for other possible effects).*

RH2: *CSR has an indirect positive effect on Club's Identification by people via evoked positive emotions (controlling for other possible effects).*

The formulated research hypotheses are to be tested with help of planned in-depth interviews with CSR experts and a survey among football fans. The principal relationships in the theoretical framework are to be quantified using the PLS-SEM routine.

3. Conclusion

In this study we pose the problem of analyzing of perception of CSR activities of sports organizations in Russia. Based on the literature reviewed, we develop an extended model of CSR influence in sports, which encompasses the impacts of CSR activities of a sports organization (a football club) on the club's reputation and identification.

Empirical support of the identified relationships will help sports organizations better develop their growth strategies. Effectiveness and efficiency of government's actions in supporting such CSR activities is also expected to be better analyzed based on the results of this research.

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Public Regulation Evolution of Local Public Goods (case of major renovation of apartment buildings in Russia)

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Abstract:

The article attempts to trace the evolution of government intervention in the production of local public goods in the housing economy in Russia and to identify the prospects for the further development of government regulation in the field of major renovation of apartment buildings. The empirical basis of the study is the regulatory legal acts of the Russian Federation that regulate the governance of common property in the housing sector since the 1990s so far, forecasting, and analytical documents of the federal and regional level, the activities of state institutions in this area. It was revealed that the declared guidelines of the state housing policy for the development of self-organization of homeowners in apartment buildings did not receive the necessary incentives for real implementation at different time stages. The modern highly centralized system of organizing major renovation of apartment buildings in Russia turned out to be its logical consequence, generating significant financial and material flows of private resources under the direct supervision and control of the state through a system of regional major renovation funds.

Keywords: *local public goods; housing economy; apartment buildings; major renovation; government regulation.*

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Introduction

The major renovations of common property in the apartment buildings are carried out quite rarely (once every 10-15 years), are relatively expensive¹, but they are necessary to ensure the safety of the home. The voluntary nature of participation in organizing and carrying out these works generates the problem of collective actions. So the major renovation of an apartment building (AB) is an example of a local public good. It takes place in the prisoner's dilemma situation and requires third-party intervention to overcome the free rider problem.

According to M. Olson, the propensity to freeride is higher in large groups of participants (*Olson, 1995*), while in small groups it is possible to organize themselves and ensure collective actions without direct state intervention. The studies of E. Ostrom and her followers proved that hypothesis (*Ostrom, 1998; Ostrom, 2000; Schmidt, Shupp, Walker, Ahn & Ostrom, 2001*). That is, in situations of local public goods, different mechanisms of coercion to participate in production without state intervention are theoretically possible: from spontaneous self-organization of participants to full institutionalization of self-organization processes (creation of self-government bodies, formulation of rules and procedures for decision-making). Successful practices of self-organization can be found in various practical situations. E. Ostrom and co-authors presented an empirical analysis of that (*Ostrom, 1998; Ostrom, 2000; Schmidt, Shupp, Walker, Ahn & Ostrom, 2001*), in Russian literature – in the publications of *Yu. V. Fedorova (2011), D. B. Grafov (2018)* and other authors.

In fact, there are no problems of major renovation in apartment buildings in the housing economies of countries that were initially developing with a priority of private property and market relations in the housing sector. The general institutional model for the providing of local

¹ For example, replacing an elevator in one entrance of a 9-storey building requires about 2.5 million rubles, which is about 70 thousand rubles per apartment.

public goods in apartment buildings has formed in the USA, Canada, Western Europe, despite of the variety of established practices. A decisive role in this model belongs to a non-governmental non-profit organization that unites all homeowners in an apartment building. And it acts on behalf of all owners. Membership in this associations is an obligation of the homeowners. The organization of homeowners in an apartment building works on a democratic basis, it makes decisions by voting, and the degree of a homeowner influence on decision-making on the common property in a building depends on their share in the total area of apartments in this building. The homeowners and their organization are fully responsible for the major renovation of the apartment building. Public intervention is limited to the establishment of general rules and norms for conducting economic activities, the protection of the rights of participants in housing relations, as well as monitoring compliance with housing safety standards.

Thus, the practice of developed countries with market economies proves the possibility of housing self-organization in the most institutionalized form for the production and financing of local public goods, including the major renovations of the common property of an apartment building.

Residents of an apartment building in Russia become participants in situations of local public goods associated with the maintenance and use of common property, including major renovation of common property in the house. Most residents are also owners of housing in apartment buildings², and on the one hand, it increases their interest, and on the other hand, it increases the ability to influence on collective decision-making in the house. Meanwhile, we observe active government intervention in providing of local public goods in the apartment buildings in Russia.

The aim of the work is to find answers to the questions:

- ✓ why is there a need for active state intervention in the production of local public goods in apartment buildings in Russia?
- ✓ what is the evolution of this intervention?
- ✓ what is the future of this intervention?

Public housing policy in the field of major renovations of apartment buildings

The logic of housing policy in Russia since the 1990s assumed the development of self-organization processes for homeowners of apartment buildings. There were stimulating the organization of homeowners' associations (HOA) as institutional subjects of the market for governance of apartment buildings. Homeowners' associations as an organization of homeowners had to take responsibility for making collective decisions and producing local public goods in apartment buildings. Thus, the state had to be exempt from liability and economic activities in this area. And the role of homeowners in the AB governance was supposed to grow with an increase in their activity and ability to organize collective actions.

Analysis of the regulatory legal acts of the Russian Federation in the housing sector from the 1990s to 2012 demonstrates, overall, the consistent formation of this model.

However, the law on the privatization of the housing stock in Russia, adopted in 1991, postulated the obligation of the state to overhaul an apartment building in which apartments were privatized³, therefore, the new owners of the privatized apartments expected the necessary work to be completed at the expense of budget funds. The Housing Code of the Russian Federation (2004) established full financial responsibility of the owners for the maintenance, operation and repair of common property in an apartment building⁴. However, at the time of the adoption of the

² Housing in Russia. 2019: Stat. Sat / Rosstat. - M., 2019. P. 14-15

³Law of the Russian Federation "On the privatization of the housing stock in the Russian Federation" dated 04.07.1991 N 1541-1 http://www.consultant.ru/document/cons_doc_LAW_100/ (date accessed: 15.09.2021)

⁴ "Housing Code of the Russian Federation" dated December 29, 2004 N 188-FZ (as amended on July 31, 2020). Article 39. Maintenance of common property in an apartment building.

document, the payment procedure, terms of overhaul and other significant issues were not determined. From 1993 to 2007 apartment buildings were repaired mainly at the expense of budget funds with little participation from the owners, usually members of the HOA. However, the budgetary funds for carrying out planned capital repairs in the country were not enough, the deterioration of houses increased, and the effectiveness of its implementation caused great doubts and fair complaints from residents.

The new stage of development of the Russian housing policy is linked to the State Program for Supporting the Major Renovation through the State Corporation – The Assistance Fund for Housing Reform (2007 - 2012). One of the targets of this program declared the axis to increase the activity of owners. So, according to D.N. Kozak, Minister of Regional Development of the Russian Federation - Chairman of the Fund's Supervisory Board in 2007, with the State Program for Supporting the Major Renovation of ABs, “not only a mechanism has been launched to repay debts by the state for housing and communal services, but also the process of reviving a full-fledged and responsible homeowner as the basis for successful reform and formation housing and communal services”⁵. Program of The Assistance Fund for Housing Reform (2007-2012) involves substantial government subsidies overhauls of ABs with the active participation of homeowners. In apartment buildings in need of major renovations, it was necessary to hold general meetings of homeowners, draw up an application, collect the necessary documents and ensure 5% participation of owners in financing. Participation in the program was to contribute to the institute of effective collective owner in an apartment house⁶, who can be capable in the future to take responsibility for organizing production and financing major renovation and other local public goods in apartment buildings. However, these hopes were not justified, and the budget allocated for the program was not enough to qualitatively improve the state of the housing stock in the country.

In these circumstances, they decided to create a new largely centralized system of major renovation in apartment buildings in Russia, the foundation of which became mandatory regular contributions from the owners for generating major renovation funds⁷. In addition to solving the free rider problem in financing the overhaul of apartment buildings, the state also assumed the responsibility for organizing this work: at the regional level, long-term overhaul programs were formed, and special state non-profit organizations, the Major Renovation Funds (MRF), were also created. The MRFs perform the functions of regional operators, organizing both the filling of regional MRF and their spending on the modernization of the housing stock of the region in accordance with the regional programs. In the new system homeowners in apartment blocks must choose a method of accumulating funds for major renovation from two options - on a special bank account at home or in a general regional fund.

In the current model of major renovation organizing when owners choose the way of forming major renovation fund with a regional operator, the owners are almost completely freed from activities to organize renovation works in the house, their liability is limited to the payment of contributions and formal participation in signing decisions of general meetings on carrying out the renovation and acceptance certificates. The activity and self-organization of homeowners in an apartment building is necessary when home owners are choosing the way of forming a renovation fund on a special bank account of a house: for its implementation, it is necessary to

⁵ Annual report of the Civil Code - Fund for Assistance to Reform of Housing and Communal Services for 2007”. Approved. Supervisory Board of the State Corporation-Fund for Assistance to Housing and Utilities Reform. Minutes dated March 27, 2008 No. 3. P.5

⁶ We call effective an owner of housing in an apartment building who is ready to bear the burden of ownership as the need for current and capital expenditures for the maintenance of personal and common property, use his property as a source of present or future rental income and is capable of co-organizing his interests and actions with other owners in an apartment building, which allows you to create an effective management system for an apartment building as a single property complex (*Ermishina & Klimenko, 2009, p. 108*).

⁷ Federal Law of December 25, 2012, N 271-FZ "On Amendments to the Housing Code of the Russian Federation and Certain Legislative Acts of the Russian Federation and the invalidation of certain provisions of legislative acts of the Russian Federation. - Collected Legislation of the Russian Federation. 2012. N 53 (Part. 1). Art. 7596

hold a general meeting, which, by a majority of votes, must choose this way, and determine who will become the owner of the special bank account and where it will be opened. In the future this way of renovation fund forming will also require self-organization and active participation from the owners: it will be necessary to agree on the terms of the renovation, the list of works and their cost, select the performers and control the performance of the work, etc.

Therefore, the choice of the method of forming a major renovation fund on a special house account is to some extent an indicator of the homeowner self-organization level. In the Strategy for the Development of Housing and Utilities of the Russian Federation until 2020, adopted in 2016, the gradual transition "from the prevalence of the system of state organization of major renovation through the system of regional operators to the prevalence and dissemination of the model of organizing major renovation through the system of special accounts" was declared the goal of state policy in overhaul of common property in apartment buildings⁸. Meanwhile, over the seven years of operation of the new system of major renovation of ABs in Russia, the level of state participation in the organization of major renovation of ABs not only did not decrease, but also increased significantly.

The public sector scale in the field of apartment buildings major renovation

The system of state organization of common property major renovation in apartment buildings in Russia has become one of the important elements of the public sector, unique for the housing economy of market-oriented countries. Sustainable flows of significant cash flows have been formed, directed by homeowners to major renovation of apartment buildings: over the seven years of the program, more than one billion rubles have been collected (Table 1).

Table 1

Dynamics of collection of contributions for major repairs in Russia in 2014 - 2020

	2014	2015	2016	2017	2018	2019	2020
Accrued, RUB mln	26060.2	127025.6	165879.8	186323.3	191882.2	213275.2	214468,1
Collected, mln rubles	17035.1	98042.3	142214.7	171621.6	182686.2	203714.3	206307,9
Collection rate, %%	65.37%	77.18%	85.73%	92.11%	95.21%	95.52%	96,20%

Source: calculated based on the data of the State Corporation - Fund for Housing and Utilities Reform. URL: <https://www.reformagkh.ru/analytics> (Access date: 06.09.2022)

The funds raised are quite comparable to the assessment of the resource requirements for major renovation carried out by the experts prior to the start of the new system. At the same time, the collection of owners' funds is quite high and in 2020 amounted to more than 96% (Fig. 1).

⁸ Order of the Government of the Russian Federation of January 26, 2016, N 80-r (as amended on October 18, 2018) "Strategy for the development of housing and communal services in the Russian Federation for the period up to 2020". P. 12
<http://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=LAW&n=309453&fld=134&dst=100006.0&rnd=0.8282321922920401#012220284423870109> (Access date: 06.07.2022)

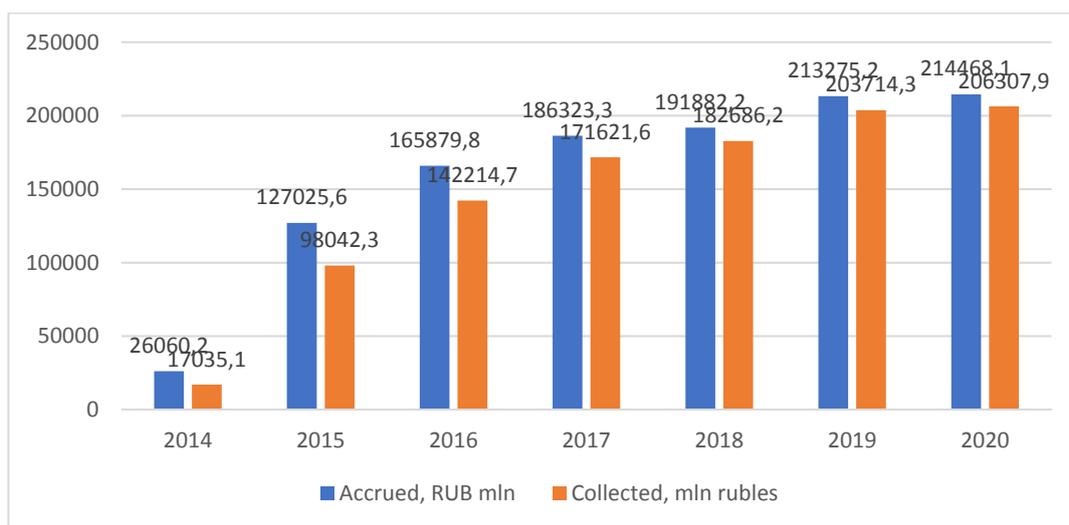


Fig. 1. Dynamics of collection of contributions for major repairs in Russia in 2014 - 2020.

Source: Data of State Corporation - Housing Reform Assistance Fund. URL: <https://www.reformagkh.ru/analytics> (Access date: 06.09.2022)

Mostly collected for the overhaul of funds manage regional MRF, for seven years of implementation in Russia of a new model of organization of repair in the apartment building is not more than 13% of apartment houses in Russia chose special account for the formation of the fund overhaul of their house.

Thus, one of the goals of the Housing and Utilities Development Strategy until 2020 in the field of overhaul organization - to move to the prevalence of special accounts for the accumulation of owners' contributions - was not achieved. Moreover, in the draft Strategy for the Development of Housing and Utilities in Russia until 2035, prepared by the Ministry of Construction of Russia,⁹ here is no longer any preference for special house accounts for the formation of a major renovation fund. It can indicate that the state is not going to withdraw from the disposal of the funds of homeowners in apartment buildings collected for major renovation of common property. And regional major renovation funds have become another area of activity of the state bureaucracy, with a steady trend of growth in expenses for their maintenance.

Thus, over the past decades, the state in Russia has not only not reduced, but also significantly increased its intervention in the economy of an apartment building, in the production and financing of such a local public good as the major renovation of apartment buildings. The economic behavior of the institutions created in this area is consistent with the theory of the Niskanen Bureau (*Niskanen, 1971*), which casts doubt on the effectiveness of expanding government intervention in this area.

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⁹ The Ministry of Construction of Russia has prepared a draft Housing and Utilities Development Strategy until 2035 <https://minstroyrf.gov.ru/press/minstroy-rossii-podgotovil-proekt-strategii-razvitiya-zhkkh-do-2035-goda/&rhash=360a41bef0ae99> (Date of access: 07.07.2022)

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Counteraction the Spread of HIV/AIDS and Tuberculosis: What can Be Done Applying the value Chain Methodology

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Abstract:

The value chain methodology suggested by M. Porter in the early 1980th and revised for application in healthcare twenty years later has become a powerful tool for increasing the quality of healthcare provision. The original value chain (VC) model can be used for strategic planning regardless of the studied industry while the care delivery value chain (CDVC) is applied by hospitals to model care delivering for their patients with specific medical conditions. The latter doesn't allow using CDVC directly to develop the strategy of hospitals and even their departments since they deliver care to patients with different medical conditions applying a variety of CDVCs.

The focus of this research is on the medical institutions countering the spread of HIV/AIDS and tuberculosis (TB) in Russia that can be considered as hospitals that deliver care to patients with a single medical condition. As to countering the spread of HIV/AIDS and TB diseases, the corresponding value chains have been constructed and reflected in the academic literature for the former, but yet not for the latter one. This paper fills in the gap. Thus, specific objectives of this paper are: (1) develop a CDVC framework for the TB pathology; (2) propose some improvements to the value chain methodology; (3) identify the directions for increasing performance of the institutions countering HIV/AIDS and TB in their procurement practice; (4) propose a set of measures called for increasing the overall performance of these institutions.

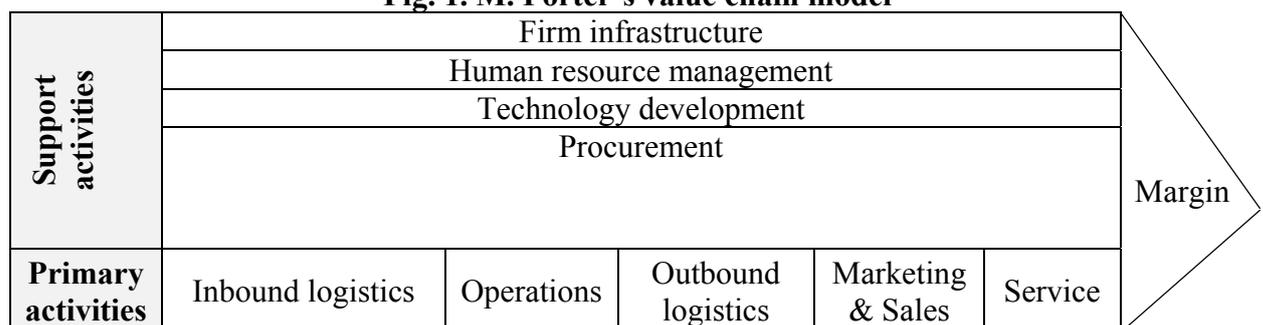
Keywords: *public hospital, HIV/AIDS, tuberculosis, value chain, care delivery value chain, procurement, collusion.*

1. Introduction

The value chain methodology was introduced by M. Porter in his monograph “Competitive Advantage...”, [Porter, 1985]). The following three ideas constitute the essence of the concept.

1. The activity of a company (production of goods or provision of services) is presented as a set of relatively independent but interrelated sub-activities – the primary ones (implemented in the company’s units that produce goods or provide services) and the supporting ones (conducted by the company to support such units; see Fig. 1). Therefore, M. Porter directly introduced the list of primary and supporting activities that turns out to be independent of the company’s industry, thus, ensuring the universal application of the created methodology.

Fig. 1. M. Porter’s value chain model



Source: [Porter, 1985, p. 37].

2. In the process of conducting of the primary activities (links in the value chain) – with contribution of the supporting ones, – on the one hand, value for potential consumers is accumulated, and, on the other hand, company’s costs are accumulated, too.

3. The success of the company is determined by whether the willingness of consumers to pay for the value created in the production process is higher than the corresponding company’s costs.

On the one hand, M. Porter's model gave rise to a method of strategic planning for the company's – or its SBUs in the case of a multi-business firm (see [Chandler, 1991]) – development associated with a consistent consideration of activities implemented within the links of the value chain in terms of their contribution to creating value for the buyer (in healthcare – the patient) or reducing the company’s costs. This approach allows making an appropriate contribution to the formation of the SBU's functional strategies (production, marketing, personnel), along with the analysis of its general and industry environment.

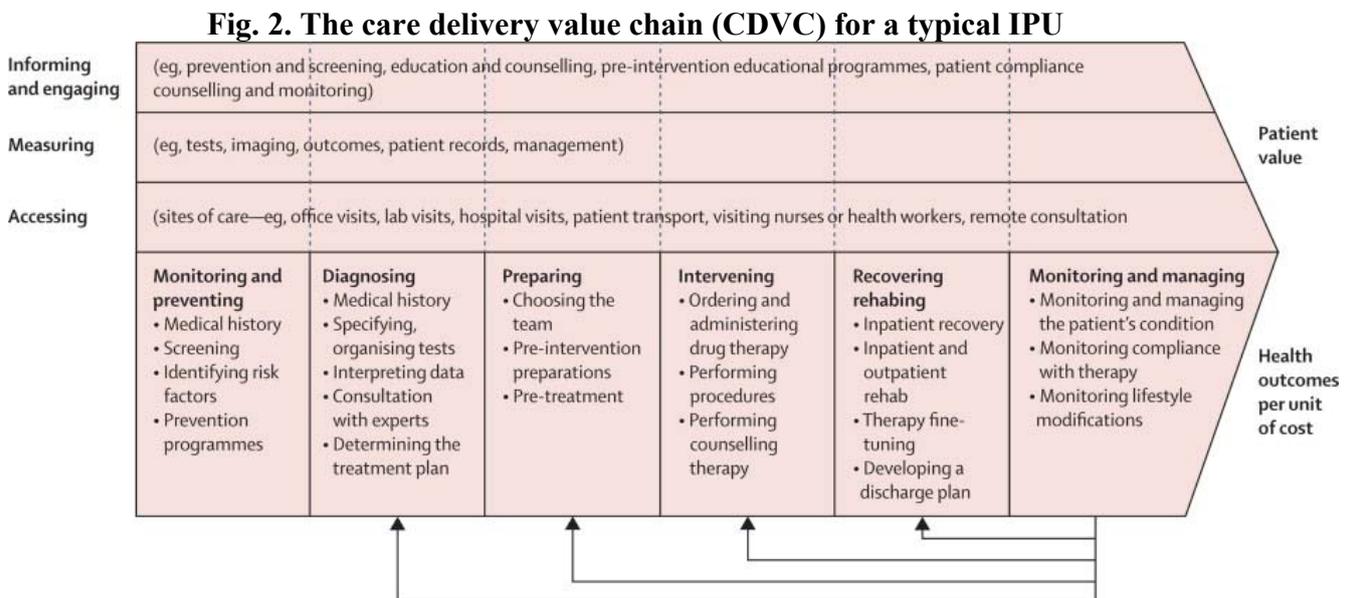
On the other hand, comparing its activities with the ones of its competitors in the framework of industry analysis, the SBU can determine its strengths and weaknesses as internal factors that determine its advantages or the advantages of its competitors in implementation of this or that link of the value chain.

The development of VC-methodology with regard to health care has been suggested by M. Porter and his colleagues starting in the seminal book [Porter, Teisberg, 2006]).

The developed concept of value-based health care:

- puts the patient with a specific medical condition (pathology) in the center of care delivery;
- introduces the term of *integrated practice unit* (IPU) – the dedicated multidisciplinary team that is organized around the needs of patients with a specific medical condition over the full cycle of care (see [Porter et al., 2021]);
- constructs the care delivery value chain (CDVC) that connects the structured activities of IPU with their contribution to the patient value.

The care delivery value chain for a typical IPU is given in Fig. 2.



Source: based on [Porter, Teisberg, 2006, p. 204]

This paper is dedicated to improvement of care delivery quality in medical institutions that counteract the HIV/AIDS and tuberculosis (TB) diseases. Unlike the application of CDVC to counteract spreading of the HIV/AIDS infection, which has been developed with an extensive participation of M. Porter himself, the case of TB is substantially less covered in the academic

literature. To the best of our knowledge, there has been no attempts in the literature to construct a CDVC for TB – so, *one of our goals* in this research is to develop a CDVC for TB counteraction.

While the list of value chain links (monitoring and preventing, diagnosing, preparing, ..., see Fig. 2) is usually modified in the literature in accordance with the peculiarities of a specific pathology, the set of key components of patient's value (informing, measuring, and accessing – see Fig. 2) has remained the same. But, as we show here, this set can also be appropriately extended. We suggest introducing a *fourth* key component – patient's health status – which is relevant in the case of HIV/AIDS and some other pathologies.

The value chain concept has been extensively applied for hospital strategy development on each level of strategy planning: corporate, business, and functional ([Ginter et al., 2018]).

CDVC aims to provide a holistic view on managing the treatment of a particular pathology in the framework of IPU. So, its application to development of a strategy for the whole hospital or its departments responsible for providing care for many pathologies represents a certain challenge and has been largely neglected in the academic literature. However, there is a lot of institutions that can be considered as IPU, including the ones that we focus on in this paper – TB dispensaries and hospitals, as well as HIV/AIDS prevention and control centers¹.

The value chain methodology contributes to a standard algorithm of strategy developing as follows. On the one hand, the value chain concept in marketing allows to identify the brand and product (industry) competitors as those that use a similar value chain (see [Ferrell et al., 2022]). On the other hand, it explicates the value that consumers and organizations gain at each stage of the chain ([Pitta, Laric, 2004, p. 451]). Thus, it can be considered as a powerful instrument for competitive strategy development ([Porter, 1985, p. 11]): differentiation, cost leadership or focus – depending on the choice that is prescribed by SWOT-analysis results.

However, for HIV/AIDS and TB institutions, the need for a marketing strategy is significantly restricted due to the weak competitiveness in the corresponding markets. Market failures, distributional issues, and other inefficiencies are the primary reasons for government intervention in the health care markets [Watts, Segal, 2009]. It is a common practice in most markets, but in the markets in question, governments make interventions by means of direct funding of public and/or private organizations to support provision of health care and medicines to patients.

Thus, for HIV/AIDS and TB institutions the production strategy – that aims at health care quality improvement and costs optimization – is much more demanded than the marketing one. However, marketing efforts still can effectively contribute to the effectiveness of care delivering by establishing strong and flexible contacts with various patient groups [Gilenko et al., 2021a, p. 49]. From the strategic point of view, these efforts can be classified as components of the market penetration strategy which is developed in the framework of hospital growth strategy [Ibid, p. 48]. Market penetration is the only strategy option when stability is selected as the growth strategy type; but when the growth strategy is expansion, this becomes an attributive option – in contrast to other variants of product-market strategies (market and product development, and diversification) that may be relevant or not.

Hospital procurement plays a key role in reaching both of the above-mentioned production strategy aims. In this paper, *three* ways of enhancing the procurement contribution to effectiveness and efficiency of HIV/AIDS and TB institutions' performance are considered:

1. We propose to extend the methodology of value chains by adding to CDVC some elements of the original VC and complementing the original three components of patient's value with a fourth one. These changes are applied to the CDVCs of HIV/AIDS and TB.
2. We show some ways of application of the value-based procurement concept (see [Gerecke et al., 2020]) to procurement of HIV/AIDS and TB institutions.

¹ Among other examples of such institutions are perinatal centers, anti-COVID-19 mono hospitals, and sanatoriums.

3. We consider the problem of suppliers' collusion in healthcare public procurement and suggest some measures for countering this *mala fide* type of behavior.

Thus, on the one hand, this paper is in line with the studies that highlight the importance of tender design in reducing the opportunities for an anti-competitive agreement ([Klemperer, 2002]; [Kovacic et al., 2006] – so-called, *ex ante* collusion counteraction. On the other hand, this research contributes to the development of applied empirical methods for collusion detection – so-called, *ex post* collusion counteraction.

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Analytical Assessment of the Availability of Medicines for the Treatment of Cardiovascular Diseases in the Region (Based on the Materials of the Sverdlovsk Region)

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Abstract:

The purpose of the study was to analyze the availability of medicines for the treatment of cardiovascular diseases in 2011 and 2017 to assess their assortment, financial and logistical availability as the basis for the rational construction of a regional health system.

A comparative and structural analysis of the availability of medicines for the treatment of diseases of the cardiovascular system was carried out according to data for 2011 and 2017 in the Sverdlovsk region, including using the methodology of the World Health Organization and the International non-governmental organization "Action Program for Health and Healthcare" (Health Action International, HAI) and (WHO/HAI). The availability and prices of 71 names of medicines in the hospital and outpatient segments of the Sverdlovsk region were revealed and the direct costs of patients for medicines for the treatment of arterial hypertension in 2017 were estimated. For each name, we studied the prices for the original branded drug and its generic analogue at the lowest price. Drug prices were compared with international reference prices for 2011 and 2017 from the International Index of Drug Prices of the organization Management Sciences for Health and expressed in medians the ratio of prices to reference prices. Prices for generic drugs in both the public and private sectors decreased in 2017 compared to reference prices in 2011. In 2011, one third of drugs were purchased in the form of original brands, and in 2017, almost all medicines were purchased in the form of generics with a significant price reduction. As a result of the conducted research, according to the data from 2011 to 2017, there was a general decrease in prices relative to reference prices for generic drugs for the treatment of cardiovascular diseases. To ensure the rational construction of the regional health system, additional price studies and pharmacoeconomical analyses are needed, taking into account changing prices on the pharmaceutical market.

Keywords: *medicine prices, availability of medicines, procurement price, pharmacy, WHO/HAI*

Introduction.

Increasing the availability of modern effective and safe medicines is one of the key tasks of success in achieving the goals of the national project "Healthcare". Modernization of the drug supply system for citizens as a multifaceted process is in the focus of attention of the economy, the state and society.

A special place among the issues of reforming the system of drug provision for citizens is occupied by the problem of availability of medicines for the treatment of cardiovascular diseases due to a number of circumstances.

The prevalence of cardiovascular diseases in the population is the reason for the negative economic impact and significant costs of public health systems for their treatment throughout the world. The basis of economic losses is the mortality from cardiovascular diseases and the incidence of them in the working-age population, which leads to significant losses of human capital. According to experts, the total amount of economic damage from cardiovascular diseases can reach indicators on the scale of Russia of more than 2% of the gross domestic product [Yagudina R., 2019].

In addition, it is obvious that cardiovascular diseases have an exceptional social importance due to their leading position in the structure of causes of death. Therefore, close attention to the treatment of cardiovascular diseases is quite justified and relevant.

It is known that the system of medical care for the treatment of cardiovascular diseases is represented by several interrelated stages: the outpatient stage (because of polyclinics, consultative and diagnostic centers, etc.), the stage of emergency medical care, the hospital stage (including in a day hospital), and the rehabilitation stage. At each stage, in accordance with the established diagnosis and for medical reasons, the necessary drug therapy is carried out, the financing of which is carried out in accordance with the structure of the state drug supply system at both the federal and regional levels.

The financial burden of treatment of cardiovascular diseases is imposed on the subjects of the Russian Federation within the framework of the implementation of territorial programs of state guarantees of free medical care to citizens, which contain, in addition to the allocated funds from the state budget, additional types and conditions of its provision, as well as additional volumes. However, to date, there are no clear criteria for the formation of regional drug supply systems for patients with cardiovascular diseases.

The analysis of medicines included in the list of regional programs of preferential drug provision for the subjects of the Russian Federation (2019) showed that the average number of medicines intended for the treatment of cardiovascular diseases in the regional context was 50, and in particular in the Sverdlovsk region - 25. At the same time, among the subjects of the Russian Federation, the Sverdlovsk Region ranks 23rd (when ranking from the best to the worst) in terms of the overall morbidity of the entire population, while in recent years there has been an increase in the morbidity of the entire population compared to the average long-term level in 2019 by 35.0%. In the structure of morbidity of the adult population of the Sverdlovsk region, diseases of the circulatory system are leading, accounting for 18.1% of the total number of morbidity of the adult population of the Sverdlovsk region (2017).

Thus, the problem of assessing the availability of medicines intended for the treatment of cardiovascular diseases at all stages of providing medical care to citizens for similar social groups in the regions of Russia is being updated.

The construct availability of medicines is understood by us as the possibility of obtaining the necessary medicine by the patient at the necessary time and at an acceptable price for him or on preferential terms.

Based on this, the key elements of the availability of medicines are:

- * Assortment availability of medicines as their availability in sufficient volume and variety in accordance with the stage and type of treatment
- * Financial availability of medicines as an acceptable price and / or preferential conditions for obtaining
- * Logistical availability of medicines as the timeliness of their receipt and delivery in accordance with the stage and type of treatment

The purpose of the presented work was to screen the availability of medicines for the treatment of cardiovascular diseases in the region to develop recommendations for improving the efficiency of the regional health care system (based on the materials of Monitoring the assortment and prices for VED in the Sverdlovsk region).

Among the tasks of the study, the following were considered:

- analytical evaluation of the product availability of drugs on the basis of changes of the range of drugs for the treatment of cardiovascular diseases in outpatient and hospital segments of the pharmaceutical market in the Sverdlovsk region for 2011 - 2017;
- analytical evaluation of financial inclusion on the basis of changes in the prices of medicinal products for the treatment of cardiovascular diseases in outpatient and hospital segments of the pharmaceutical market in the Sverdlovsk region for 2011 - 2017;
- analytical assessment of logistics availability based on the study of the conditions and consequences of import substitution of medicines for the treatment of cardiovascular diseases in the outpatient and hospital segments of the pharmaceutical market of the Sverdlovsk region for 2011-2017.;

Research methodology. Econometric and statistical analysis of the average values of prices, trade margins and assortment of medicines (retail price of one package of a medicinal product) for the treatment of cardiovascular diseases in the outpatient segment and the average price of one package by trade name by dosage form for the hospital segment in the Sverdlovsk region for 2011-2017.

The information base of the study was the data of Monitoring the assortment and prices for vital and essential medicines (VED) in the Sverdlovsk region for the period 2011-2017.

More than 200 thousand accounts entered by the subject of the Russian Federation were entered into the database, most of which (from 80 to 88%) belong to the outpatient-monitoring segment and from 20 to 12% to the hospital segment.

In addition, we used the results of in-depth and semi-structured interviews with experts (representatives of medical organizations and pharmacies, the Ministry of Health of the Sverdlovsk Region, Roszdravnadzor in the Sverdlovsk region).

In contrast to the existing studies on this issue, the paper attempts to assess the availability of medicines for the treatment of cardiovascular diseases in the region in order to develop recommendations for improving the efficiency of the regional health care system (based on the materials of the Sverdlovsk region).

Thus, having carried out an analytical assessment of the availability of medicines for the treatment of cardiovascular diseases in the Sverdlovsk region, the following conclusions were made: drug provision at the outpatient stage is carried out at the expense of the state for socially unprotected groups of the population, in turn at the hospital stage - at the expense of the territorial fund of compulsory medical insurance from the list of VED, there is no continuity in the formation of the list for the hospital and outpatient stages of medical care, which reduces the overall level of availability of health care.

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Modeling Gender Differences and determinants of healthcare utilization in Russia

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Introduction

This study is about healthcare utilization and frequency of doctor visits (both specialist and GPs). Using data from RLMS, we built regression models for a variable (number of doctor visits) to uncover the socio-economic determinants of seeking medical help. In addition, we look at gender differences in healthcare utilization as demonstrated in prior studies for Russia. Our study is very important at times of COVID-19 as it shows what groups seek which services. Knowing the determinants, the healthcare demand, it is easier to estimate healthcare non-infectious demand and factor it into COVID-19 healthcare strategy.

Country and gender differences in health care usage were studied previously (Peltzer et al. 2014). Russia and five developing countries with universal health coverage (China, Ghana, India, Mexico, South Africa) were compared in terms of socio-demographic characteristics, type of health care, and reasons for use according to the SAGE questionnaire for the population aged 50+ years. Health outcomes were: 1) inpatient use referred to a stay in a hospital and/or long-term care facility for at least one night in the previous three years, and 2) outpatient use defined as ambulatory care received in the previous 12 months. Females from the pooled sample used inpatient care significantly less frequently than males, whereas outpatient care usage was considerably higher: odds ratios were 0.8 (95% CI 0.7-0.9) and 1.2 (1.1-1.3) for inpatient and outpatient care usage by females compared to males, respectively. At the country level, gender differences became more visible. Russian males were less likely to get health care when needed than females (8.9% among males vs. 1.9% among females compared to the average level of 4.9% among males and 4.0% among females obtained from the pooled sample of all six countries). Russian females used outpatient care more frequently than males (69.8% vs. 60.8% compared to the pooled averages of 72.3% for females and 68.1% for males, respectively).

We aim to explore the socioeconomic determinants of healthcare utilization among Russian men and women paying special attention to gender inequality in healthcare consumption.

Materials and Methods

We choose between a two-part model and the selection model based on understanding the assumed nature of zeros. While Heckman's selection model aims to account for selection bias and estimate 'potential' hospital visits (like in the case of female wages), the two-part model estimates actual visits (like in the classic application to the case of smoking). In addition, we assume, similar to the smoking example that this hurdle dominance means that some people choose not to see a medical specialist and get treatment outside the healthcare system. This leads to the choice of the three empirical models that estimate the effect of individual characteristics on healthcare utilization: Poisson, negative binomial, and hurdle models. The choice is well supported by empirical literature on this subject including (Winkelmann 2004; Economou et al. 2008; van Ophem 2011).

Poisson Model

The paper applies various approaches to modeling the frequency of doctor visits (docvis or Y). We start with the simplest model for count data – the Poisson model. Let's assume that Y is the number of doctor visits per year. Then Y will have a Poisson distribution for individual i (Winkelmann 2004):

$$P(y_i|\lambda_i) = \frac{\lambda_i^{y_i} e^{-\lambda_i}}{y_i!} \quad (1)$$

with λ_i as an intensity parameter that equals the mean. Equidispersion characterizes the Poisson model with variance equaling the mean:

$$E[y_i|\lambda_i] = \text{var}[y_i|\lambda_i] = \lambda_i \quad (2)$$

The Poisson regression models the mean λ as a function of predictors X and the beta coefficients (Susmel 2015):

$$P(Y_i = j|X_i) = \frac{\lambda_i^j e^{-\lambda_i}}{j!} \quad (3)$$

$$\lambda_i = E[Y_i|X_i] = \text{Var}[Y_i|X_i] = \exp(X_i' \beta) \quad (4)$$

The model is estimated via ML. A simple cross-sectional Poisson model does not account for: a) excess zeros and b) unobserved heterogeneity. While the observed heterogeneity can be addressed by estimating the model's panel versions (both RE and FE), the excess zeros can be accounted for in zero-inflated or hurdle models.

Negative binomial model

When the equidispersion assumption does not hold, and the data are overdispersed, applying the negative binomial (NEGBIN) model that relaxes this assumption is advised. The negative binomial model nests the Poisson model and is also best for the truncated data. For example, the annual number of doctor visits is likely to be truncated with zero visits as the lower boundary and 50-100 as the upper boundary.

The negative binomial (Pascal distribution) models the number of successes in a sequence of i.i.d Bernoulli trials before a specified (non-random) number of failures r occurs. NEGBIN regression can be written as (Cameron and Triverdi 1998)

$$P(Y_i = j|X_i) = \frac{\Gamma(\theta + y_i)}{\Gamma(y_i + 1)\Gamma(\theta)} r_i^{y_i} (1 - r_i)^\theta \quad (5)$$

$$\lambda_i = \exp(X_i' \beta) \quad (6)$$

$$r_i = \frac{\lambda_i}{\lambda_i + \theta} \quad (7)$$

where Γ is gamma distribution and $\alpha = 1/\theta$.

Two types of the model are available. In NEGBIN 2 models assumes that the variance in the model equals:

$$\text{Var}[y_i|x_i] = \lambda_i(1 + \alpha\lambda_i) > \lambda_i, \quad (8)$$

where λ_i is still the mean. The less often used model NEGBIN1 assumes a linear relationship between the first and the second moments.

Hurdle models

Zero-inflated models assume that for individuals with zero visits, there is a difference between sampling zeros – for those who chose not to go to the doctor in the period specified in the survey – and those who never go to the doctor (structural zeros). However, structural zeros are very unlikely since the decision to seek medical care depends on health status and not the choice per se. Hence, the hurdle models that suggest a two-part process have become more common for modeling health care utilization data (Mullahy 1986; Rose et al. 2006).

In a hurdle model, the first part introduces an event when an individual decides whether to go to a doctor or not. Once the hurdle to the first even has been cleared, the second part models

the level of healthcare utilization (the number of visits). As Winkelmann (2004) points out, independence between the first and the second part is assumed.

The hurdle model has been popular in the literature because it seems to coincide with the intuitive two-stage process of health care utilization: the individual is responsible for a decision of the first contact while a physician significantly influences the intensity of treatment (Economou et al. 2008; van Ophem 2011).

The log-likelihood functions for the hurdle model factors in two parts (Winkelmann 2004) with separate distribution functions f_1 and f_2 . In this paper, we model the decision to see a doctor (first part) as a logit model, while for the frequency of visits, we utilize a) a Poisson model (Hplomit module in Stata) or b) a negative binomial model (Hnblogit module in Stata).

Data

We make use of phase II (1994–2019) data from the Russia Longitudinal Monitoring Survey – Higher School of Economics population survey (RLMS), which collects data pertaining to a wide range of socioeconomic, demographic, and health characteristics. Our primary variable of interest is the number of doctor visits in the last 24 months (*docvis*). The variable accounts for both the GP and specialist visits. In the longitudinal RLMS dataset the question about the number of doctor visits was asked only once, in 2011, so our analysis is cross-sectional.

Females constitute 61% of the sample. They, on average, have 0.63 more doctor visits than males. 58% of females and 64% of males belong to age2 and age3 groups. Disabled individuals from age groups 3 and 4 constitute 7.6% among males and 9.2% among females. Individuals from the two lowest income quantiles without higher education compose about 23% among males and 37.5% among females. Females, on average, have 0.2 more chronic conditions than males. The majority of males in the sample are married, whereas a significant share of females is widowed. Around half of the males have children below 18 years compared to around 40% among females. Most males and around half of females are employed. The most frequent type of residence is a regional center, though about 29% males and 27% females live in rural areas.

Results

Regression analysis

Regression models are cross-sectional and say little about causality. So instead, we interpret these results to identify statistically significant associations between the explanatory variables and the number of doctor visits and healthcare utilization levels.

Table 1. Poisson, negative binomial model and hurdle modes for frequency of doctor visits (*docvis*) in 2011

VARIABLES	Model 1	Model 2	Model 3	Model 3	Model 4	Model 4
	Poisson	Negbin	Hurdle model Stage Logit	1 Stage Poisson	2 Stage 1 Hurdle model Logit	2 Stage 2 Negbin
female	0.361*** (0.048)	0.425*** (0.041)	-0.427*** (0.044)	0.191*** (0.050)	-0.427*** (0.044)	0.289*** (0.052)
age2	0.066 (0.056)	0.024 (0.057)	0.029 (0.060)	0.108* (0.059)	0.028 (0.060)	0.099 (0.072)
age3	0.093 (0.079)	0.045 (0.081)	0.118 (0.085)	0.202** (0.084)	0.118 (0.085)	0.214** (0.102)
age4	0.193* (0.079)	0.104 (0.081)	0.064 (0.085)	0.274** (0.084)	0.064 (0.085)	0.274** (0.102)

	(0.109)	(0.102)	(0.116)	(0.108)	(0.116)	(0.126)
age3_dis	0.605***	0.575***	-0.691***	0.348***	-0.691***	0.351***
	(0.096)	(0.094)	(0.130)	(0.086)	(0.130)	(0.102)
age4_dis	0.613***	0.685***	-0.487***	0.440***	-0.487***	0.599***
	(0.103)	(0.102)	(0.109)	(0.095)	(0.109)	(0.116)
sah_bin	-0.503***	-0.577***	0.560***	-0.288***	0.560***	-0.409***
	(0.075)	(0.060)	(0.067)	(0.070)	(0.067)	(0.067)
d_condit	0.233***	0.306***	-0.391***	0.103***	-0.391***	0.146***
	(0.026)	(0.026)	(0.030)	(0.026)	(0.030)	(0.030)
poor_nonheduc	-0.070	-0.085*	0.157***	0.008	0.157***	0.034
	(0.049)	(0.046)	(0.049)	(0.047)	(0.049)	(0.055)
sing	-0.175	-0.115	0.142	-0.115	0.142	-0.110
	(0.125)	(0.132)	(0.132)	(0.125)	(0.132)	(0.149)
div	-0.098	-0.061	-0.023	-0.123**	-0.023	-0.098
	(0.061)	(0.057)	(0.067)	(0.061)	(0.067)	(0.070)
wid	-0.201***	-0.147**	0.146**	-0.148**	0.146**	-0.133*
	(0.073)	(0.063)	(0.071)	(0.071)	(0.071)	(0.072)
kids18	-0.027	0.001	0.071	0.041	0.071	0.051
	(0.060)	(0.061)	(0.065)	(0.063)	(0.065)	(0.077)
leave	0.393***	0.367***	-0.121	0.385***	-0.121	0.477***
	(0.104)	(0.110)	(0.118)	(0.10)	(0.118)	(0.131)
nowork_noretired	0.008	-0.107	0.425***	0.276***	0.425***	0.289***
	(0.089)	(0.071)	(0.068)	(0.093)	(0.068)	(0.093)
nowork_retired	-0.123	-0.172**	0.459***	0.114	0.459***	0.121
	(0.077)	(0.067)	(0.074)	(0.075)	(0.074)	(0.080)
pgt	-0.115	-0.123	0.456***	0.156**	0.456***	0.226**
	(0.088)	(0.083)	(0.085)	(0.079)	(0.085)	(0.095)
rural	-0.591***	-0.586***	0.662***	-0.294***	0.662***	-0.320***
	(0.057)	(0.051)	(0.055)	(0.057)	(0.055)	(0.065)
town	-0.074	-0.050	0.032	-0.084	0.032	-0.068
	(0.051)	(0.045)	(0.052)	(0.051)	(0.052)	(0.055)
capit	0.188***	0.258***	-0.234***	0.102	-0.234***	0.208***
	(0.072)	(0.064)	(0.074)	(0.072)	(0.074)	(0.077)
Constant	0.460***	0.425***	-0.196*	0.956***	-0.196*	0.421***
	(0.116)	(0.041)	(0.111)	(0.118)	(0.111)	(0.136)
lnalpha		0.812***				0.408***
		(0.027)				(0.086)
Observations	11,413	11,413	11,413	11,413	11,413	11,413

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 1 presents results for the base Poisson model, the negative binomial model (NEGBIN 2), and the two hurdle models (logit-Poisson and logit-Negative binomial). Base model includes the socioeconomic determinants of the healthcare utilization: gender, age groups, marital status, and an interaction variable for low income (quintiles 4 and 5) and not attaining tertiary education (*poor_nonheduc*), having children under 18 in the household, and the settlement type. Regarding the employment status, apart from the employed as the reference category, we control for being on leave, including maternity leave, labor force non-participation due to retirement (*nowork_retired*), and other reasons (*nowork_noretired*). As essential for modelling doctor visits, we also add two health status variables, self-reported health and the

number of previously diagnosed chronic conditions (diabetes, heart disease, hypertension, stroke, anemia and tuberculosis). We control for gender differences by including the female dummy.

In the Poisson and the negative binomial model that do not separate the decision to seek medical help from the healthcare utilization levels, it is clear that females tend to have more doctor visits (the beta coefficients in Models 1 and 2 are positive and significant) as found elsewhere in the literature. Moving to a higher age category increases the number of doctor visits in the Poisson regression but not in the negative binomial regression, which accounts for the truncated data. Having a disability and being older has a statistically significant association with more doctor visits ($\beta_{\text{age3_dis}}=0.575$ and $\beta_{\text{age4_dis}}=0.685$) in Model 3.

Lack of financial protection and education are associated with fewer doctor visits in Model 2. This is in line with the findings of the panel study by Economou et al. (2008) for the nine EU countries in 1994-2001. Being married is associated with the greater use of outpatient healthcare services than any other marital status.

Model 2 demonstrates that the number of doctor visits is lower for the retirees. This could be due to the mobility constraints or financial constraints limiting seeking care in private care. The problems of access to the needed care in provincial districts of Russia manifests itself in fewer GP and specialist visits in urban-type settlements and rural areas, and towns relative to the reference – regional capitals – and more visits in Moscow and St. Petersburg.

Self-reported health and the number of comorbidities as proxies for health status indicate expected association with the frequencies of doctor visits. While reporting good or excellent health decreases the number of visits, having more chronic conditions is associated with higher levels of healthcare utilization. Overall, the results of the NEGBIN model, which nests the Poisson model, and the Poisson model itself are very similar. However, the lower BIC and AIC criteria show that the negative binomial model has better relative fit. The hypothesis of overdispersion is further confirmed for our models by the significance of the log-transformed over-dispersion parameter log of alpha (*lnalpha*) in Models 2 and 4.

In the hurdle model, the logit regression models the event of not clearing the hurdle, so the coefficients are generally expected to be of the opposite sign. Concerning gender, the results are in line with the Poisson and the negative binomial models: women are more likely to decide to visit a doctor and then have more visits than men. Furthermore, we observe an education gradient in health in the sense that those not attaining tertiary education are less likely to clear the hurdle ($\beta_{\text{logit1_poisson_poornonheduc}} = \beta_{\text{logit1_nb_poornonheduc}} = 0.157$) (Lokshin and Ravallion 2008).

Hurdle models (Models 3 and 4) also allow the analysis of the complex response patterns that drive the choice to seek medical care and the number of doctor visits. The significance of log of alpha confirms the correct choice of specification. The two-part process reveals the dynamics that can't be observed in the one-part regressions. Investigating the issue of access in remote and provincial areas, we note that not only do the residents of the villages (urban-type settlements) have fewer visits than those living in regional capitals, but they also rarely decide to initiate a first visit ($\beta_{\text{logit1_poisson_rural}}=0.662$ and $\beta_{\text{logit1_poisson_pgt}}=0.456$).

In regressions for males and females separately principal gender differences are the following¹: belonging to the poor population without higher education and being divorced significantly decreases healthcare consumption among females but is not statistically significant for males; being on leave significantly increases healthcare utilization by females and does not matter for males, which could partly be related to higher healthcare demand of young mothers; living in a town is negatively associated with doctor visits among females and has no significant impact on males.

Discussion and Conclusion

Our main result is confirming gender differences in healthcare utilization using the Russian data. We also found statistically significant patterns in differences in consumption based on other

¹ Tables are available upon request.

socioeconomic characteristics. Based on these results we formulate the following policy recommendations to target the vulnerable population subgroups.

- 1) Males with comorbidities should be monitored on a regular basis
- 2) The low-income individuals and widows, need regular check-ups to prevent potential subsequent high-cost treatment through early diagnostics.
- 3) Young parents and individuals with high levels of self-assessed health are rare visitors to medical facilities. They should be targeted by the message that regular health examination programs are crucial for maintaining health, which will elevate the overall cultural accessibility of health care (World Health Organization 1981).
- 4) Residents of rural areas and urban-type settlements should be reached by annual medical examinations involving a wide range of specialists, including communication through telemedicine technologies for early diagnostics and appropriate treatment.

All the proposed practical recommendations target economic, physical, and cultural accessibility of healthcare facilities and personalized approaches in healthcare. Furthermore, the proposed measures stimulate early diagnostics and lead to the potential decrease of budget spending on treating severe illnesses after they progress.

The next step in this research is to model latent classes in healthcare consumption for Russian men and women and compare the next finding to the once provided here.

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Personal Safety in the Context of a Smart City

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Abstract:

The development of a Safe City is one of the foundations for building and developing a Smart Sustainable City. Security as an integral part of a Smart City concept, allows population to be protected from various crime and emergencies by using smart technologies to process data and make the decisions. Sustainable City, in its turn, is a result of producing a safe and secure urban space. This paper investigates the concept of a Safe City as a tool for state police in terms of the prospects of system's development and overcoming its main challenges.

Keywords: *Smart cities, Safe City, Security, Crime Prevention*

1. Safety in urban space

The development of urban space and the increasing role of the city in the life of the modern state are presented by many researchers as the flowering of civilization (Weber, 1958). There is a constant interaction of people, different in their specialty, level of education and area of interest in the city. The city has the ability to attract new residents, since the development of the economic, cultural and political spheres of the city is a favorable condition for those who are looking for work, entertainment or who consider the city as an educational center. Accommodating new streams of people with different characteristics and goals, the city is faced with the problem of organization their interaction. The increasingly complex nature of the interaction of city residents leads to the development of economic and social institutions that give direction to the development of the legal and economic system of the entire state. Cities are becoming a laboratory for producing ideas and developing ways to solve pressing problems. The modern city is a diverse and rapidly changing environment for a large number of people, which undoubtedly affects the nature of the relationship of its inhabitants and leads to additional risk in those areas that have been safe for humans from generation to generation.

Cities became more associated with danger and safety in past 100 years (Ellin, 2001). The anxiety of citizens and the administration grows as the diversity and number of people living in the same territory increases, as this leads to a struggle for the resources and conflict situations based on religious, economic, political, and labor differences (Muggah, 2012). Also, rapid urbanization has created serious environmental and social problems, including deteriorating air quality, depletion of groundwater and overloaded sewer systems, transport problems, economic instability, weakening social contacts and control, energy and food insecurity (Tsyba & Erokhin, 2018). There are new tasks for government related to ensuring the efficient and safe functioning of large cities.

Safety in the city is a relative definition, which depends on the subjective perception of a person of his environment and the objective absence of potential and actual threats. Various ideas about threats and risks to life and health in the city can be considered from the point of view of their nature of origin and be associated with the environmental situation in the region, constructive and technical objects of the city, with social actors and transport problems (Tsyba & Erokhin, 2018). Recurring acts of crime and a decrease in personal involvement in the problems make citizens insensitive to non-violent and violent manifestations of crime, which introduces the city into a vicious circle that generates unjustified aggression and anomie (Tripathi & Vivek,

2020). An unsafe environment negatively affects all processes of development and existence of the city, which reduces its attractiveness for residents and investors. Solving these problems is key for the sustainable development and the social life of the city and is a priority for the city administration (Tripathi & Vivek, 2020). It should be noted that one of the main goals of state and city authorities in ensuring effective city management is the creation and development of various decision-making systems in the field of safety at the level of socio-economic development and quality of life. Safety is based on social norms, including laws and rules of conduct in public space (Goffman, 2008). State regulation of safety in the urban environment proceeds from the need to maintain generally accepted norms of interaction between people, which are aimed at minimizing the risk of conflict situations and criminal acts. Evaluation of the effectiveness and efficiency of these activities is necessary to identify problems in the field of safety and reduce the cost of its implementing.

On the one hand, safety in the city depends on the actions of the authorities, on how well they do their job of ensuring safety, and whether the population trusts them. On the other hand, safety in the city appears as a process of self-regulation and self-organization of the society living in local areas. Safety is formed at the intersection of these two forms of public control and is characterized, on the one hand, by the inevitability of punishment for committed offenses, on the other hand, by the impossibility of committing them due to constant monitoring and surveillance by prying eyes that, if necessary, can come to the rescue (Jacobs, 1961).

2. Ways to collect information and analyze safety and crimes in the city

To study the level of safety in the urban environment and the level of crime, various indicators are used such as inactivism /vandalism, against collective safety, against sexual indemnity, against heritage, homicide, injuries, and other crimes to calculate the effectiveness of implemented policies (Vivo-Delgado et al., 2020). To assess the effectiveness of public authorities, not only violent crime ratings can be used, but also ratings that reflect inequality, lack of opportunities, territorial segregation of the population, economic polarization, social exclusion, as well as the activities of residents associated with public spaces (Wereda et al., 2021) and perception of residence about private safety in a city (Glukhova et al., 2016). Since the feeling of safety in the urban environment is influenced by the understanding of the inevitability of punishment for illegal actions enshrined in laws, an indirect way to study the safety of the urban environment can be attributed to the study of the level of public confidence in the authorities and trust to police (Zueva, 2017).

However, crime statistics by city districts give a very indirect idea of the real level of safety. It cannot fully reflect the real situation in the city since it is not possible to record all incidents. This is due both to errors in the classification of crimes and to the existence of latent, that is, not recorded in statistics, crime. The main reasons for the emergence of latent crime include incomplete or inaccurate information from the victim, refusal to register a statement by law enforcement agencies or failure to report a crime to the police (Glukhova et al., 2016). Victimological surveys are aimed at identifying latent crime and consist of asking the population whether they have become victims of crime (Afanasyeva et al., 2015). Such studies make it possible to reveal the real level of crime in the area and the subjective assessment of residents about the dangers that they may encounter in the course of their daily lives.

The use of indicators helps the city administration identify significant problem areas in ensuring safety and better understand the problems that city residents face in everyday life, and thus improve the effectiveness of government work in the field of safety.

3. Methods of influence on safety in the urban environment

To correct unsafe behavior in the urban space, various approaches are used, which are aimed, on the one hand, at reducing the possibility of committing a crime, and, on the other hand, at the most effective investigation of committed crimes and reducing the attractiveness of this type of activity. As part of preventive measures, they use: 1) involvement of city residents in informal control over the urban environment; 2) reducing the possibility of committing criminal acts, including changing the public space and applying the approach and methods of the Smart Safe City concept.

There are a recognize of the need to involve the community in control over their territories in the urbanists research on the safety of urban space. It is assumed that the reduction of unsafe behavior in the city is associated not so much with the need to remove unfavorable people and reduce the possibility of their appearance on the public spaces, but also with the control over their behavior with the help of the environment and people who sanction their activities. Jan Gehl, in his book, considers the principles of planning the urban environment of a large city to ensure the most comfortable walking and interesting surroundings, as this contributes to an increase in residents' sense of transport safety and attracts those who want to enjoy communication and interaction with strangers around him (Gehl, 2013), which, in turn, favorably affects the feeling of safety in the urban space and ensures proper control by the society over the urban space and safety. Jane Jacobs argues that it is necessary to attract residents to the streets of the city so that they become constant guardians and protectors of those against whom violence may be committed (Jacobs, 1962).

Situational crime prevention is singled out as one of the methods to reduce the possibility of crime through the reorganization of urban space (Clarke, 1997). Changing urban space is aimed at increasing the effort the offender must take to commit the crime, increasing the risks to be captured, reducing the potential rewards, reducing recruitment to criminal activities by reducing provocations, establishing and maintaining normative barriers by removing excuses that may be used by offenders to justify or rationalize their actions. Thus, it is assumed that unsafety can be minimized in the urban environment with the help of architectural solutions that make it possible to attract permanent eyes as observers of public order and remove the possibility of concealing a person and his unhindered and unnoticed being on the city street. Susan Geason cites a set of principles that reduce crime by creating a constantly monitored area and demarcating private and public spaces (Geason & Wilson, 1989). Buildings and plans for the transformation of the territory, in the understanding of urbanists, should be understandable for orientation in space, comfortable, attractive for various kinds of activities, correspond to the size of a person and protect him from criminal and domestic danger (Tsyba & Erokhin, 2018).

4. Definition of Safe Smart City

In modern literature, there are many approaches to the definition of a Safe Smart City (Ristvej et al., 2020 & Risdiana et al., 2019). On the one hand, the Safe City is the basis for building a Smart City since only secure Smart City systems can provide high-quality services that increase the efficiency of using modern technologies to meet the needs of the city's population (Ristvej et al., 2020). The Safe City in this context is intended to ensure the safety and control of the data used by the Smart City system and is not an independent concept. Nevertheless, the safety of data storage and processing is an important element of city governance, as it allows the use of big data without fear that this information will be obtained by third parties and used to commit offenses in the city.

The second definition of Safe City is related to the integration of technology and the natural environment to ensure safety in a particular urban space. A unified system of control and safety in the city improves the efficiency of safety processes, including helping to reduce the

threat of crime, terrorism and emergency situations (Lacinák & Ristvej, 2017). In other words, a Safe City is the public administration that uses Smart technology to help governments, communities, and businesses reduce crime and create an environment where people feel safe and comfortable (Risidiana & Susanto, 2019).

The concept of a Smart Safe City is based on the idea that a city is a combination of an integrated system of modern technologies and the natural environment, which makes it possible to increase the efficiency of the city's policy against the threats of crime and terrorism, providing the population with a healthy and attractive environment for life (Laufs, et al., 2020). In this understanding, the disparate systems of the city should be combined into a single one in order to perform safety functions more effectively and cost-efficiently. In a broad sense, the concept of Smart Safe City is to organize disorderly urbanization, bringing urban life to certain standards that provide comprehensive safety at four main levels: digital security, infrastructure security, health security and personal security (Vereda et al., 2021). In other words, Smart City promises to be a safe city, and Safe City promises to be a city worth investing in.

The emergence of the Safe Smart City concept is associated with the digital transformation of the public and business sectors, caused by the spread of remote access technologies, the emergence of inexpensive sensors and methods for low-price storing and quickly processing large amounts of information in the cloud, as well as successful developments in the field of information and analytical technologies (Kachanov & Popov, 2019), such as advances in cloud computing, machine learning, and data analytics (Jameel et al., 2019). The development of the concept of "Smart Technologies" in urban safety leads to the creation of an integrated system that uses digital transformation to create Crime Prevention Center and Unified Security Center (Kachanov & Popov, 2019). Such government center collects data from various sensors throughout the city, provide storage and processing of large amounts of information to ensure the safety of the entire city.

Predictive techniques of surveillance and control ensures the safety of urban space by making statistical predictions, such as advanced video monitoring, automated license plate recognition systems, facial recognition systems and predictive policing (Kupriyanovsky et al., 2016). This analysis allows to identify where and when crimes are most likely to occur. The Smart City is using predictive systems, including identifying connections in the criminal environment based on the analysis of police files. In this context, smart technology is about gathering big amounts of data and making use of risk assessment systems to predict changes in crime patterns for specific locations, times, and perpetrators (Schuilenburg & Peeters, 2018). Also, to ensure personal safety in urban space, psychopolitical techniques of surveillance and control are used, which are aimed at creating favorable environmental conditions, such as correct lighting, sound and olfactory (smell) manipulations. These technologies, based on scientific research in the field of behavioral analysis, influence passers-by in order to minimize the risks of aggressive moods (Schuilenburg & Peeters, 2018). Proper behavior is encouraged while unwanted behavior — aggression, violence, vandalism, public drunkenness, noise disorder — is discouraged in order to improve the safety of the entertainment area and the psychophysiological wellness of the individual visitor (Schuilenburg & Peeters, 2018). Each of these approaches analyzes the information coming from the sensors and allows city authority to change the behavior that is considered unacceptable and unsafe, to reduce the risk of a crime situation, however, the definition of what is acceptable and unacceptable and what behavior should be suppressed depends on the policies of the governing bodies, control and different beneficiaries, and is of a political nature, which should also be taken into account when forming a city safety system.

5. Stakeholders and beneficiaries of a Safe City

Since cities are complex systems that include many different interactions and relationships between interested groups, city authorities should consider various stakeholders in

order to ensure the effective operation of a Safe City (Wereda et al., 2021). The interaction of political, institutional, and social elements and technologies can lead to a more effective solution of city problems in the field of safety. Key city stakeholders must be involved in addressing the city's safety problem: police, fire and ambulance services, national safety services, transportation agencies, utilities, and the local community (Wereda et al., 2021). Establishing democratic mechanisms that facilitate the exchange of information and interaction to resolve safety issues can improve the quality of decisions made by the administration based on more accurate and reliable information. Not only the surrounding space and force of official departments affects the safety of city's territories, but also a developed sense of belonging and community of residents can increase the safety of the city, due to the emergence of responsibility and indifference towards the place of residence (Cozens, Terence: 2015). As Oldenburg notes, places of constant interaction between the local and visiting population of the city, such as bars, cafes, influence the safety in the city (Oldenburg: 1982), allowing the creation of communities of streets and districts, and, if necessary, provide shelter from night attacks, while allowing the younger generation to successfully socialize on the streets of the city under the control of adults.

City administrations must also consider that the implementation of a Safe and Smart City system involves deep ethical reflection and determination of what information and how will be used to make decisions (Vivo-Delgado et al., 2020). Participants in the system should be aware of what information is used and to whom it may be shared for decision making, and whether it is anonymized or personal (Tarasenko & Boltenkova, 2020). Such measures provide reliable and timely information for decision-making, which in turn affects the efficiency and effectiveness of the city administration in the field of safety.

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Transforming the Regulatory Model of Public Private Partnerships in Light of Sustainable Development Goals, ESG-Agenda, and the G20 Principles for Quality Infrastructure Investment¹

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Abstract:

Investments in infrastructure are one of the main driving forces of economic and social progress, creation of new jobs, expansion of productive chains, and activation of trade. They are important for achieving the UN Sustainable Development Goals (the SDGs) and accelerating the 2030 Agenda for Sustainable Development (the Agenda-2030). PPP occupies a central place in Agenda-2030 largely by the ability to capture private financing for infrastructure. To date, new targets of PPPs are to provide not only economic effects but also the social and environmental effects, value for the people and for the planet provided for by the SDGs. The created by PPPs the infrastructure must be sustainable. And starting from these targets, author had developed the concept of “SDGs-focused PPPs”. However, there are many constraining factors for “SDGs-focused PPPs” implementing. One of this is the regulatory uncertainties. The aim of this paper is to promote the formation of a consistent approach to PPP as means of achieving SDGs as well as to outline the contours of the regulatory model for SDG-focused PPPs.

Keywords: *Public Private Partnerships; SGDs; ESG; sustainable infrastructure, sustainable private investments; sustainable financial instruments; PPP standards; lex PPPs*

INTRODUCTION

Public private partnership (PPP) is one of the legal forms of investment which differs from other forms by explicit public elements of legal relations, pooling of resources of public and private partners, distribution of risks among them, special guarantees of risk coverage, and by a variety of models.

Since its origin in 1990s, PPPs have made substantial strides towards becoming the widely applied way of an infrastructure-building.

Table 1.
Public Private Partnerships within a Global Context:
some of the components

Number of PPP Projects / Total Investment Amount	Countries and Integration Associations
7,900 PPP projects / 13,1 trillion yuan	China is the fastest-growing PPP market
1800 PPP projects / 368,3 bill euros	PPP market of the European Union countries
5160 PPP projects	PPP market of the Eurasian Economic Union countries

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3710 PPP projects / 3,894 bill rub	Russian PPP market
1350 PPP projects / 1,349 bill tenge	PPP market of Kazakhstan
55 PPP projects / 100 bill soms	PPP market of Kyrgyzstan

Source: compiled by the author from national PPP Units data.

The trends of recent years demonstrate not only an increase in the number of PPP projects but also a qualitative transformation of the very PPP.

Starting points of qualitative changes for PPP concept are decisions by international organizations, namely, Addis Ababa Action Agenda of the Third International Conference on Financing Development, Resolution of the General Assembly “Transforming Our World: the 2030 Agenda for Sustainable Development”, UN Global compact, Principles for Responsible Investment, G20 Principles for Quality Infrastructure Investment, and UNECE Guiding Principles on Public-Private Partnerships in support of the United Nations Sustainable Development Goals. Indeed, Resolution of the General Assembly directly indicates the PPP as mechanism for achieving SDGs (SDG-17). UNECE defines a “PPPs for the SDGs” as a project that fosters access to essential public services for all, with sustainable development outcomes as its objective and putting people at the core [2]. UN Principles for Responsible Investment defines “responsible” investment as an approach to investing that aims to take environmental, social and managerial (ESG) factors into account in investment decisions in order to better manage risks and generate sustainable, long-term returns [8]. G20 Principles underlines that infrastructure investment should take into account economic, environmental and social, and governance aspects, and be guided by a sense of shared, long-term responsibility for the planet consistent with the 2030 Agenda for Sustainable Development. “Quality” infrastructure investment should attain value for money and remain affordable with respect to life-cycle costs, by taking into account the total cost over its life-cycle (planning, design, finance, construction, operation and maintenance), compared to the value of the asset as well as its economic, environmental and social benefits [1].

Theoretical view on a correlation between investments and SDGs

Initially the correlation between the investments and SDGs / ESG had been investigated in economic science. Elkington J. derived the «concept triple bottom line», which considered the three dimensions of sustainable development (environmental, economic, and social) in relation to the company's activities. Three fundamental elements of shareholder sustainability (“3P” – “People”, “Planet”, and “Profit”) have been identified. The beneficiaries of the positive effects of business activities can be simultaneously the company, its customers and all other groups of stakeholders [9]. Hart S. and Milstein M. offered the concept of creating sustainable value. There are business strategies to promote sustainable development and also simultaneously provide the growth of shareholders' profits, i.e. contribute to obtaining “shareholder value” [10].

Author’s concept of the “SDGs-focused PPPs”

In light of the above international acts, as I see it, PPP began to take on new meaning as means of a sustainable development, as well as means of “sustainable” investing, and means of building “sustainable” infrastructure. Such views led to the author’s concept of SDGs-focused PPPs [11]. “SDGs-focused PPPs” can be used as tools to build sustainable infrastructure that contribute to the implementation of climate and social governments agendas. Public investing in SDGs and private investing taking in a focus on ESG can be efficiently synchronized within “SDGs-focused PPPs”. “SDGs-focused PPPs” it can be considered by private investors as an Investment

mechanism for sustainable infrastructure, providing an increase in shareholder value in the long term (due to the reduction of ESG risks, as well as revenue growth due to the creation of new “sustainable” products and services, the demand for which is growing dynamically).

Nowadays the volume of private investments in “PPPs for SDGs” projects is not huge yet. Private partners are wary of investment in these projects due to an uncertainty in investment returns, a small set of available financial “sustainable” instruments. The restraining factors for investors are also a shortage of reliable information about the benefits of participation in PPPs for SDGs. Not all have the necessary skills and time to independently understand and implement ESG-standards, new funding mechanisms of PPPs for accelerate SDG implementation. However, the biggest obstacle to the development of SDGs-focused PPPs is regulatory uncertainty.

Existing regulation of SDGs-focused PPPs at international and national levels

There are no special rules of international law regarding PPPs for SDGs. The nature of very SDGs in international legal doctrine has not yet received a comprehensive assessment. In my opinion, not so long ago, SDGs could be attributed to ideological component of the international system as reflecting motives and aspirations of subjects of international law to achieve the results aimed at sustainable development. Currently, there are signs of transformation of the ideological component into a regulatory component of the international system. The SDGs as an intention to be implemented becomes an element of international and trans-border legal relations. They are enshrined as obligations of States, foreign investors and international organizations in their implementation of international investment. They are laid down in international documents governing environmental relations and international relations for human rights protection. Thus, Article 24 of the Agreement on the Promotion and Protection of Foreign Investments between the Government of the Kingdom of Morocco and the Government of the Federal Republic of Nigeria stipulates that investors and their investments should strive to make the maximum feasible contributions to the sustainable development of the Host States and local community [7]. The Preamble of the “Investment Protection Agreement between the European Union and its Member States, on the one hand, and the Socialist Republic of Viet Nam, on the other”, indicates the determination of the Contracting Parties to strengthen their economic, trade and investment relationship in accordance with the objective of sustainable development, in its economic, social and environmental dimensions, and to promote investment in a manner mindful of high levels of environmental and labor protection and relevant internationally recognized standards and agreements [3]. It follows that targets to ensure the achievement of economic, social and environmental outcomes arising from the SDGs are objectified in norms of the above international treaties. These norms are different in content and legal nature. In one case, they introduce the concept of SDGs and link them to the objective of the international treaty. In the other case, they turn the SDGs into an objective setting a rule of conduct of subjects of legal relations regulated by an international treaty.

There are different legislative approaches of States to PPP regulation in the light of the SDGs. Current version of the Law of the Republic of Kazakhstan “On Public-Private Partnership” is the most advanced approach to reflect PPPs as means of achieving of SDGs. According to the Law of the Republic of Kazakhstan “On Public-Private Partnership” one of the principles of PPP is “the principle of value for the population” – ensuring the development of social infrastructure and life support systems, increasing the level of accessibility and quality of goods, works and services, as well as the creation of jobs within the framework of the implementation of a PPP project [4]. Russian PPP legislation poses the opposite example. The Methodology for evaluating the effectiveness of a PPP Projects does not take into account the impact of the PPP project on achieving sustainable development [5]. Generally speaking, rules specific to SDGs-focused PPPs do not exist in most States.

Future regulation of the SDGs-focused PPPs: the challenges and prospects

This study allowed to outline a circle practical and theoretical questions, namely:

- Whether “SDGs-focused PPPs” should be regulated by law, and, if so, how?
- Who should regulate the SDGs-focused PPPs (States and / or non-State actors)?

- What should be the level of regulation (international and / or national)?

The highlights made during this study are referred to in the following paragraphs:

- Transforming the “SDGs-focused PPPs” regulatory should concern the notions and principles, requirements of pre-qualification and criteria for selection of private partners, PPP risks allocation and provisions of PPP contracts. Notions of the “SDGs-focused PPPs”, “sustainable investments”, “sustainable infrastructure” as well as “principles of value for people and value for planet” should be incorporated into PPP legal framework. States should incorporate requirements to “sustainable” procurement in its national PPP law, special rights and obligations of public and private partners associated with achieving SDGs.
- State regulation by law is preferred over non-State regulation by non-legal norms. Non-legal norms can fill in gaps left by PPP legislation or in aspects of the “SDGs-focused PPPs” not regulated in the national PPP laws. This is where lex PPPs and professional PPP associations can be helpful.
- Regulating the “SDGs-focused PPPs” will require both at national and international levels.

CONCLUSION

Despite a surge in recent years, “SDGs-focused PPPs” remain a small share of the global PPP market and there is a risk that it remains in this situation: as a small segment of the overall PPP market. To realize the full potential of the “SDGs-focused PPPs” legal PPP framework should be improved. The problems of existing regulation and the goals of future legal regulation of the “SDGs-focused PPPs” are identified. Through increased coordination and cooperation among States and international development banks as well as private sector will it be possible to effectively address these challenges.

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Preservation and Promotion of Cultural Heritage and Increase the Potential for the Regional Development

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Abstract:

The preservation of objects of cultural and historical significance has been an important direction in the state policy of culture for many years. The preservation and use of historical and cultural monuments located in small towns in Russia faces numerous problems that cannot be reduced to a lack of funding. This paper examines problems and challenges, as well as changing approaches to the task of preserving and using objects of cultural and historical heritage, aimed at increasing the potential of regional development.

Keywords: *Cultural Heritage, historical cities, regions, development.*

1. Introduction

The preservation of objects of cultural and historical significance has been an important direction in the state policy of culture for many years. In the last decade, on the wave of sustainable macroeconomic and budgetary policies and overcoming the crises of 2008-2009 and 2015-2016 the attitude towards the task of preserving and using objects of cultural and historical heritage has become more pragmatic and positive. At the same time, the approach of government authorities has changed due to the intensification of measures to increase budget revenues and the growth of tourism in the regions.

This performs a new request for the organization of cultural heritage management in the regions. First, the issues of sustainability of the region's economy are considered when such objects are included in the economy, building new chains for the creation and distribution of products and services of cultural objects, and the rapid formation of missing competencies. This paper examines problems and challenges, as well as changing approaches to the task of preserving and using objects of cultural and historical heritage, aimed at increasing the potential of regional development.

2. Culture and economic growth

World practice shows that immovable monuments of history and culture are now becoming a strategic resource for the socio-economic development of the territory, and investments in their preservation and restoration are the basis for economic activity and diversification of the regional economy

This requires an understanding of the main aspects of financing and organizing the conservation of objects of cultural and historical significance. According to Rosstat, in 2013 there were 180.1 thousand immovable monuments of history and culture in the Russian Federation, including: 82.2 thousand - monuments of archeology; 30.7 thousand - historical monuments; 61.4 thousand - monuments of urban planning and architecture; 4.1 thousand - monuments of art. (Rosstat 2015). In addition, Wikimedia volunteers continue to form the Free List of Russia's Cultural Heritage. (Wikimedia)

In the Strategy of the State Cultural Policy for the period up to 2030, approved by the Decree of the Government of the Russian Federation of February 29, 2016 No. 326-r, about 83 thousand identified cultural heritage objects were recorded in Russia, but not included in the unified state register of cultural heritage objects (Government of Russian Federation 2016).

Funding for the implementation of the activities of the program “Culture of Russia” is carried out from the federal budget. The role of regional and municipal budgets in the restoration of cultural and historical monuments is insignificant. Individual restoration projects are financed by private donors, this mainly concerns places of worship.

Nevertheless, it is the bodies of state power and local self-government that are responsible for the implementation of laws on the protection and use of cultural heritage objects. According to the State reports on the state of culture in the Russian Federation for 2015-2020, a significant number of monuments were destroyed as a result of anthropogenic impact and only partially due to natural disasters (Ministry of Culture of Russian Federation). The low level of legality in the field of protection and use of objects of natural and cultural heritage is in some cases the result of the ineffectiveness of state and municipal management and supervision (control) in the field of protection of natural, historical and cultural monuments.

The same Strategy notes “the share of cultural heritage objects in federal ownership, the condition of which is satisfactory, in the total number of cultural heritage objects is 39 percent. Since the state of cultural heritage sites of regional significance is much worse, the number of regional monuments in ruined or unsatisfactory condition is increasing every year”

In recent years, the demand on the part of the population for visiting Russian cities and territories, where cultural and historical monuments are located, has grown significantly. It is necessary to intensify the restoration of these objects, include them in the routes and programs of tourist trips. To do this, it is necessary to expand the toolkit for the development of the cultural environment, using already tested methods for implementing restoration projects in the regions of Russia.

Equally important is the consideration of regulatory and policy documents of the federal center that set trends in the regional development of the cultural sector. A significant trend of recent years is the increased competition for tourists, visitors to cultural sites, and young people. In such a situation, it becomes especially important to create new conditions and transform services to attract new population groups.

Faced with significant development challenges in many Russian regions, the Government of the Russian Federation has taken advantage of the opportunities provided by its partnership with the World Bank to increase the institutional capacity of the regions and strengthen the ability to take into account cultural and historical heritage when developing a regional development strategy.

During this period, the country experienced the effects of the global financial crisis; in 2009 real GDP in Russia fell by 7.9 percent. The crisis had a significant impact on the social situation, causing an increase in unemployment, lower wages and an increase in the level of poverty. To counteract the crisis, the Government of the Russian Federation has developed and implemented an anti-crisis program of measures, using its own budgetary reserves, to support the financial sector and the real economy, as well as to mitigate the impact of the crisis on the population

In November 2008, the Government of the Russian Federation presented the Concept for the long-term socio-economic development of the country for the period up to 2020. This Concept presents a plan of measures to improve the efficiency of spending budget funds, with special attention paid to the social sphere and the protection of vulnerable groups of the population. The Concept defines priorities, among which the structural diversification of the economy, which provides for the development of other types of activities and sources of income, is of particular importance. To solve the problem of diversifying the sources of economic growth, perhaps for the first time, a large-scale attempt was made to activate the resources of cultural and historical heritage.

3. Regulatory Framework

The regulatory framework for the preservation of historical and cultural monuments, as well as historical settlements, primarily includes the Federal Law of June 25, 2002 No. 73-FZ “On Cultural Heritage Objects (Historical and Cultural Monuments) of the Peoples of the Russian Federation” Urban Planning Code of the Russian Federation , as well as the legislation of the constituent entities of the Russian Federation. A number of resolutions of the Government of the Russian Federation and orders of the Ministry of Culture of the Russian Federation and the Ministry of Regional Development of the Russian Federation determine the approval of draft master plans for settlements and urban districts, draft documentation for planning the territory

developed for historical settlements, as well as town planning regulations established within the territories of cultural objects heritage and their protection zones.

Officially, 41 settlements out of 26 subjects of the Russian Federation have the status of historical settlements. This obliges to carry out state protection of historically valuable city-forming objects - buildings and structures that form historical buildings. They are united by scale, volume, structure, style, structural materials, color scheme and decorative elements; planning structure and its elements, spatial structure; composition and silhouette of the building - the ratio of vertical and horizontal dominants and accents; the ratio between different urban spaces (free, built-up, landscaped); compositional-species relations (panoramas), the ratio of natural and man-made environment.

However, there are undoubtedly more cities with cultural and historical heritage in Russia. This problem is recognized by the management system, there are attempts to overcome the crisis of small and medium-sized cities with historical heritage through the development of tourism, which aims to revive the economic life of cities. The state acts in two directions. The first of them is the allocation of funds from the federal budget through the Ministry of Culture for the restoration of cultural objects of federal significance located in historical cities. On the other hand, at the state level, a program has been approved for the development of internal and external tourism in Russia for the period from 2011 to 2018, which provides for the allocation of funds from the budget on a competitive basis among the constituent entities of the Russian Federation for the organization of urban infrastructure for tourists.

An analysis of the dynamics of expenses for repair and restoration work in absolute terms for 2000–2007 (in comparable prices) (Muzychuk 2010) showed that the top five subjects of the Russian Federation that received most of the budget for the preservation of cultural heritage: the city of St. Petersburg and Moscow, Tyumen and Novosibirsk regions, Tatarstan. Despite the fact that the North-West and Center of Russia leads among other federal districts, the vast majority of funds for restoration and restoration falls on the central cities of St. Petersburg and Moscow.

4. Cultural and historical resources of historical settlements

The attention of state authorities to the issues of preserving cultural and historical heritage is due to the realization of the fact that the cultural and historical resources of historical settlements are not fully utilized. If they are used more effectively and linked to the sphere of culture, they can contribute to the socio-economic development of historical settlements. This is understood all over the world, however, until now, objects of cultural and historical heritage, city centers that have preserved the heritage of past centuries are considered, if not as a burden, then as a place for applying resources from the expenditure side of budgets.

A feature of small historical towns is the possession of a large number of cultural heritage sites with ancient and rich history. As already mentioned, the involvement of cultural objects, especially in small towns, creates opportunities for the development of new activities, which is confirmed by international practice. It should be noted that in order to stimulate economic growth, it is necessary not only to intensify investments in cultural objects, but also to transform the methods of planning and implementing investments during the project, as well as measures of institutional development of the regions. Thus, a significant effect of the transformation of the historical territory as a whole will be achieved, a comfortable environment attractive to city residents and tourists will be formed and prerequisites will be created for the socio-economic development of the municipality based on the existing cultural heritage and human potential.

Of course, the local government is obliged to maintain the cultural heritage on its territory. However, in reality, the authorities have no incentives to replenish the revenue side of the budget by attracting tourists. Most of the taxes generated on the territory of the historic city go to the budgets of other levels, and the land tax and property tax remain in the localities.

To solve the problem of diversifying the sources of economic growth and more evenly distributing the benefits received among all Russian regions and their populations, the Russian government used various new models for organizing and financing work. In particular, it was

necessary to draw on the experience of international financial organizations. Of particular interest is the example of the project of the Ministry of Culture in 4 regions of Russia in the period 2011-2017. "Preservation and use of cultural heritage in Russia", carried out with the help of the World Bank.

5. The project Preservation and Use of Cultural Heritage in Russia»

To stimulate the economic and social development of the territories, the Project provided support for the development of cultural and educational tourism in four regions of the Russian Federation - Leningrad, Pskov, Novgorod and Tver - located between Moscow and St. Petersburg. This region has a rich history, the historical monuments located here are not only local, but also of national importance. All this wealth can be used to stimulate local development through the support of cultural and educational tourism, the service sector and cultural crafts. During the implementation of the Project, support was provided for the implementation of recently adopted resolutions and orders by the Government of the Russian Federation aimed at strengthening measures to ensure the preservation of museum exhibits (movable objects of cultural heritage).

The lessons learned from the project have demonstrated the importance of building institutional capacity for managing cultural heritage sites and taking steps to ensure that works of art and other cultural objects are protected from damage, theft and other threats.

During the preparation of the project, extensive studies were carried out to assess various aspects of the current state of historical settlements and individual real estate objects (engineering and transport infrastructure, tourism potential, physical condition of objects, management system, legal status, etc.), with special attention paid to historical centers cities. It was necessary to identify opportunities for the most effective and long-term use of the cultural and historical heritage of historical settlements.

Among the directions of using investments within the framework of the Project, in addition to the restoration and adaptation of cultural heritage sites and the improvement of the historical territory, it was important to develop tourism infrastructure, marketing, branding of historical settlements, advanced training of employees in the field of cultural heritage management at the regional, municipal levels and at the level of individual cultural institutions.

In addition, the modernization of tourism, engineering and service infrastructure was financed from the funds of the regional and local budgets of the participating regions.

6. Challenges Facing Historic Cities

There are processes of searching and testing various approaches to the inclusion of cultural heritage in the life of small towns for over the world.

The study, comprehension and localization of international experience can be a useful factor in the development of small historical towns. This statement has long been a commonplace in the reports and plans of administrations, but the reality is far from being realized. It would seem that this is enough, if not for prosperity, then at least for a decent existence. But, unfortunately, at the present time there is a situation in which the historical heritage of small towns is seen as an obstacle to the economic development of the city, which explains the frequent violations of the established restrictions. For the administrations of settlements, the complex of historical buildings, the historical environment still acts not only as an asset, but also as a liability. The very presence of historical monuments of varying degrees of preservation creates continuous problems.

The content of strategic and other plans for the development of the territory is dominated by an emphasis on the creation of tourism infrastructure (hotels, travel agencies, cafes, entertainment centers, transport services, information centers and motels). Often these plans are associated with the development of tourism, which should stimulate work to preserve the unique characteristics of the historical environment, the formation of demand for qualified personnel of restorers and builders.

Of course, the infrastructure and quality of service are traditionally a weak point in many territories, but it should be understood that comfort could not replace objects of display and interest for tourists, i.e. architectural and historical heritage.

The issues of the need to preserve the historical and urban environment of cultural heritage objects from an independent topic have become just a part of the topic of urban development and new construction. Priority is given to development and transformation plans in comparison with measures for the protection of cultural heritage. Moreover, in the protection system itself, as experts themselves note, for most cities classified as historical settlements of federal and regional significance, projects of borders and the subject of protection have not been developed. Buildings that should be preserved are rapidly disappearing. As experts point out, the methodology for preserving historically valuable city-forming objects has not been approved. (Archi.ru 2021).

In addition, there is an objective dilemma between the creation of a vivid urban environment, natural and comfortable for living, recreation, contemplation, knowledge, a sense of pride in one's native places, the restoration, and rehabilitation of historical heritage. At the same time, there is a danger of losing the originality and color of the settlement, turning it into a dead exhibit.

To a certain extent, this process can be observed on the example of the Volga cities. Landscaping and restoration of cultural and historical monuments were carried out there. And if the main significant objects of culture have been restored, then things are far from the same with ordinary buildings that create a historical context for understanding the past of the territory. Often, renovated historical monuments are surrounded by faceless glass-concrete buildings of city centers, which certainly creates the impression of dummies. There is no need to talk about preserving the integral elements of the urban environment, fixing certain objects of protection: height, length of the facade, outbuildings, etc.

At the same time, an improvement in the condition and comfort for residents and tourists was achieved at the cost of the loss of diversity, the leveling of originality, the monotony of architectural and planning solutions, the reduction to a certain informal standard of historical centers - an abundance of tiles, small sculptural forms, for some reason called "monuments", sparse vegetation.

4Federal Law 3 on Cultural Heritage (2002) has undergone quite serious changes, thanks to which it allows you to save monuments quite effectively. However, there are many by-laws that create certain loopholes that are used by owners and developers.

7. Problems and Conflicts

In our opinion, the preservation and use of historical and cultural monuments located in small towns in Russia faces numerous problems. Among them are the following:

- Inclusion / non-inclusion in the Unified State Register of monuments of identified objects of cultural heritage.

Based on such decisions on non-inclusion of cultural heritage objects in the State Register, developers receive positive expert opinions on restoration projects. Applications for non-inclusion come either from

A) state authorities and local governments for the construction of a "more significant" facility, for example, sports complexes for championships, museums and other cultural facilities;

B) individuals who bought a cultural heritage object with obviously different purposes - not for restoration, but for reconstruction with an increase in the physical volume of the object.

Whereas the exclusion of an object of cultural heritage from the register can only be in case of its complete physical loss or loss of historical and cultural significance. The loss of the historical and cultural significance of the object is determined by the conclusion of the historical and cultural expertise.

- Conducting historical and cultural expertise.

Recently, there has been a certain discrediting of certified state experts colluding with interested customers. Based on such an examination, the developer receives the right to a restoration project, which means replacing a historic building with a remake.

- Exceeding estimates for restoration and adaptation activities

A frequent occurrence is the excess of the estimate for measures for the restoration and adaptation of cultural object for modern use, the lack of public examination of financial documents. This is noted by Irina Markina, Chairman of the Council for the Architectural Heritage of the SAR, an expert in state historical and cultural expertise (Archi.ru 2021). A corrupt system of "kickbacks" from 15-30 to 50% of the cost of all work at the object has been formed. Accordingly, verification of the validity of the scope of work, which generates inflated estimates, is not a barrier to corruption, thereby contributing to a decrease in the amount for funds for other objects.

- The need to preserve historical heritage

Even in St. Petersburg one can hear the mantra “a city is not a museum”, behind which is the aggressive introduction of outdated architectural projects into a continuous historical building, despite a direct ban on new construction in the historical center

- Creation of so-called public spaces.

In fact, this turns into the creation of a kind of reservation for certain age groups, mainly young people. The renovation of the urban environment should not lead to segregation and exclusion, tearing apart the dynamics and social fabric of the urban space.

- Adaptation of monuments and environmental buildings to modern requirements.

In the last decade, toilets, communication facilities, coffee machines, kiosks, information stands, etc. have appeared in historical buildings that did not have basic amenities for visitors. However, unlike European analogues, where the most modern, expensive equipment is used, designed for the flow of visitors and vandal-resistant, Russian museums and galleries, theaters use fragile cheap options that quickly become unusable.

- Public access to information about historical and cultural monuments

In recent years, as part of digitalization, a lot of work has been launched to provide information about the cultural environment and monuments of the territories. The content and illustrative material at the same time differ in the degree of content and presentation on the Internet. This is evidenced by the data of the rating "Rating of Russian regions to ensure digital openness of cultural heritage objects".(Wikimedia.ru)

- Preservation of historical buildings not under state protection

By definition, such buildings are on the verge of extinction their preservation is envisaged only within the framework of preserving the subject of protection of historical settlements.

- Redundancy

A specific problem, perhaps not so significant for other regions, notes Petr Chernenko, chairman of the Kaliningrad branch of the SAR. (Archi.ru 2021)Not only unique buildings are registered as objects of cultural heritage (as it should be done according to the meaning of the legislation), but a significant amount of historical, but ordinary buildings. Resources allocated for the protection of monuments are scattered, and there is not enough of them to preserve the most valuable objects. In the Kaliningrad region, there is an excessive number of objects transferred by the Russian Orthodox Church (not only religious objects, but also order castles). With an understandable lack of funds for the maintenance of objects - restoration and conservation - the church is simply not able to independently "digest" such a number of fairly quickly collapsing monuments.

Conclusions

The preservation and use of historical and cultural monuments located in small towns in Russia faces numerous problems that cannot be reduced to a lack of funding. Restoration and use is opposed by the interests of developers focused on obtaining sites in city centers. At the same time, the system of registration of monuments and state expertise and architects are partially included in corrupt relations. As a result, the historical centers of the settlements are represented at best by individual restored buildings surrounded by faceless structures. Public organizations, the urban community, and local residents are excluded from the process of organizing the historical environment. Therefore, individual successful examples of the preservation and promotion of historical and cultural monuments should not overshadow the understanding that systemic institutional changes are required, also new tools for participation and financing, as well as public control over the processes of preserving and using cultural heritage in Russia.

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Development of City-forming Enterprises in Russia: Transition to ESG-investments

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Abstract:

Functioning and development of single-industry towns are influenced by many factors, among which investment attractiveness is significant. Investment attractiveness directly depends on the activity of a large city-forming enterprise in a single-industry town. Investors consider three parameters under which the involvement of this company in solving environmental, social and managerial problems is achieved, according to which the company provides sustainable development management.

For analysis of ESG - investments the analysis of ESG parameters was conducted, as well as on examples of ESG parameters influence on improvement of situation in single-industry towns of Europe, Australia, USA and Canada. On the basis of the analysis five priority directions of development of single-industry towns economy were identified.

Keywords: *ESG, single-industry town, investment, city-forming enterprises.*

Necessity of transition to new priorities of city-forming enterprises development in Russia

Economy of single-industry towns essentially depends on the condition of the backbone enterprise. When a single-industry towns' enterprise develops, the municipality receives an appropriate level of tax revenues from the company, the enterprise forms jobs, due to which the population becomes more solvent, and therefore, it spends more savings in the economy of the single-industry towns. The efficiency of the enterprise has a significant impact on the welfare of the single-industry town. The dependence of a single-industry towns economy on the enterprise can be reflected in the investment decisions of investors. Active development of a single-industry town may indicate the receipt of more profit by the town-forming enterprise. The company can spend part of its profit on the improvement of a single-industry town, including the creation and support of municipal facilities, the formation of additional jobs, higher indexation of wages compared to the enterprises of the industry in question, which will have a positive impact on the economy of the single-industry town.

The investor tends to make an investment decision based not only on the standard approach of analyzing industry-specific corporate factors, but also taking into account data about the city in which the company operates. There are now a number of environmental, social and corporate governance (ESG) indicators. Over the past 10 years, investment managers have favored ESG indicators that demonstrate the long-term performance of the company in which they invest their financial resources. (Cardamone, 2012).

The purpose of the study is to identify the impact of environmental, social and governance indicators on the development of city-forming enterprises in Russia.

ESG (Environmental, Social, and Corporate Governance) defines three parameters under which a given company's involvement in environmental, social, and governance issues is achieved. According to the parameters, the company provides sustainable development management. (Freiberg, Rogers, Serafeim, 2019)

The importance of ESG for city-forming enterprises is significant because the economic and social components of a single-industry town depend on these companies. With negative trends in ESG indicators, investors may decide to refuse to invest, respectively, the enterprise will not receive the necessary funds, will not create additional jobs, etc. Consequently, the economy of a single-industry town will not develop. (Freiberg, Rogers, Serafeim, 2019) In the

Cardamone work points out that the improvement of the environmental component contributes to higher profits of the enterprise in the long run, as a more favorable environmental situation is an incentive to preserve human and, consequently, intellectual capital in the monotown.

The work of David Freiberg, Jean Rogers, George Serafeim, Murphy D.T., McGrath D.M. points out the importance of ESG when investors decide to conduct an investment campaign or not. It is noted that the orientation of enterprise policy on ESG indicators contributes to an increase in investment activity and maximizes the long-term interest of investors. The paper also points out the importance of quality corporate governance and sustainability in creating long-term value for shareholders. (Freiberg, Rogers, Serafeim, 2019) The analysis of ESG indicators will help to improve investment activity aimed at large city-forming enterprises in single-industry towns in Russia. (Aerts, 2006).

When analyzing a city-forming enterprise, an investor analyzes a number of factors, among which EGS indicators, compares the data to other enterprises, including those that do not have a significant impact on the welfare of the city. Investor, when making a decision, determines how much higher the likelihood of profit from a particular enterprise is than that of other companies and how much higher the possibility of higher profits. The investor also considers how high the probability of losing each company's investment is and compares these probabilities between companies. Then the investor will decide to include the city-forming enterprise in the investment portfolio, if the probability of profit and the amount of remuneration from the investment in this company will be higher than in other companies. (Yoshinara, 2010).

The support of a large city-forming enterprise is also felt in the implementation of major economic projects. For example, the company helps build local roads, sponsors economic forums, and implements projects in nanotechnology and robotics. (Michel, 2015).

Based on the analysis of the literature sources, the importance of the study of attracting investment in city-forming enterprises was determined. Single-industry towns depend on the functioning of the city-forming enterprise; the economy of such towns depends on the success of the company. Accordingly, the economic parameters of a single-industry town have a significant correlation with the success of the enterprise, which connects the welfare of the population living in a single-industry town and the activities of the enterprise.

The special role of the social component of investment projects of town-forming enterprises on the development of single-industry towns

The issue of employment in single-industry towns is socially important because large city-forming enterprises occupy more than 72% of the labor market. (Abelyan, 2012). Thus, the monotown enterprise forms the main demand for labor force.

Personnel - are one of the significant problems of single-industry towns, due to the low level of public services, as well as insufficiently comfortable environment for living, narrow specialists and highly qualified often do not pass to single-industry towns. Thus, the presence of qualified personnel in a single-industry town enterprise can contribute to the growth of company profits, in turn, due to higher financial performance, single-industry town enterprises will have more opportunities to invest in single-industry towns. The personnel of town-forming enterprises often build their career within a particular enterprise for a considerable number of years; accordingly, they have no opportunity to obtain new methods to improve the enterprise's performance.

In the work of Y. Pan, E. Pikulina, S. Siegel, T. Wang the authors consider the reports of companies for the disclosure of information on the ratio of wages. In the work the following results were obtained, so the firms in the USA disclosing higher pay ratios get significantly lower profitability. However, there are companies in which shareholders are not inclined to pay inequality because they want to reduce social inequality. This factor directly affects the negative reaction of the market. The analysis performed gave the following results, so stock markets react negatively to published reports with high wage dispersion within the firm, which directly negatively affects the value of the firm. (Y. Pan, E. Pikulina, S. Siegel, T. Wang, 2022)

At the moment, the trend emphasizing the social aspects of sustainable development is the concept of corporate social responsibility (CSR), which is used all over the world, Russia is no exception. (Rizov, 2018) According to I. Alvarez, social performance indicators usually include: management accountability, accountability, development, employee diversity, training, labor relations, etc. (Alvarez,2015).

Consider the strategy of attracting investment and keeping as many jobs as possible in single-industry towns in Australia.

Single-industry town Woodcutters, prevails mining, i.e. lead-zinc ore, as well as development and surveying of mineral deposits.

The reason for the crisis is uncompetitive products.

Australia has extensive experience of restructuring single-industry towns specializing in mining, but in each town the administration had the right to choose the most relevant method.

Thus, the administration of the city of Woodcutters chose another direction of development - support for the city-forming enterprise producing lead-zinc ore. As its reserves were dwindling and its products were uncompetitive, the industry began to decline. The city administration began to prepare the population morally for the transformation, as it was clear that all jobs could not be saved. However, the government wanted to use the remaining undeveloped layers, so the main efforts were aimed at finding an investor and protecting the environment. An investor was found, but it was not possible to change the fossil processing technology that would be relevant to the market.

Thus, these measures did not lead to a positive result and the authorities were forced to partially resettle the inhabitants.

A partially successful change in the monotown's economic strategy: the administration managed to save more than 50% of the jobs, the actively working population which had lost their jobs was resettled and employed in neighboring communities, and the mining company continues to operate, being the regional leader in lead-zinc ore mining.

The United States of America (USA), along with Germany, was one of the first to address the issue of managing the economic situation in a monotown through environmental, social, and management tools. The experience of American colleagues is important for further analysis and regulation of the situation with monotowns in Russia.

The United States of America has been facing the problems of "companytowns" for a century, so there are more than 2.5 thousand monotowns in the country.

Investment strategy as an option for the development of single-industry towns.

Pittsburgh, the second largest city in Pennsylvania, was a major steel monotown in the United States.

The cause of the crisis was the Great Depression of 1930.

Northern industrial cities began to deindustrialize and migrate, usually to the southern resource regions of the United States with high wages. For example, Pittsburgh was severely affected by this trend in 1950, and by the end of the 1960s, the city's population had been cut in half. The U.S. authorities began to solve the problem of population outflow, so investment was made in several areas: health care, urban infrastructure, construction of universities, greening production.

At the moment, the outflow of population continues, but it has decreased by a third. As a result of the state's correct policy, the single-industry city has become one of the largest modern educational and medical centers. Thus, with the help of investments, the largest educational institution in the city is the University of Pittsburgh. It is one of the ten largest universities in the United States. The university has a department of Slavic languages and cultures, which, together with the Center for Russian Studies, organizes, among other things, the Summer Institute of Foreign Languages, as well as programs for children with Russian linguistic heritage. At the same time, the city's most famous university is the private Carnegie-Mellon University, which ranks high in American and world rankings. Also in Pittsburgh are small private universities Duquesne, Carlow, Chatham, Point Park and Robert Morris.

Managerial efficiency of management of city-forming enterprises as a driver of their development

Currently, single-industry towns are in need of updating management approaches, tools and mechanisms of management. Qualitative management in a single-industry town, mainly should correspond to the interests of the population of the single-industry town, as well as determine the options for development. Management efficiency is expressed in the implementation of effective methodology of enterprise management. Accordingly, management methods indirectly influence enterprise profit: the more effective methods are applied in enterprise management, the higher the profit. The inefficiency of management in a monotown is increasingly visible, as management resources are almost exhausted. In the 21st century, in the era of technology modernization and innovation - a monotown needs a modern management system. This management system should be in constant search for options to improve the life of the monotown population. Managers should be engaged in the search for innovations and timely implementation, raising the level of service area, as well as creating conditions for the innovative potential of personnel in the management system of a single-industry town. It is necessary to involve the citizens of a single-industry town for the joint solution of problems.

It is worth highlighting the dissertation works of I. Samboretsky and V. Meshkov. The articles of these authors paid attention to socio-economic problems in a monotown, which are inextricably linked to the system of management efficiency. The authors note the need to create a unified management approach for single-industry towns. Rejuvenation of the personnel system, young personnel are able to act in a rapidly changing socio-economic environment.

The efficiency of management is considered in the work of A. Kocmanová and M. Dočekalová. According to the authors, an important element of social efficiency is occupational health and safety (OHS). For the corporate management of each company it indicates the necessity to constantly create such working conditions, which guarantee a high degree of safety both for the company's employees and for its customers and surrounding people. (Kocmanová, Dočekalová, 2012)

French was one of the first countries to regulate the economic situation in monotowns. The French authorities were based on a strategy: "Only the state can orchestrate long-term and costly processes of industrial change in depressed areas."

Crisis phenomena in single-industry towns appeared after World War II. In France after 1945, 63% of the territory was depressed.

To solve this issue, the French government selects a certain set of tools and includes them in the program "Territorial Reorganization". This program is mainly aimed at the rehabilitation of territories, as well as the creation of multi-profile enterprises - corporations in place of mono-profile enterprises. Under the program "Territorial Reorganization", France is divided into districts according to the areas of industry.

Thus the single-industry towns of Lorraine, which were the center of metallurgy, were on the brink of death. One of the main tools to improve the situation in single-industry towns was the attraction of private investors, who were reimbursed 25% of their investments upon completion of construction. This construction was deployed to modernize and renovate the economy of the country as a whole, as well as individual monotowns. The next not insignificant tool by 1970 was the development and subsidization of small and medium-sized businesses. The development of business incubators, so on the territory of monotowns in Lorraine more than 160 business incubators were created in 10 years. The results of this subsidizing were not long in coming, and by the 1980s small and medium-sized enterprises had become a mainstay of the country, as large industrial enterprises in monotowns were ill adapted to the economic and institutional changes.

The monotowns of Lorraine were the first to face the strategy of "Territorial Reorganization". So 80 thousand jobs appeared in monotowns, GRP growth began to increase noticeably, and the reconstruction of the industrial structure of monotowns and the territory as a whole began.

Not only single-industry towns in Lorraine underwent transformation, but the strategy of creating new jobs and land reclamation as a variant of development of single-industry towns touched single-industry towns in Alsace.

The French authorities were based on the strategy: "Only the state can organize long-term and costly processes of changing the industry of depressed territories."

Crisis phenomena in single-industry towns appeared after World War II. In France after 1945, 63% of the territory was depressed.

The causes of the crisis were the consequences of the energy crisis and the saturation of markets.

Thus, single-industry towns in Alsace, which were the center of the coal industry, were on the verge of death. The French authorities in the single-industry towns of Alsace have succeeded in solving the problems of the core areas by recognizing the primary role of the state in this difficult situation for the entire region, especially for the working population. The state institutions in charge of macroeconomic regulation have adjusted the mechanisms and functioning of the labor market. Thus a program for creating new jobs at large industrial enterprises in single-industry towns appeared. During the macroeconomic adjustment program, more than 202 thousand jobs were created at 817 industrial sites.

In the next stage, the French government began to create programs of state support. Thus, in single-industry towns of Alsace where production had to be curtailed a program of land reclamation for 10 years appeared; this program covers the space exhausted as a result of development and geodesic works on mineral deposits. This project is under the control of the "Land Office" during the entire period. This program has led to the following results, so 37% of the total areas have become suitable for agricultural work, more than 50% of the areas have become suitable for the cultivation of fodder varieties for livestock.

The key importance of indicators of environmental effectiveness of investment projects of city-forming enterprises on the development of single-industry towns

The standard of living often depends on the environmental situation in a single-industry town, and since the extraction and production of chemical, metallurgical, oil industry to a large extent harms the environment, the deterioration of health of citizens in single-industry towns is becoming more and more the norm every year.

Yu. Alushkin notes that large city-forming enterprises often save on purification facilities and filters. Thus, large industrial enterprises pollute surface and underground water and soil by dumping production wastes. Moreover, large city-forming enterprises of chemical industry pollute rivers and lakes with their wastes, which leads to a shortage of drinking water and destruction of ecosystems on the territory of the Russian Federation. According to Yu. Alushkin, more than 35% of large city-forming enterprises in Russia are engaged in extraction and processing of radioisotope materials. These materials contain nuclides hazardous to the environment. Y. Alushkin notes in his work that large city-forming industrial enterprises engaged in oil production and processing supply oil products via pipelines, tankers and tankers. As a consequence of accidents caused by oil spills, the soil and water are covered with a dangerous oil film, which causes irreparable harm to flora and fauna.

The main problem for large city-forming enterprises is obsolete equipment at technogenic sites. Yury Alushkin notes that the situation is approaching catastrophic, because an accident can happen at any moment and cause an environmental disaster. The same situation is observed at many (Alushkin, 2010)

Environmental problems affected the Swedish city of Kiruna. The relocation strategy of the single-industry town as a development option. The single-industry town of Kiruna is a Swedish town, the northernmost town in Sweden. Located in Swedish Lapland. The richest iron ore deposit. Kiruna was incorporated as a town in 1948. The reason for the crisis is the formation of underground voids due to aggressive mining of iron ore.

Kiruna is a major producer of iron in the country. This is due to the presence of huge deposits of iron ore in the vicinity of the city. The city produces almost 85 million tons of iron

ore annually. As much ore is mined per day as would be needed to build six Eiffel Towers. The largest iron ore mining company is LKAB, a state-owned Swedish mining concern founded in 1890. LKAB has a production capacity of 28 million tons of iron ore products (pellets, iron ore fines and other products) per year. Residents of the monotown work for this company, so about 2109 employees work in ore mining. Since 2000, the company's investments in production have exceeded 30 billion kronor.

The city of Kiruna is in the process of relocating the town to protect the residents from underground voids formed by the activities of the mining company LKAB. In the process of the relocation project there is a separate plan to attract small and medium-sized business to the city and to reduce its dependence on the city-forming enterprise: creation of a favorable business environment, development of social sphere, ecological protection of the territory. All the costs of this project was assumed by the company LKAB, the project relocation should be completed by 2033.

Conclusion

The analysis of international experience, which concerns large city-forming enterprises in single-industry towns allowed identifying environmental, social and managerial directions and tools of economic development of single-industry towns. Five priority directions of economic development of a single-industry town have been identified, the implementation of each of which is impossible without investment in large city-forming enterprises in single-industry towns. These priorities are: the use of specially oriented regional programs for the development of old industrial monotowns, increasing the labor market at the expense of retrained personnel, improving innovation potential with the help of subsidies, creating a comfortable urban environment through regional programs, as well as attracting investors, development of small and medium businesses. It was revealed that the stable functioning and development of the economy of a single-industry town is not possible without attracting investment.

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The «Foreign Agent» Status in Russia: Public Perception and Government Regulation

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Abstract:

This paper investigates the problem of government regulation of the work of media with the «foreign agent» status in the Russian Federation. The perception of such sources of information by the Russian society is also studied. Based on the paper of T. Wilson (1981), we propose a modification to his model by including in it a hierarchy of needs for receiving a news stream by users, and also focus on some of the factors influencing behavior changes in the process of information search. We seek to understand whether there is a difference between «trust» and positive «perception» from the part of the society. Ultimately, we aim at developing an understanding of whether assigning a «foreign agent» status is efficient and effective, and provide relevant policy recommendations.

Keywords: *foreign agent, information perception, hierarchy of information needs, information seeking behavior, government regulation.*

1. Introduction

Nowadays, there is a change in trends in Russian media consumption: in 2020, analytical and news portals have become one of the key ways to obtain information for all age categories of respondents, including young people (14-24 years old) and elderly audience (over 65 years old) [Deloitte, 2020].

Against the background of a general decline in the level of trust in television (despite high consumption of its contents in Russia, [HABR, 2019]), it should be noted that the authority of independent online media is growing.

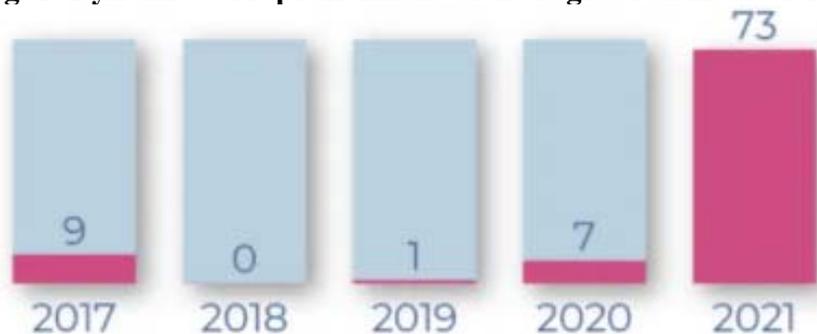
Thus, there is an increase in the level of trust in independent sources of information [RBC, 2019]. Due to the spread of influence of Internet media, the issue of government regulation of online publications has become most acute.

Due to the fact that the media are engaged in covering the political situation not only in Russia, but also abroad, the government exercises control over the activities of such subjects. The actions are implemented within the framework of measures aimed at countering threats to national security [National Security Order, 2021].

Thus, in order to control the actions of the media in 2017, legislation regulating the activities of media performing the functions of a “foreign agent” was officially approved in Russia.

Considering government regulation, it is worth noting that the development of the issue of «foreign agency» in Russia was uneven. This is also evidenced by law enforcement practice (see Fig. 1, [Pravo.RU, 2022]).

Fig. 1. Dynamics of replenishment of the register of media-foreign agents in Russia



Source: Russian Ministry of Justice, 22.12.2021

It is important to note that the unified legislation on foreign agents in Russia is not currently fixed (separate clauses regulating the activities of such subjects are provided for in the Legislation on Mass Media and the Legislation on Information), and there are no cases of the media leaving this status in Russia.

In connection with all of the above, the issue of the «foreign agent» status has become controversial. Taking into account the changing trends in the consumption of information content by society, the need for government regulation of such Internet sources can be traced most clearly.

In this paper, it was important for us to understand how Internet users perceive the status of media with the «foreign agent» status, as well as the subjective sufficiency of government regulation of such sources of information. Basically, we want to develop an understanding of whether assigning a «foreign agent» status is efficient and effective.

In this way, the purpose of this paper is to offer recommendations for optimizing Russian legislation, taking into account the analysis of the perception of media with the «foreign agent» status by web users, their behavior in the process of searching for information, as well as expert experience.

2. Theoretical framework

2.1. Literature review

The key concept of our research is «information seeking behavior». The Wilson model of information need ([Wilson, 1981]) was taken as a basis.

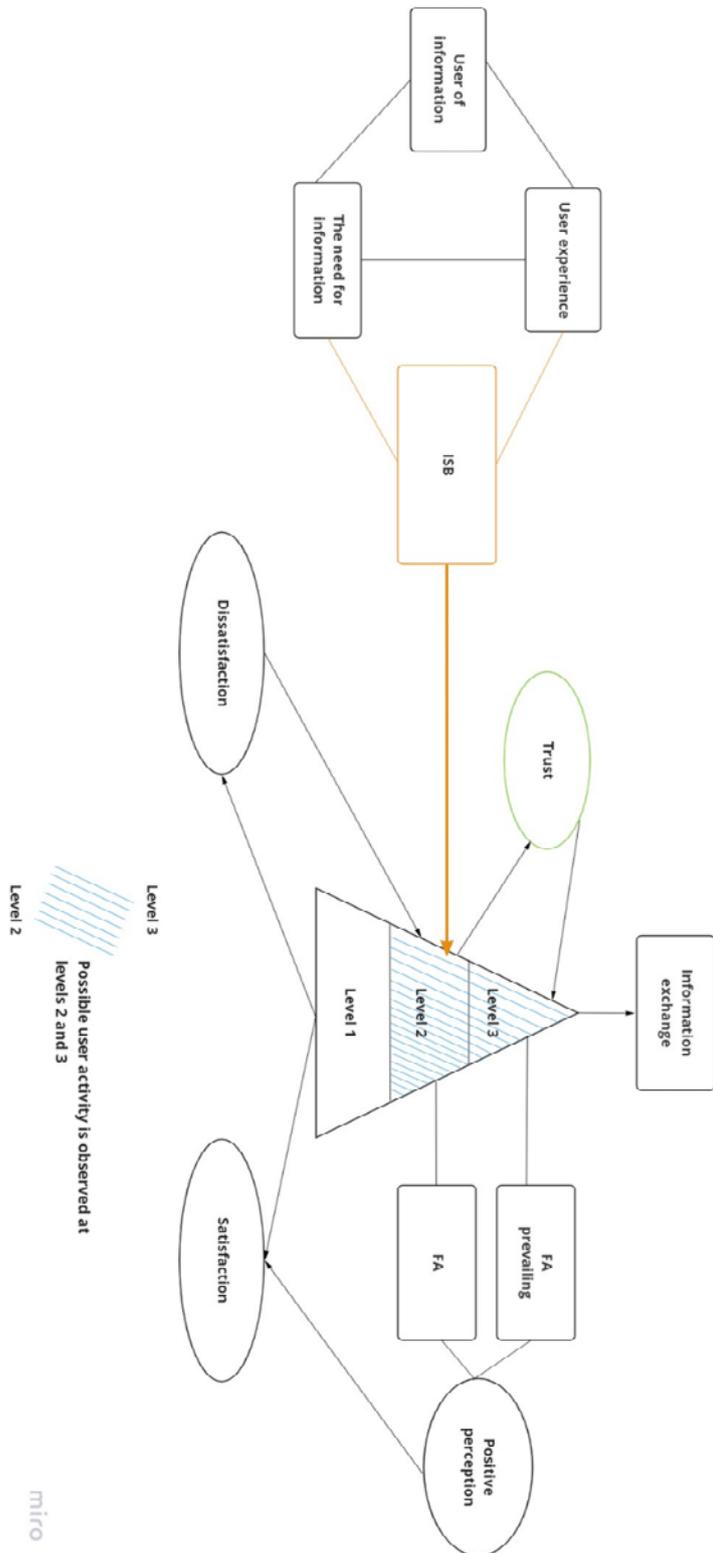
The model assumes that the information seeking behavior is the result of recognition of some need perceived by the user. In addition, it can change depending on the goals, a context and other factors.

Within the framework of the model, the user can make demands on information sources, receive information from other people and exchange the received data. Thus, the user's actions are explained by his need to overcome the gap of uncertainty between the situation that has arisen and the result/satisfaction/certainty.

2.2. The theoretical framework

Based on the above review of the literature review, we have expanded the framework proposed by [Wilson, 1981]. The suggested scheme is shown in Fig. 2. The model has been extended to reflect the subject under study:

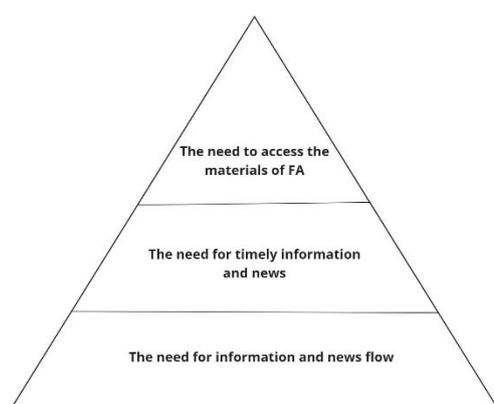
Fig. 2. The extended model of information seeking behavior



Source: authors' design

Information seeking behavior in this model is related to the user, the experience and the need for information. The variability of behavior is explained by the modification of different factors. In this regard, we have suggested that there are several levels of need for information (in particular, in the news stream), depending on: information search goals, user experience, socio-demographic characteristics, loyalty to Internet sources, etc.

Fig. 3. Part of the general scheme: the hierarchy of needs for receiving a news stream



Source: authors' design

In this way, with each level there is an increase in interest in obtaining a variety of information resources. With the growing need for prompt and independent information, the likelihood of contacting foreign media agents increases.

3. Research methods and sample description

For check the research hypothesis, we made our own questionnaire and conducted a survey using Microsoft Forms. A total of 101 responses were collected. After preliminary processing of the data obtained as a result of the survey, an econometric model was built.

The questionnaire consisted of 18 questions and was divided into the following parts:

- 1) Socio-demographic characteristics;
- 2) Media activity of the population;
- 3) Perception of the of media with the «foreign agent» status.

So, our principal **research hypothesis** is: respondents who have a high level of «trust» in the media-«foreign agents», do not see the need to assign this status.

As part of the construction of the econometric model, «necessity» was chosen as a dependent variable («Do you think it is necessary for the state to assign such a status to the media at all?», where an assessment was given on the Likert scale from -2 «no, in no case should you do this» to 2 «yes, this is unequivocal necessary»).

The independent variable «trust» («How does the assignment of the status of a foreign media agent affect your trust in the activities of such a media?», where an assessment was given on the Likert scale from -2 «I completely stop trusting» to 2 «I begin to completely trust»).

Also included in the model were experimental independent variables «perception» («How do you generally perceive of media with the «foreign agent» status, where a Likert scale score was given from -2 «definitely negative» to 2 «definitely positive») and «useSMgetinfo» («Do you use social networks and messengers in as sources of news? (Telegram, VKontakte, WhatsApp, etc.)», where «yes» = 1, «no» = 0)) and control variables: age, educ.

4. Empirical results and recommendations

As it can be seen from the obtained results (see Fig. 4), the main research hypothesis is confirmed in connection with the statistical significance of the independent variable «trust», p-value <5%. According to the results obtained, with an increase in the level of trust of media with the «foreign agent» status, the vision of the need to assign this status decreases: the negative relationship between the dependent and independent variables.

Fig. 4. Results of the econometric model estimation

```
coefficients:
      Estimate Std. Error t value Pr(>|t|)
(Intercept) -2.383504   1.041775  -2.288  0.0244 *
trust        -0.806956   0.105515  -7.648 1.74e-11 ***
perception    0.209872   0.098503   2.131  0.0357 *
usesMgetinfo  1.757559   0.987611   1.780  0.0784 .
age           0.010723   0.009869   1.087  0.2800
educ          0.042259   0.096336   0.439  0.6619
---
signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

The model also showed a nontrivial relationship between the dependent variable and the independent experimental variable «perception»: thus, with a positive perception of media with the «foreign agent» status, the respondents' opinion on the need to include such sources in the register simultaneously increases.

In this case, we have made the following assumptions:

In the respondents' understanding, there really is a difference between a positive «perception» and the formation of «trust» in relation to media with the «foreign agent» status;

There is an effect of a «quality mark», according to which the award of the status of a «foreign agent» - the media «fixes» the position of the media in the media space as an impartial source of information with a different news agenda [Prufy.ru, 2022].

Principal recommendation: The Ministry of Justice needs to informatively supplement the register of media with the «foreign agent» status, make this data available and transparent to all users/stakeholders.

Based on the results of our survey, about half of the respondents (44%) do not know in which cases the status of a foreign media agent is assigned in Russia.

Empirical research has also shown that there is a difference between «trust» and positive «perception» of such sources.

The register must contain complete information about the subject to be included. It will allow the user to objectively assess the need to access the materials of media with the «foreign agent» status, as well as to form a perception of such sources of information supported by facts.

In this case, foreign experience may be useful: for instance, on the website of the US FARA, in the «Recent FARA cases» tab, situations of foreign agents are presented, which describe in detail the reasons for inclusion in the register, measures against «foreign agents» and etc. [US DoJ, 2022].

The need for cooperation and work on legislation is also noted by representatives of the professional community (as obtained by us via in-depth interviews with various experts).

It should be noted that some countries have refused to implement legislation on foreign agents due to problems with the formulation of criteria for inclusion in the register, which once again confirms the need for existing inaccuracies so that the law does not become a tool for «eliminating» some media without objective reasons.

5. Conclusion

This paper is a trial assessment of users' perception of media with the «foreign agent» status, as well as the identification of major inaccuracies in the government regulation of the activities of such subjects. We came to the conclusion that nowadays the information needs of users are becoming more complicated: people are actively using social media resources to receive a news stream. The results of an empirical study reveal that there is a difference between «trust» and positive «perception» of media with the «foreign agent» status.

In relation with the identification of a non-trivial connection: with a positive perception of media with the «foreign agent» status, the respondents' opinion on the need to include such sources in the register simultaneously increases, several assumptions can be made for further study: 1) incorrect perception of this status by users; 2) imperfection of legislative mechanisms. People, despite having the «foreign agent» status, continue to perceive such subjects positively.

At the same time, the legislation assesses the activities of media with the «foreign agent» status as a threat to national security. In this case, the contradiction between users' perception and the legislative mechanism is obvious.

As an interim result, recommendations for optimizing the state regulation were proposed.

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Phenomenon of Smart Sustainable city in Modern Urban Development

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Abstract:

The problem of smart sustainable cities has appeared in the modern research literature relatively recently as a result of the integration of two areas of research - sustainable development and smart cities. However, as the analysis shows, such integration has complicated the understanding of both smartness and sustainability of cities and has posed a new challenge for researchers, namely, to form a monitoring and evaluation approach that would include both dimensions. This article briefly examines the factors that influenced the emergence and development of the concept of smart sustainable cities, defines a smart sustainable city phenomenon, determines the directions of its research and based on the identification of the main problems of monitoring and evaluation of smart sustainable cities, formulates a new approach to monitoring.

Keywords: *smart city, sustainable development, smart sustainable city, urban development*

1. Introduction

The problem of determining optimal approaches to monitoring territorial development is one of the key topics of discussion both in research and in the practice of urban development. It is obvious that the monitoring approach should be based on the basic assumptions about the object of research and its parameters. In addition, in such complex systems as a city, where the interests of different stakeholders are intertwined, it is necessary to take into account these interests, and therefore involve the stakeholders themselves in the monitoring process. This is especially true as far as the parameters of smart sustainable urban development are concerned, where the result of urban development is largely determined by the degree of involvement of all participants, as well as the synchronization of their interests, opportunities and limitations.

2. Literature review

2.1.1 Drivers for smart sustainable cities development

Höjer and J. Wang, 2015 identify five main trends that influenced the development of the concept of smart sustainable cities:

1. *Globalization and the formation of the sustainable development agenda.* The rapid growth of multinational companies in line with the acceleration and expansion of mobility and migration horizons, made the sustainability agenda more global than ever. The global concern about climate change, environmental pollution, waste disposal, energy-saving technologies, and many others have formed the call for green and circular economics, in which both public and private sectors are considered as being responsible for the future. Sustainable development is the development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. It includes two key concepts:

- the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and
- the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs" [Word Commission on Environment and development, 1987].

The UN Sustainable Development Agenda, adopted in a set of 17 interrelated goals was developed in 2015 by the UN General Assembly as a "plan to achieve a better and more

sustainable future for all", which catalyzed the development of research and practices in the field of sustainable development around the world [UN, 2017]. These goals were named in the resolution of the General Assembly "Agenda for the period up to 2030". A special part of this agenda is devoted to the role of cities in ensuring sustainable development. Sustainable Development Goal (SDG) No. 11 is stated as "Sustainable cities and human settlements" and sets the task to make cities and human settlements open, safe, viable and sustainable.

2. *Urbanization*. At the beginning of the 20th century, only 12.5% of the world's population lived in cities. A hundred years later, this percentage increased to 52. According to various data, by 2050 it is expected that up to 67% of the population will live in cities [UN, 2012].

3. *The problem of sustainable development in cities*. The problem of efficient use of limited resources is more likely to be faced by urban agglomerations, where the quality of infrastructural solutions (drainage, water, energy, waste management, etc.) influence directly the quality of life, expressed in environmental, economic and social indicators. This is one of the most difficult challenges faced by city administrations due to the multidimensional city infrastructure, as well as highly diversified stakeholders with diverse preferences and needs. Obviously, the definition of urban sustainable development policy is impossible without the organization of effective interaction between the main stakeholders - the government, business and the population of the territory. The role of stakeholders in the formation and implementation of the sustainable development agenda is increasingly highlighted in modern literature (see for example [Lelite et al., 2015]).

4. *Development of information and communication technologies and information society*. This trend over the past 30 years has significantly changed the format of work, communication and interaction between people and organizations, brought the speed of processes to a new level, led to global changes in the understanding of what is the quality of services and their customer orientation. ICTs have not just challenged the understanding of efficiency but have completely transformed approaches to achieving efficiency based on the analysis of information (especially big data). Townsend points to two recent changes in the global development of ICT that has challenged the cities to become smart. The first is the transition from wires to wireless communications, including both phones and Internet access. The second trend concerns the increase in the number of devices connected to the Internet (Internet of Things) [Townsend, 2013].

5. *Formation and implementation of the smart city concept* in various countries of the world. The concept of smart cities arose in the 90s, catalyzed by business' IT solutions for infrastructure management – for its' better integration, as well as for the development of customer-oriented user interfaces. Monitoring and integration of critical infrastructure, application of smart computing technologies, focus on sustainability and long-term strategy - are the key ideas embedded in all smart city concepts around the world. Modern smart city strategies emphasize the purposeful use technologies with the strong commitment to improve the quality of citizens' life [McKinsey, 2018].

After the adoption of the UN Sustainable Development Goals, their integration with the concept of a smart city was fostered. In 2016 the joint project of the United Nations Economic Commission for Europe and the International Telecommunication Union entitled "Association for Smart Sustainable Cities" started. The project proposed 92 key performance indicators for smart sustainable cities development, correlated with one or more international SDG indicators.

2.1.3 Smart sustainable city: definition and areas of research

A Smart Sustainable City, as defined by the UNECE and the ITU [ITU-T, 2015], is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental as well as cultural aspects. This definition was proposed in 2015. In 2020, this framework was expanded to "People-smart sustainable cities" [Golubchikov, 2020], where

the role of citizens and their needs and public participation for sustainable development was emphasized.

Once the concept of Smart Sustainable Cities has been set, it became clear that evaluation methods regarding that meaning should be developed. The current research sees strategic assessment of Smart Sustainable City as one of its main challenges [Hojer, Wangel, 2015] and suggests various methodologies to be implemented (for instance, see [ITU, UNECE, 2017; Wendling et al. 2018; Huovila et al. 2019; Akande et al. 2019]).

In line with that, the number of ratings positioned as approaches to assessing both smart and sustainable development of cities has increased over the past few years, and their total number is no longer inferior to the number of ratings evaluating urban development just from the perspective of "smartness". In addition, some of them are at the development stage, and the results of the compiled ratings are only an approbation of these techniques.

Nevertheless, a significant disadvantage of most of the methodological approaches is that these ratings are based solely on the evaluation of external for the citizens (subjective) quantitative data. Existing methodologies for assessing smart and sustainable urban development do not consider the opinions of the main stakeholders of the city – urban residents, and only secondary data is used to assess the needs of citizens in the territory. Moreover, the term "smart" usually implies exclusively the use of ICT to solve urban development problems, which is why the social aspect remains ignored.

However, this gap is gradually filled with a bunch of scientific papers which conceive sustainability of smart city projects not only through environmental lens, but also study their social objectives [Sugandha et al. 2022], highlighting the importance of a wide citizens' involvement into all stages of smart city programs creation [Lozano et al. 2021]. In particular, some scholars expand on what factors influence citizens to participate in co-production of city services [Huang et al. 2022] and how modern ICTs are used to promote such collaboration of government and citizens towards achieving social sustainability [Bouzuenda et al. 2019].

Accomplishing sustainable development goals depends not only on the government, but also on private sector companies since it is business that is the driver of economic changes, who controls financial flows and introduces innovative technologies. In this regard, another research direction in the discussed field investigates the ways of promoting business sustainability in smart cities [Dana et al. 2022].

Moreover, a growing body of research explores the benefits of the implementation of Smart Sustainable City concept instead of the Smart City in general [Dindarian, 2022] and further emphasizes that taking into account the balance of interests of government, business, citizens and other related stakeholders and their needs in the future, should be placed in the center for smart sustainable development of the city [Goel et al. 2021].

3. Problems of smart sustainable city monitor

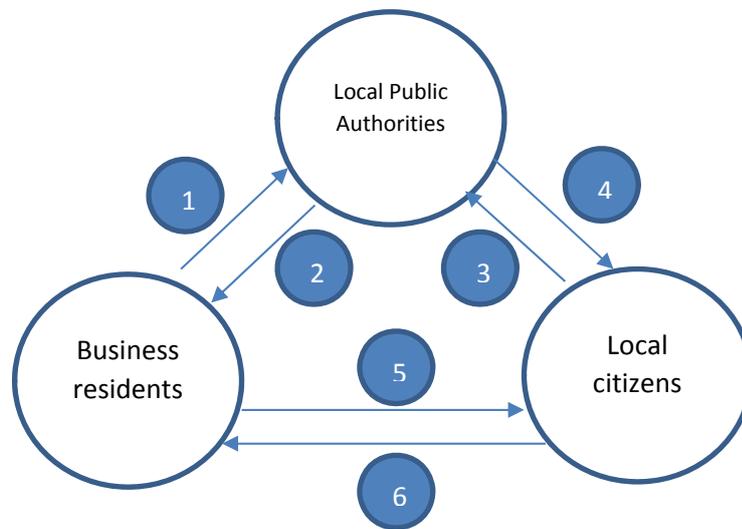
A smart sustainable city concept strengthens the connection of modern technologies with the efforts towards greater sustainability, which complicates the task of monitoring such cities. Summing up the discussion in the literature and taking into account the roots of the concept, we assume that a smart sustainable city means:

- implementation of sustainable development agenda in urban policies;
- policy development based on balancing of stakeholders' needs;
- "smart" use of policies and ICTs for good – when there is a real and tangible positive impact on objective and subjective urban parameters (reflected in statistical indicators, as well as in public polls).

The last assumption has a primary importance as it represents the modern understanding of "smartness". The real progress in sustainability is a result of aligned joint efforts of local public authorities, business residents and local citizens where the latter are considered not as passive consumers, but as co-producers and contributors to sustainability. Therefore, the main questions that monitoring of smart sustainable cities should answer, are the following:

- How is the interaction of stakeholders on the sustainable development agenda arranged, to what extent are expectations, needs and efforts synchronized?
- What is the progress (results) on the main dimensions of sustainable development issues, is there a bias in any direction, to what extent does this affect the subjective perception of citizens?
- How are ICTs used to ensure progress in sustainable development?
- What conclusions can be drawn to change corporate non-market strategies and policies of state and municipal authorities, working jointly on the urban development?

Figure 1 illustrates a model of interaction between three groups of stakeholders in the framework of smart sustainable development of the city. Table 1 presents the content of the areas of interaction, tasks for monitoring, as well as its' potential results.



Picture 1. Stakeholders' interaction in smart sustainable development agenda

Table 1. The potential areas for smart sustainable cities monitoring

Nº	The content of interaction	The task of monitoring	Intermediate results	Final results
1.	Implementation of ESG strategies by the local companies, Public-Private partnerships	To correlate ESG reports of companies with urban development plans	List of inconsistencies between ESG reports and urban development strategies; Effectiveness of public policy tools	Recommendations on non-market strategies for local companies (including GR)
2.	Urban policy towards business engagement into urban development, implementation of smart technologies into business-government	To determine the tools of business engagement; urban economic policies and their effectiveness	Gaps in expectations, business needs and government policy	Recommendations for public authorities how to improve business engagement into smart sustainable development

	interaction			agenda
3.	Public participation (form citizens' feedback to co-production)	Subjective assessment of the quality of life, including assessment of the quality of public sector services, the level of involvement in public participation of various levels, urban smart technologies acceptance by citizens	Discrepancy between subjective and objective assessment of quality of life The discrepancy between the projects being implemented and the needs of the population	Recommendations for public authorities regarding prioritization of projects and on how to improve citizens' engagement into smart sustainable development agenda
4.	Urban development projects, Services provided by the public sector, implementation of smart technologies into government-citizens interaction	Objective indicators of quality of life; Urban ratings; Support of the local government by the population		
5.	Social projects Urban development projects	ESG-reports	The discrepancy between the projects implemented by companies and the needs and expectations of citizens	Recommendations on non-market strategies for local companies (primary PR)
6.	Public support	Content analysis of media and social networks		

4. Conclusions and recommendations

The development of smart sustainable city needs continuous monitoring of the actions and needs of all three groups of stakeholders: local public authorities, local businesses and local residents. To make consistent approach towards such monitoring, it is necessary not only to take into consideration those three areas of sustainability, but also analyze needs and internal attitude of citizens towards the development of the territory. This dimension can improve not only sustainability, but also smartness of urban development.

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Demand Factors for Telemedicine Services in the Russian Federation

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Abstract:

This paper investigates the development of telemedicine services in the Russian Federation. The main problems and the trends in this sphere are reviewed. The aim of the research is to identify demand factors for telemedicine services in the Russian Federation. To analyze demand factors for the remote telemedicine services, a survey of Russian residents' attitude towards telemedicine was conducted. Based on the research results, recommendations for improving the demand for telemedicine services are provided.

Keywords: *state regulation, health care, digital medicine, telemedicine.*

INTRODUCTION

According to the WHO's (World Health Organization) definition, telemedicine is «the provision of healthcare services at a distance with communication conducted between healthcare providers seeking clinical guidance and support from other healthcare providers (provider-to-provider); or conducted between remote healthcare users seeking health services and healthcare providers (client-to-provider) (WHO guideline..., 2019). The terms “telemedicine” and “telehealth” have been separately defined over time but are often used interchangeably with considerable overlap in scope (Implementing telemedicine services..., 2020). The National Library of Medicine's Medical Subject Headings (MeSH) vocabulary equates, telemedicine and telehealth as “entry terms” (synonyms) (Telehealth Evidence Map, 2015).

However, telehealth is different from telemedicine because it “refers to a *broader scope of remote healthcare services* than telemedicine. While telemedicine refers specifically to remote clinical services, telehealth can refer to remote non-clinical services, such as provider training, administrative meetings, and continuing medical education, in addition to clinical services” (HealthIT.gov, 2015).

Telehealth encapsulates a wide range of distance healthcare services and applications using Information and Communications Technologies (ICT) for home care, long-term care, prevention, health promotion, selfcare and support for the integration of social and healthcare services (Monteagudo, Salvador, Kun, 2014, p. 79). According to the Health Resources Services Administration telehealth is “the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health, and health administration. Technologies include videoconferencing, the internet, store-and-forward imaging, streaming media, and terrestrial and wireless communications” (HealthIT.gov, 2015). World Health Organization (WHO) defines telehealth as: “The delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment, and prevention of disease and injuries, research and evaluation, and for the continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities” (World Health Organization, 2010).

Federal law “On the fundamentals of healthcare of residents of Russian Federation”, № 323-FZ, 21 November 21, 2011 (Point 22, article 2) provides definition of telemedicine technologies. They are defined as “information technologies, which provide remote interaction between doctors, between doctors and patients and (or) their official representatives; their

identification and authentication; documentation of their actions during counselling, consultations, and remote medical supervision of the patient”.

Telemedicine increases availability of medical services, reducing travel time and travel costs for patients, and having no risk of disease spreading (Dullet et al., 2017; Dahlgren et al., 2021; Pokida, Zybunovskaya, 2021). Greater travel distances for services can result in a reduced number of physician visits and inadequate management of chronic conditions (Smith et al., 2003). For instance, in (Dullet et al., 2017) there were estimated travel-related and environmental savings resulting from the use of telemedicine for outpatient specialty consultations for the period between July 1996 and December 2013. This study provides evidence of the potential time efficiency, cost efficiency, and positive environmental impact of telemedicine for outpatient consultations (p. 545). Telemedicine contributes in regularity of treatment, decreases costs of treatment and quantity of repeated hospitalizations, improving self-control of patients and general clinical results (Agboola, Bates, Kvedar, 2016).

The COVID-19 pandemic COVID-19 pandemic has become a driver for the development of telemedicine (Implementing telemedicine services..., 2020; Dahlgren et al., 2021). During the COVID-19 pandemic “many digital health tools have been used during the pandemic to support four main areas: communication and information, including tackling misinformation; surveillance and monitoring; the continuing provision of health care such as through remote consultations; and the rollout and monitoring of vaccination programmes. Greater use of digital health tools during the pandemic has been facilitated by: 1) policy changes to regulation and reimbursement; 2) investment in technical infrastructure; and 3) training for health professionals” (Fahy, Williams, 2021, p. 5).

It is of great importance now to investigate Russian current trends in the development of telemedicine and identify demand incentives and barriers. Thus, the report poses the following research question: what are the main demand factors for telemedicine services in the Russian Federation? To answer it a situation in this sphere is analyzed.

2. LITERATURE REVIEW

In (Shaderkin, 2022) the main barriers for the development of the supply of the telemedicine services are discussed — technological, legal, economic, and methodological — and ways to overcome them. The author defines following technological barriers: user-unfriendly telemedicine platforms and devices for the remote monitoring; weak integration of telemedicine platforms with existing medical information systems; insufficient standardization of protocols for information exchange between information systems of different producers; small amount, and low quality of digital information about the health of each patient and others. The main legal barriers are the prohibition on making a diagnosis and prescribing treatment in the provision of medical care using telemedicine technologies; formal requirements for the workplace of a doctor, providing telemedicine consultation. Financial barriers are represented by the problems of financing telemedicine: the absence of mandatory medical insurance tariffs, incorrect opinion that telemedicine should reduce healthcare costs or doesn't require separate funding at all. The lack of methodological support for telemedicine — clinical studies, publications, methodological and clinical recommendations, training courses and programs for students — leads to insufficient incentives for doctors to provide telemedicine consultations.

It seems necessary to identify demand factors for telemedicine services. Analysis of demand factors for the telemedicine services in Sweden in 2018 showed that probability of consumption of at least one telemedicine consultation was higher for women, younger people, and people with higher level of income and education (Dahlgren et al., 2021).

In (Pokida, Zybunovskaya, 2021) the attitude of different socio-demographic groups of Russian citizens toward telemedicine was analyzed. It was found that respondents with higher level of income more often used medical services remotely. The share of people with such experience is about three times higher than in the low-income group (17.8% and 5.1% correspondingly). Survey data show that if the respondents are prone to or suffer from any

diseases, they are more likely to use telemedicine services. As for the age, it was shown that the smallest proportion of those who use telemedicine services are the oldest citizens (60 years and older), only 2.8%. Respondents with higher education more often admit the possibility to use telemedicine consultations (40.8%). The results of the survey show that, in general, people do not have a complete understanding of telemedicine technologies. Approximately 50% of respondents could not formulate their position towards telemedicine.

The results of a 2019 sociological survey of Moscow doctors and outpatients about the prospects of telemedicine (Bogdan, Gurylina, Chistyakova, 2020), indicate that less than a quarter of patients (24%) believe they know what telemedicine is. Only 11% of the surveyed outpatients used telemedicine services. It was found that younger and more experienced users of ICT, as well as those with experience in telemedicine services consumption, demonstrated a greater willingness to use those services in the future. The study shows the need to provide citizens and doctors information about essence and availability of telemedicine services.

Healthcare goods are sometimes characterized as “credence goods”. It means that the consumer does not obtain full information about the quality of the service even after consuming it. In the case of “experience goods,” markets tend to converge to full information equilibrium as purchases increase. At the same time in (Busso, Gonzalez, Scartascini, 2022) the analysis of an increase of demand for telemedicine services in Argentina during COVID-19 pandemic demonstrated that the telemedicine is an experience good. For instance, the number of first-time callers (using telemedicine services for the first time) as a share of the total dropped from 60% at the onset is of the pandemic to 30% later on (Busso, Gonzalez, Scartascini, 2022, p. 1497). The authors conclude, that “patients might have been hesitant to use telemedicine for the first time but, as they started using the service, they continued to do so throughout the year. In fact, about 65% of patients are recurrent users of telemedicine, meaning that they called multiple times after their initial call (Busso, Gonzalez, Scartascini, 2022, p. 1499).

The similar assumption can be made based on the results presented in (Pokida, Zybunovskaya, 2021). The authors found that personal practical experience of using digital (telemedicine) technologies leads to more loyal and engaged attitude of consumers towards their further use (Pokida, Zybunovskaya, 2021, p. 14). Those respondents, who have had previous experience of remote communications with doctors by phone or Internet, are more likely to use telemedicine consultations in the future: 71.6% of them admit such practice for themselves and only 21.1% stated the opposite (Pokida, Zybunovskaya, 2021, p. 13).

3. TELEMEDICINE DEVELOPMENT IN RUSSIA

The start of the development of telemedicine services was done by the Order of Ministry of Health of Russia № 344, RAMN №76, August 27, 2001 “On the confirmation of the Concept of the development of telemedicine technologies in Russian Federation and the program of its implementation”. Even though the document included legal aspects and principles of implementation of telemedicine technologies, as well as algorithms of interaction of telemedicine stakeholders in field of telemedicine development, and the role of research institutions, the legal regulations of telemedicine development were formulated only in 2017.

Peculiarities of provision of medical help by means of telemedicine technologies were described in art. 36.2, Federal Law #323: “Patient’s or his official representative’s consultations by doctor by means of telemedicine technologies are done for following purposes: 1) prevention, collection, analysis of patient complaints and anamnesis data, evaluation of the effectiveness of therapeutic and diagnostic measures, medical monitoring of the patient's health; 2) making a decision on the need for an in-person appointment (examination, consultation)”.

The patient cannot be diagnosed, prescribed treatment and remotely monitored without visiting a doctor. After the initial remote consultation, the patient is given a report, which may include recommendations: a personal visit to the doctor or the need to undergo preliminary medical examination for an offline visit to a specialist. Telemedicine is not licensed as a stand-

alone service, being just a “co-service”. This means that the patient cannot get a treatment prescription using only an online medical consultation.

Order of the Ministry of Health of the Russian Federation No. 965n dated November 30, 2017 “On approval of the procedure for organizing and providing medical care using telemedicine technologies” recognizes telemedicine as a full-fledged part of medical services. The document defines the types of telemedicine assistance and the procedure for their organization, defines the prerequisites for the inclusion of telemedicine services in the programs of state guarantees of free medical care to citizens, officially establishes the status of the Unified state health system (EGISZ), and legalizes electronic medical document flow.

In 2021, the Ministry of Economic Development proposed to conduct a three-year experiment in Russia to introduce a new legal regime, under which doctors would have the competence to determine diagnoses and prescribe treatment without a face-to-face visit. However, already at the beginning of 2022, the Ministry of Health rejected this proposal, citing a possible increase in the spread of medical errors and offenses (Минздрав против телемедицины..., 2022).

Thus, the laws of the Russian Federation regulate the conduct of telemedicine consultations but limit the process of their application.

4. MATERIALS AND METHODS

Our pilot qualitative research was performed using survey method in May 2022. The questions in the questionnaire were divided into three sections. The first section included socio-demographic issues such as gender, age, marital status, education, financial situation, etc. The second one was aimed at identifying respondents’ attitude toward face-to-face and remote consultations. The third section covered the experience and desire to receive telemedicine services. The type of questions was chosen as closed with a choice of single or multiple-choice answers. 212 responses were received.

The sample includes Russian residents aged 16 to 73, including 70% of women and 30% of men. The prevailing group was the younger generation (under 30 years old) — 62%, the adult generation (from 30 to 55 years old) is 27% and the older generation (from 55 years old) turned out to be 11% of the total number of survey participants.

The main contingent of respondents are employees, 38%, then students — 35%, pensioners — about 10%, unemployed — 7%, and civil servants and entrepreneurs, respectively, about 5%. The sample contains a wide geographical coverage of participants - these are cities of federal significance, regional and republican centers, district centers, urban-type settlements, and villages.

The research was carried out in several directions:

1. Determining whether respondents have the necessary equipment to receive telemedicine consultations and Internet use skills;
2. Determining the availability of health care facilities in the territories of residence of the respondents, the availability of narrow medical specialists;
3. Identification of the frequency of visiting doctors and the desire to do so more often;
4. Finding out how much people have confidence in doctors and whether they treat themselves without consulting specialists;
5. Identification of the presence of the Internet in medical institutions and the possibility of obtaining telemedicine services;
6. Determination of the experience of receiving telemedicine consultations by respondents and their satisfaction with the services received;
7. Determining the willingness of respondents to use online medical consultations and their willingness to pay for them.

5. RESULTS OF EMPIRICAL RESEARCH

In general, it was found that the determining factors of preference for telemedicine services are the motivation to visit a doctor more often, digital literacy of the population, as well as trust in the remote format of receiving medical care.

Let us consider the results of identifying the experience of receiving telemedicine consultations by respondents and their satisfaction with the services received (direction 6). In general, it was found that the determining factors of preference for telemedicine services are the motivation to visit a doctor more often, digital literacy of the population, as well as trust in the remote format of receiving medical care.

According to the data received, 8% of respondents had experience in receiving telemedicine consultations within the framework of mandatory health insurance, and 10% received such services for a fee.

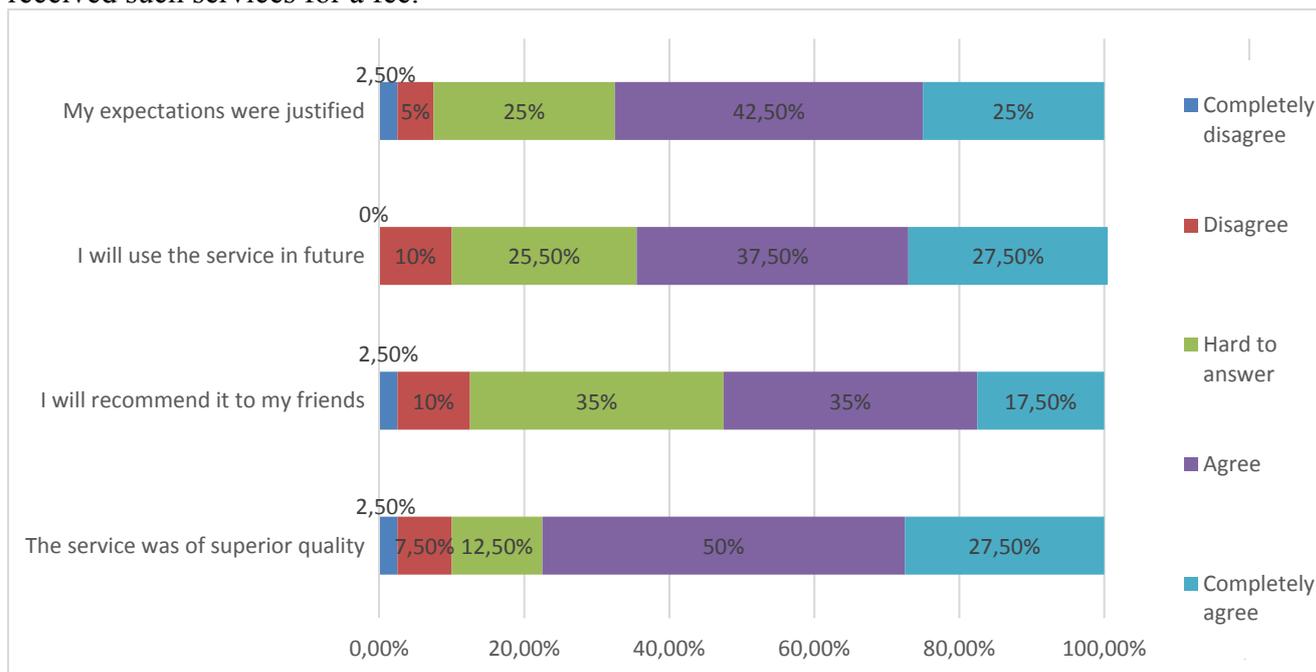


Figure. Satisfaction with received telemedicine services

Thus, almost every fifth participant was already familiar with the procedure for receiving remote medical services. Moreover, according to the data obtained, in most cases, respondents are satisfied with the services provided (see figure). In general, people respond positively to telemedicine consultations, they are ready to recommend them to their friends and acquaintances.

Thus, the results of Russian and foreign studies, as well as the analysis of the survey data, indicate that telemedicine is an experience good. This means that if people start using the service, they will continue to use it in the future, even if it is possible to visit a doctor in person.

6. RECOMMENDATIONS

The following recommendations for the increase of demand have been developed in order to improve the state policy in this sphere.

1. Inclusion of telemedicine services in the territorial programs of state guarantees for providing citizens of the Russian Federation with free medical care. Currently, telemedicine consultations are contained in tariff agreements in the field of mandatory health insurance only in some subjects of the Russian Federation
2. Health authorities, territorial mandatory health insurance funds and insurance medical organizations should regularly inform the population, as well as use social marketing methods about the possibility of receiving telemedicine services free of charge. In healthcare facilities, banners or posters can be used to inform patients about the possibility of accessing telecommunications services.

3. Campaigns to educate patients about the processes of obtaining telecommunications services can be implemented in polyclinics, hospitals, as well as through text messages or patient portals.
4. Among the indicators of the quality of telemedicine services include the satisfaction of patients and doctors.

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Monetary Estimation of Transportation Mode Choice Factors: the Pilot Project Results

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Abstract:

Authors discuss the role of transportation preferences as a tool for proper design of urban transportation policy tool. The paper argues that citizens while being asked about factors of transportation mode choice do not consider alternative cost of time. But the same time namely costs become the most popular parameter, which defines the type of transportation behavior. So, the aim of the current paper is to justify the need to assess the monetary value of travel time through stated preferences for the development of urban transport policy instruments.

Keywords: public transportation, mode choice, travel behavior, stated preferences

Introduction

High rates of urbanization in recent decades have inevitably led to an increase in the level of motorization in most cities. This caused not only environmental but also a number of economic and social problems. An obvious consequence of the increase in the number of cars is the deterioration of air quality. Researchers note an increase in carbon dioxide emissions, which in turn affects the health of citizens and leads to an increase in healthcare costs. The growth in the level of motorization negatively affects the demand for the services of small and medium enterprises, since a person moving around the city in their car is more likely to use the services of large shopping centers and online services vis-à-vis someone who moves around the city by public transport or on foot.

Attempts of the city authorities to solve the problem of traffic congestion through the construction of new highways did not lead to the desired result. The emergence of new roads stimulates people to buy cars, further increasing the level of motorization. This cyclic relationship between the expansion of automobile infrastructure, the growth of motorization and the resulting growth in demand for further expansion of automobile infrastructure is known as the Lewis-Mogridge paradox (Mogridge, 1990).

International experience in the implementation of urban transport policy shows that the solution of urban transportation problems is possible primarily by reducing trips by private car and replacing them with trips by public transport. To do this, it is necessary to understand what influences the choice of mode of transport for traveling around the city, that is, to study the factors of demand for different modes of transportation.

In basic microeconomic theory, the demand function is the relation between the volume of consumption and the price of a good. The consumer's choice consists of the optimal combination of marginal utilities and prices of products in the bundle he buys. It can be noticed that most studies of demand factors for public transport are devoted specifically to comparison of negative utility of various transportation modes (Horni et al., 2016). A survey of factors affecting transportation mode choice allows local authorities to develop policies to alter travel behavior.

Generally, urban transport policy also operates with two diametrically opposed sets of instruments. The first group is aimed at increasing the cost of using a private car, thereby stimulating citizens to make a rational choice in favor of a cheaper way to travel around the city (so called "push measures"). The second group aims to increase the attractiveness of public transport (i.e. passenger satisfaction with the trip), again shifting the point of rational choice towards travel by public transport (so called "pull measures") (Batty et al., 2015). Such simplified interpretation of approaches to the formation of urban transportation policy allows us

to analyze the effectiveness of its tools from two positions: utility (satisfaction) and prices (consumer's costs) associated with the use of different modes of transport.

When developing the instruments of urban transport policy, one should take into account the institutional, spatial planning and other features of the city. The impossibility of a direct transfer of regulatory institutions from other countries or even cities is currently recognized by most policymakers. Thus, in order to form effective policy tools, it is necessary to study not only the characteristics of the city, but also the characteristics of the transportation behavior and preferences of the citizens.

There are multiple studies upon factors affecting the choice of transportation mode throughout the world. The authors take into account both the characteristics of the urban environment (such as population density, unemployment rate, etc.), socio-economic characteristics of respondents (age, gender, income, etc.), and parameters that are directly related to the trip (time, cost, comfort, etc.) (see table 1) and define those, which occur to be the most significant for transportation mode choice.

Table 1. Factors affecting mode choice

Article	Location	Methods	Factors used for modeling	Key results
Milioti C., Karlaftis M., 2014	Greece	time-series modeling approach	Metro ticket price, bus ticket price, electric bus ticket price, urban rail ticket price, unemployment rate, gasoline price, GDP per capita, population of the city, population of the country, number of motorcycle sales, number of car sales	Metro ticket price was found to be among the most significant factors affecting ridership. An increase in the price of gasoline leads to an increase in transit ridership.
Buehler R., Pucher J. 2012.	USA	comparative study and econometric approach	Gender, age group, employment, number of cars in household, population per square kilometer, metropolitan area population, day of the week	Attractive fares and convenient ticketing, full multimodal and regional integration, high taxes and restrictions on car use, and land-use policies are most important factors influencing ridership.
Paulley, N., Balcombe, R., Mackett, R. et al. 2006.	United Kingdom	meta-analysis	Fares, quality of service, income, car ownership	Fares are the most influential factor
Manoj M., Verma A. 2015.	India	binary logit model	Gender, income, car ownership, age, health care activity, trip distance and land-use mix	The low-income group individuals have longer walk trip lengths and they travel shorter distances on other transport modes. Also, this group makes more social stops than the other groups, but conduct fewer shopping activities.

Recent studies also show that environmental factors can have a significant influence on the choice of mode of transportation in the city, along with the direct characteristics of public transport and private cars (see table 2).

Table 2. External factors influencing transport choice

Article	Influencing transport preferences external factors	Key results
Cohen S., Higham J. 2011.	climate change and increase of environmental awareness	External factors were not significant for mode choices.
Fanglei J., Kun A., Enjan I. 2020.	increase of environmental awareness	External factor was significant for mode choices and led to increase in interest of citizens in shared mobility
López-Rousseau. 2005.	accident with train bombing in Madrid, Spain	External factor was significant for mode choices and led to decrease in the train choice for transportation after bombing.
Marsden G., Anable J., Shires J., Docherty I., 2016.	Forth road bridge closure in United Kingdom	External factor was significant for mode choices and led to reduction in bridge use.

Even though the demand function in reality is formed under the influence of both external and internal factors, in the study we propose to narrow the set of demand factors to internal ones, that is, those that are directly related to the trip around the city. The problem of identifying demand factors for public transport in this case also turns out to be non-trivial, since when studying the transportation preferences of citizens, it is not always possible to assess how they perceive certain characteristics of the trip. For example, economic analysis assumes the existence of direct and indirect costs. If the cost of a trip is most likely perceived by all respondents as an expense, then not everyone is ready to evaluate the time spent on a trip in terms of money. In addition, the monetary value of time for different citizens is different. Moreover, the fixed costs of using a personal car are usually not considered by car owners when choosing transportation mode and assessing the cost of their choice. (Vuchic, 1999). Thus, the identification of factors influencing the choice of means of transportation is complicated by the behavioral features of the choice for each respondent and requires the use of a technique that allows one to neglect these features.

For a monetary assessment of the characteristics of a trip, we propose to take into account the stated preferences, which allow us to determine the attitude of a potential consumer to goods (in our case – services, or characteristics of urban transportation infrastructure) that do not exist yet. The use of the stated preference method in transportation research was introduced in the 1960s for the monetary measurement of travel costs. The method assumes that the respondent chooses one of two hypothetical options based on some designated characteristics (Wardman, 2014). In the case of the formation of urban transportation policy tools, such an approach seems reasonable since the policymakers must first assess the possible reaction of citizens to the proposed novelties. Despite the problem of estimation bias, this method is one of the most accurate methods for predicting the transportation behavior of city residents while implementing any regulatory changes (Cordera et.al., 2022).

The direct cost of using public transport services will be determined by public transport tariffs. The direct costs of using private cars will include the cost of fuel to travel from point A to point B, but may also include measures to increase both the fixed costs of using private cars (for example, a vehicle tax or the cost of parking spaces at home), and variable costs (including the cost of parking at the destination (for example, in the city center), toll roads, paid entrance to the

city center, etc.). At the same time, indirect costs of using private cars - transport taxes, maintenance costs, fines - are usually not taken into account by car owners.

Comparison of the cost of using public transport and a private car, while simultaneously assessing the difference in the time spent on a trip when using them, allows us to assess the monetary cost of time for citizens.

Comparison of the cost of using public transport and a private car, while simultaneously assessing the difference in the time spent on a trip when using them, allows us to assess the monetary cost of time for citizens. On the other hand, it allows comparing the value of vehicle choice factors for different population groups and pays attention to more significant factors for target groups (for example, motorists or students). The effectiveness of the chosen measures is determined by the ratio of the increase in public transport passengers while reducing the number of trips by private car.

Research setting and preliminary results

To assess the monetary value of time for citizens, we conducted a survey among residents of St. Petersburg in March 2022. The survey was conducted in groups of city districts in the social network VK. The sample size was 344 respondents. The questionnaire included questions related to the socio-economic characteristics of the respondents (gender, age, marital status, level of education, income level, job availability, personal car, children, etc.), characteristics of the living environment (housing category, time on the way to the city center, time to the nearest public transport stop, etc.) as well as behavioral characteristics (transport used when traveling, use of park and ride, frequency of use of public transport, etc.). The behavioral characteristics section of the questionnaire included questions to identify stated preferences, where respondents were asked to choose between two travel options depending on the following parameters:

- travel time;
- start time of the trip;
- end time of the trip;
- fuel expenses (for a personal car);
- the cost of a trip by public transport;
- number of transfers (for public transport);
- interval of movement (for public transport);
- fare on a toll highway;
- the cost of an hour of parking in the city center;
- probability of being late to the destination by 15 minutes.

The questions were designed in such a way that the respondent made a choice between travel options from point A to point B, first based on various characteristics (type of transportation mode, travel time, travel cost, mode reliability, etc.). This allowed us to indirectly estimate the monetary value of these characteristics for each respondent: comparing answers to different questions shows how much money a person is willing to spend to save one minute of time or how many minutes a person is willing to spend to save a certain amount of money.

Although the stated preference method allows us to estimate the cost of any characteristics of a trip (including, for example, factors such as the occupancy of public transport and the novelty of the rolling stock), for this study we settled on the cost of travel time. Respondents were asked to choose between two options for traveling by private car, where the first option was to travel on a regular road, and the second option was to use a toll road with reduced travel time. The ratio of the travel time difference to the cost difference and the proportion of respondents who chose to travel on a toll road makes it possible to estimate the cost of travel time.

$$C_t = \frac{(C_{toll} - C_{free}) \cdot N_{toll}/N}{t_{toll} - t_{free}}$$

Where $C_t = \text{time cost}$, $C_{toll} = \text{costs of using toll road}$, $C_{free} = \text{costs of using free road}$, $N_{toll} = \text{number of respondents that chose toll road}$, $N = \text{total number of respondents}$, $t_{toll} = \text{travel time for toll road}$, $t_{free} = \text{travel time for free road}$.

It is to note that the use of free road is not costless since the driver has to pay for gasoline. Since the use of toll road allows to reduce travel time, it also reduces gas cost.

Figure 1 shows the statistics on time cost for various groups of respondents depending on such socio-economic characteristic as possession of kids and such behavioral characteristics as private car use and attitudes towards travel time, trip cost, trip convenience, trip comfort, and availability of knowledge about the accurate trip time.

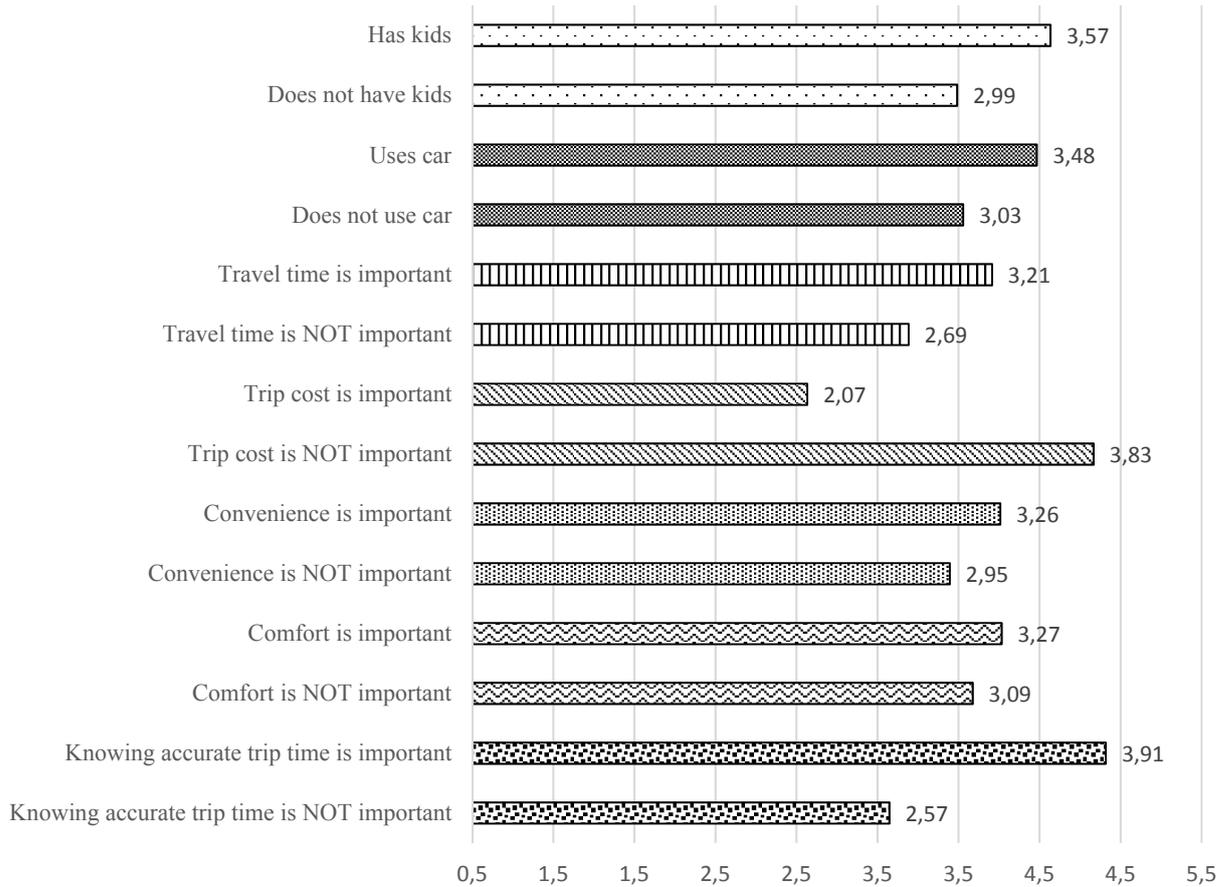


Figure 1. Time cost for various groups of respondents

These results indicate that respondents having kids are ready to pay more to reduce the travel time (one minute of travel time costs 3.57 rubles versus 2.99 rubles for those who do not have kids). Surprisingly, car users occur to value time less than non-users (2.57 vs. 3.03) when it comes to the choice between free and toll road. Respondents that signified importance of trip time valued travel time more than those who did not (3.21 vs. 2.69). The most drastic difference occurred between respondents who value trip cost and those who do not (2.07 vs. 3.83). A slight difference is between those who value convenience (3.26 vs. 2.95) and comfort (3.27 vs. 3.09). Simultaneously, factor of awareness about the accurate travel time proved to be more significant (3.91 vs. 2.57). Such estimations can be used not only for determination of prices for different elements of urban transportation infrastructure, but also as quantitative (“cardinal but not ordinal”) measured of consumers preferences concerning different characteristics of different transportation modes.

Conclusion

The stated preference method allows for a direct comparison of the factors influencing vehicle choice. So, for example, if a respondent is asked what characteristic of a trip is preferable for him, he is very likely to choose something really attractive from the proposed list of characteristics. However, when studying the stated preferences, we get a cost estimate of various characteristics, which is more reasonable and objective. Therefore, it is necessary to conduct further research with an increase in the sample to test the hypothesis of the need to determine the cost of time, instead of simply ranking the various characteristics of private and public transport.

In a pilot study of the stated preference method, he showed the feasibility of using it to study the transport preferences of citizens in order to form an urban transport policy.

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Access to Healthcare and Digitalization

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Abstract:

Waiting time in a queue for a health care visit is one of the indicators of a doctor's accessibility. Digitalization reforms in the health care system in Russia during 2012-2016 involved the implementation of 'terminals' or 'infomats', allowing patients to view a doctor's available time and sign up for a visit. The research studies using the micro-level data about Living Standards conducted by the Federal State Statistics Service, which is representative on the regional and federal levels. Waiting time is measured as self-reported time by a patient that he/she spent waiting in a queue to see a doctor. The results of the research show a negative association between the usage of terminals and the waiting time in a queue. In addition, the opposite effect of terminals in different regions is discussed.

Keywords: *waiting time, terminal, infomat, health services, e-health, accessibility, inequality*

1. Introduction

Accessibility and quality of healthcare are among the most important indicators of socio-demographic development in society. The Russian healthcare system provides universal free medical help to its citizens based on compulsory health insurance. Ideally, all groups of people should receive medical services of the same quality and have equal access to primary care. However, the Russian healthcare system is struggling with the problem of the ineffective organization of medical facilities, resulting in long queues, which impede people's access to healthcare.

During the last decade, digitalization measures have been taken in Russia in the form of systems of electronic registration for medical appointments through websites and terminals. Thus, we want to find out whether these measures had any effect on the ability of people to receive medical help. In our study, we want to focus on the terminals that are also known as infomats - special electronic devices that are set up in the medical facilities to remove an intermediary of an administrator while signing up for the appointment. The existing research for Russia covers the general results of information technologies implementation in one medical center (Gerasimov et al., 2017). Although it contains a description of initiatives implemented to improve healthcare, the research lacks a detailed evaluation of the effectiveness of the measures.

In this study, we discuss the access to healthcare system in Russia through the prism of waiting time in a queue. Identification of the influence of terminals' usage on the waiting time will help healthcare managers to understand whether it is viable to set up terminals to decrease waiting time for an appointment. This research focuses on the influence of terminal usage on waiting time, using data from the Complex Monitor of Living Conditions Survey in 2014 and 2016.

2. Background

The primary theory the study is based on is the Behavioral Model of Health Services Use, suggested by Andersen (2008). It helps to incorporate both patient-related and medical system-related factors. The model implies that the usage of health services can be described as a function of their predisposition to use services and factors that can either lead to or impede the need and use of the healthcare system (Andersen, 2008). The Behavioral Model of Health Services Use has a wide application in studies that investigate the usage of health services.

The evidence that digitalization improves operational effectiveness and efficiency in healthcare systems is as follows: Barnett et al. study (as cited by Darker et al., 2018) suggests that

innovations in medical systems, including digitalization, drive improvement in operational management in the forms of lowering costs and improving access and efficiency. According to Sarv and Rajiv (2003), using E-Health in hospitals is becoming increasingly important for effectively executing clinical/administrative processes and connecting internal processes to other entities.

Different research suggests that waiting time can be an indicator of access to health care (Siciliani & Verzulli, 2009; Sheiman & Richardson; Abásolo et al., 2013; Johar et al., 2012; Martin et al., 2020; Moscelli et al., 2017) and the higher it is, the worse is the access.

Moreover, since geographical factors also can affect the access, we should keep in mind that Russia is an extensive country with many regions and interregional heterogeneity of health status is present there (Shartova et al., 2021), which implies differences in the effectiveness of regional health care systems and allows for the hypothesis that the effect of using terminals can also be heterogeneous.

3. Method

3.1. Data

We use the dataset of the “Comprehensive monitoring of living conditions” for the years 2014 and 2016 collected by Federal State Statistics Service, since in these years the variable representing usage of terminals is present. The goal of the monitoring was “to receive statistical information, representing real living conditions of Russian households and their needs in a safe and favorable environment, healthy lifestyle, children's upbringing and education, increasing working, professional and social mobility, betterment of housing conditions, establishment and development of sociocultural connections. The data is representative on the federal and regional levels since 2014, the random sampling approach is used¹².

The dependent variable in our analysis is time spent in a queue to a physician. It is measured in minutes using the question “How much time did you spend waiting for an appointment or seeing a doctor?”. This question was asked only to those respondents who applied to a medical organization for outpatient care current year. The average time in a queue in 2014-2016 years was 42.18 minutes. To assess the effect of digitalization on waiting time, we choose the usage of the terminal to sign-up for the visit. This variable is binary variable, which is equal to 1, if the respondent answered “Yes” to the question “Have you ever made an appointment to a doctor using a terminal installed in a medical organization?” and 0 otherwise. The percentage of respondents who used terminals, rose from 19.67 to 27.41 in 2016, comparing with 2014.

3.2. Data description

During the preparation of the data, several procedures were made. Firstly, observations where the respondent indicated that he/she works in a medical sphere were eliminated since we assume that medical healthcare workers might be able to get the appointment faster. Also, only the years 2014 and 2016 were kept in the data since the question about the terminal usage was asked only in those years. The descriptive statistic of the variables used is presented in Table 1.

	mean	p50	sd	min	max
Time spent in queue to a physician	42.17505	30	38.75929	0	480
Basic or high school	.2712374	0	.4446009	0	1
Vocational training	.4733293	0	.499291	0	1

¹ Complex monitoring of living conditions survey 2014 // Federal State Statistics Service [website]. URL: https://gks.ru/free_doc/new_site/KOUZ14/survey0/index.html.

² Complex monitoring of living conditions survey 2016 // Federal State Statistics Service [website]. URL: https://gks.ru/free_doc/new_site/KOUZ16/index.html

Tertiary training	.2554333	0	.436107	0	1
Household income per household member	15606.54	12500	10604.38	416.6667	275000
Age	55.08251	57	17.08161	18	99
Age-sq	33.25861	32.49	18.32233	3.24	98.01
Married, yes=1	.5704701	1	.4950119	0	1
Good	.2019313	0	.4014436	0	1
Satisfactory	.5838083	1	.492929	0	1
Bad	.2142603	0	.4103106	0	1
Chronic condition, yes=1	.5062562	1	.4999637	0	1
Urban resident, yes=1	.7123049	1	.4526908	0	1
Employed	.482814	0	.4997074	0	1
Unemployed	.0287064	0	.1669811	0	1
Inactive	.4884796	0	.4998701	0	1
Time spent to book a visit	17.50263	10	20.52836	0	599
Physicians per 1000 capita	4.740733	4.630548	.9544777	2.678243	8.194209
Observations	87193				

Table 1. The descriptive statistics for the variables.

3.3. Methodology

Waiting time for medical care can depend on the region of residence, or on the type of visit. As our dependent variable is count variable, we can use Poisson regression model. But if we violate the assumption that the variance is equal to the mean, we should use the generalization of the Poisson regression – negative binomial model.

In our study, the overdispersion problem exists, that is why, we cannot rely on the results of the Poisson regression model (Gardner, Mulvey, Shaw, 1995). Besides, we should consider both individual and regional variation, thus, we use two-level random-coefficient negative binomial model. Two-level model is used to allow one or more of the slope coefficients and the intercept vary across regions (Leckie, et al., 2020). The advantage of the random-coefficient model is that we can control the regional heterogeneity of the waiting time in a queue. The essence of the model is that the value of the coefficient for each region is calculated, averaged and the dispersion of the coefficient is calculated.

The estimated model is as follows:

$$y_{ij} = x'_{ij}\beta + z'_{ij}u_j + e_{ij},$$

where x_{ij} is the vector of individual- and regional-level covariates (the usage of terminal, the vector of exogenous variables (socio-economic characteristics of the individual and contextual characteristics) determining the outcome and the regional differences of the healthcare system), z_{ij} is a vector of individual- and regional-level covariates (an intercept and a subset of the unit-level covariates in x_{ij}), u_j is the vector of cluster random coefficient effects.

4. Empirical results and conclusion

4.1. Results and discussion

This work is devoted to the study of the relationship between the waiting time in a queue and the usage of the terminals in medical organizations in Russia in 2014 – 2016. Table 2 presents the results of the estimation of multilevel negative binomial models based on the sample of total population; Tables 3 and 4 show the estimation results on subsample of urban and rural population, respectively. As we can see, in all models (columns (1) – (4) in Tables 2 – 4) the dispersion parameter (alpha) is significantly greater than zero, which indicates that the data are overdispersed and a negative binomial model is better than a Poisson model.

The respondents, who use terminals to sign-up for the visit, compared to non-users, holding the other variables constant, are expected to spend less time waiting in a queue – by a factor of 0.956 (column (4) in Table 2). The reported likelihood-ratio test shows that there is enough variability between respondents to favor a two-level negative binomial regression over negative binomial regression without random effects. In the urban area the use of terminals is associated with lower waiting time (by a factor of 0.94 for the respondents, who use terminals) at

a 99% confidence level (column (4) in Table 3). In the rural area we don't observe any significant effect of terminals (column (4) in Table 4).

The variance of the terminal usage coefficient is greater for the rural area. The fact that terminal usage decreases waiting time in a queue only for urban population can be explained by overall low quality of healthcare system in rural areas or low level of implementation the terminal use in such areas.

Random coefficient model allows to compare the effect of usage of terminals on waiting time for different regions. The slope coefficient varies from -0.37 to 0.42 (for the total population), which shows that terminals can either decrease or increase waiting time in a queue.

	(1)	(2)	(3)	(4)
Time spent in queue to a physician				
Used a terminal, yes=1		0.961*	0.957*	0.956**
		(0.0172)	(0.0167)	(0.0163)
Male		1	1	1
		(.)	(.)	(.)
Female		1.035***	1.035***	1.035***
		(0.00656)	(0.00652)	(0.00649)
Basic school or high school		1	1	1
		(.)	(.)	(.)
Vocational training		1.015	1.014	1.013
		(0.00871)	(0.00869)	(0.00854)
Tertiary training		0.993	0.993	0.992
		(0.0101)	(0.0101)	(0.00994)
ln(Household income per household member)		0.937***	0.937***	0.937***
		(0.0103)	(0.0102)	(0.0101)
Age		1.002	1.002	1.002
		(0.00140)	(0.00141)	(0.00143)
Age-sq		0.996**	0.996**	0.996**
		(0.00129)	(0.00130)	(0.00132)
Married, yes=1		1.025***	1.024***	1.024***
		(0.00700)	(0.00701)	(0.00680)
Good		0.936***	0.939***	0.938***
		(0.0167)	(0.0167)	(0.0155)
Satisfactory		1	1	1
		(.)	(.)	(.)
Bad		1.057***	1.057***	1.058***
		(0.0127)	(0.0128)	(0.0120)
Chronic condition, yes=1		1.100***	1.099***	1.098***
		(0.0111)	(0.0111)	(0.0113)
Rural		1	1	1
		(.)	(.)	(.)
Urban		1.027	1.026	1.026
		(0.0211)	(0.0210)	(0.0208)
Employed		1	1	1
		(.)	(.)	(.)
Unemployed		0.965	0.965	0.964
		(0.0181)	(0.0179)	(0.0188)
Inactive		0.992	0.991	0.991
		(0.0109)	(0.0109)	(0.0105)
2014		1	1	1
		(.)	(.)	(.)
2016		0.828***	0.829***	0.898***
		(0.0401)	(0.0406)	(0.0233)
ln(Time spent to book a visit)		1.281***	1.281***	1.280***
		(0.0140)	(0.0138)	(0.0141)
Ln(Physicians per 1000 capita)				15.31*
				(20.80)
Constant	42.01***	40.17***	40.20***	0.347
	(0.983)	(4.889)	(4.884)	(0.823)
/				
lnalpha	0.567***	0.508***	0.506***	0.502***
	(0.0164)	(0.0152)	(0.0152)	(0.0153)
var(_cons[regions])	1.045***	1.038***	1.040***	1.249
	(0.00876)	(0.00826)	(0.00851)	(0.235)
var(used_terminal[regions])			1.018***	1.018***
			(0.00362)	(0.00344)
Observations	87193	87193	87193	87193
AIC	813386.4	803254.3	803014.0	802344.7
BIC	813414.5	803432.5	803201.5	802541.6
ll	-406690.2	-401608.2	-401487.0	-401151.4

N_clust	83	83	83	83
chi2		1535.3	1596.3	1688.1
p		1.30e-317	0	0
chi2_c	4671.5	3643.1	3885.4	4549.4
p_c	0	0	0	0

Exponentiated coefficients; Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2. The estimated multilevel negative binomial models. Sample of total population. The table shows incidence rates

	(1)	(2)	(3)	(4)
Time spent in queue to a physician				
Used a terminal, yes=1		0.948** (0.0186)	0.942** (0.0194)	0.940** (0.0187)
Male		1 (.)	1 (.)	1 (.)
Female		1.037*** (0.00815)	1.037*** (0.00815)	1.037*** (0.00807)
Basic school or high school		1 (.)	1 (.)	1 (.)
Vocational training		1.007 (0.0102)	1.006 (0.0102)	1.006 (0.0101)
Tertiary training		0.985 (0.0128)	0.984 (0.0127)	0.983 (0.0125)
ln(Household income per household member)		0.925*** (0.0124)	0.925*** (0.0122)	0.927*** (0.0125)
Age		1.002 (0.00145)	1.002 (0.00146)	1.002 (0.00145)
Age-sq		0.997* (0.00136)	0.997* (0.00137)	0.997* (0.00137)
Married, yes=1		1.024** (0.00928)	1.024** (0.00937)	1.024** (0.00909)
Good		0.936** (0.0207)	0.939** (0.0207)	0.939** (0.0193)
Satisfactory		1 (.)	1 (.)	1 (.)
Bad		1.056*** (0.0139)	1.056*** (0.0141)	1.058*** (0.0129)
Chronic condition, yes=1		1.081*** (0.0135)	1.081*** (0.0134)	1.080*** (0.0135)
Urban		1 (.)	1 (.)	1 (.)
Employed		1 (.)	1 (.)	1 (.)
Unemployed		0.964 (0.0242)	0.964 (0.0239)	0.965 (0.0252)
Inactive		0.995 (0.0140)	0.994 (0.0139)	0.995 (0.0136)
2014		1 (.)	1 (.)	1 (.)
2016		0.807*** (0.0518)	0.807*** (0.0523)	0.896*** (0.0277)
ln(Time spent to book a visit)		1.268*** (0.0150)	1.269*** (0.0148)	1.267*** (0.0150)
Ln(Physicians per 1000 capita)				21.66* (29.22)
Constant	42.23*** (1.033)	49.41*** (7.403)	49.17*** (7.201)	0.228 (0.542)
/				
lnalpha	0.555*** (0.0179)	0.499*** (0.0156)	0.497*** (0.0156)	0.490*** (0.0156)
var(_cons[regions])	1.049*** (0.00873)	1.044*** (0.00828)	1.046*** (0.00867)	1.300 (0.265)
var(used_terminal[regions])			1.024*** (0.00464)	1.024*** (0.00450)
Observations	62108	62108	62108	62108
AIC	578756.0	571812.7	571594.6	570882.4
BIC	578783.1	571975.3	571766.3	571063.2
ll	-289375.0	-285888.3	-285778.3	-285421.2
N_clust	83	83	83	83
chi2		1408.9	1490.7	1658.8
p		2.06e-291	4.96e-309	0
chi2_c	3654.9	2793.9	3014.0	3728.1
p_c	0	0	0	0

Exponentiated coefficients; Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3. The estimated multilevel negative binomial models. Sample of urban population. The table shows incidence rates

	(1)	(2)	(3)	(4)
Time spent in queue to a physician				
Used a terminal, yes=1		0.997 (0.0247)	0.969 (0.0281)	0.969 (0.0282)
Male		1 (.)	1 (.)	1 (.)
Female		1.032** (0.0102)	1.031** (0.00993)	1.031** (0.00993)
Basic school or high school		1 (.)	1 (.)	1 (.)
Vocational training		1.029* (0.0143)	1.029* (0.0140)	1.029* (0.0141)
Tertiary training		1.014 (0.0195)	1.015 (0.0193)	1.015 (0.0193)
ln(Household income per household member)		0.957* (0.0177)	0.956* (0.0176)	0.956* (0.0176)
Age		1.004 (0.00299)	1.004 (0.00299)	1.004 (0.00300)
Age-sq		0.994* (0.00251)	0.994* (0.00253)	0.994* (0.00253)
Married, yes=1		1.019 (0.0117)	1.019 (0.0115)	1.019 (0.0115)
Good		0.934*** (0.0189)	0.933*** (0.0187)	0.933*** (0.0187)
Satisfactory		1 (.)	1 (.)	1 (.)
Bad		1.054** (0.0207)	1.054** (0.0205)	1.054** (0.0205)
Chronic condition, yes=1		1.125*** (0.0173)	1.125*** (0.0173)	1.125*** (0.0173)
Employed		1 (.)	1 (.)	1 (.)
Unemployed		0.967 (0.0388)	0.967 (0.0380)	0.966 (0.0381)
Inactive		0.977 (0.0154)	0.976 (0.0153)	0.976 (0.0153)
2014		1 (.)	1 (.)	1 (.)
2016		0.881*** (0.0238)	0.883*** (0.0238)	0.885*** (0.0226)
ln(Time spent to book a visit)		1.306*** (0.0203)	1.306*** (0.0202)	1.306*** (0.0202)
Ln(Physicians per 1000 capita)				1.088 (0.303)
Constant	40.33*** (1.306)	29.14*** (5.119)	29.69*** (5.247)	25.69*** (13.21)
/				
lnalpha	0.571*** (0.0202)	0.506*** (0.0188)	0.503*** (0.0187)	0.503*** (0.0187)
var(_cons[regions])	1.084*** (0.0186)	1.064*** (0.0191)	1.064*** (0.0192)	1.065*** (0.0200)
var(used_terminal[regions])			1.042*** (0.0130)	1.042*** (0.0130)
Observations	25085	25085	25085	25085
AIC	233635.1	230420.5	230351.8	230353.6
BIC	233659.4	230566.9	230506.3	230516.2
ll	-116814.5	-115192.3	-115156.9	-115156.8
N_clust	81	81	81	81
chi2		550.0	557.7	567.9
p		1.46e-107	3.38e-109	1.44e-110
chi2_c	1991.5	1731.6	1802.3	1782.1
p_c	0	0	0	0

Exponentiated coefficients; Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4. The estimated multilevel negative binomial models. Sample of rural population. The

table shows incidence rates

4.2. Conclusion

Summing up, we can conclude that the usage of terminals decreases waiting time. Female respondents, married people, individuals with chronic diseases and bad health, who spend more time booking a visit wait longer. The waiting time in a queue is less for the respondents with higher income, good health, who use terminals, and living in the urban area with greater number of physicians per 1000 capita. Based on the analysis, we can confirm that the terminal usage is associated with a decrease in the waiting time in a queue, but only in urban areas, while it doesn't provide opportunities to the rural population.

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Russian Public Procurement and National Innovation Policy

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Abstract:

This paper investigates the analysis of the Russian innovation policy in the regulation of public procurement based on the methodology of narrative economics. Public procurement is an important part of the Russian innovation system because its share is about 30% of the national GDP. The narrative analysis showed that the actors of the Russian innovation system understand the importance of public procurement for its development. It is also confirmed by the popularity of the Russian mass media's innovation and public procurement narratives. However, the national policy in the field of innovative procurement has certain regulatory failures. Despite the reforms of the public procurement system over more than ten years, it still does not allow for innovation development. Consequently, the government should reconsider its policy on regulating innovative public procurement. These conclusions obtained with the narrative analysis confirm the findings made earlier at the previous stage of the research.

Keywords: *Public procurement; innovation policy; narrative economics; national innovation system; institutional economics.*

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Introduction

Two federal laws cover the public procurement system in Russia: 1) Federal law "On the contract system in the field of procurement of goods, works, services for state and municipal needs" No 44-FZ (Law No. 44)¹ and 2) Federal law "On the procurement of goods, works, services by certain types of legal entities" No 223-FZ² (Law No. 223). Law No. 44 regulates the procurement of federal, regional and municipal authorities, state and budgetary institutions. Law No. 223 governs the procurement of state corporations, state-owned companies, natural monopolies, etc. To understand the scale of this sector, it should be noted that procurement of the largest Russian companies controlled by the government, such as Rosneft, Gazprom and Russian Railways are covered by this law. Public procurement is a significant part of the Russian national economy, its share in recent years has been slightly less than 30% of the national GDP (Bar chart 1).

Therefore, due to its significant share in the Russian gross domestic product, the government can broadly apply public procurement for the development of its national innovation system. Nevertheless, the potential of using public procurement to develop the national innovation system has not yet been realised (Chernykh and Koshakreva, 2019), so it is vital to identify the reasons for these problems.

¹ Federal Law of April 05, 2013 'On the contract system in the field of procurement of goods, works, services for state and municipal needs' No 44-FZ

² Federal Law of July 18, 2011 'On the procurement of goods, works, services by certain types of legal entities' No 223-FZ



Bar chart 1 - The share of the Russian public procurement in national GDP³.

Methodology

Interdisciplinary research allows for complementing and expanding the subject boundaries of the social sciences (Volchik, 2015); in legal studies, it is used for understanding law as a social phenomenon taking into account law and its environment. Interdisciplinary legal research provides a more comprehensive view of a specific topic, can lead to more informed and balanced judgment and is suitable for policy recommendations (Siems, 2009).

Public procurement is a market (more precisely, a quasi-market because the demand is fully formed by the government (Korytsev, 2009)), that is, an economic category; therefore, economic analysis and the methodology of institutional and narrative economics can be applied here.

The key idea of the institutional economics approach is not to be limited to the analysis of economic categories and processes in their pure form but to include institutions in the research to take into account non-economic factors. According to Nobel Laureate Douglas North, "institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction" (North, 1990). The institutional environment peculiarities determine the possibilities for developing the national innovation system (Malkina, Volchik and Krivosheeva-Medyantseva, 2014).

Earlier, as part of the research of national innovation policy in the context of public procurement in Russia based on institutional analysis, we have already made the following conclusion (See Tsygankov, Syropyatov and Volchik, 2021) that it is possible to characterise the Russian policy of regulating innovative public procurement as a "no special policy" and identify institutional failures in public procurement regulation within the framework of the national innovation policy, such as:

- the lack of a unified methodological framework that defines "innovative public procurement", as well as uniform criteria for all public agencies for classifying products as innovative (high-tech). Nowadays, there are 11 different documents on the national level;
- the transition has been made from the institutionalisation of the innovation principle in 2014 to the reduction of the provisions aimed at the development of innovations in the Russian legislation in 2022, for example:
 - The list of innovative and high-tech products has become invalid;

³ Kaulbars A. (2021) Report on the results of the expert analytical event "Monitoring the development of the system of state and corporate procurement in the Russian Federation for 2020" (Approved by the Board of the Accounts Chamber of the Russian Federation): <https://ach.gov.ru/upload/iblock/123/442w02xo0vq4unq199jwxnr9mpow972c.pdf> (date of access: 18.05.2022).

- The two-stage tendering (used for innovative procurement) has been excluded from the possible procurement methods.

In these circumstances, the Russian public procurement system is not able to develop innovations.

In this work, the methodology of narrative economics is applied to the analysis of the Russian innovation policy in the public procurement market. Narrative economics continues the tradition of institutional economics in the analysis of economic problems (Volchik, 2022). It is a branch of economic theory that explores the influence of common narratives (stories or expressed explanations of events) on economic processes. Narratives are popular images (stereotypes and "stories") under the influence of which people make decisions in everyday life. According to the Nobel Prize winner Robert Shiller, "narrative is the telling of a story that gives it meaning and significance and is often aimed at teaching a lesson or extracting a moral. Being compared with the story, the narrative can become an interpretation of the events taking place. If we talk about narratives in the field of economics, a narrative can simply be an economic model that is accessible to the general public" (Shiller, 2017). Narrative economics allows us to show how the information (namely, ideas, values, and rules) contained in narratives influences economic choices and economic behavior. Through the narrative analysis, it is possible to obtain a more complete picture of the functioning of institutions and regulatory mechanisms in public procurement to develop the Russian innovation system.

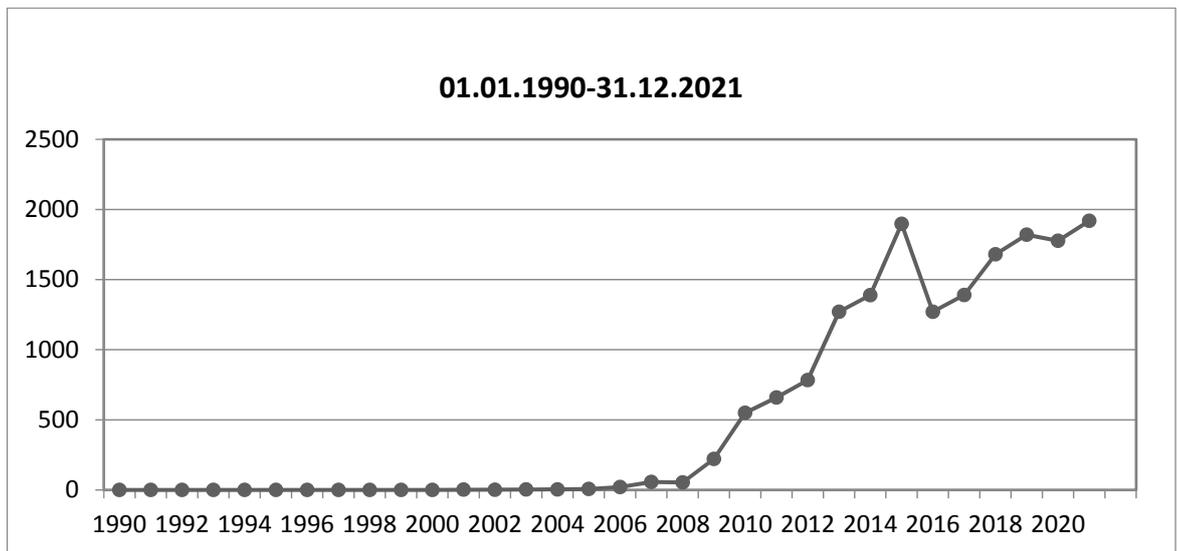
Public procurement and national innovation policy: a narrative analysis

Traditionally, in the scientific literature devoted to innovation, government, business and academies are determined as key actors of the national innovation system (Roman, Varga, Cvijanovic and Reid, 2020). Therefore, narratives of these actors serve as a source of knowledge for us about practices and rules in a particular social system or field of activity, in this case about public procurement and innovation.

The empirical basis for the analysis of narratives for this research consists of 43 rating sources of mass media, journals and Internet resources contained in the electronic database of periodic sources of information "Integrum". The search included eight keywords (phrases) related to public procurement and innovation to identify narratives from the source database. Analysis of the results showed that the government is aware of the importance of public procurement for developing a national innovation system. Representatives of the academies also confirm the importance of public procurement for innovation development. The analysis of narratives also shows that the actors of the national innovation system note the existence of failures in the regulation of innovative public procurement. In addition, it should be noted that there were also failures of innovation policy in public procurement back in 2012. It means that these problems have not yet been resolved for ten years, despite the change in public procurement legislation.

Besides narrative analysis, it is also appropriate to apply content analysis of the frequency of use of these keywords (phrases) to show the degree of virality and influence of narratives. As part of the research, an analysis of information sources (mass media and websites) was carried out based on the Information resource "SCAN-Interfax" (www.scan-interfax.ru). I have built a line graph of mentions of the phrases "public procurement" and "innovation" for the period from January 1990 to December 2021 in all sources contained in this information database.

As can be seen from the line graph, the popularity of the idea of the relationship between innovation and public procurement began to grow about 13 years ago, which, for example, corresponds to the mention of public procurement in 2011 by the Strategy for Innovative Development of the Russian Federation for the period until 2020.



Line graph 1 - Mentions of the words (phrases) "public procurement" and "innovation" in the media and on websites based on the Information database "SCAN-Interfax"⁴.

Conclusion

Public procurement accounts for a significant share of Russia's GDP. The narrative analysis showed that the actors of the Russian innovation system understand the importance of public procurement for its development. It is also confirmed by the popularity of the innovation and public procurement narratives in the Russian mass media. However, the national policy in the field of innovative procurement has certain regulatory failures. Despite the reforms of the public procurement system over more than ten years, it still does not allow for the development of innovation. Consequently, the government should reconsider its policy on regulating innovative public procurement. These conclusions obtained with the narrative analysis confirm the findings made earlier at the previous stage of the research.

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⁴ Source: Information resource SCAN. <https://www.scan-interfax.ru> (date of access: 18.05.2022).

Classifying Risk Factors of Workers' Health Impairments in Accordance with Occupational Health and Safety Science Theories: a Narrative Review

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Abstract:

Background: Work settings play an important role in explaining a certain level of injuries or the prevalence of disorders among workers. Safety science theories attempt to identify predisposing determinants of occupational disorders to explain why certain occupational conditions impair employee health. At the same time, theoretical studies rarely explain what particular risk factors (that is, variables) have to be included in these “grouped” determinants. As a result, it is unclear whether some risk factors belong to the same group of determinants in different theoretical models. This lack of clarity could confuse researchers who try to understand which factors are easy to modify, which are not modifiable, and what interventions are needed in occupational health management. In this context, it can be important to examine how the risk factors used in empirical studies can be classified in accordance with safety science theories. Therefore, it could be possible to gain a better understanding what risk factors play an important role in predicting health outcomes in accordance with theoretical explanation. In addition, the expected result could suggest an avenue for a further development of surveys and polls in occupational health to make them compatible with the more established safety science theories. **Objectives:** We attempt to identify the most important groups of risk factors of workers' health outcomes that empirical studies use while taking into account different occupational safety and health theories. **Methods:** A narrative umbrella review relies on a structured examination of relevant literature and a synthesis of the evidence identified. We searched for systematic reviews and meta-analyses that studied employees' risk factors of health outcomes. In order to do so, we used PubMed (Medline), Web of Science, and SCOPUS databases. To be used, all the records had to have been published in an English-language peer-reviewed journal from 2009 to 2019. After that, we collected information about risk factors and their importance to some occupational illnesses and matched these risk factors with the existing occupational safety science theories. **Results:** The results showed that some risk factors were considered to be important predisposing inputs in theories and, indeed, as empirical evidence showed, they are important in practice. At the same time, certain factors were unimportant in empirical studies, although theories stressed that they can be important. In addition, some factors were widely used in empirical research, but it is difficult to explain their role in occupational health from the theoretical viewpoint because they were not explained in detail by the existing theories. Moreover, some factors remained unclassified, and their use implies explanations on the basis of common sense rather than theoretical knowledge. This fact stresses that the current surveys of employees have to be better adjusted to the current occupational health theories to understand the causal mechanisms between risk factors and health impairment better.

Keywords: *workplace, risk factors, working population, health, occupational health, review.*

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1. Introduction.

Employee health is an important aspect for every organization because deterioration in the health of workers invariably leads to an increase in the costs of the enterprise. The most obvious costs will consist in the increased direct costs of sick leaves; at the same time, one cannot ignore the indirect costs associated with the replacement of employees, the additional burden on workers replacing the sick ones, and the decrease in productivity because of illness, both as a result of the absence of the “main” employee at the workplace and of presenteeism, a situation in which an employee who feels bad continues to perform his job duties.

Reducing the risks of workers’ becoming ill requires one to identify key risk factors that can be modified. To improve the health of workers and reduce the impact of negative risk factors, various preventive measures can be used. However, in order to select the most effective interventions in the workplace, it is necessary to understand the most important risk factors that these interventions will aim to prevent.

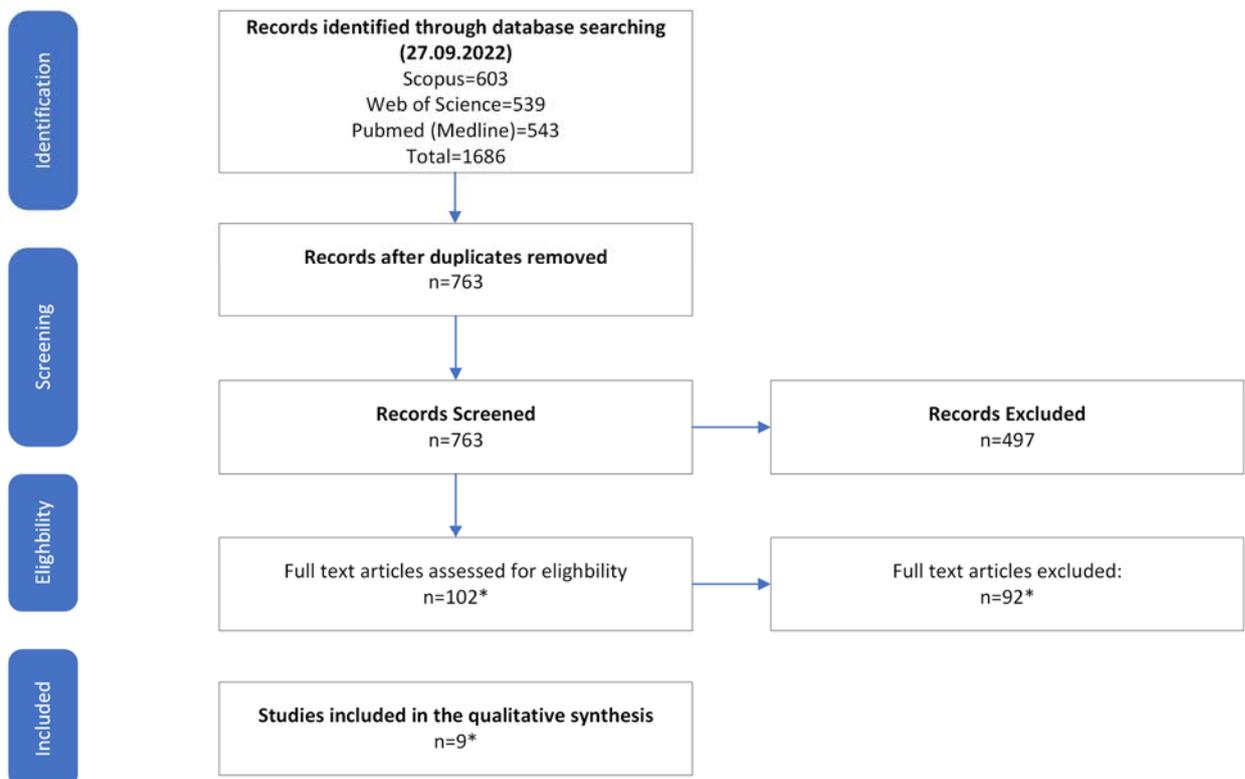
There are various theories explaining the mechanism of influence of various risk factors on certain diseases. Often, theories explain the influence of only some of the risk factors, while there are many empirical epidemiological studies considering various risk factors, many of which are not reflected in existing theories. In our study, we summarized and highlighted the most important groups of health risk factors for workers on the basis of existing theories and empirical studies.

For a preliminary pilot study, we chose to work with musculoskeletal diseases and conducted a systematic review of the literature for this group of diseases that workers suffer from.

2. Methods

We used manual search to find the most established theoretical models explaining the occurrence of some disorders. Also, we conducted a structured search in three databases – Scopus, Web of Science and Pubmed (Medline) - to identify the most relevant systematic reviews of empirical studies about what risk factors influence different worker’s health outcomes. The study identification flowchart is shown in Fig. 1. The systematic reviews identified 9 eligible reviews (see table 1).

We considered six the most established theoretical models: Multivariate Interaction Theory (MIT), Work Compatibility Model (WCM), a cumulative trauma load-tolerance model (CTLTM), Model of job stress and health (MJSH), Job Demands — Resources Model (JDRM), Integrated model (IM). The first four theories explain the influence of multiple factors that influence on health outcomes directly. The last four ones use strain and perceived stress respectively as mediators.



*This outcome is the result of a pilot study

Fig. 1. Flow diagram showing the systematic review identification process.

Table 1.

Characteristics of the included systematic literature reviews.

Article title	Health outcome	Sample	Number of studies
Associations between work-related factors and the carpal tunnel syndrome — a systematic review.	Carpal tunnel syndrome	not available	44
Psychosocial work stressors as antecedents of musculoskeletal problems: a systematic review and meta-analysis of stability-adjusted longitudinal studies.	Musculoskeletal problems	not available	50
Systematic review: risk factors for musculoskeletal disorders in musicians	Musculoskeletal problems	not available	15
The association between awkward working posture and low back disorders in farmers: a systematic review	Low back disorders	not available	not available

Wrist pain: a systematic review of prevalence and risk factors — what is the role of occupation and activity?	Wrist pain	220 brick field workers and 130 controls; 50 brass metal workers; 50 office; 5169 nurses; 680 workers who use power tools;...	not available
Work-related upper quadrant musculoskeletal disorders in midwives, nurses, and physicians: A systematic review of risk factors and functional consequences	Upper quadrant musculoskeletal disorders	Nurses, midwives, physicians	17
The occurrence of musculoskeletal complaints among professional musicians: a systematic review	Musculoskeletal complaints	Professional instrumental musicians and/or music academy students aged 18 and above	21
Work-related psychosocial risk factors and musculoskeletal disorders in hospital nurses and nursing aides: A systematic review and meta-analysis	Musculoskeletal disorders	Hospital nurses and aides	17
The incremental effect of psychosocial workplace factors on the development of neck and shoulder disorders: A systematic review of longitudinal studies	Neck and shoulder disorders	Working populations or populations of working age	18

3. Results

A comparison of risk factors collected from empirical articles and theoretical models explaining their impact on a particular disease showed that most often in epidemiological studies there are risk factors associated with the psychological state of the worker at the workplace and the organizational features of the work process. The distribution of the risk factors from empirical studies between theories presented in the table 2.

Table 2

The distribution of the risk factors from empirical studies between six theoretical models

Groups of risk factors or Factors	WCM	JDRM	MIT
Physical environment	Positive (1) Positive or no association (3) Negative (1)	Positive (2) Positive or no association (1) Positive or negative (1)	
Physical task content	Positive or no association (1)	Positive (1) Positive effect or no association (1)	

Organizational characteristics	Positive (3) Positive or no association (1)	Positive (3) Positive effect or no association (1)	
Social/communication characteristics	Positive (2) No association (1)	No association (1) Positive (1)	
Performance	No data	Positive (1) Positive or no association (1)	
Psychological aspects		Positive (3) Positive or no association (1)	Positive effect (4) Positive effect or no association (1)
Social support		Positive (2) No association (1)	
Job stressors		No data	
Mental task content	Positive (2) Positive or no association (1)		
Satisfaction/dissatisfaction	Positive (1)		
Morphological			Positive (3) No association (1)
Biomechanical			Positive (2) Positive or no association (1) Positive or negative (1)
Groups of risk factors or Factors	MJSH	CTLTM	IM
Physical environment	Positive (2) Positive or negative (1) Positive or no association (1)	Positive (2) Positive or no association (1) Positive or negative (1)	Positive (2) Positive or no association (1) Positive or negative (1)
Physical task content	Positive (1) Positive or no association (1)	Positive (1) Positive or no association (1)	
Organizational characteristics			Positive (4) Positive or no association (1)
Social/communication characteristics			Positive (3) Positive or no association (2)

Performance			
Psychological aspects			
Social support	Positive (2) No association (1)		
Job stressors	Positive (4) No association (1) Positive or no association (1)		
Mental task content			
Satisfaction/dissatisfaction			
Morphological			
Biomechanical			

4. Conclusions

Different models can explain the occurrence of the same disorders; however, they use different numbers of risk factors or groups of risk factors. The narrative umbrella review shows that organisational and psychosocial groups of factors play the most important roles if we match the variables from empirical models with the existing theories. At the same time, the physical environment plays a moderate role in explaining musculoskeletal disorders. As a result, there is a need for a further development of theoretical models and empirical studies to make them more universal for occupational health research.

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Re-thinking Entrepreneurship in Times of Uncertainty

Narrative Analysis of Russian Entrepreneurial Networks

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Abstract:

This paper examines the possibilities and feasibility of using narrative analysis methods to study the structure and dynamics of entrepreneurial networks. The authors analyze the results of interviews with entrepreneurs published on the internet gained by means of automatic content collection service PressIndex, as well as semi-structured interviews with entrepreneurs conducted online, and manual collection of entrepreneurial stories in the form of transcription of video interviews with entrepreneurs from Youtube channels. The preliminary results show that narrative analysis suits the goal of looking for insights that could be impossible to gain by other types of research. The most important id to apply narrative analysis to investigate informal entrepreneurial networks.

Keywords: *narrative analysis, entrepreneurial networks, Russia, formal networks, informal networks*

1. Introduction

Narrative research is a promising research method, that allows to reach hidden data that cannot be obtained otherwise than through interviewing respondents and describing their personal experience (Larty, 2011; Johansson, 2004). Narrative analysis reveals the entrepreneurial story of starting business, role of different people and structures in this process, achievements and fails, goals of the company inbuilt in communal, contextual, and moral dimensions, moreover it helps to find entrepreneurial strategies and the challenges of running an entrepreneurial business embedded in cultural contexts (Lindh de Montoya, 2004).

Narrative analysis is becoming a widely used method for analyzing the strategies of companies and their ways of success (Mehta&Sinha, 2022; Gusel et al, 2021; Audretsch, 2022; Forsman, 2021). The term ‘narrative’ refers to a story or expressed explanation of events that many people want to bring up in conversation or on the news or social media (Audretsch, 2022). The method focuses on actors behavior, on the sequences of events taking place over time, provides a richer and more realistic understanding of the processes involved in an entrepreneurship (Buttriss, 2006). The literature review showed gaps in application of narrative analysis to the networks research in the context of Russian entrepreneurs. So, the goal of the article is to show opportunities of narrative analysis application to the SME business networks analysis.

Our previous research showed (Sheresheva et al, 2022) that interviewed entrepreneurs participated very little in a formal networks and clusters, whereas informal networks were mentioned almost by everybody. This means that it makes no sense to use quantitative methods or analyze the interconnections between participants of formal networks and clusters, since such networks do not contribute to the prosperity of business. In this case, the use of narrative analysis will help us understand how partner networks can really help the development of entrepreneurship in Russia.

The field task of the current study was to analyze the interviews, texts about entrepreneurs, and to find answers to the questions: how do entrepreneurs talk about networks, who do they mention, who supports business, government support, how did they start business, who gave the initial capital, who can be long term partners, type of business ownership, can entrepreneurs rely on partners or get any help of them, formal or informal networks do they prefer, do they participate in associations or non-profit organizations, do they have support from

local government structures or municipality, how do entrepreneurs communicate with each other, on which platform, and etc.

2. Literature review

2.1. Formal and informal entrepreneurial relationships

Participating in the networks has number of advantages, but in the period of starting business entrepreneurs are faced with difficulties in establishing connections and finding partners. Previous social links can help in the network initiation (Sabatini, 2020). Business relationship development is gradual process, that goes through stages, periods, and phases (Edvardsson, 2008).

Sabatini (2020) describes three stages in the entrepreneurial network development: pre-engagement, initial engagement, engagement. Pre-engagement stage includes all activities and preparations that the new venture deploys before network initiation, on initial engagement stage entrepreneurs focus on developing of social connections, exchanging information and joint problem solving to lay the basis for network initiation, and network initiation stage happens when a new venture adapts products, creates bonds and strengthens mutual trust with the actors of the network. This approach can be applied to analyze the role of different partners engagement in the stages of SME development.

While analyzing life narratives of CEOs Korhonen and Leppaaho (2019) found out that building networks is crucial process in several types of entrepreneurs. For example, they revealed diplomatic script of SME owner that characterized by the fact, that entrepreneurial careers build on social relationships and networks. This type of individuals forms identities under the influence of their international relationships, the meaningful people around them, and the effects of their own behaviors on those relationships. So, we shouldn't underestimate the role of networks in entrepreneurial development.

Formal and informal networks both can play pivotal role in the entrepreneurial development. While considering cross-clusters relationships Waltermann et al (2019) focuses on two types of partnership: formal established and informal exchanges between managers. In formal networks clusters managers combine their marketing activities to raise public awareness of certain products and technologies, organizing cross-clusters networking events, acquisition of public funding for cross-clusters R&D projects, political lobbying, and employee training, joint participation in international trade affairs. On the informal level, collaboration of cluster managers usually deals with exchange of know-how, exchange of experience, seeking advice, to obtain information concerning industry Cluster managers commonly connect with peers to acquire intangible resources (networking) needed to fulfil their tasks. The results authors received important role of both formal and informal networks (Waltermann et al, 2019). Even though this analysis was performed on the basis of clusters, we can use the understanding of formal and informal connections for the purposes of our research.

2.2. Narrative analysis application to the network research

Narrative method was first developed by Abell (1987) and was widely spread in management, sociology, politics, history, psychology, economics, archaeology (Buttriss, Wilkinson, 2006). Narrative approach can make a constructive contribution to entrepreneurship research by introducing enhanced conceptual, epistemological, and methodological reflection (Johansson, 2004). This approach offers a good ground of a rich understanding of how individual entrepreneurs are motivated, how do they find opportunities and gain experience, how and with whom they cooperate and establish partnership. Narrative analysis is used nowadays for the different reasons: to analyze cultural context of entrepreneurship (Gusel, 2021; Lindh de Montoya, 2004), describing entrepreneurship success and failures (Forsman, 2021), extend the

entrepreneurship theory (Buttriss, Wilkinson, 2006; Johansson, 2004). It allows to account the way events were interconnected over time, how one thing leads to another, and other causal mechanisms. There are two rules the researcher should follow applying the narrative methods: 1) the researcher needs to precisely define the outcome to be explained, 2) the researcher works backwards from the event to be explained, or from a particular aspect of the event, as part of a wider explanation, that means that while history is ‘lived front to back’, narratives are built backward through time (Buttriss, Wilkinson, 2006).

Narrative analysis consists of several important aspects that need to be considered: entrepreneur portrait and motivations, the start-up growth process and stages, events that took place (Audretsch, 2022), and partnership development (Sabatini, 2021). So, we create our interview guide based on mentioned aspects.

3. Methodology

The field research in the form of narrative analysis was applied. To gather the data, we have considered:

- interviews with representatives of all forms of business types published on the internet, e.g. interviews, texts with a story about an entrepreneur and networks, partners using an automatic content collection service - PressIndex, which additionally provided recommendations in compiling a user request,
- conducting semi-structured interviews with businessmen,
- manual collection of entrepreneurial stories in the form of transcription of video interviews with entrepreneurs from Youtube channels.

The result of the data collection stage, after the removal of repetitions and information garbage was a document with 3 types of content: interviews with Chinese entrepreneurs (20 pieces), interviews with foreign entrepreneurs (20 pieces), interviews with Russian entrepreneurs (315 pieces).

Qualitative content analysis was carried out using the programs QDA Miner 6 (demo version with a limit of the volume of processed fragments to 20) and QDA Miner Lite - without volume limitation, but with a significant limitation of functionality (in particular, the lite version does not allow you to set intersections between labels - the most important option when analyzing content).

At the initial stage, the text was marked up from 300 independent fragments according to the following keys: starting a business, mentioning connections, type of business, event, support, mentioning the state, social business, philosophy/mission.

In the table 1 you can find the categories and tags that were counted.

Table 1. Categories and tags for a text coding

Network	friends/acquaintances
	relatives
	classmates
	counterparties
	father/mother
	diaspora
	partner, companion
Social entrepreneurship	Various mentions of social business activities
Starting a business	after the graduation
	with the help of friends
	in the pandemic

	the implementation of the business idea
	problem that needs to be solved
	business by inheritance
	work experience in the same field
	the only way to earn
	money is to support relatives
	after the army
	after school
	in the early 90s
	in Soviet times
	in the 2000s
Government	support
	barriers
Type of business, entrepreneur	small business
	self-employed
	large business
	manufacturing
	services
	online business
	consulting
	disabled person
	single mother
	large family
	student
Event	business expansion
	transition to another sphere
	is a problem
	crime
	bankruptcy
Mission and vision	mission, vision, phylosophy

4. Data analysis and empirical results

A preliminary analysis of the most frequently mentioned categories in the texts of American, Chinese and Russian entrepreneurs showed an almost complete coincidence of the main topics of the interview. This is actually a business (company, "business", enterprise, project), people, market and consumers (customers), product, money, experience, idea and opportunities. In the texts of American entrepreneurs, the product and experience are mentioned a little more often (perhaps due to the wider use of the word "experience" in the context of "testing"). The texts of Chinese entrepreneurs quite often mention a 'father', as well as the concepts of "development", "management" and "responsibility". A relatively greater emphasis is placed on the category of "time" - this word was encountered 46 times in 10 thousand words. In the selection of texts about Russian entrepreneurs, more often mentions of people / partners. The concept of "development", "opportunity" and "idea" is also more common.

In our opinion, the way people talk about their business largely reflects official rhetoric. So, Chinese entrepreneurs talk quite a lot about the social responsibility of business, while for Russian businessmen associate their business with a breakthrough idea, the search for an free

niches, self-realization and development. Speaking about their business, Russians much more often called it a "project", as if assuming its innovative nature. Table 2 shows the frequencies of the most frequently used concepts (per 10 thousand words of text).

Table 2. The most frequently mentioned nouns in the interview texts of American, Chinese and Russian entrepreneurs

American entrepreneurs	Average amount per 10K words	Chinese entrepreneurs	Average amount per 10K words	Russian entrepreneurs	Average amount per 10K words
Business, companies, office work, project, work	75,3	Business, companies, office work, project, work	118,9	Business, companies, office work, project, work	127,4
People, man	30,9	Time	46	People, man	36,2
Time	18,3	Market, consumers	36,1	Time	22,5
Market, clients	10,6	Development	23,1	Market	16,3
Product	10,3	Management	20,8	Money	10,6
Idea	7	People, man	31,2	Development	9,7
Money	6,6	Technologies, equipment	11,5	Opportunity	7,7
Experience	6,1	Money	13	Product	6,4
Opportunity	5,7	Father	9,4	Idea	3,7
Problem	3,3	Product	7,5	Support	3,7
		Staff	7	Partners	3,5
		Responsibility	6	Experience	3,1

Preliminary results of the analysis of the Russian sample showed (Table 3) that the most frequently mentioned business connections are those with friends and acquaintances, as well as relatives - these categories occur in 20% of text parts. Contractors (suppliers, contractors, banks, etc.) are also mentioned quite often – in 16%. 9% of respondents spoke about the help of parents, especially at the time of business start, a partner or business partner was mentioned in 4% of fragments. There was also mention of classmates (2%) and support of the diaspora (4 fragments or 1%).

3% of respondents attributed their business to social business (working with disabled people, etc.), 6% of respondents identified themselves in interviews as a small business. Many interviews described the stages of business development, we were especially interested in the fact that there were like-minded colleagues, classmates. Institute relations mentioned 7%, fellow soldier – 2%, the help of friends – 2%.

Despite the significant efforts of the government in supporting entrepreneurship, this support, is almost not mentioned. So, in 7 cases, the positive role of concessional lending was noted, in 3 the government is mentioned rather in a negative way - "it was not possible to use help in the pandemic", and in general "it is better to stay away". More detailed information can be found in the table 3.

Table 3. Frequency analysis of mentions in interviews with Russian entrepreneurs

Category	Tegs	Quantity of mentions	Share of mentions
Network	friends/acquaintances	59	19%
	relatives	59	19%

	classmates	7	2%
	counterparties	50	16%
	father/mother	29	9%
	diaspora	4	1%
	partner, companion	12	4%
Social entrepreneurship	social business activities	10	3%
Starting business	after the graduation	21	7%
	with the help of friends	7	2%
	after serving in the army	6	2%
Government	support	7	2%
	barriers	3	1%
Type of business, entrepreneur	small business	19	6%

5. Conclusion and Further Research

Narrative analysis has become widely used in social sciences. In the entrepreneurship research, it allows to describe events, factors, actors that lead to the company success or failure, study phases of relationship development and their role in the SME performance. It helps to find out that formal networks are not often mentioned by entrepreneurs, however, informal networks (relatives help, classmates' participation, friends support) have a huge relevance for the entrepreneurship growth in Russia. Moreover, government assistance more often mentioned in the negative or neutral aspect than as a business support tool. Application of narrative analysis also helps to understand factors that prevent business networks development in Russia.

This paper presents preliminary and incomplete results of a narrative analysis of interviews with entrepreneurs. Further analysis will include the analysis of the contingency of labels – the search for intersections between the categories and characteristics of respondents.

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Role of Self-initiated Affinity Groups in Fostering Women Entrepreneurial Actions

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Abstract:

The research is conducted in a partnership of three self-initiated affinity groups: “Selfmama”, Moscow; “Mamainsuccess”, Saint-Petersburg and “Leika”, Chelyabinsk. They all boost internal empowerment of women in fulfilling their ideas about launching the project, enterprise, or new product. In November-December 2022 these organizations will join their efforts and conduct a shared learning event for women with childcare commitments from these three cities. Current research intends to analyze this intervention, comparing it with prior similar initiatives conducted by these partners and prior literature to answer the following research question: how to boost intrinsic empowerment of entrepreneurial actions of women with childcare commitments in Russian context? The research is grounded on the person-environment fit theory and follows a case-study research design. Theoretical contribution lies in the fields of women education, entrepreneurial intention-action research and studies related to affinity groups. Practical contribution shows education institutions possible clues how to tune learning programs for the analyzed audience, provides hints for women for a better fit.

Keywords: *affinity groups, SIG, self-initiated groups, entrepreneurial intention, Russia*

1. Introduction

The research is focused on domestic self-initiated affinity groups in Russia which unite women with childcare commitments. According to the person-environment fit theory, women are searching for congruency between individual characteristic, like needs, values, intentions, goals, competencies, characteristics, etc., and environmental rewards, demands, roles, traditions, and other sorts of expectations (French et al., 1982).

Environmental expectations in gender research could be explained by “national gender imaginaries” (Wilks, 2019), which differentiate countries by their understanding of the most appropriate aspects for women intrinsic empowerment. Such understanding is affected both by the international gender agenda, spread for example through international NGOs and multinational corporations, and by the domestic institutional environment, including policies, traditions, influencers. The researcher of Wilkd (2019) defines three alternative imaginaries: Scandinavian imaginary of “brave activists”, dealing with the political gaps and challenges; American imaginary of “entrepreneurs”, promoting economic independence and sharing “universal breadwinner” strategy; and South-Korean “caretakers” – focusing on increasing awareness in the area of parenting and caring for children. However, it leaves behind the questions of motivation – what inspires women with childcare commitments to correspond to a certain imaginary and adjust their behavior accordingly?

As all three partners of the current research “Leika”, “Selfmama” and “Mamainsuccess” are not political or educational institutions, they reconsider these three imaginaries from the perspective of direction of actions: 1) interest in affecting corporate policies for better career trajectories and higher inclusion in corporate setting, which is close to “activist imaginary”; 2) interest in entrepreneurial opportunities discovered by emergence of a new role (“entrepreneur”) and 3) focus on personal development, including boosting knowledge of parenting (“caretaker”),

but not limited by it, as they often might look for a professional identity shift. Such adjustment could be explained from the preference theory (Hakim, 2000): if women are home/family-centered, work-centered or strive towards balance.

The research question: how can self-initiated affinity groups help women with childcare commitments in Russia to foster women entrepreneurship action? What motivates women to take part in such interventions? Which interventions are perceived as the most valuable? Findings might be interesting for other affinity groups and educational organizations, which provide support for women with entrepreneurial intentions.

We plan to conduct a case-study in Saint-Petersburg; however, the event will unite women from three regions: Moscow, Saint-Petersburg and Chelyabinsk. We follow social constructionism paradigm, assuming that (a) “Multiple realities are constructed through our lives experiences and interaction with others”, and (b) description of “reality is co-constructed between the researcher and researched and shaped by individual experiences” (Creswell and Inquiry, 2007, p. 21). For interviews and coding, as an outcome of literature review, we prepared a list of frames of reference (Piskaryov, 2022), following advised procedure for the paradigm analysis.

2. Theoretical background

2.1. Self-help affinity groups as a form of intrinsic empowerment for women with entrepreneurship intentions

Self-Help Groups. Self-help groups’ initiatives are perceived as valuable interventions for boosting women intrinsic empowerment, as they are formed by women to fulfill their own needs and needs of those, who share similar values. High share of research related to boosting entrepreneurial intentions and leading it to action, is dedicated to rural women in India. For example, research of Mathur and Agarwal (2016) highlights crucial role of such groups in enhancing women decision-making capacity in all spheres of life and at all levels: financial, social, private through development of their bottom-up empowerment. It states that in India women are the largest discriminated community and thus intrinsic empowerment would be more realistic than “top-to-down” extrinsic empowerment, for example, by government or employers. Mathur and Agarwal (2016) analyzed internal empowerment, fostered through self-help groups, initiated by Indian government with a help of banking industry. Specially recruited volunteers organized women self-help groups consisting of around 25 participants in villages to pass programs about health, nutrition, financial and political literacy. Additionally, women individually or as a group entity were taught how to generate income through microfinancing or by joining their assets. Such intrinsic empowerment through extrinsic empowerment strategy was perceived from four steps (Karl, 1995) (Table 1):

Table 1: extrinsic empowerment frame of reference

4) transformative action.	1) building awareness;
3) increased participation and decision-making power, also known as voice;	2) building capacity;

Adopted from Karl (1995)

Brody et al. (2017) in their review summarized positive outcomes: economic empowerment, political empowerment, women’s mobility, women’s control over family planning, psychological empowerment, and decrease of domestic violence. Women were inspired both by their own success and success of their colleagues, furthermore their success changed attitude of their husbands towards them. However, researchers (Mathur and Agarwal, 2016) also reported negative observations mentioned in other studies of self-help groups: some women could not overcome poverty, or combine economic activity with domestic roles, could not generate income or assets, did not raise awareness about governmental and technical

peculiarities needed in their new work. All these problems could be explained by the stereotypes in society and family, which pushed them back to traditional behavior. Supposedly, including men and bigger scope of such projects could increase success of such initiatives.

Amount of research of self-help groups in India was increased significantly, leading this research domain to a mature level, and suggesting quantitative methods. For example, empowerment was measured with three dimensions: autonomy, economic empowerment, and gender relationship (Mohapatra, Sahoo, 2016); or two-dimensions as:

- self-empowerment (1 capacity building and human resource mobilization; 2 Self-development; 3 Perception towards economic factors, 4 Perception towards family; 5 Perception towards environmental saturation.

- and group-empowerment: group solidarity, awareness on sustainability of Self-Help Groups, self-development of Self-Help Group members and assured economic benefits of Self-Help Group members (Vijayanthi, 2000). This stream motivated researchers in other areas, like Ethiopia (Alemu et al. 2018). Key drawback of this research stream is lack of theoretical background.

The resent research shifts their focus to learning events and apply different synonyms for the concept “self-help group” identity-based employee resource groups, caucus, employee networks, employee councils, employee forums, employee boards, business resource groups, communities of practice (Wenger,1998) (Table 2).

Table 2 Paradigm of communities of practice frame of reference

	Practice	Enthusiasm
	Community	Domain

Adopted from Wenger (1998)

Summing up, self-initiated groups have opportunity to foster intrinsic empowerment of women that leads to increased entrepreneurial intention and action.

1.2. Women learning and its effect for entrepreneurial intention and action

There are several models, helping to predict entrepreneurial intention (Figure 1). Current research refers to the theory of planned behavior and entrepreneurial event theory, suggesting that intervention should focus on the following aspects: attitude toward the behavior, subjective norm, perceived behavioral control, perceived desirability, perceived propensity and perceived feasibility (Vodă and Florea, 2019).

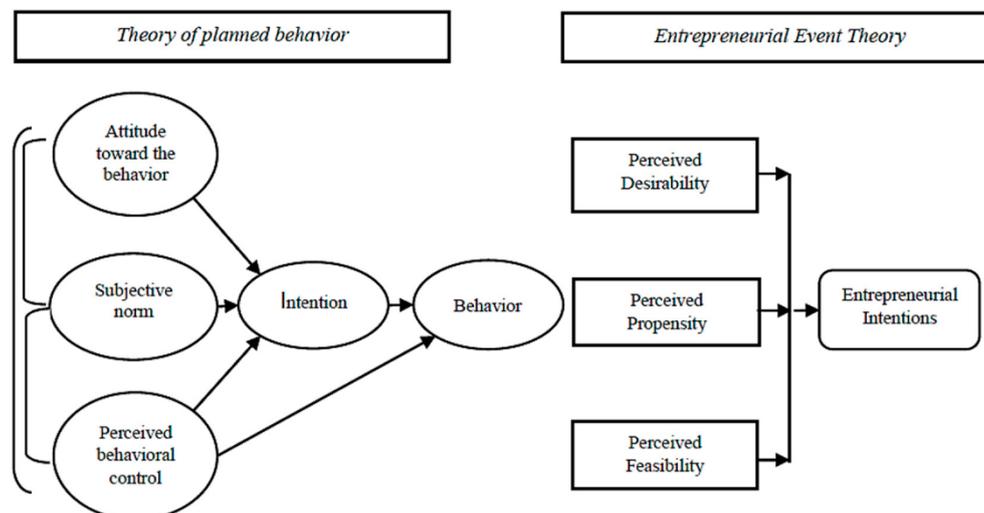


Figure 1: theories predicting entrepreneurial intention

Gender difference in learning events was heavily analyzed by Ruth Simpson, who researched MBA outcomes: for example, in UK and Canada women shared that they gained more confidence, self-worth, self-awareness, lesser level of discrimination towards them; while men were focused on improvements in extrinsic aspects, like pay, status, hard skills (Ituma, 2017). Considering that MBA is still more about hard skills, alternative knowledge environment becomes more useful, which shall be focused on intrinsic empowerment and soft skills, not a set of hard knowledge.

This is in line with research, related to entrepreneurial competencies. For example, Bird (1995) includes alongside with knowledge also certain motives, self-images and social roles.

Rowley (2013), while analyzing competencies of women entrepreneurs suggested a four-factor model:

Factor 1 – 11 personal and relationship competencies, related to communication and relationship building skills, personal traits associated with the internal drivers of entrepreneurs, their motivators and traits: e.g., interpersonal skills, oral communication skills, relationship building, networking with others, integrity, passion for work (love of work), political competence (ability to enhance your position, establish connections)

Factor 2 – 8 hard skills, related to business, e.g. budgeting skills, business operational skills, development of the management system necessary for the long-term functioning of the business, formulating and implementing strategies for taking advantages of opportunities (develop programmes), business plan preparation and writing, etc.

Factor 3 – 9 entrepreneurial competencies, directly associated with the entrepreneurship, e.g. innovation, risk taking, creativity, visioning, idea generation.

Factor 4 – how well the person is dealing with human relations.

Networking is another gender-specific point, which women see as a challenge, especially during a long-lasting maternity leave (above 3 years in Russia). According to prior findings, personal networks for women have priority over business networks in terms of resourcefulness; especially valuable are personal contacts with other entrepreneurs, however their interest towards it should be intrinsic (Bogren et al., 2012). Final important concern is a specific timetable and ability to combine women's learning and networking with the childcare commitments: how well the related event accommodates special needs, and what are they in Russia. Intrinsic empowerment is also associated with proactiveness.

We assume that change in expertise of entrepreneurship-related competencies should increase entrepreneurial intentions by affecting perceived desirability, propensity and feasibility in entrepreneurship; while shifts in personal network affects attitude towards the behavior, subjective norm and perceived behavior control. From the perspective of person-environment fit, the first aspect adjusts perception of person fit to entrepreneurial needs, while the second aspect adjusts understanding of the environment needs, making it closer to the personal characteristics. Change in intentions should also affect change in behavior: entrepreneurial action and possible proactive behaviour is general: e.g. proactive feedback seeking, proactive information seeking, positive reframing, networking (Ashford and Black, 1996).

3. Methods and research design

Sample information. Mamainsuccess is a social consulting project, which was initiated in 2020 in Saint-Petersburg. Core team joined volunteers from Junior Chamber International - global network of young active citizens with high entrepreneurial intentions, and thus big share of interventions they hold aims to inspire entrepreneurial spirit and provide required tools.

Mamainsuccess is partnering with Leika in Chalyabinsk and Selmama in Moscow to propose a learning initiative for women with childcare commitments with entrepreneurial spirit, taking into account Russian context. Prior to this step we plan to analyze previous related event

conducted by all three partners to formulate firstly the understanding of the environment needs and the value of the previous events.

The event is a 2–3-day conference held in the hotel, where participants can take part together with their children. At one time there are 10-15 volunteers in a team and 25-30 participants, who learn. Prior to event there are also several learning events and competition to define winner who will get opportunity to take part in this event.

This case will be compared to the similar interventions in Selfmama, which was fully online; and Leika Both initiatives emerged in 2014 and have a big scope of businesses, which was inspired by their interventions. However, each of them had different strategy of intrinsic empowerment.

Leika inspired coworking space for women with children till 4 years old, "Theater of Good Stories", Art lectures club, club "Walking under the table", school of balance bikes, NPO "Union of Parents", portal "Union of fathers and mothers", "Wings" in Tyumen, "Leika" in Miass, "Leika" in Vladivostok.

Selfmama had also start-up accelerator and was initiating spreading across Russia, however, reduced these initiatives and focused on lectures. However, many start-ups were initiated by its volunteers on similar manner to Leika.

Methods. The research relies on a case-study methodology (Eisenhardt & Graebner, 2007; Yin, 2009; or Gioia et al., 2013). Semi-structured interviews with co-founders, volunteers and participants will be supplemented with the field observations and narratives' analysis.

4. Findings

Current research shows three different strategies of boosting intrinsic empowerment of entrepreneurial actions of women with childcare commitments in Russian context: Selfmama relies on masculine proactivity, following agentic values, while Leika – on communal values and priorities. Mamainsuccess combines people with diverse values and inspire entrepreneurial intentions though intense learning environment.

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Strategic Finance

Board Characteristics and Firm Performance Relationship: Evidence from Russian Markets

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Abstract:

The purpose of this paper is investigating the link between board characteristics and financial performance of Russian companies. In particular, we examine how board size, gender diversity, independence, board interlocks and average age of directors affect corporate performance in a sample of 973 firm-year observations covering the period of 2011 – 2020. Basing on frameworks of agency theory and resource dependence theory, we posit six hypotheses. The obtained results demonstrate that proportion of female directors, interlocking directorships, and board age are positively associated with performance. In addition to that, we provide some evidence that the direction and materiality of this link tends to change over time – in particular, it changes in the period of economic recession that started in 2014. Although findings of the research are subject to some limitations, they can be considered in the process of appointing directors.

Keywords: *board of directors, board characteristics, financial performance, Russian market*

1. Introduction

Seeking the link between board characteristics and firm performance is a long-running concern in corporate governance research. Boards' characteristics are critical in impacting firm outcomes, sustainable development, efficient performance (Johnson et al, 2013). Among characteristics that are considered to be linked with corporate performance, researchers explore gender diversity, board's size, proportion of insiders, average age of directors, CEO duality etc. There is a variety of papers devoted to studying the relationship between the aforementioned factors and performance. The results of these studies are not aligned and provide controversial evidence (e.g., Rhoades et al, 2001, vs Dalton et al, 1998; Pucheta-Martinez & Gallega-Alvarez, 2020, vs Rodriguez-Fernandes et al, 2014). This misalignment of findings drives our motivation to posit several research questions:

1. Whether the key characteristics of Russian corporate boards are connected to financial performance?
2. Which characteristics demonstrate significant and consistent relationship with performance?
3. Does the impact of corporate boards change over time, especially in the crisis period?

The motivation to consider Russia is not driven by the desire to provide additional evidence only. This is no secret that Russian economy has been subject to large economic shocks that occur repeatedly due to external reasons; it is also well-known that there are problems related to corporate governance admitted even at the state level.

This paper exploits a manually collected longitudinal dataset including 105 Russian publicly traded companies and covers the period of 2011-2020. We collected the information on corporate boards from the companies' quarterly reports. Information on financial characteristics of the companies was obtained from annual financial reporting of the selected firms. Techniques of econometric analysis are applied to the collected data in an attempt to address research questions that we formulated before.

As a result of the empirical analysis, we have obtained evidence linking characteristics of corporate boards with financial performance of the companies. More importantly, we provide some evidence that the role of corporate boards is changing over time. Considering the crisis period that started in 2014, we demonstrate that board parameters have different impact on financial performance before the beginning of the recession and after it.

2. Theoretical framework

The nature of the relationship between board features and firm performance can be explained in a variety of ways. One of the most popular and widely used explanations arises from the agency theory, which considers stockholders as beneficiaries whose main goal is maximizing the firm value and performance (Jehnsen & Meckling, 1976). Stockholders delegate the tasks on enhancing corporate performance to professional managers (agents). However, the objectives of managers might be misaligned with those of the stockholders, and this is what gives foundation to agency problem. The additional support to this foundation is provided by negative events related to corporate governance resulting in a massive loss of shareholder's value (Hsu & Wu, 2014). In this perspective, boards of directors can be viewed as a control mechanism to ensure that managers pursue the stockholders' best interests and that issues occurring because of the agency problem are controlled and addressed properly (Fama & Jensen, 1983).

Another popular theoretical foundation linking board characteristics and performance is the resource dependence theory (RDT), which considers boards as a source of the resources provided to the company (Pfeffer & Salancik, 1978). According to the RDT, firms tend to vary the composition of the boards, responding to significant changes in the external environment (Hillman et al, 2000).

There is significant variation in the existing studies regarding the selection of particular board characteristics, approach to empirical research, and the obtained results. Some authors claim that there is not enough consistent evidence supporting the existence of the link between firm performance and boards' characteristics (Kiel and Nicholson, 2003) that opposes other papers that provide evidence of either positive or negative (Abdo, Fischer, 2007) relationship. Some studies demonstrate that there is no correlation at all (Dalton, Dalton, 2011). The same can be said about influence of particular characteristics like board independence, board size, gender composition etc.

Studies devoted to linking board characteristics with corporate financial performance are mostly focused on a single market; moreover, legal frameworks and historical approaches to appointing directors seem to demonstrate no or almost no variation within a single country while they are likely to differ significantly across countries. Studies at the Russian market (Muravyev, 2017; Garanina and Muravyev, 2021) disclose several important characteristics and trends that occur within Russian corporate governance, such as relatively low inclusion of women and foreigners, prevalence of non-executives and small ownership stakes. These studies also reveal positive association between performance and some board characteristics. In particular, there is robust evidence that foreign directors are associated with better performance; having directors that hold directorships in other companies also increases firm value. Berezinets et al (2013) found out that board size has significant impact on financial performance, while independence of the board does not demonstrate any significant link with financial results. Another study by Berezinets et al (2018) suggests that female directors with larger "social capital" have a positive effect on performance.

What is considered important in the studies devoted to Russian companies is that the role of boards changes over time (Muravyev, 2017). The impact of board composition on financial performance is different if considered within post-crisis periods (i.e., 1998-2001 and 2009- 2014) and compared to a baseline period.

Considering the existing literature, we posit several hypotheses that are to be tested empirically.

H1: board size is positively associated with performance, but with decreasing return to scale. Overall, there is evidence that larger boards are associated with better performance (McIntyre et al, 2007). However, too large groups are less likely to reach consensus and work at maximum efficiency.

H2: female representation has a positive association with performance. Such evidence is provided by a plenty of studies and is usually explained by a greater diversity of intellectual capital and positive contribution that female directors bring to discussion process.

H3: board independence is positively associated with performance. In the framework of agency theory, more independent boards provide better monitoring over management.

H4: board age is positively associated with performance. Following the resource dependence theory, we see older board members as more experienced ones.

H5: board interlocks are positively associated with performance. As stated by Boyd (1990), interlocking directorates serve as a channel of access to resources and as a source of broad and diverse experience, and therefore better advice and counseling.

H6: the relationship between board characteristics and firm performance changes over time. Evidence provided by Muravyev (2017) demonstrates that in the post-crisis periods the effect on performance differs. Considering the recession that started in 2014, we expect that the effect on performance would differ comparing to the baseline period which is 2011-2014.

3. Data and methodology

We used the most recent available data on 105 Russian publicly traded companies over the period 2011 – 2020, forming an unbalanced dataset with a total of 973 firm*year observations (after dropping missing values). Financial data was obtained from the companies' annual financial reporting through Bloomberg database, data on capitalization was taken from the Moscow Stock Exchange quarterly reporting, and data related to corporate boards has been collected and aggregated manually using SCRIN, SPARK and corporate websites.

The list of board characteristics that could be linked with performance was selected based on the literature review. We consider following independent variables.

1. Board size is measured as a total number of directors. We expect a non-linear effect of board size on performance; in particular, a quadratic relationship between board size and performance indicators with a decreasing return to scale is expected. Hence, board size is included to the model along with its square.
2. Board independence is measured as the ratio between insider directors and total number of directors.
3. Gender diversity is calculated as a ratio of female board members to total number of directors.
4. Average age of the board.
5. Board interlocks (cross-participation of a single director in multiple boards) is measured as a proportion between a number of board members that hold seats in multiple boards, and a total number of directors.

Aside from the main independent variables, several control variables have been considered for the research.

1. We control for firm size using a natural logarithm of total assets. Following the insight from previous studies (Carter et al, 2003), positive association with performance is expected from company size.
2. Capital intensity is calculated as a ratio of capital expenditures per period to total assets. Previous studies demonstrate variation in estimating the relationship between capital intensity

and performance: e.g., Jorgenson and Wu (2005) claim that higher capital intensity is associated with improvements in performance, while Lee and Xiao (2011) provide opposite evidence.

3. We include age as a control variable considering that older firms are likely to have more stable approaches to board formation, which may differ from those used by more recently formed firms.

4. Leverage is measured as firm long-term debt divided by total assets and represents capital structure. A negative relationship between debt and performance is expected, as previous studies demonstrate that higher debt is associated with lower sustainability and therefore with worse values of performance indicators (Tsuruta, 2017).

The dependent variable is Tobin's Q, one of the most widely used performance indicators. It is calculated as a market capitalization plus book value of debt divided by book value of assets.

Descriptive statistics is presented in Table 1.

Table 1. Descriptive statistics of the key variables

	mean	sd	min	median	max
Tobin's Q	1.14	0,68	0.09	0.98	5.41
RoA	0.09	0.09	-0.39	0.08	0.56
RoE	0.11	0.35	-2.56	0.10	2.12
Board size	8.62	2.40	5.00	8.00	16.00
Board size (squared)	82.13	44.49	25.00	64.00	256.00
Share of insiders	0.24	0.24	0	0.17	1.00
Share of female directors	0.11	0.13	0	0.09	0.83
Average age	47.73	6.84	35.20	47.46	69.82
Share of board interlocks	0.58	0.42	0	0.75	1.00
Firm size	11.20	2.23	5.35	11.29	16.97
Leverage	0.22	0.34	0	0.17	4.55
Capital intensity	0.07	0.05	0	0.06	0.33

3.1. Methodology

To catch the link between board characteristics and corporate financial performance, a regression analysis was used. A generalized model is as follows:

$$Performance_{i,t} = \alpha_i + \beta_1 * Characteristics_{i,t} + \beta_2 * Controls_{i,t} + \gamma_t + \varepsilon_{it}$$

Here *Performance* denotes the performance indicator, which is Tobin's Q; *Characteristics* is a vector of parameters describing the characteristics of the board, that are variables of interest, *Controls* is a vector of control variables described above, α and γ refer to unobserved time-invariant firm-specific effects and time effect respectively.

The second step of the empirical analysis tests for the presence of a structural break. After the events that occurred in 2014, Russian economy turned into recession. Within the analysis, this recession is considered as a structural break. For this purpose, the independent variables of interest have been included to the model along with their product with a dummy that is valued 1 for years 2015–2020 and 0 for years 2010–2014.

4. Empirical results

Table 2 below represents the obtained empirical findings in the context of the baseline model. Board size turned out to have positive relationship with performance with decreasing marginal effect. However, this estimate lacks statistical significance.

Proportion of female directors is positively associated with Tobin's Q at 10% significance level. This evidence corresponds with previous findings described in the literature.

Proportion of insiders is negatively associated with financial performance, which is relatable to the expectations, but this finding lacks statistical significance. However, plenty of previous studies fail to prove consistent evidence that insiders have a significant impact on performance as well.

Board interlocks turned out to have positive and statistically significant relationship with performance. It can be explained within the resource dependence framework, according to which cross- participation in multiple boards may result in broader communication networks, more diverse and universal experience, and better advisory performance of board members.

Average age of board members demonstrated positive and statistically significant relationship with performance. This might be connected with the fact that more experienced directors are slightly more appreciated as board members.

Table 2. Baseline model

Variable	Tobin's Q (FE)	Tobin's Q (RE)	Tobin's Q (Driscoll-Kraay estimation)
Board size	0.155 (0.116)	0.144 (0.105)	0.155* (0.069)
Board size squared	-0.008 (0.006)	-0.008 (0.006)	-0.008** (0.004)
Share of female directors	0.385* (0.222)	0.291 (0.217)	0.385* (0.203)
Share of insiders	-0.200 (0.126)	-0.075 (0.123)	-0.200* (0.099)
Share of board interlocks	0.293*** (0.074)	0.292*** (0.072)	0.293*** (0.042)
Average board age	0.013** (0.005)	0.015*** (0.005)	0.013** (0.005)
Company size	-0.475*** (0.060)	-0.131*** (0.033)	-0.475*** (0.080)
Leverage	-0.127*** (0.046)	-0.143*** (0.044)	-0.127 (0.071)
Capital intensity	2.553*** (0.556)	3.294*** (0.535)	2.553*** (0.551)
Firm age	0.335*** (0.105)	0.194*** (0.070)	0.335 (0.422)
Industry		0.035 (0.022)	
Constant	1.601* (0.834)	-2.131*** (0.610)	1.601 (0.965)
Year variables	Included	Included	Included
F	11.984		2946.796
R ²	0.276		
chi ²		92.573	

Significance levels: *** - 1%, ** - 5%, * - 10%

Control variables are significant in both cases. Higher leverage is associated with worse performance, which is consistent with previous evidence. Company size is also negatively connected to performance, while firm age and higher capital intensity is associated with better performance.

According to the results of the Hausmann test, Fixed effects model is preferable compared to Random effects model, so it will further be considered as the baseline model.

To increase the robustness of the model and provide additional validation of the obtained results, we run the same regression with Driscoll-Kraay estimation of standard errors. Driscoll-Kraay method allows to address potential cross-sectional correlation and provide consistent estimates of standard errors (Driscoll, Kraay, 1998). As can be seen from the output, the estimations obtained by Driscoll-Kraay method are aligned with those provided by the baseline model.

To test Hypothesis 6, we consider the period after 2014, when the recession occurred due to political events and affected Russian economy, and compare it to the baseline period of 2011-2013. Table 3 presents the results of this analysis. Independent variables were included along with their cross-products with dummy variables representing the period after 2014. Similarly to the previous one, this report provides cluster-robust standard errors.

Table 3. Model with structural break

Variable	Tobin's Q (FE)	Tobin's Q (Driscoll-Kraay estimation)
Board size	0.036 (0.129)	0.036 (0.088)
Board size, after 2014	0.157* (0.088)	0.157** (0.051)
Board size squared	-0.001 (0.007)	-0.001 (0.005)
Board size squared, after 2014	-0.007 (0.005)	-0.007* (0.004)
Share of female directors	0.188 (0.297)	0.188 (0.172)
Share of female directors, after 2014	0.287 (0.296)	0.287 (0.301)
Share of insiders	-0.480*** (0.164)	-0.480*** (0.080)
Share of insiders, after 2014	0.426*** (0.160)	0.426*** (0.105)
Share of board interlocks	0.196** (0.093)	0.196*** (0.054)
Share of board interlocks, after 2014	0.118 (0.091)	0.118 (0.111)
Average board age	0.017*** (0.006)	0.017** (0.007)
Average board age, after 2014	-0.015*** (0.006)	-0.015** (0.007)
Company size	-0.559*** (0.062)	-0.559*** (0.086)
Leverage	-0.135*** (0.045)	-0.135 (0.075)
Capital intensity	2.749*** (0.548)	2.749*** (0.528)
Firm age	-0.139 (0.133)	-0.139 (0.490)

Dummy	0.058 (0.479)	0.058 (0.430)
Constant	4.227*** (0.979)	4.227*** (1.621)
F	9.985	258.285
R ²	0.284	

Some remarkable differences with the baseline model can be noticed here. First of all, board size becomes statistically significant after 2014. Proportion of female directors remains positively associated with efficiency. Although statistical significance of this estimate drops after 2014, it can be the result of overall low representation of women within corporate boards and should not be perceived as their insignificance.

Share of insiders now becomes significant but the direction of impact changes after 2014. It may have the following explanation: before 2014, higher proportion of insiders could have been associated with less board independence, but after entering the crisis period, companies demonstrated increasing demand for better advisory function of directors and therefore required presence of directors with firm-specific expertise to resist recession more effectively. Hence, higher share of insiders becomes more appreciated by market. This corresponds to a large extent with the resource dependence framework.

Proportion of directors holding seats in multiple boards turns out to be statistically insignificant after 2014. It might be connected to higher appreciation of diverse expertise in the period of growth that changes for higher demand for directors with firm-specific experience in the period of recession.

The effect of average board age also changes its direction after 2014, becoming negative. This finding is interesting in the concept of resource dependence theory. According to Ahn and Walker (2007), elderly executives are risk-averse and are less likely to undertake change; at the same time, younger directors are more associated with strategic change. In the period of relative economic stability drastic changes are usually not required, and elderly executives has a competitive advantage over their younger counterparts; but during the crisis business might need decisiveness and ability to change the strategy to adapt to changing environment. At this point, younger directors seem to be more appreciated by companies.

The direction and significance of control variables remains unchanged in this model, except firm age.

5. Discussion

The results obtained are quite logically built into existing theoretical concepts and are consistent with the studies devoted to Russia. Positive association between board size and performance is discovered in papers by Muravyev (2017) and Berezinets et al (2013) and is supported by current research. In the baseline model, we do not provide statistically significant evidence linking board independence with performance, neither does none of the existing studies focused on Russian companies (to the best of authors' knowledge). Instead, positive association of gender diversity with performance demonstrated by our baseline model was also discovered in the paper of Garanina and Muravyev (2021). However, hypothesis that board age is linked with performance does not find much support in the study of Muravyev (2017), while Berezinets et al (2013) do not consider this variable at all. Our research provides some evidence that age can be linked with board performance, though the effect caused by this measure is relatively small. Proportion of board interlocks is considered in a study by Berezintes et al (2018), providing evidence linking "social capital" of female directors (measured as their interlock directorships) with better financial performance. To some extent our findings are aligned with this evidence.

More importantly, this paper contributes to the existing studies with some evidence that the role of corporate boards changes in the period of recession. Previous studies demonstrate that companies have to adapt to the changing economic environment, otherwise their performance suffers (Peng, 2004). The most remarkable is that board independence becomes significant and reveals positive association with performance during the pre-crisis period and negative – after the recession begins.

6. Conclusion

This paper aims to investigate the link between corporate boards' characteristics and financial performance. With controlling for firm size, age, leverage, and capital relate to market performance. First of all, representation of women, board interlocks and average age of the board are positively associated with performance and demonstrate acceptable level of statistical significance. This meets our expectations and supports Hypotheses 2, 4, and 5.

Board size has a positive and declining impact on performance but is statistically insignificant and hardly interpretable – hence, Hypothesis 1 can be neither accepted, nor opposed. Proportion of insiders demonstrates no significance in the baseline model, but the situation changes considering model with the structural break. Hence, Hypothesis 3 is correct if considered in the context of economic stability but is rejected in the post-crisis period.

That, in turn, supports Hypothesis 6 which states that the relationship between board structure and performance is subject to changes. It is not only board independence that illustrates this finding; hence, the impact of female directors becomes insignificant in the model with structural break; in addition, the effect of board interlocks is only visible in the baseline period, while in the post-crisis it becomes insignificant. The effect of board age changes direction after recession begins, turning negative.

The results of the research can be considered in the process of appointing directors to the board. Appointing more gender-diverse boards might result in an improvement of corporate performance. In addition to that, directors with firm-specific expertise can also positively affect financial results. However, radical measures such as introduction of gender quotas, or appointing internal candidates only, may have no effect or even reduce performance, so these recommendations should be treated carefully.

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The analysis of the Impact of Sustainability Disclosure on Value of US Listed firms in Telecommunication Service Industry

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Abstract:

Assessment of impact of sustainability disclosures on companies' value is a task of a high interest for academics and practitioners from telecommunication industry. This is underpinned by the growing exposure of telecoms to environmental, social and governance (ESG) risks. ESG disclosure serves as a key channel to inform investors about the efficiency of ESG risk management and controlling practices of the firm and thus can impact the firms' financial performance and market value. However, these are numerous controversies in academic literature on this topic the lack of research examining this issue in telecommunication industry. We closed the research gaps and investigated the impact of ESG disclosure on Tobin-Q of 93 US-listed telecommunication service companies between 2011-2021. We found that aggregated ESG disclosure score positively impacted telecoms' Tobin-Q. Among individual ESG disclosure pillars, only corporate governance positively influenced Tobin-Q while the impact of environmental and social pillars was statistically insignificant. We also analyzed the impact of several individual corporate governance factors on telecom's market value. We found that CEO duality had a significant and negative impact on Tobin-Q. The presence of corporate social responsibility (CSR) committee, greater gender diversity in the Board and the percentage of independent directors in the Board positively affected the value of the telecoms. The result of the study can be applied in developing of ESG rating methodologies of telecommunication companies. They also can assist managers and stakeholders of telecom companies to identify key value drivers of ESG agenda.

Keywords: *telecommunication; ICT; sustainable development; ESG disclosure; Tobin Q; corporate governance*

Introduction

In the last decade, the global telecommunication (telecom) industry has changed significantly and enabled a lot of innovations. These changes have been driven by the rapid dissemination of high-speed internet, mobile devices, big data, cloud technologies, over the top media services or 5G generation mobile networks. Moreover, increasing global connectivity, fueled by COVID-19 pandemic, presents even more opportunities for telecom companies to offer. The list of the recent disruptive technologies includes internet of things, increasing use of satellite communication, artificial intelligence and machine learning, edge computing, etc (Santoso et al., 2019). Indeed, the industry has reformatted into the info-communication space (ICT) where telecommunication and IT are intertwined to provide the customers the large variety of services: from "traditional" voice and data transmission to different kinds of digital services and users applications (Glukhov and Balashova, 2015).

However, these new opportunities come with the significant challenges. They include the raising competition and the threat from newcomers. Other challenges include (1) new project adoption risk; (2) regulatory risks; (3) operational risks; (4) technological risks; (5) macroeconomic uncertainties and others. All these risks drive return on investment capital (ROIC) ever closer to weighted average cost of capital (WACC). This, in turn reduces investors' expectations and mutes the market value of companies in the industry (Mohammad and Wasiuzzaman, 2021).

Perhaps, the most recent challenge for info-communication industry is the dissemination of environmental, social and governance (ESG) investing. As of end-2021, the volume of ESG-related assets of large investors has grown almost 6 times in the last decade and reached around 120 trillion dollars. This trend has significantly changed the attitude of institutional investors toward financing the companies in ICT. Today, investors are ready to provide long-term funding only in those companies that follow the principles of sustainable development. Moreover, several studies showed that successful integration of sustainable practices into companies' strategies and operations can affect the firms' value. This is underpinned by widening of the spread between ROIC and WACC due to increase in firms' competitive advantages, reduction of long-term risks and improvements in investors' expectations (Schramade, 2016). For example, The GSMA, the mobile operators' industry association, conducted research that demonstrated that ESG reduces the cost of capital of ICT companies, provides better operational performance and positively influences stock prices (GCMA, 2020).

The company, in order to convince the stakeholders (customers, investors, employees, suppliers, lenders, and shareholders) that it follows the practices of sustainable development, communicates with them via the ESG disclosure mechanisms. Such disclosure may be both direct in form of ESG reporting or indirect in form of ESG ratings or other scores. ESG disclosure serves multiple purposes: (1) it reduces the informational asymmetry between stakeholders and the management; (2) it improves the reputation of the company; (3) it demonstrates the company's commitment to sustainability; (4) it helps the stakeholders understand the related opportunities and risks that may affect the company; and (5) it helps businesses align their purpose, strategy, and operations to ESG (Porter et al, 2019). Ultimately, the high quality ESG disclosure will positively affect the market value of the firm. (Friede et al., 2020; Fatemi et al., 2017).

However, the controversies in the literature exist about the impact of ESG disclosures the market value of the firm. There were evidences (Atan et. al., 2018; Bullay et al., 2020; Dhailwal et. al., 2011) that ESG disclosure had negative impact on company's cost of capital or performance. Another gap in studies is the lack of research on impact of ESG disclosure on firms' value in ICT industry.

Therefore, the *goals* of this study is to investigate the impact of ESG disclosure on value of listed telecommunication service companies and identify the key factors affecting the value of telecommunications companies for individual significant ESG pillars. We chose Tobin Q as a proxy for the market value of the firms. The sample included 94 telecommunication companies in 2011-2021 listed in USA stock exchanges. The paper contributes to the literature in various ways. It not only studies the relationship not only between ESG-disclosure and market value of the firms in telecommunication industry but also assesses in what extend individual components (environmental, social or corporate governance and their sub-components) affect the value of ICT companies. Lastly, the paper addresses previously underexplored ICT industry. From the practical standpoint, the paper helps to managers of ICT companies to identify key drivers of sustainable development which can affect the value. The results can be also useful for ESG rating agencies for refining the methodologies.

The rest of the paper is structured in the following ways. Section two analyzes the importance of ESG agenda for the participants of ICT industry, provides the thorough literature review of the topic and describes the data source, the methodology and the variables. The results of the model estimation are presented in the section three. Section four gives results' interpretations and discussions. The conclusions are presented in the last section.

2. Materials and methods

2.1 Importance of ESG agenda and practices in info-communication industry

Environmental, social, and corporate governance (ESG) is an important measure of corporate sustainable development, and it also extends and enriches the concept of socially

responsible investment (SRI) (M. Nekhili et al., 2021; Rodionov, et.al., 2018; Koroleva et al., 2020). Environmental pillar includes such major themes as climate change, biodiversity, waste, natural resources, and pollution. The major themes of social principle include human rights, health and society, local and indigenous community engagement, and workforce diversity. And major themes of governance principle are business ethics, politics, executive pay, tax approach, and cybersecurity (Khorin and Krikunov, 2021).

Companies in ICT industry can impact global sustainability via complex, indirect effects on energy consumption, data privacy and security as well governance and transparency (Berawi, 2020). The carbon emissions in ICT come mainly from power consumption and bandwidth usage. The industry currently uses more than 4% of total global power demand but can increase to 10% by 2025. Total carbon emissions from ICT exceeds 0.8 gigatons. Moreover, in the decade 2010-2020 carbon emissions from the industry had increased by more than 100% reducing in increase in the carbon footprint. The shift toward green info-communication is now observed by adopting energy efficient and renewable energy technologies such as cloud sustainability or advanced grid management software (Mohanty and Moreira, 2014).

Academic and practitioners also point out the several social factors which should be of concern in ICT firms: workplace conditions, diversity, employee engagement and belongingness (Zhang and Slijkerman, 2022). Others mentioned important issues such as human rights violations at ICT companies' vendors or leakages of private data of consumers or corruption. On the contrary, telecom companies who implemented social agenda had better financial performance (Sutherland, 2016).

Corporate governance perhaps is the most influential ESG pillar for telecoms, its impact on the firms' financial performance can reach around 60% (Rittenhouse, 2011). In our opinion, important governance issue in ICT companies is the lack of diversity of the leadership. Despite the fact that female board is associated with greater innovative success and better performance, yet there is a the still limited participation of woman in leadership. This is due to harmful stereotypes and a lack of digital confidence on the part of women.

To conclude, telecommunication and ICT companies are exposed to ESG risks which, if not properly managed, can result in decrease in firms' economic profits and market values as well as the loss of investors confidence. On the other hand, to increase chances to attract investments ICT companies must improve the quality of ESG disclosure and evaluate which pillars of ESG agenda and their sub-components affect the market value of the firms.

2.2. Literature review

a) Impact of ESG pillars on firms' value

The outcome of studies which test the impact of the following of ESG agenda on the value of the firms is controversial. Some papers shows that the firms which integrate good ESG practices into strategic and operational activities improve their non-financial indicators such as consumer and supplier satisfaction, market acceptance, employees' management skills etc. This, over the years, will result in significant increase in firms' economic profit and market value (Mohammad and Wasiuzzaman, 2021; Fatemi et. al., 2015; Atan et al.,2018). As for corporate governance component which is an important value driver in telecom many studies showed that good governance resulted in increase of in investors' confidence, which in order results in larger firm's value (Siagian, Siregar, & Rahadian, 2013), (Bubbico, Rossana & Giorgino, Marco & Monda, Barbara, 2012). As for impact of individual components, some studies stated that environmental efforts had negative value on the value of the firm (Verbeeten et al., 2016; Hassel et al., 2005; Freedman and Wasley, 2000). The underlying assumption is that the payoffs of ESG activities do not exceed their costs. Nevertheless, some studies demonstrated that good environmental practices strengthen financial performance (Endrikat et al., 2014; Derwall et al., 2005; Miroshnychenko et al., 2017). Conversely, following the socially responsible behavior and good management practices positively affected the firms' value (Fatemi et al., 2015). For

example, following the best governance practices results in increase investors' confidence which, in turn, results in larger shareholder return (Bubbico et al. 2012).

However, several studies have found either a negative or a nonsignificant association between ESG performance and financial performance or firm value (Horváthová, 2010). The results significantly varied among industries. For example, Marsat and Williams measured the relationship between ESG ratings and firms' value for entities from various industries. They found negative relationship between ESG rating and Q-Tobin on the cross-industrial sample but obtained positive relationship between these factors for ICT companies (Marsat and Williams, 2011). Fisher-Vanden and Thorburn while studying companies engaged in voluntary environmental programs found that these firms destroyed its market value. The weaker the corporate governance standards were in the firm the higher were abnormal negative stock returns (Fisher-Vanden and Thorburn, 2008). In a later study, Schagbaz, in turn received non-significant relationship between ESG ratings and q-Tobin ratio of energy companies (Schagbaz et al, 2020).

To conclude, despite so many years of research on the relationship between the following ESG agenda and financial performance of corporates, there is no generally accepted theoretical framework which explains the contradictions in practical and academic literature. The major gaps are lack of studies which measure impact of ESG implementation on value creation in particular industry (i.e. info-communication); short data span. The latter is important because effect from ESG efforts is usually long-term. Trumpp and Günther while studying the impact of environmental performance on financial metrics of 2361 firm-years from 2008 to 2012 found the significant U-shape relationships between them. Similar results were presented by others. (Nollet et al., 2016; Moore, 2001; Chen et al., 2019). This confirms that investments which are made in development of sustainable growth bring results in the future.

b) The relationship between ESG disclosure and firms' value and performance

Many studies state that companies engaged in high quality ESG disclosures are associated with lower systematic risks as well as idiosyncratic risks. The latter is driven by lower possibility of negative market reaction and higher resilience (Mohammad and Wasiuzzaman, 2021). This should result in higher market value and this effect is the most pronounced for the listed firms in developed markets (Porter, 2019). Firstly, a firm's ESG disclosure is a predictor of its ESG score: firms with positive ESG performance would choose to report their ratings fully, and those with a negative ESG performance would choose to report minimally (Verrechia, 2001). Moreover, ESG disclosure associated with the competitive advantage, society-oriented product offering and high reputation. For example, firms report ESG information to prevent the adverse effects of acute environmental damages on its reputation and market value (Cho and Patten, 2007).

However, the outcome of studies is also controversial. Cai and He (2014) found a positive correlation between following ESG practices and companies values using 20 years' data from year 1992–2011 (Cai and He, 2014). Cheng argued that ESG facilitates firm's superior return due to higher investors expectations, lower equity capital or better access to finance (Cheng et al., 2014). Conversely, Dhaliwal et al. examined the relationship between ESG disclosure and the equity cost of capital in an international sample that included 31 countries and found negative association between ESG disclosure and the cost of equity capital (Dhaliwal et al., 2014). Plume et al., found no significant association between the overall level of voluntary ESG disclosure and the value of the firm, its component cash flows, or its cost of capital (Plume et al, 2015). Fatemi (Fatemi, 2018) showed that ESG disclosure, per se, decreases firms valuation.

To conclude, the research gaps are reflected in controversies of findings. The latter depends on market, time period and state of economy. There is a lack of industrial studies in general and research of ESG disclosure impact on value for telecommunication firms in particular.

2.3 Hypotheses development

The goal of this study is the goals of this study is to investigate the impact of ESG disclosure on value of listed telecommunication service companies and identify the key factors affecting the value of telecommunications companies for individual significant ESG pillars. Due to the conflicting results found in the above studies, the hypotheses are as follows:

H1: In telecommunication sector, firm value is positively associated with ESG disclosure

H2: In telecommunication sector, the value of the company is positively associated with E-component disclosure

H3: In telecommunication sector, the value of the company is positively associated with S-component disclosure

H4: In telecommunication sector, the value of the company is positively associated with G-component disclosure

H5: Selected components of E, S or G components of disclosures have significant impact on the financial performance of telecommunication companies

2.4 The data

We used the annual panel data for telecommunication companies, listed in USA stock exchange between 2011-2021. We chose this timespan to cover the almost entire history of developing of ESG financing but to take into account the availability of ESG disclosure metrics (Bloomberg has started publishing ESG disclosure scores for telecom companies since 2011). The first green bond was issued by the European Investment Bank and since then the total volume of ESG related debt have increased to over US2.2 trillion (Ivashkovskaya and Mikhailova, 2020). We chose USA financial market due to its high liquidity and long history of telecommunication company listing. The screening of the companies was performed in Capital IQ. We used US dollar as the reporting currency. We applied the following selection criteria: (1) industry classification: telecommunication services; (2) firm's earnings before interest, taxes, depreciation and amortization (EBITDA) is strictly greater than 0; and (3) total enterprise value (TEV) is strictly greater than 0. The screening resulted in a dataset of 306 companies, from which top-100 were chosen by their market value. We used Bloomberg ESG disclosure scores (the ESG score and E, S and G components scores) as a proxy for the quality of ESG disclosure. It tracks about 800 different disclosure metrics that cover all aspects of ESG, from emissions to shareholder rights. The companies in the ranking are ranked from 0 to 100, with 100 being the best score We normalized Blomberg ESG disclosure score to [0;1].

The dependent variable is Tobin Q metric (TQ) which represents the sum of market capitalization, total liabilities, preferred equity and minority interest divided by total assets. It is a good proxy for the firm value and allows investors to assess the justification of an investment in a firm: if its market value is higher than the accounting value (that is, $q\text{-Tobin} > 1$), then the investment is justified and vice versa (in the case when $q\text{-Tobin} < 1$). Thus, Tobin Q is the good indicator of investors' expectations. This metric is the most widespread indicator used in studies of the impact of the introduction of sustainable practices on financial results (Nirino et al., 2021).

Dependent variables (Table 1) set consists of complex ESG score, individual E, S and G scores and control variables: (1) debt ratio; (2) tangibility; and (3) return on assets (ROA). ROA was chosen as it is good indicator to assess the quality of the company's management, namely the efficiency of the use of capital. Tangibility ratio measures the importance of non-financial capital in creating value and indicates firm's internal competitive advantage. The high-technology companies (including ICT companies) with a smaller proportion of tangible assets grow faster (Lei, et. al. 2018). Debt ratio measures the financial leverage. The studies showed that leverage is positively related to firm's value as the returns earned are greater than the average interest expense incurred on leverage (Ruland and Zhou, 2005).

Table 1. Dependent variables and their descriptive statistics

Variable	Calculation	Notation	Expected sign	Mean	Standard deviation	Minimum	Maximum
ESG score	Bloomberg	ESG _{it}	“+”	0.882	0.323	0	0.96
E score	Bloomberg	E _{it}	“+”	0.748	0.435	0	0.92
S score	Bloomberg	S _{it}	“+”	0.806	0.396	0	0.93
G score	Bloomberg	G _{it}	“+”	0.882	0.323	0	0.97
ROA	Net income/Average assets	ROA _{it}	“+”	0.061	0.179	-0.32	5.320
Tangibility ratio	Net fixed assets/Total assets	TANG _{it}	“-”	0.790	0.092	0.220	0.990
Leverage	Debt/Equity	DEBT _{it}	“+”	0.395	0.403	0	9.860

Source: calculated by authors

For all our analysis, Variance Inflation Factor (VIF) is below 10, signifying no sign of multicollinearity and the correlation between the dependent variables is below 0.4.

2.5 The models

The regression model to test the H1 is as follows:

$$TQ_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 ROA_{it} + \beta_3 TANG_{it} + \beta_4 DEBT_{it} \quad (1)$$

The regression model to test H2-H4 is as follows:

$$TQ_{it} = \beta_0 + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 ROA_{it} + \beta_5 TANG_{it} + \beta_6 DEBT_{it} \quad (2)$$

To regression model to test H5 is as follows:

$$\ln(TQ_{it}) = \beta_0 + \sum_{j=1}^K \beta_j f_{it} \quad (3)$$

Where: f_{it} – factors describing some individual components of ESG disclosure score (see Results section); K – the number of explanatory variables

For our panel data, we used three methods on the basis of which it is possible to estimate the relationship between Tobin Q and dependent variables: pooled OLS regression, fixed effect linear model and random effect linear model. To select the best model, we used Durbin–Wu–Hausman test.

2.6 Results and Discussion

a) Testing hypothesis H1-H4

Table 2. shows the results of estimation of regressions (1) and (2). The constant is not significant for all specifications and thus it is not shown in the table.

Table 2. The results of estimation of regressions (1) and (2)

Variable	Pooled OLS	FE	RE	Pooled OLS	FE	RE
ESG	0.117* (0.116)	0.149* (0.088)	0.152* (0.089)			
E				-0.056 (0.161)	-0.274 (0.167)	-0.217 (0.160)
S				0.054 (0.204)	0.102 (0.163)	0.089 (0.182)

G				0.169* (0.175)	0.273** (0.136)	0.244* (0.137)
Debt ratio	0.914*** (0.094)	0.984*** (0.092)	0.964*** (0.089)	0.916*** (0.945)	1.006*** (0.093)	0.978*** (0.090)
Tangibility	-1.582*** (0.458)	-2.073*** (0.549)	-1.996*** (0.508)	-1.567*** (0.460)	-2.046*** (0.549)	-1.970*** (0.508)
ROA	1.669*** (0.212)	0.476*** (0.160)	0.629*** (0.161)	1.673*** (0.212)	0.470*** (0.160)	0.623*** (0.161)
Observations	1 034	1 034	1 034	1 034	1 034	1 034
R-squared	0.140	0.306	0.146	0.140	0.309	0.148

***, **, * indicate the value is significant at 1%, 5% and 10% level

Source: author's calculation

The Durbin–Wu–Hausman test confirms that the fixed effect (FE) estimator is the most efficient, thus, the study focuses on the FE estimators to explain the results.

Table 2 shows that the ESG disclosure score is significant at 10% confidence level. Positive sign means that ESG disclosure increases the market value of telecommunication firm. *Thus, the hypothesis H1 is confirmed.* On the one hand, this conclusion agrees with those of (Servaes, H., & Tamayo, 2012) but on the other hand this outcome contradicts the finding of (Velte, 2017; Buallay and Marri, 2022) who found a negative relationship between Tobin Q and sustainability disclosure. We explain this by the differences in explored markets, sample size and timespan. Additional further research is necessary to explore these contradictions.

The individual disclosure pillars: environmental (E) and social (S) are both statistically insignificant in influencing the Tobin's Q. *Therefore, hypotheses H2 and H3 are rejected.* Conversely, governance pillar (G) is significant at 5% confidence level. *Hence, the hypothesis H4 is confirmed.*

These results coincide with that of (Rittenhouse et al, 2011) that the share of corporate performance (G-factors) in the investors expectations of ICT companies equaled around 60%. This is also confirmed by practical studies, for example (Derue, 2021) which state that unlike investors in other industries with severe influence of environmental factor (oil and gas or metals and mining) or social factor (e.g. banking or mining) the impact of these factors in telecommunication sector (especially in large established corporates) is marginal. Moreover, the insignificance of these factors may be explained by the fact that these factors have a more significant impact on the value of the firm in markets with weak development of financial institutions (Ge and Liu, 2015), but we studied the US market. Conversely, the governance has first order impact on telecommunication companies as it increases investors' confidence, which results in larger firm's value (Siagian et al., 2013).

All control variables are significant at 1% and signs at the variables coincide with the previous findings and our expectations. The higher is the company's profitability the higher its market value and the increase in company's leverage also positively affect its value. Tangibility has an opposite effect, it negatively and significantly decreases Tobin Q. This agrees with the findings of (Lei, et. al. 2018). These results indicate that the model is correctly specified.

b) Testing hypothesis H5

G-factor appeared to be the only ESG pillar which influence the Tobin-Q of telecommunication firm. For our research we selected first-order G-impact factors (Table 3) cited in the literature (Velte, 2017; Malik and Makhdoom, 2016; Bătae et. al, 2021, etc.). To get the information about individual corporate governance practices we used data from Refinitive Thomson Reuters terminal.

Table 3. G-factors considered in the research and their descriptive statistics

Variable	Calculation	Notation	Expected sign	Mean	Standard deviation	Minimum	Maximum
Independence policy	0/1	IPit	“+”	0.522	0.5	0	1
Percentage of independent director in the board	%	NED _{it}	“+”	59.098	31.242	0%	100%
CEO Chairman Duality	0/1	CD _{it}	“-“	0.524	0.5	0	1
Existence of Corporate Social Responsibility (CSR) Board committee	0/1	CSR _{it}	“+”	0.74	0.439	0	1
Women in board	%	WB _{it}	“+”	11.422	12.072	0%	100%

Source: calculated by authors

For all our analysis, Variance Inflation Factor (VIF) is below 10, signifying no sign of multicollinearity and the correlation between the dependent variables is below 0.2.

Among the studies that examined the impact of mentioned individual corporate governance factors on financial indicators, controversial estimates were obtained. The high presence of independent directors in the Board usually positively influences Tobin-Q (Malik and Makhdoom, 2016). Impact of Board diversity on firm value can be either positive (Smith et al, 2006) or negative (Adams, Ferreira, 2009). The empirical evidence of the relationship of CEO duality and policy independence is also inconclusive. For example, Harris and Helfat (Harris and Helfat, 1998) in literature review showed that out of 13 studies, three indicated negative effects, while ten exhibited either positive or absence of effects.

The results of estimation of regression (3) is presented in the Table 4.

Table 4. The results of estimation of regressions (1) and (2) for G factor in telecoms firms

Variable	Pooled OLS	FE	RE
Independence policy	-0.078 (0.059)	-0.008 (0.023)	0.039 (0.065)
Percentage of independent directors in the board	0 (0.002)	0.001* (0.001)	0.002* (0.001)
CEO Chairman Duality	-0.053 (0.042)	-0.045*** (0.017)	-0.088* (0.046)
Existence of Corporate Social Responsibility (CSR) Board committee	-0.119* (0.062)	0.04* (0.021)	0.053 (0.048)
Women in board	0.011*** (0.002)	0.007*** (0.001)	-0.053 (0.048)
Constant	0.194 (0.589)	0.174 (0.489)	0.201 (0.514)
Observations	1 034	1 034	1 034
R-squared	0.121	0.180	0.115

***, **, * indicate the value is significant at 1%, 5% and 10% level, standard errors are stated in parenthesis

Source: author's calculation

The Durbin–Wu–Hausman test confirms that the fixed effect (FE) estimator is the most efficient, thus, the study focuses on the FE estimators to explain the results.

Therefore, the hypothesis *H5 is partially confirmed* as factors of corporate governance affect the value of telecommunication companies. CEO duality has a significant (at 1% level) and

negative impact on company's value. This result suggests that if these posts are separated, the investment attractiveness of the telecommunication company increases. This result coincides with that of (Rhoades et al., 2001). Consequently, Tobin Q for companies in which CSR committees exist is higher than for those organizations without a committee. This finding agrees with the outcome of (Bozec, 2005). Thirdly, greater gender diversity increases the market's assessment of the company's prospects reflected in Tobin Q. This result coincides with (Bear et.al, 2016; Smith et al, 2006; Gonçalves et. al, 2022). Lastly, percentage of independent directors has a significant (but only at 10% level) but marginal effect on Tobin Q. This finding agrees with that of (Bhagat and Black, 1999) that having moderate number of independent directors can increase firm's value. On the contrary, firms with "supermajority-independent boards can be less profitable than their counterparts. Moreover, director outsiders can give the little value to telecommunication companies because in this industry director's technical expertise can be more valuable than his or her outsider status.

Conclusion

Thus, telecommunication companies are exposed to ESG risks which, if not properly managed, can result in decrease in firms' economic profits and market valuation. Moreover, the effect on company's value can be reinforced by the proper ESG disclosures. However, despite many years of research on the relationship between the following ESG agenda, ESG disclosure and financial performance of corporates, there is no generally accepted theoretical framework which explains the contradictions in practical and academic literature. Moreover, there are lack of studies of impact of ESG disclosures and market valuation of specifically for telecommunication companies.

We closed the research gaps and investigate the impact of ESG disclosure on Tobin-Q of US-listed telecommunication service companies between 2011-2021. We showed that ESG disclosure score positively affects the value of the companies and significant at 10% confidence level. Among individual ESG disclosure pillars, only corporate governance positively affects Tobin-Q and statistically significant (at 5% level). Environmental and social pillars are both statistically insignificant in influencing Tobin Q of the telecoms. We also identified individual corporate governance factors which influence value of telecoms. We found that CEO duality has a significant and negative impact on company's value. On the contrary, the presence of corporate social responsibility (CSR) committee, greater gender diversity in the Board and the percentage of independent directors in the Board positively affect the value of the telecoms. The result of the study can be applied in developing of ESG rating methodologies of telecommunication service companies. The results also can assist managers as well as investors of telecom companies to identify key value drivers of ESG agenda.

The limitations of the study are the following: (1) it does not address the issue of the U-shaped link between the value of the firm and ESG disclosures; (2) the limited number of years used in modelling. These limitations will be addressed in further studies. Also, further research directions include the exploration the impact of ESG disclosures on both companies' performance and value in various industries in emerging markets.

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The Value of State Support for Russian Payment Cards Mir

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Abstract:

Mir payment cards, launched after the creation of the National System of Payment Cards in Russia, had to compete with the cards of the international payment systems VISA and MasterCard, which by that time had completely captured the Russian market. The Russian legislature, executive government and the Bank of Russia took a number of protectionist measures of a legal and organizational nature that provided the initial impetus for the diffusion of Mir cards among Russian citizens. In this article, we assess the value of this state support by viewing the payment card system as a two-sided platform and describing its development with equations of population dynamics. Our estimates obtained by simulation modeling show that at the time of decision-making, the value of state support for payment cards Mir amounted to about 3.5 billion rubles.

Keywords: *Russian card payment system, payment cards Mir, state support, platforms, simulation modeling.*

Introduction

Since the middle of the 2000s, the rapid development of the card payment market began in Russia: the issue of cards and the volume of card transactions grew at a high pace. The Russian market was dominated by the international payment systems VISA and MasterCard, their share in the total issue of cards by 2014 was 59% and 35%, respectively. Other international (American Express, Union Pay, JCB) and Russian payment systems (PRO100, Zolotaya Korona, etc.) occupied an insignificant market share in total. That situation responded to the interests of the majority of Russian card-issuing banks. Users were also generally satisfied with the functionality of VISA and MasterCard cards. But in March 2014, after the imposition of political sanctions against a number of Russian banks, users and banks faced a real threat of blocking cards of international payment systems. Thus, the Russian authorities decided to create a National System of Payment Cards and develop national payment instruments.

Within a short space of time, the project of the National System of Payment Cards was implemented [Golubeva, Okulov, 2021]. The Bank of Russia created a subsidiary, NSPK JSC, which became the operator and payment and clearing center of the national payment system. Despite the resistance of VISA and MasterCard, the national operator switched over the processing of all domestic payment transactions using cards of international payment systems. This was an important step in ensuring Russia's financial security, but for the country's full financial sovereignty, it was necessary to create a national payment card and bring it to the market. The card came out at the end of 2015 and was named Mir.

The Russian authorities and the national regulator represented by the Bank of Russia did not impose restrictions on the use of cards of international payment systems, believing that the national card should be developed in a competitive environment. Nevertheless, given the particular importance and significance of national payment instruments for the security of the country's financial system, the country's authorities and the Central Bank of Russia at the initial stage provided state support for the introduction of Mir cards and their further development. The support measures included a whole range of measures of an organizational and legal nature, directly aimed at developing the National System of Payment Cards business, but ultimately

affecting the socio-economic processes in the country and the social status of Russian citizens. The purpose of this article is to assess the financial value of this support.

State Support Instruments of Mir Cards

Initially, Mir cards could only be used within the Russia and could not be used to pay abroad and in international online services. Therefore, Mir cards were skeptically received by both the banking community and ordinary citizens, who did not seek to switch to using new cards. Particularly active rejection of the national card was demonstrated on social networks, where the Mir card was disparagingly called a “souvenir for patriots”. To give impetus to the diffusion of Mir cards, a number of measures were taken by the state and the national regulator to increase both the demand for new cards and their supply.

The Committee of the State Duma of the Russian Federation on the Financial Market amended the federal law 161-FZ “On the National Payment System”, which was the first and main demand support measure. The accepted amendments established that payments from the budgets of the Russian Federation and state off-budget funds should be processed with national payment instruments [Federal law 88-FZ, 2017]. After these amendments were introduced, the rapid spread of Mir cards began among civil servants, the military, pensioners, students and other citizens who receive money from the budgets of the Russian Federation, the Pension Fund, the Social Insurance Fund, etc. Attracting this vast category of customers, issuing banks began mass issuing Mir cards and quickly adapted their ATM networks to work with them.

The second demand support measure, adopted at the legislative level, concerned amendments to the federal law “On Protection of Consumer Rights”. The provisions of the law obliged almost all merchants in Russia to accept payment for goods and services with cards, including cards of the national payment system. Merchants and platforms were forced to link up with acquiring banks, which began replacing or reprogramming trading terminals to accept new cards to make it possible to pay with Mir cards throughout the country.

The supply of the new cards was supported by setting the attractive tariffs of the payment system (including the amount of the guarantee fee of participating banks, interchange fee, as well as the fee for connecting to the system, certification and clearing services). The Bank of Russia and the National System of Payment Cards set tariffs for transactions with Mir cards on average at a lower level than for transactions with cards of international payment systems, while tariffs for payment for housing, communal and medical services, etc. were considerably lower. Though this decision acted as a measure to support citizens, the costs of issuing and servicing cards had also become an important factor determining the interest of banks to issue certain cards.

The Bank of Russia and the National System of Payment Cards made the fundamental decision to create a plastic card of international standard that is familiar to people and inexpensive to issue, which can be made with both a Russian and a foreign chip. Manufacturers' competition allowed issuing banks to reduce the cost of the national card to the level of VISA or MasterCard cards, which also contributed to the supply of Mir cards by banks.

The creation of a national system of payment cards and a national card allowed the National System of Payment Cards, together with regional authorities and federal agencies, to implement a number of projects that increased the demand for Mir cards from various categories of Russian citizens. This includes the use of the Mir card as a social card (resident card, student card, etc.), and preferential payment by Mir cards for travel in public transport, and much more. A tourist subsidy from Rostourism in the form of 20% cashback to the Mir card from the amount of money spent on the trip turned out to be highly popular among active Russians. For advanced card users, an innovative contactless and mobile payment service was implemented using NFC technology and the MirPay application. Through Mir cards designed in the form of bracelets and pendants, people with disabilities were also provided with an opportunity to use payment instruments.

State measures to support the national payment system Mir, taken at the initial stage of the project, were criticized by some experts, market participants and even some official Russian institution. But after the events of 2022 (the imposition of large-scale international sanctions against the Russian financial system), it became clear that they were completely justified. According to the Wall Street Journal [Osipovich, Andriotis, 2022], the retail payment services market has become the only segment of the Russian financial system that was not affected by the sanctions in any way.

Method and the model of valuation

The National System of Payment Cards project was fully financed by the Bank of Russia. The full initial investment amount is not disclosed, but it is known that the authorized capital of NSPK JSC amounted to 4.3 billion rubles. The company's business is very successful, since it began to make profit after the first year of operation. Using the company's financial statements, it is possible to predict the dynamics of its cash flows, calculate the value of its business, take into account the initial investments and calculate the value of decisions to create a national payment card system and support national payment instruments. But such an evaluation is unlikely to be reliable, since the cash flows of NSPK JSC are determined by servicing payments not only with Mir cards, but also with VISA, MasterCard, etc. In addition, it is impossible to determine what part of the total investments of the Bank of Russia should be attributed to the creation and implementation of Mir cards.

In order to calculate the value of organizational and legal state support measures regarding the Mir cards, we use a non-standard approach. We believe that without state support, in the face of fierce competition with VISA and MasterCard, the national card would at best developed in the same way as cards of international payment systems spread in Russia. Such an assumption actually sets a benchmark against which the value of observed cash flows from servicing Mir cards is compared. The difference between the “as it is” assessment and the “as it could be” assessment is the value of state support measures.

If the company's shares are not traded on the market, then business valuation is most often carried out using the discounted payment method (*DCF valuation*) based on forecasts of future cash flows [Brealey, Myers, etc., 2015]. Another approach (*customer lifetime value, CLV*) assumes that a company's main asset is its loyal customers, and the value of a company's business is determined by their lifetime value [Gupta, Lehmann, Stuart, 2004]. Therefore, to evaluate a business in the service sector, it is necessary to predict the inflows and outflows of the company's customers.

The *CLV* approach seems to us the most suitable for the purposes of the study, since the payment system can be considered as a multi-sided market platform. The one side of this platform is presented by card users (acting through issuing banks), the other one comprises companies (they are represented by acquiring banks), accepting payment for goods and services through POS terminals [BIS, 2012]. The greater the number of users of certain cards and owners of terminals, the more attractive these cards are for new members. In other words, each new user of the Mir card increases the value of using Mir cards for all other participants in the payment system, creating a positive external effect. It should be noted that the *CLV* method shows good results in platform evaluation, is widely used by researchers (for example, [Libai, Muller, etc., 2009]), and business estimates obtained by this method are close to the observed market capitalization values.

There are different models to describe the dynamics of the number of platform users. In the research we use the population dynamics model [Brauer, Castillo-Chavez, 2012] known from mathematical biology:

$$dU_t = (a_t - c_t) \cdot U_t \cdot (1 - U_t/U_{max})dt, \quad (1)$$

while U_t is the user base, a_t is the instantaneous acquisition rate, c_t is the instantaneous churn rate and U_{max} is the theoretical asymptotic maximum of total users at the end of the time horizon T .

In our research, we use the assumption [Schneider, Imai, 2020] that the coefficients of acquisition and churn rates of users of the platform are random and follow a geometric Brownian motion:

$$da_t = \mu_a \cdot a_t dt + \sigma_a \cdot a_t dW_a, \quad dc_t = \mu_c \cdot c_t dt + \sigma_c \cdot c_t dW_c, \quad (2)$$

while μ is the expected change in acquisition (or churn) rate of the platform's users, σ characterizes volatility of acquisition (or churn) rate and dW is the Wiener increment.

Another important assumption is that the random processes of user acquisition and churn rate are correlated with the correlation coefficient ρ :

$$dW_a dW_c = \rho dt$$

Thus, the value of the cash flow generated by platform users in period t [Schneider, Imai, 2020]:

$$V_t = U_t \cdot (PR \cdot ARPU - FC) \cdot (1 - tax) / (1 + WACC)^t, \quad (3)$$

while U_t is the user base, $ARPU$ is the average revenue per user, PR is the company's gross margin, FC is the company's fixed costs, tax is the effective corporate tax rate, $WACC$ is the weighted average cost of capital.

Finally, the value of the platform can be determined by computing [Schneider, Imai, 2020]:

$$V = \sum_{t=0}^T V_t + \frac{V_T \cdot (1 + g)}{WACC - g}, \quad (4)$$

while g is the terminal growth rate of customer lifetime value beyond the time horizon T .

Since the number of users U_t is a random variable, the values in equations (3-4) are also random. Conducting numerous simulations of random processes, we obtain a set of possible values (4). The average value based on the results of all simulations gives an estimate of the platform's value.

Expressions (1-3) must be written for participants from each side of the platform (card users and terminal owners), and the values from all sides of the platform must be summed as in equation (4).

To check the adequacy of the model, it was used to evaluate the business of the MasterCard international payment system as of the end of 2021. The value of \$208 billion obtained from the results of simulation modeling is lower than the market capitalization of the company, which in 2020-2021 fluctuated within the range of \$212-380 billion. The difference, in our opinion, can be explained by the international nature of MasterCard's business, in particular, different tariffs and different levels of average revenue per user from different countries, which is difficult to take into account in within a simple model. We believe that such a discrepancy is not critical for the purposes of the study.

Results and Discussion

Valuations of state support measures were carried out at the beginning of 2018, when these measures started to operate (although fully they were implemented later). The initial data used in the Mir payment system evaluation are presented in Tables 1–2. These values were obtained on the basis of historical data from the reports of the Bank of Russia, VISA, MasterCard, NSPK JSC, the opinions of independent experts and the authors' own estimates. The value of $WACC$ was computed using $CAPM$ model (for evaluation of the equity capital cost) and the yield of Russian Government Bonds.

Table 1. Initial data for the Mir payment system valuation

Label	Description	Value
$U_{c,t=0}$	Number of cards at the end of 2017, mln rubles	30
$U_{c,max}$	Asymptotic maximum of cards at time T , mln rubles	227
$U_{p,t=0}$	Number of POS terminals at the end of 2017, mln rubles	2,4
$U_{p,max}$	Asymptotic maximum of POS terminals at time T , mln rubles	7,9
PR_p	Gross margin of POS terminals, %	41%
PR_c	Gross margin of cards, %	30%
FC	Fixed costs, bln rubles	1,8
$WACC$	Weighted average cost of capital, %	16%
tax	Effective corporate tax rate, %	22%
g	Growth rate of the platform value after T , %	1%

Source: authors' compilation

We assumed permanence of all the parameters presented in Table 1. The parameters that, as we believed, could change due to the state support measures taken, are the parameters of random processes of acquisition and churn rate of card users (Table 2). The parameters of random processes “in the case of competition” were evaluated under the assumption that for Mir cards they will be the same as the average process parameters for VISA and MasterCard. When evaluating the parameters of random processes “in the case of the state support”, we relied on the existing historical data on the dynamics of the number of users of Mir cards.

With regard to random processes of acquisition and churn rate of terminal owners, we believe that their dynamics equally affect card users of all systems, therefore, the support measures established by amendments to the Federal Law “On Protection of Consumer Rights” affected the entire Russian card payment market, not only Mir cards. However, taking into account lower tariffs for servicing Mir cards and higher average receipt of Mastercard and Visa card holder, we reflected the change in ARPU from terminal owners (Table 2).

Table 2. Initial data for the Mir payment system valuation under different conditions

Label	Description	In the case of competition	In the case of state support
$a_{p,t=0}$	Acquisition rate of POS terminals at the end of 2017, %	19,0%	19,0%
$c_{p,t=0}$	Churn rate of POS terminals at the end of 2017, %	16,9%	16,9%
$\mu_{p,a}$	Expected annual growth of POS terminals acquisition rate, %	18,0%	18,0%
$\sigma_{p,a}$	Annual volatility of POS terminals acquisition rate, %	2,6%	2,6%
$\mu_{p,c}$	Expected annual growth of POS terminals churn rate, %	16,8%	16,8%
$\sigma_{p,c}$	Annual volatility of POS terminals churn rate, %	3,9%	3,9%
ρ_p	Coefficient of correlation between deviation in acquisition and churn rate of POS terminals	-0,6	-0,6
$a_{c,t=0}$	Acquisition rate of Mir cards at the end of 2017, %	24,4%	24,4%
$c_{c,t=0}$	Churn rate of Mir cards at the end of 2017, %	16,4%	16,4%
$\mu_{c,a}$	Expected annual growth of Mir cards acquisition rate, %	22,2%	56,0%
$\sigma_{c,a}$	Annual volatility of Mir cards acquisition rate, %	4,7%	25,1%
$\mu_{c,c}$	Expected annual growth of Mir cards churn rate, %	16,1%	21,2%
$\sigma_{c,c}$	Annual volatility of Mir cards churn rate, %	0,7%	3,8%
ρ_c	Coefficient of correlation between deviation in acquisition and churn rate of Mir cards	-0,2	-0,6
$ARPU_c$	Annual average revenue per Mir card, rubles	110	110
$ARPU_p$	Annual average revenue per POS terminal, rubles	2562	1926

Source: authors' compilation

Changes in the parameters of random processes of acquisition and churn rates lead to a change in the dynamics of card users. The possible values of the number of cards and terminals at each point in time in the future were modeled by simulation methods, then the possible values were calculated and averaged over all simulations.

First, we assessed what the possible value of the Mir payment system (that is, NSPK JSC's business servicing operations with Mir cards) could be in the face of fierce competition with VISA and MasterCard (Fig. 1). The average value for all imitations amounted to 25 billion rubles.

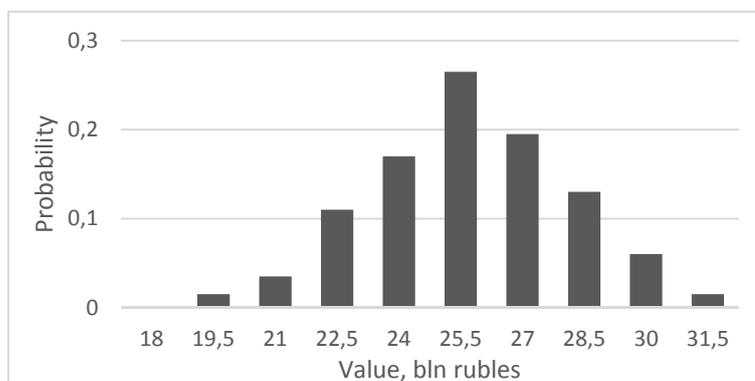


Fig. 1. Empirical probability of the value distribution of Mir cards servicing business in the case of competition with international payment cards

Source: authors' estimation

Then we repeated the calculations using estimates of the acquisition and churn rates parameters obtained from historical data. These estimates correspond to the reality observed after the implementation of state support measures (Fig. 2). The average value turned out to be 28.5 billion rubles. The difference between the average received estimations is about 3.5 billion rubles, and this value presents itself a monetary value of the organizational and legal state support measures for Mir cards.

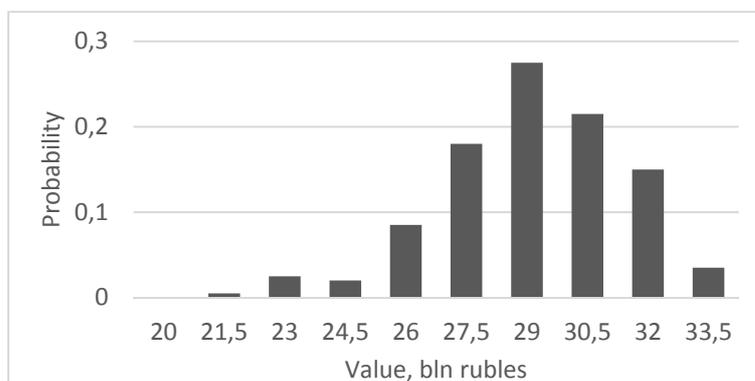


Fig. 2. Empirical probability of the value distribution of Mir cards servicing business in the case of state support measures

Source: authors' estimation

According to the simulation modeling results, under the conditions of state support, at the end of 2021 the number of Mir cards reaches an average of 125 million, which corresponds to the actual number of Mir cards at the end of 2021 (113 million). Whereas in the conditions of fierce competition with cards of international platforms, the number of Mir cards, according to calculations, averages 52 million.

The obtained estimate should be considered as a minimum, lower level of value, since our highly optimistic assumption that without state support, the Mir cards would develop as VISA

and MasterCard systems. In Russia until 2014 several attempts have been made to create payment card systems and payment cards (for example, a universal electronic card - UEK from Sberbank), but all these projects could not withstand competition with international giants and practically did not receive any development.

Conclusion

The fact that the Mir card turned out to be in demand, and the business of NSPK JSC was highly profitable, attests not only to the effective work of the NSPK JSC team. Success would not have been possible without the support provided to the project by the state authorities and the Bank of Russia, and this fact is recognized by both Russian and foreign researchers and financial market experts.

We set the task to evaluate the state support in monetary terms, however our estimates relate only to the business associated with the processing of payments using Mir cards. But it should be noted that building a national system of payment cards and bringing the national Mir card to the market is not just an attractive business project with high added value. From the very beginning, the Bank of Russia conceived Mir as a large-scale impact project with a wide range of goals: from influencing the socio-economic processes in the country, supporting national institutions and ensuring the security of the financial system, to promoting modern technologies in people's daily lives. History has shown that these goals have been achieved, but their effect can hardly be measured in monetary terms.

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Effects of Monetary Interventions on Equity Markets Pricing: An Analysis by Sectors

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Abstract:

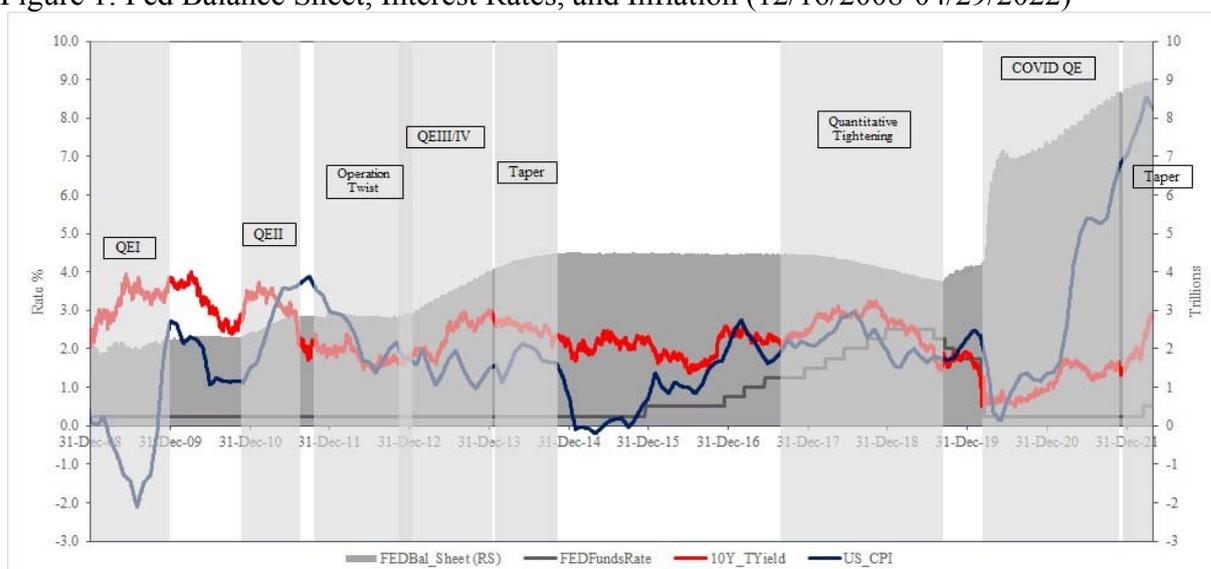
This study examines the effects of changes in the size of the Fed's balance sheet on the value of the S&P500 index by industry sectors during the 2008 – 2022 period, which includes the 2008 – 2013 and 2020 – 2021 Fed interventions. The results of this study suggest that stocks in the banking industry within the S&P500 index may be more positively influenced, while the real estate sector is the most negatively impacted from changes in the size of the Fed's balance sheet.

Keywords: *Fed's Balance Sheet, Instrumental Variables, Quantitative Easing, Tapering*

Introduction

Since the response to the Great Recession, the Federal Reserve (Fed) has actively engaged in a large-scale purchases of government debt securities, becoming a common instrument of monetary intervention in recent years. In response to the Covid-19 crisis, the Fed has again employed this monetary tool aggressively. That is how the Fed's balance sheet has grown to nearly nine trillion dollars (Federal Reserve, 2021a). All of this has been implemented with the objective of keeping the interest rates as low as possible according to the needs of the economy. Figure 1 shows the 10-year treasury yields as the main indicator of the effects in the credit market interest rates in direct connection to the securities purchases by the central bank since late 2008. The figure reveals that the Fed's purchases (increase in its balance sheet) has indeed kept the yields at low levels while also lowering the federal funds rate near the zero percent bound. The figure also shows how the US Consumer Price Index (CPI) escalated through the Covid-19 Quantitative Easing (QE) program in comparison to past QE programs.

Figure 1: Fed Balance Sheet, Interest Rates, and Inflation (12/16/2008-04/29/2022)

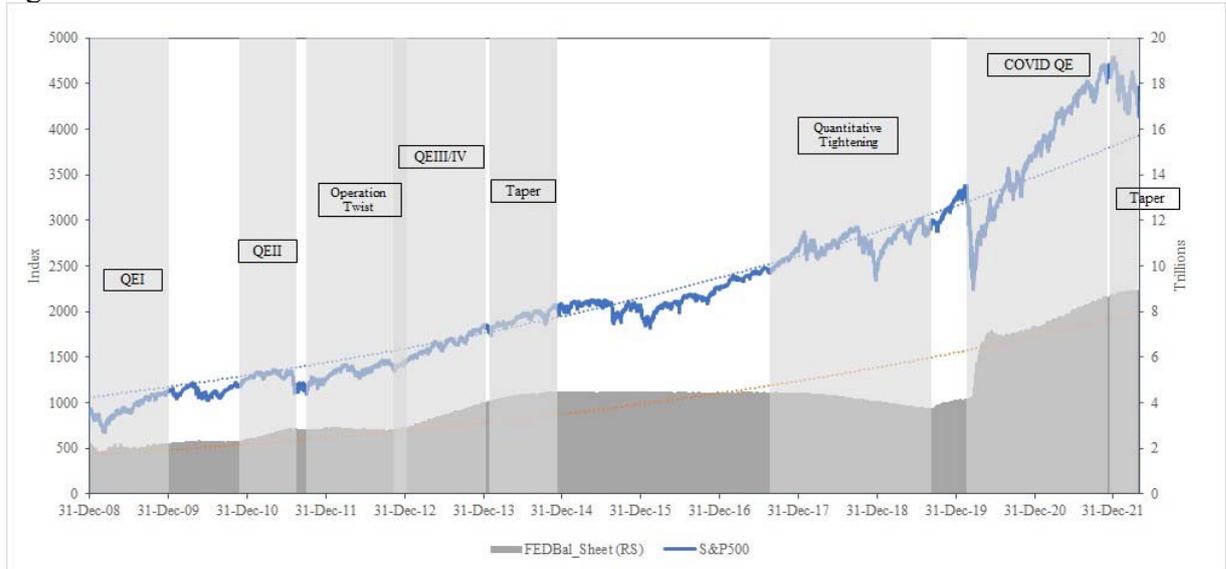


Source: EIKON Refinitiv

While the credit market had been stimulated, the equity markets have been as well.

Figure 2 shows the performance of the S&P500 in comparison to the evolution of the Fed's balance sheet. The trajectory of the S&P500 suggests mimicking that of the Fed's balance sheet size.

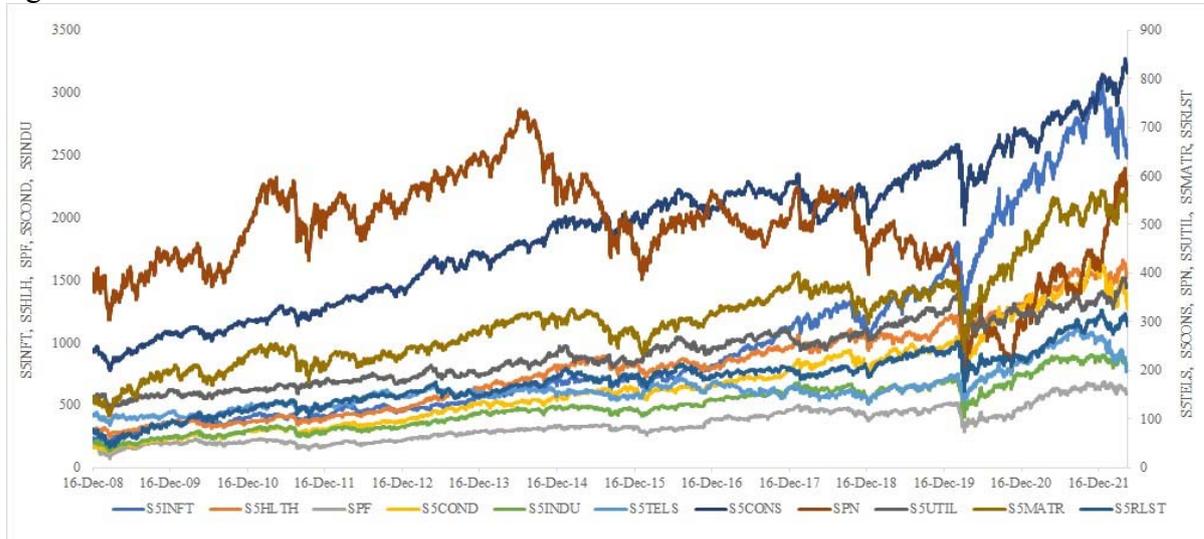
Figure 2: Fed Balance Sheet and S&P 500 index



Source: EIKON Refinitiv

Figure 3 displays the performance of the S&P500 index by sectors. This figure suggests that, although most of the industries that compose the index follow the trend of the index itself, some do not exactly mirror the index. As an example, while the communications and real estate sectors indexes, S5TELS and S5RLST, have the lowest correlations with the index, the energy sector index SPN suggests a negative correlation.

Figure 3: S&P500 Sector Indexes



Source: © 2022 S&P Dow Jones Indices

The aim of this study is to identify the extent of the effects on the pricing of the stocks in the S&P500 from the Fed's securities purchases. Hence, the following questions are addressed: Do government interventions in the credit markets via the large-scale purchases of government securities impact some key industry and financial asset prices? Then, which industries and assets are those?

Methodology

Empirical Model

Given that the value of the S&P500 may be explained in part by the treasury yield and the currency levels, both of which are explained by the balance sheet and oil price levels, respectively, we suggest the use of the instrumental variables approach as the identification strategy of this study. Hence, the following three simultaneous equations system:

$$\text{Equation 1: } t_yieldt = \pi_0 + \pi_1 Fed_BalShtt + v_t \quad (1) \quad \text{Equation 1': } t_yieldt = \pi_0 + \pi_1 Fed_BalShtt + \pi_2 lag1w_BalShtt + v_t \quad (1')$$

$$\text{Equation 2: } usd_eurt = \delta_0 + \delta_1 t_yieldt + \delta_2 wti_spott + e_t \quad (2)$$

$$\text{Equation 3: } SPSectorit = \beta_0 + \beta_1 t_yieldt + \beta_2 usd_eurt + \beta_3 Fed_FRatet + \beta_4 us_cpit + u_t \quad (3)$$

where the (1') includes the one-week lag of the balance sheet size.

Results and Discussion

Regressions Results

The regression results, estimated by the three stage least squares approach for the eleven sectors of the S&P500, are shown on Table 1.

Table 1: Regression Results of Sector Indexes
Three-stage least-squares regressions by Sector Indexes

	(1)		(2)		(3)	
Variable	S5InfT3SLS	S5InfT3SLSlg	S5Hlth3SLS	S5Hlth3SLSlg	SPF3SLS	SPF3SLSlg
Fed_FRate	207.66896***	206.1073***	152.32994***	151.54598***	70.9482***	70.597426***
us_cpi	265.68711***	265.47594***	102.23884***	101.76448***	42.972323***	42.739401***
_cons	333.07124***	334.88461***	498.27668***	500.1065***	212.67004***	213.46546***
t_yield						
Fed_BalSht	-.2330399***	-1.3219703***	-.23107664***	-1.402906***	-.26968922***	-1.5646243***
laglw_Bal_Sh		1.0919501***		1.1760084***		1.3011711***
_cons	3.2589326***	3.2577683***	3.2505782***	3.2453075***	3.4148888***	3.40222***
usd_eur						
t_yield	-.05456567***	-.0515975***	-.04051059***	-.03788808***	-.03509606***	-.03289572***
wti_spot	-.00183657***	-.00185226***	-.00182401***	-.00183369***	-.00188301***	-.00188441***
_cons	1.0697437***	1.0643472***	1.0370124***	1.0319834***	1.0287973***	1.0241572***
	(4)		(5)		(6)	
Variable	S5ConD3SLS	S5ConD3SLSlg	S5Tel3SLS	S5Tel3SLSlg	S5Indu3SLS	S5Indu3SLSlg
Fed_FRate	142.36484***	141.34785***	-1.4286457	-1.6157432*	91.974164***	91.374025***
us_cpi	120.7004***	120.35641***	14.156896***	14.091823***	58.340225***	58.045355***
_cons	337.38802***	339.08369***	132.48324***	132.77037***	316.57843***	317.76953***
t_yield						
Fed_BalSht	-.22716062***	-1.3889899***	-.21016049***	-1.5040384***	-.24238635***	-1.5173137***
laglw_Bal_Sh		1.166499***		1.3011408***		1.2815521***
_cons	3.2339141***	3.2264481***	3.1615724***	3.1443532***	3.2987051***	3.2841047***
usd_eur						
t_yield	-.04771746***	-.04483884***	-.04558658***	-.04249853***	-.03849251***	-.03602222***
wti_spot	-.0018268***	-.00183905***	-.00183135***	-.00184303***	-.00185641***	-.0018615***
_cons	1.0535439***	1.0481131***	1.0490258***	1.0430807***	1.0346668***	1.0296681***
	(7)		(8)		(9)	
Variable	S5ConS3SLS	S5ConS3SLSlg	SPN3SLS	SPN3SLSlg	S5Unl3SLS	S5Unl3SLSlg
Fed_FRate	57.478125***	57.133078***	-19.556981***	-19.924617***	35.810685***	35.749787***
us_cpi	38.818453***	38.611875***	-1.4840665	-1.7395217	17.252903***	17.228998***
_cons	372.0099***	372.86724***	502.63431***	503.53214***	177.79623***	177.95561***
t_yield						
Fed_BalSht	-.21042926***	-1.3934235***	-.25270817***	-1.2066139***	-.19562575***	-1.2154052***
laglw_Bal_Sh		1.1879743***		.95669393***		1.0225228***
_cons	3.1627161***	3.1540924***	3.3426283***	3.3411618***	3.0997218***	3.0989315***
usd_eur						
t_yield	-.03574284***	-.03319455***	-.05308889***	-.05134259***	-.0443932***	-.04146718***
wti_spot	-.00180341***	-.00181177***	-.00210329***	-.00212605***	-.0017772***	-.00179314***
_cons	1.0247846***	1.0198318***	1.0847547***	1.0826276***	1.0425926***	1.0373056***
	(10)		(11)		(12)	
Variable	S5Matr3SLS	S5Matr3SLSlg	S5RlSt3SLS	S5RlSt3SLSlg	SP5003SLS	SP5003SLSlg
Fed_FRate	29.725169***	29.37402***	20.999808***	20.835392***	384.9307***	382.3947***
us_cpi	35.559453***	35.421197***	17.068127***	16.983007***	333.8543***	332.7607***
_cons	219.8017***	220.44431***	131.58941***	131.95901***	1327.101***	1331.839***
t_yield						
Fed_BalSht	-.25651191***	-1.5437003***	-.19596268***	-1.4129472***	-.02337216***	1.178981***
laglw_Bal_Sh		1.2948586***		1.2228187***		-1.408131***
_cons	3.3588146***	3.3399363***	3.1011555***	3.0891984***	3.261833***	3.25493***
usd_eur						
t_yield	-.04061871***	-.03822877***	-.03378103***	-.03116753***	-.0449834***	-.0422205***
wti_spot	-.00187812***	-.001882***	-.00183112***	-.00183822***	-.0018359***	-.0018465***
_cons	1.0409822***	1.0360836***	1.0222438***	1.0170573***	1.047974***	1.04269***

legend: *p<.05; **p<.01; ***p<.001
Source: Own Calculations

In line with the main index case results, summarized in the twelfth panel of Table 1, the regression results of the simultaneous equations for the sector indexes show high statistical significance for most variables as well as the coefficients similarity in the first and second equations.

The results show different effects of the Federal Funds Rate, Fed_FRate, the oil prices, wti_spot, and price index, us_cpi, on the various sectors. For example, increases in the Federal Funds Rate seem to go in the opposite direction to that of the communications sector index, as the negative coefficient shown in panel (5) tells, in contrast to the majority of the results for the other sectors and the main indexes. Another case is that of a positive coefficient of the oil prices, wti_spot, for the Energy sector, which certainly is accurate as the price of this commodity is the selling price reference for most energy sector products.

Results Discussion

Central bank interventions conform externalities valued differently by each sector of the S&P500. The intervention in this respect is the balance sheet size that in turn influences the interest rate levels, which subsequently generate externalities that may be highly or less observed in the different sectors of the S&P500. Table 2 shows the rank of the externality generated from the balance sheet size in each of the sectors of the S&P500.

The results shown on Table 2 suggest that the sector index with the largest positive externality from the government intervention via the expansion of the central bank balance sheet is naturally the financial sector, SPF, followed by the Materials sector, with 0.0760, 0.0746, 0.0338 and 0.0291, for the current and lagged balance sheet size, respectively. On the other hand, negative externalities from the expansion of the Fed's balance sheet are present in the Health Care, though minimal (-0.00053 and -0.00135 for the current and lagged balance sheet sizes), with the largest negative externalities are present in the Utilities and Real Estate sectors with -0.11148, -0.11391, -0.13696 and -0.13874, for both models, respectively.

Implications

As the banking industry is the largest participant in the debt markets, the results of Tables 1 and 2 suggest that banks tend to benefit from the trading of their more valued treasuries in their portfolios each time the central bank makes attempts to lower treasury yields. Bank's treasury portfolios overvalued in the spring of 2020 as the yields dropped to their lowest levels in history. In turn, bank stocks overperformed relative to the stocks of other industries. Further study on a by-intervention basis will be conducted to estimate changes in the λ s, for each sector of the S&P500.

Table 2: Externality from the Fed Balance Sheet Size by Sectors of the S&P500
Differences in the First Stage Equation of the Three-stage least-squares regressions of Sectors to the S&P500

Index	$\lambda_{k,i}$
SPF3SLS	0.0760042
SPF3SLSlg	0.0745914
S5Matr3SLS	0.0337726
S5Matr3SLSlg	0.0291104
S5Indu3SLS	0.0072939
S5Indu3SLSlg	0.0042142
S5InfT3SLSlg	0.0035254
S5InfT3SLS	0.0007891
SP5003SLS	0
SP5003SLSlg	0
S5Hlth3SLSlg	-0.0005265
S5Hlth3SLS	-0.0013480
S5ConD3SLS	-0.0154129
S5ConD3SLSlg	-0.0161474
SPN3SLS	-0.0163783
SPN3SLSlg	-0.0197979
S5ConS3SLS	-0.0781881
S5ConS3SLSlg	-0.0789018
S5TelS3SLS	-0.0960258
S5TelS3SLSlg	-0.1004532
S5Util3SLSlg	-0.1114853
S5Util3SLS	-0.1139111
S5RIS3SLS	-0.1369570
S5RIS3SLSlg	-0.1387413

Source: Own Calculations

Conclusions

The empirical results display that increases in the Fed's balance sheet, as a consequence of large-scale purchases of government securities, in the last fourteen years have impacted positively the valuation of the S&P500 stock index. Moreover, this effect seems to add a residual factor that accumulates through the years as the performance of the S&P500 index continued its upward trend even during times of dis-interventions.

Based on the above conclusions, this study may suggest that if policymakers aim to reduce the relative cost of financing in the capital markets in times of financial distress via market interventions, long-run effects on the pricing of financial assets must be considered, such as overvaluation of financial assets and, thus, inefficient asset valuations in the future. Moreover, the impact may be more or less valued depending on the various sectors of the economy.

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Green Economic Development as the Framework for Green Finance and Green Investment

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Abstract:

This study aims to analyze the main elements of the green economic development as a framework for green finance and green investment. The analysis spurs from the underlying notion that green economics is inherently a normative framework and a school of thought development of the neo-classical economic thinking with conceptual assumptions, deficiencies, and contradictions, beginning to set out the roots, aims and philosophical principles. The methods used are the analytical and descriptive based on the literature review and an experiential reflective attitude on the key issues concerning the variables green economic development, green finance, and green investment. It is concluded that Implementation of green economy activities have many obstacles to face among which are the inadequate funding and financing, the institutional development in collaborations and coordination practices, etc.

Keywords: *Green economic development, green finance, green investment*

Introduction

The concept of green economy is related to other concepts intersecting with sustainable development to permeate multiple structures, renewable energy, economic growth and combines with the concept of green finance. Green economy perspectives, including the most radicals are statist responses to global economic and financial crises of 2008–2009 by re-legitimizing public intervention in economic development. Green finance is an approach to economic environmental development as concerned with the framework of economic recovery that marginalize other existing approaches to sustainable innovation.

Economic factors such as the geographical patterns, energy structure, foreign direct investments, green tax policies, industrial structure, carbon dioxide emissions affect the development of green economy (Feng et al., 2017; Sapna and Nivedita, 2019; Hille et al., 2019; Pan et al., 2019; Liu N. et al., 2020). Foreign direct investments improve of green economic development.

Industrial agglomeration has a competitive effect on green development of businesses forcing them to invest on green technological innovation, transform the methods of green production methods to achieve a dominant market position. Green economic development is supported by production supply strategies.

Green economy development

Green economic development has become a global trend for sustainable economic growth. Societal actors contribute to the development of green economy, circular economy and bioeconomy resulting in a diversity of meanings (Bugge et al., 2016; Korhonen et al., 2018; Merino-Saum et al., 2020). Promotion of green transformation in developing countries may be oriented towards the protection of environmental resources, urban governance, and green economic development (Li, Zhang, Fan, Chen, 2021). However, there is little empirical evidence that environmental, social, and economic sustainability transitions at regional and local scales result from improvements of ecological sustainability and the impacts from green economy initiatives upon the located areas with little environmental effects of green transformations.

Green economic development is crucial for climate adaptation strategies (Schipper et al. 2020).

Green financing

The aftermath of the 2008 fiscal crisis was the green economic momentum with redirecting private and public capital to finance green economy activities instead of the brown economy activities.

Implementing transitions to a green economy model needs to be promoted and supported by including policy options among others, attracting green investments, suspending incentives for coal-fires energy plants and other extractive sectors, regulation policies to maintain consistency to green economy, etc. (Martawardaya, Rakatama, Junifta, & Maharani, 2021). The policy objectives include regulatory frameworks for government investment and spending favoring green economic development through the implementation of fiscal and market oriented instruments to promote capacity building, training, and innovation.

Firms are getting involved on green economic development pushed by external pressure and addressing obstacles. The private sector and the investment financial sector and governments must steer investments towards greening the economy. Public funding and investments are critical for the implementation of green economy initiatives and projects, but they do not guarantee positive results, but there is a need for multiple-source and far-sighted planning of green economy initiatives. Public sector funding and financing for green economy initiatives such as the coal power plants, and the large-scale hydro stretches the breaking point.

As a response to the global financial crises, the greening economy has different proposals by combining ecological perspectives and transition management. The green economy is experiencing the implementation of green economic policy measures promoted by the Earth Summit and its Agenda 21 that provided limited guidance and on climate resilience policies instrumented under the United Nations Framework Convention on climate change in response to the global fiscal crisis of 2008-09.

The global financing system is converging into a green economic system attracting new climate-concerned investors and shifting global financial flows to climate-aligned projects (Cortellini, and Panetta, 2021). International-scale responses to the climate change and the financial crisis concludes that policies uphold the environment interpretation from mainstream economics concerned with the economic recovery. Green economy growth strategy in specific areas such as food and agriculture, public finance, and fiscal policy. The green economy strategies may use indicators to reveal the direction of the renewable energy sector and dependance from foreign direct investments.

Climate change questions the stability and growth of the financial sector to transform polluted economies into green economies (Alemzero et al., 2021). Negotiations under the United Nations Framework Convention on Climate Change provides the imperative for the renewing of green economic concepts and approaches to take advantage of economic transitions based on the opportunities offered by an agreement of collective low carbon finance goal (United Nations 2015).

Financial development promotes green economic growth. The allocation of financial resources promotes the development of a green economy. Improvement of economic development enhance urban green innovation, entrepreneurship, and green economic development. Financial development has an impact on urban green economies, but the differences between the prefecture-level cities makes the conclusions biased.

Digital financial inclusion promotes and improves the development of a green economy in key cities, although it may have different impact in developed and less developed cities. Cities with perfect financial development provides a financing environment for business promoting and improving the development of green economy. Environmental investments have constraints that hinder the transition to green economy, such as lacking support and protection against risks, lack of regulatory frameworks, etc.

The structure of financial institutions may improve the efficiency of green financial services and environmental quality and promote the green economy development. Financial changes in the value of green funds trade taking place in the financial stock markets have an impact on the green economy development (Wang, and Zhi, 2016). The mechanism research shows an impact that the digital inclusive finance indirectly promotes and improves the green economy development by an agglomeration of producer services and optimizing the industrial structure.

Agglomerations of enterprises share the benefits of green innovation technology, by reducing green transaction costs and using financial resources to transform the methods of green economy to promote green economy development. The digital inclusive finance has influence on the total factor productivity by upgrading the industrial structure and promoting the agglomeration of producer. Producer services agglomeration has a moderating effect with agglomeration between the digital inclusive finance and green economy development.

Green financial credit determines the production systems performance (Peng et al., 2020; Peng et al., 2021a; Peng et al., 2021b; Zhao et al., 2021). Green credit mechanisms have an impact acting indirectly into green economic growth through industrial and energy structures (Xie and Liu 2019; Ni et al. 2020; and Jiang & Zhou 2021). Businesses that are not under pressure to repay loans and political background occupy financial resources. Bank loans discriminate finance against green ventures while funds from government and capital firms align to serve green economy.

The transition to green economic development has been expanding very fast around the globe focusing on the reduction of potential sustainable environment associated with low gas emissions, renewable energy and cost-efficiency, transition toward clean and cheap energy, considering the economic risks, more specifically in times of finance (Yan, Ren, Kong, Ye, Liao, 2020; Yan, Kong, Ren, Shi, Chiang, 2019; Ren, Lu, Cheng, Shi, Shen, 2019; Ren, Cheng, Wang, Yan, 2021; Ziegler, 2017, Drozdowski, 2021; Barnett, Darnall, Husted, 2015).

Green finance has a critical role in the green economics transformation and ensures a fair play field among the conventional mainstream and green economies. Documents of green economy provide promotion and financing for renewable energy and efficiency measures for infrastructure, renewable sources, urban transport mobility, waste management and processing, water, and sewage infrastructure, etc. Green economy investment in clean energy is becoming relevant at the global scale (Bloomberg New Energy Finance 2016a, BNEF 2016b).

Transition towards green economy requires the development of investment mechanisms such as issuing green bonds. Renewable energy efficiency investment can be financed with green bond to design and implement green economy growth policies (Russo et al., 2021; Ning, Cherian, Sial, et al. 2022). Green bond market is a tool of financing for the global warming and climate change mitigation and to improve green economic growth in local economies (Al Mheiri and Nobanee 2020).

The vigorous development of the digital innovation finance making use of enterprise funds to improve the development of green economy. There is a relationship between the digital inclusive finance and the development of green economy. The inclusiveness of digital inclusive finances improves the financial environment easing the financial constraints of green enterprises, increases the funding sources for green enterprises and promotes green economic development (Ozili, 2018). Financial inclusive development alleviates consumer financial liquidity constraints and stimulate consumer demand.

Digital inclusive finance influences the quality of green economic development. The dimension of digital inclusive finance has an influence of on green economy development. There is a direct relationship between digital inclusive finance as a financial development and green economy development and there is a nonlinear relationship between financial inclusive development and the green economy (Zhang, 2017). A panel threshold model of the digital inclusive finance and the green economic development, which considers the threshold effect.

There is a nonlinear relationship between the digital inclusive finance and the development of green economy. There is no significant negative influence relationship between the digital inclusive finance and the green total factor productivity. Financial development has no significant inhibitory effect on green productivity maybe because the increase in financial development scale may not improve the development of green economy but must adapt to the resource endowment and industrial structure. However, the impact of financial inclusive development on green economy growth is uncertain.

Digital inclusive finances develop to a certain extent to have an impact on green economy. Digital inclusive finance has an influence on green economy development. Digital inclusive finance in combination with the green economy development complements the relationship. Digital inclusive finances promote development of green economy. The internal mechanism of digital financial inclusion supporting the development of green economy manifest through the producer service industry to enhance the development of green economy. The mechanism path of digital inclusive finance indirectly promotes through the industrial structures the green economy development.

Digital inclusive finance guides green consumption and promote green economic development. The digital inclusive finance reduces financial resources efficiency of green business and hinders green economy growth. The digital inclusive finance reduces the innovation thresholds of financing constraints stimulating the innovation in green technology. Financial inclusiveness development hinders green economic growth.

The development index of the digital inclusive finance may have an inhibitory effect to promote the development of the urban green economy. The digital inclusive finance index of Peking University, DIF index of Peking University (Gu et al. 2020), includes the sub dimensional indexes of Coverage, Depth of Use, and Digital Support Service Level to measure green economy development.

Conclusions

Implementation of green economy activities have many obstacles to face among which are the inadequate funding and financing, the institutional development in collaborations and coordination practices, etc.

Green economy development as a framework for the development of green finance and green investment is a path for financial institutions, banking, and business organizations proposed by international organizations that have developed green economic policy conceptual frameworks,

guidelines and tools on the creation and application of green economy methodologies and indicators on sustainable procurement, climate change adaptation, urban green economy patterns, training capabilities, process for low-carbon development, green accounting, etc. Some methodologies have become to be part of the green economy toolkits framed by the neo-classical economic thinking with conceptual assumptions, deficiencies, and contradictions, beginning to set out the roots, aims and philosophical principles.

Green economy has the character of public good while employment and income growth are driven by both private and public investment. The green economy growth in income and job employment is driven by public and private investments aimed to reduce carbon emissions and pollution, enhance renewable energies and natural resource efficiency, and care of biodiversity and ecosystem services. Private and public investment are required to be shifted to enable the transition to a green economy.

Deliberation of green economic policy instruments and investment decisions to green national and local economies in selected priority economic sectors are required to achieve the desired outcomes. The green economy policy options and strategies are open to the alternative evaluations of the action courses to be selected depending on the specific situations of each country, such as the level of development, institutional capacities, resource endowments, governance frameworks, etc.

The formulation of green economy policies is frame within a complex dynamic between the interests of investors and donors. At national scale, the concept of green economy applies to countries that have investments in green energy and human resources regarded as tools for green growth and economic performance and upgrading production facilities but lack of natural resources.

Less developed countries are incorporating green economy initiatives mechanisms in sustainable development plans towards more environmental sustainability, social inclusive economy and address vulnerabilities in land ownership and large scale investments. Implementation of green economy initiatives require the support from legislative changes to regulate investments.

The development of best practices to apply green economic policy measures includes the development of specific guidelines, tools and measures for the design and implementation of low-carbon strategies. Government decision making and policy making can make right environmental regulations in place and green economy efficiency to achieve green development. Governments applying green economic policy measures, mechanisms and tools for design, implementation and evaluation get better results in building institutional capacities for sustainable, low-carbon and environmental development, creation of employment, poverty eradication, etc.

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