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# strategic & risk-decisions management

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# Strategic Decisions and Risk Management
# 战略决策和风险管理

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# Strategic Decisions and Risk Management

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# Forms of economic proximity and their impact on innovation performance: A study of multidisciplinary commercial organisations in industry

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## Abstract

This article analyses the influence of different types of economic proximity (geographical, organisational, technological and social) of business units of multidisciplinary organisations on the effectiveness of their innovative activities. The conducted research is based on a survey of a sample of 83 holdings belonging to 27 MCOs (a total of 189 respondents). The analysis confirmed that most of the companies surveyed associate increased efficiency of innovation activities with organisational and technological proximity, while geographical and social proximity are significantly underestimated by respondents. It was also possible to identify separate profiles of different types of economic proximity of the business units in the sample. Thus, the net profit from the sale of new products is more influenced by technological and social proximity, the introduction of new products to the market is influenced by technological and geographical proximity, and the growth in the number of patents registered is influenced by organisational, technological and social proximity.

Based on econometric estimates, our results suggest that while all types of proximity have a positive effect on the introduction of new products to the market, only organisational and technological proximity have a direct effect on net profits from the sale of new products.

**Keywords:** geographical proximity, social proximity, technological proximity, cognitive proximity, organisational proximity, multidisciplinary organisations, industry, efficiency of innovation activity.

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# 经济亲密度形式及其对创新效率的影响：对工业中多元化商业组织的研究

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## 简介

本文分析了多元化组织的业务单位在地理、组织、技术和社会等不同类型经济亲密度对其创新活动效率的影响。所进行的研究基于对27个多元化商业组织中83家控股公司的问卷调查（共189名受访者）。分析结果表明，大多数受访公司将创新活动效率的提高与组织和技术亲密度联系在一起，而地理和社会亲密度则被受访者显著低估。 此外，研究还成功识别了多元化商业组织中不同类型经济亲密度的独特影响模式。例如，新产品销售净利润更受技术和社会亲密度的影响，新产品市场推广则更受技术和地理亲密度的影响，而专利数量增长则主要受组织、技术和社会亲密度的共同作用。

我们基于计量经济学评估的结果表明，尽管所有类型的经济亲密度对新产品上市都有积极影响，但只有组织和技术亲密度直接影响新产品销售的净利润。

**关键词：** 地理亲密度、社会亲密度、 技术亲密度、认知亲密度、组织亲密度、多元化组织、工业、创新活动效率。

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## Introduction

The competitiveness of multi-industry organisations is largely determined by their innovation efficiency, which in turn depends on the success of continuous knowledge creation and management, as well as the construction of an effective communication strategy between them.

For example, [Villasalero, 2013] shows that knowledge spillovers have a positive impact on productivity. Similar conclusions were reached by the authors of [Agarwal et al., 2009, Ding et al., 2013], who used transnational companies as their empirical base, and [Villasalero, 2014], who studied diversified companies. At the same time, the researchers note the difference between multi-industry organisations and transnational corporations, pointing out that the division of business units in multi-industry organisations mainly corresponds to industries, while in transnational corporations it is based on geographical location. As a result, the design of business unit communication and knowledge flow will differ significantly: in multi-industry companies, the key issue is crossing technological boundaries, whereas in multinational companies, the main issue concerns geographical boundaries. [Miller et al., 2007]. In both cases, intra-organisational communication and knowledge transfer takes place through an internal knowledge network, but in the first, it operates across product divisions, while in the second, it spans geographical branches.

Research also shows that when a business unit is actively involved in knowledge outflow, it indicates the presence of a rich resource base within the division. On the contrary, a lack of key resources and a weak resource base is indicated by the fact that a business unit is actively involved in the inflow of knowledge [Gupta, Govindarajan, 2000]. The authors of [Monteiro et al., 2008] demonstrate this using data from transnational corporations and argue that foreign subsidiaries that actively participate in knowledge transfer to the rest of the corporation have higher competencies and valuable potential. Similar conclusions are drawn in [Harzing, Noorderhaven, 2006]: foreign affiliates with high knowledge outflows have higher relative capabilities than foreign affiliates with high knowledge inflows. The authors of the study [Cho, Lee, 2004] also argue that the greater the competitive advantage of a foreign business unit, the greater the opportunities it has to acquire and create new knowledge through the sharing or recombination of knowledge located within

the divisions of a multinational corporation [Manolopoulos et al., 2007].

For knowledge absorption to be optimal, the inflow and outflow of knowledge and resources must be simultaneously high in all business units of multi-industry organisations, since the recombination of resources and knowledge requires the mutual exchange of knowledge between units [Galunic, Eisenhardt, 2001].

If the level of knowledge inflow in a business unit is high and the level of knowledge outflow is low, this means that the receiving unit plays a more passive role in the exchange process and the results are not comparable to those observed in the optimal scenario [Markides, Williamson, 1994]. Finally, if a business unit has a low level of both knowledge inflow and outflow, the result is that virtually no new knowledge is created in the unit, i.e. the business unit ceases to be innovative.

In order to develop a communication strategy and the process of knowledge transfer between the business units of a multi-industry organisation, i.e. to create the conditions for optimal knowledge acquisition by the business units, it is important to analyse the economic proximity.

The concept and forms of economic proximity related to types of inter-organisational relationships were first proposed in [Boschma, 2005], which argued that it is precisely these forms of economic proximity that facilitate effective joint learning and collective innovation between business units of a multi-industry trading organisation. R. Boschma classifies the types of economic proximity as geographical, cognitive, social, institutional, and organisational. Empirical evidence suggests that indeed all forms of closeness tend to be associated with higher levels of collaborative innovation, with distance in one dimension offset by closeness in another [Autant-Bernard et al., 2007; Balland, 2012].

The article aims to analyse the influence of different forms of economic proximity on innovation performance indicators of multi-industry commercial organisations.

## 1. Theoretical overview and research hypotheses

*Geographical proximity.* In research, geographical proximity is most often understood in terms of territorial (spatial) proximity. [Howells, 2002]. Geographical proximity was first described in [Bellet et al., 1992]. The article states that the geographical proximity of enterprises (business units) determines the effectiveness of business strategies and the success of innovative activities. In the results of their study, the authors proposed, for the first time, the organisation of scientific and technological parks for industrial enterprises in connection with the identified effectiveness of geographical proximity.

The measurement of geographical proximity varies between studies: some authors define the degree of geographical proximity as the absolute geographical distance separating participants, while others use the distance relative to transport (travel time) or the perception of these distances by companies. There are also differences in the scale at which geographical proximity is defined. Some studies look at the distance between two interacting organisations (dyadic distance), while others look at the presence of groups of firms in a geographical area (agglomerations).

The effect of geographical proximity is based on the concepts of knowledge spillovers by A. Marshall and tacit knowledge by M. Polanyi. According to them, geographical proximity allows for a reduction in the communication gap between participants, thereby facilitating technology transfer. Geographical proximity plays a special role in the transfer of tacit knowledge, as short distances facilitate personal interaction [Gilly, Torre, 2000].

More recent research has introduced the concept of dynamic geographical proximity (see e.g. [Gallaud, Torre, 2004; Kautonen, Hyypia, 2009; Rallet, Torre, 2009; Torre, Gallaud, 2022]), which implies that actors do not necessarily need to be in constant proximity to each other - temporary visits, meetings, and temporary co-existence in close proximity may be sufficient. In [Kautonen, Hyypia, 2009] it is shown that if participants manage to build other forms of proximity (e.g. organisational), they will enable companies to cooperate successfully across any geographical distance. Furthermore, [Gallaud, Torre, 2004; Torre, Gallaud, 2022] argue that geographical proximity is only necessary at certain stages of (innovative) collaboration, such as knowledge creation, basic research, while at the prototyping or commercialisation stage, geographical proximity is irrelevant.

Although the concept of temporal geographical proximity is supported by many authors, it has not been empirically confirmed.

There are many studies showing the relationship between geographical proximity and innovation performance, including in multi-industry organisations (see for example [Sidhu et al., 2007]), where the task of managing multi-industry organisations is to combine the knowledge of geographically distant business units to develop new technologies, processes, or products.

Research shows that business units tend to rely on the knowledge of geographically proximate partners [Rosenkopf, Almeida, 2003], as interpersonal communication between employees of nearby firms expands opportunities for formal and informal knowledge exchange and promotes the development of relational trust [Kale et al., 2000; Capaldo, 2007]. However, when business units are geographically distant, collaboration between them is difficult.

Therefore, the first hypothesis of this study is as follows:

*Hypothesis 1. In multi-industry commercial enterprises, geographical distance between business units negatively affects the overall innovative performance.*

Proximity between business units is essential for building and maintaining collaboration [Mattes, 2012]. For a long time, studies of proximity focused on geographical proximity [Belussi, Caldari, 2009], but over time researchers have come to the conclusion that business units of a multi-industry organisation can be co-located without interacting with each other and, conversely, can interact without being located close to each other [Knoben, 2009]. Thus, the origi-

nal concept of geographical proximity has been extended to other dimensions, i.e. cognitive, organisational, institutional, and social proximity [Boschma, 2005]. Moreover, it has become clear that one or more types of proximity can compensate or replace other types of closeness [Huber, Huber, 2012; Mattes, 2012]. The main motives for business units to initiate cooperation are their cognitive and organisational proximity.

*Cognitive proximity* reflects the extent to which partners have similar knowledge in terms of technical language, know-how, and depth of knowledge (see, for example, [Huber, Huber, 2012]). With cognitive proximity, business units find opportunities for innovation by combining their knowledge [Boschma, 2005].

*Organisational proximity* reflects the similarity between business units in their organisational goals (see, for example, [Werker et al., 2016]). There is currently no established understanding of organisational proximity. Some authors define it as 'participants who are in the same field of relations' [Oerlemans, Meeus, 2005]; others as 'actors who have a similar value system and whose interaction is governed by the same rules and procedures' [Rallet, Torre, 2017].

[Balland et al., 2014] define organisational proximity as a parameter consisting of geographical proximity and a scale of proximity of general business turnover, where business turnover is defined by the authors as 'fast, reliable, and well-adapted turnover of stocks and information, as well as effective mobilisation of external resources'.

In this regard, [Balland et al., 2014] define organisational proximity as 'the closeness between employees of a multi-industry organisation who identify themselves by belonging to the same organisation and by their knowledge of specific procedures' [Balland et al., 2014]. This means that business units that are part of the same group share the same organisational rules and procedures. This encourages interaction between them, making work easier than with external organisations [Rallet, Torre, 2017] and, in particular, facilitates knowledge flow and assimilation [Phene, Almeida, 2008]. In fact, multi-industry organisations (business groups) become platforms for knowledge sharing [Ratcheva, 2009], where collaboration and knowledge transfer tend to develop easily, facilitating the combination of knowledge from affiliated business units and their ability to co-create innovations even across large geographical distances. The existence of group links between distant business units of a multi-industry organisation appears to be particularly important for the transfer of complex and tacit knowledge that characterises knowledge-intensive collaboration, which requires strong links between organisations.

This presents the second hypothesis of this study:

*Hypothesis 2. In multi-industry commercial enterprises, organisational proximity has a positive effect on overall innovative performance.*

Although cognitive and organisational proximity stimulate collaboration in innovation activities between business units, some empirical studies (e.g. [Caniëls et al., 2014; Werker et al., 2016]) suggest that personal and social proximity also play an important role in collaboration.

Although personal and social proximity both reflect the human factor in collaboration and are therefore often considered as the same concept (e.g. in [Boschma, 2005; Knoben, Oerlemans, 2006]), these types of closeness are distinct from each other [Caniëls et al., 2014; Werker et al., 2016]. Employees who are personally close and similar to each other are more likely to work together [Caniëls et al., 2014]. Thus, personal proximity influences cooperation at the individual level. Social proximity enables cooperation because (potential) partners belong to the same professional or social networks [Caniëls et al., 2014]. Because these networks provide common informal rules, such as shared habits and a common socialisation process, social proximity ensures trusting interactions between partners [Boschma, 2005].

Initially, personal and social closeness were only analysed as separate variables, but then the researchers suggested that the human factor at the individual level, i.e. personal proximity, is crucial for collaboration and the creation of knowledge networks. For example, a study [Casciaro, Lobo, 2008] showed that professionals only collaborate with (potential) partners if they like them. At the same time, this research shows that the competence of (potential) partners is of little importance. This behaviour is observed in different organisational contexts and for different tasks [Casciaro, Lobo, 2008].

This is the third hypothesis of the study:

*Hypothesis 3. In multi-industry commercial enterprises, social proximity has a positive effect on the overall innovative performance.*

Technological proximity is based on shared technological expertise and knowledge bases. Technology can be defined as the tools, equipment, and knowledge that mediate inputs and outputs (process technology) and/or create new products or services (product technology) [Tushman, Anderson, 2018]. Technological proximity does not refer to the technologies themselves, but to the knowledge possessed by the owners of these technologies. Technological proximity between business units facilitates the acquisition and development of technological knowledge and the creation of new technologies [Anderson, Tushman, 2018].

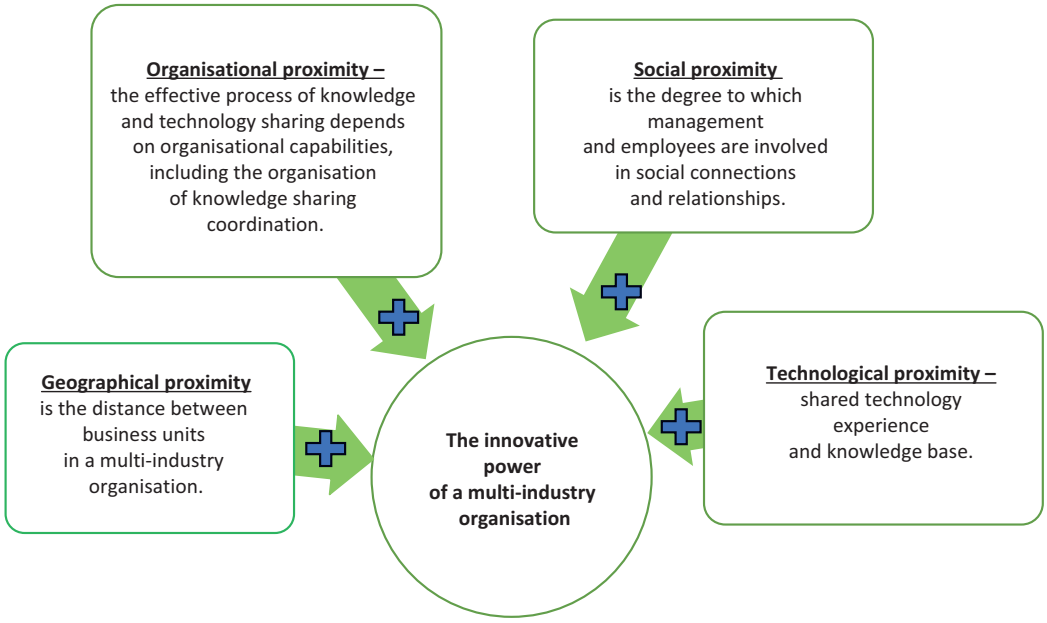
The importance of technological proximity is explained by the concept of relative absorptive capacity [Lane, Lubatkin, 1998]. In contrast to the general concept of absorptive capacity, which assumes that a firm's ability to learn depends only on the firm itself, the concept of relative absorptive capacity says that this ability also depends on the source of the knowledge being exchanged. Business units need to have comparable knowledge bases to ensure efficient and creative use of new knowledge [Colombo, 2003]. The knowledge base of firms is typically measured in terms of products they produce or the scientific or technological areas in which they file patents [Fung, 2003].

This leads to the fourth hypothesis of the study:

*Hypothesis 4. In multi-industry commercial organisations, the technological proximity of business units has a positive effect on the overall innovative performance.*

The conceptual model of the study is shown in the figure below.

Fig. 1. A conceptual model for studying the economic proximity of business units of multidisciplinary commercial organisations in industry




*Source:* compiled by the authors.

## 2. Reserch methodology

### 2.1. Description of the sample

The empirical testing of the proposed hypotheses was based on the analysis of data collected between January 2022 and February 2023.

A total of 28 multi-industry commercial organisations (MCOs) were selected for the analysis, including 83 holding companies and 2864 companies from various sectors. The number of companies included in the MCO ranges from 8 (YATEC) to 898 (Gazprom). Regions of presence - from 2 (YATEC) to 71 (Gazprom). A number of MCOs selected for analysis include sub-holdings. For all MCOs in the sample, the core enterprise is an industrial enterprise. More than half of the surveyed companies have been active in the market for more than 20 years; the age of the MCOs in the sample ranges from 18 to 83 years, with an average of 39 years. The characteristics of the MCOs in the sample are shown in Table 1.

The questionnaire was pre-tested in in-depth interviews with managers of 17 MCOs in order to clarify ambiguous interpretations of the questions. Data collection was carried out using a combination of online questionnaires and telephone interviews, which allowed the questionnaire questions to be clarified.

Questionnaires were then sent electronically to the 83 holdings that make up the MCO. The respondents were senior management and persons responsible for the development and innovation activities of the holdings. A total of 189 respondents representing 83 holdings participated in the study.

### 2.2. Research variables

The following indicators were used as dependent variables: the share of sales of innovative products in the total sales of the MCO; the number of new products launched during the year; the number of patents registered; the number of joint research projects between the business units of the MCO.

To measure geographical proximity, we used the number of cities in which each MCO's business units are located.

Organisational proximity was assessed using three questions aimed at measuring the ability of companies to build a well-coordinated system of interactions in the MCO innovation process, both between participants in the innovation process and within MCO companies.

Social proximity is measured by the ability of the MCO to engage employees of business units in direct interaction with each other, establish social ties and relationships, as well as the ability to build feedback loops with consumers and involve them in co-creating value (customer active paradigm).

Technological proximity is measured as the level of knowledge and competence of the MCO business unit. The higher the technological proximity of the business units, the greater their absorptive capacity.

The questions used to measure the degree of economic proximity of business units are shown in Table 2.

When responding to questions about social and technological proximity, MCOs showed a low ability to bring business units closer together and to create interactions within the framework of social and technological proximity.

Table 1
Characteristics of multidisciplinary commercial organisations in the sample

| MCO | Structure of multi-industry commercial organisations | | Regions of presence | Sub-holdings | Revenue, 2022 (billion roubles) |
|---|---|---|---|---|---|
| | Number of industries | Number of enterprises | | | |
| Severgroup | 30 | 121 | 28 | Sveza<br>Severstal<br>Power Machines<br>Lenta<br>AVA-Peter | 22.5 |
| Interros | 33 | 98 | 9 | Norilsk Nickel<br>Pervovaks<br>Rosbank | 243 |
| Gazprom | 70 | 898 | 71 | Gazpromneft<br>Slavneft<br>Gazprombank<br>TGC-1<br>Gasstroyprom<br>Centrenergoholding<br>Gazprom Mezhregiongaz<br>Centrenergoholding<br>Mosenergo<br>Moscow United Energy Company<br>SOGAZ<br>Gazprom Teploenergo<br>Stroytransneftegaz (STNG) | 100 |
| Rosneft | 40 | 221 | 37 | Slavneft | — |
| Novatek | 13 | 36 | 11 | — | — |
| EuroChem | 15 | 47 | 10 | — | 209 |
| Sibur | 23 | 75 | 17 | Nizhnekamskneftekhim<br>KOS<br>NIPIGAS | 39 |
| RusHydro | 24 | 66 | 31 | Yakutskenergo | 206 |
| Yatec | 7 | 8 | 2 | — | — |
| Rusal | 15 | 66 | 10 | — | 3.3 |
| Safmar | 20 | 43 | 6 | A101 Development<br>Neftisa | 99 |
| USM Holding | 19 | 150 | 12 | Udokancopper<br>Metalloinvest<br>Megafon<br>Akkerman Cement<br>ICS Holding LLC | — |
| Svyazinvestneftekhim | 28 | 197 | 9 | Tatneft<br>KOS<br>Tatneftkhiminvest<br>Tatenergo<br>Tattelecom<br>Tatspritprom<br>Centre for Technology Transfer<br>Investneftekhim | 138 |
| Ural Mining and Metallurgical Company (UMMC) | 42 | 148 | 17 | Petropavlovsk<br>Kuzbassrazrezugol<br>Vostochny Port<br>Uralelectromed (Ural Mining and Metallurgical Company)<br>Susumanzoloto | |
| Cable Alliance | 72 | | | | |
| Transmashholding | 10 | 61 | 13 | Locomotive Technologies | — |
| Independent Oil and Gas Company | 3 | 43 | 9 | Alliance Oil | 25 |
| Etalon | 14 | 148 | 11 | YIT (Finland) | 0.244 |
| Novolipetsk Metallurgical Plant (NLMK) | 12 | 43 | 8 | — | 95 |
| UralChem | 11 | 33 | 7 | Uralkali<br>BMF | — |

Table 1 *(ending)*

| MCO | Structure of multi-industry commercial organisations | | Regions of presence | Sub-holdings | Revenue, 2022 (billion roubles) |
|---|---|---|---|---|---|
| | Number of industries | Number of enterprises | | | |
| AEOH | 31 | 107 | 28 | AEOH-Development<br>Azot<br>Novaport<br>AEOH-Agro<br>Geoprommining | 1.5 |
| Russian Copper Company (RCC) | 11 | 36 | 6 | — | — |
| Magnitogorsk Iron and Steel Works (MMK) | 13 | 44 | 6 | — | 0.481 |
| Siberian Business Union (SBU) | 14 | 53 | 5 | SDS-Ugol | 0.01 |
| Evraz | 21 | 47 | 5 | — | — |
| Alrosa | 17 | 33 | 8 | — | 1.4 |
| United Metallurgical Company (OMK CJSC) | 11 | 20 | 6 | — | — |
| Industrial Metallurgical Holding (IMH) | 8 | 22 | 4 | | 2.8 |

*Source:* compiled by the authors.

The calculation of the main resulting indicators was based on three questions to measure each aspect of the MCO's economic proximity, as well as to measure the performance indicators of the MCO's innovative activities: net profit from the sale of innovative products as a percentage of the MCO's total net profit, the number of new products launched during the year, the number of patents registered, and the number of new products launched.

Control variables: the size of the MCO in terms of the number of enterprises belonging to the group, the volume of investment in the modernisation of equipment, the presence of the own research and development department in the structure of the MCO business units.

### 2.3. Data analysis procedure

To assess reliability, Cronbach's alpha coefficients were calculated, which met the recommended level of at least 0.75 (Table 3). A factor analysis using principal components (Varimax) was then performed on 13 questions describing four types of innovation: product, technological, organisational,

Table 2
Frequency of respondents' answers on the level of economic proximity

| | | Share of mentions (% of respondents) |
|---|---|---|
| | *Geographical proximity* | |
| 1 | MCO has several sub-holdings in different regions. | 74.1 |
| 2 | MCO business units in one region are located in several cities | 67.3 |
| 3 | MCO business units are located in more than one region | 99.8 |
| | *Organisational proximity* | |
| 1 | MCO business units have a knowledge base accumulation system | 64.8 |
| 2 | MCO business units have a unified knowledge sharing system | 56.9 |
| 3 | Business processes of the innovation process of the business units of the MCO are adapted to each other | 76.9 |
| 4 | Business processes of the innovation process are aligned only for business units of the MCO that are integrated along the value chain | |
| | *Social proximity* | |
| 1 | MCO has a corporate university | 29.7 |
| 2 | MCO conducts training programmes for specialists of the same category from different business units | 24.9 |
| 3 | MCO business units have acceleration programmes | 62.8 |
| 4 | MCO business units collaborate with consumers to create new products | 76.4 |
| | *Technological proximity* | |
| 1 | All MCO business units have their own R&D departments | 27.9 |
| 2 | MCO has a single centre for managing innovation activities | 49.4 |
| 3 | MCO reconfigures its organisational structure to better match existing competencies with the conditions for developing new markets or launching new products. | 38.1 |

*Source:* compiled by the authors.

Table 3
Factor analysis: questionnaire, factor load and reliability test (Cronbach's alpha coefficient)

| Questionnaire | Factor loadings sum of squares | Model 1 for the 'geographical proximity' factor | Model 2 for the 'social proximity' factor | Model 3 for the 'organisational proximity' factor | Model 4 for the 'technological proximity' factor |
|---|---|---|---|---|---|
| *Geographical proximity - Cronbach's alpha = 0.89* | | | | | |
| MCO has several sub-holdings in different regions | 0.628 | 0.824 | 0.311 | 0.276 | 0.258 |
| MCO business units in one region are located in several cities | 0.534 | 0.728 | 0.254 | 0.196 | 0.221 |
| MCO business units are located in more than one region | 0.664 | 0.733 | 0.329 | 0.247 | 0.253 |
| *Organisational proximity - Cronbach's alpha = 0.84* | | | | | |
| MCO business units have a knowledge base accumulation system | 0.718 | 0.221 | 0.741 | 0.346 | 0.258 |
| MCO business units have a unified knowledge sharing system | 0.639 | 0.198 | 0.824 | 0.298 | 0.221 |
| Business processes of the innovation process of the MCO business units are adapted to each other | 0.784 | 0.237 | 0.889 | 0.307 | 0.253 |
| Business processes of the innovation process are aligned only for MCO business units that are integrated along the value chain | 0.639 | 0.273 | 0.914 | 0.193 | 0.242 |
| *Social proximity - Cronbach's alpha = 0.7* | | | | | |
| MCO has a corporate university | 0.548 | 0.414 | 0.271 | 0.761 | 0.398 |
| MCO conducts training programmes for specialists of the same category from different business units | 0.671 | 0.363 | 0.259 | 0.695 | 0.401 |
| MCO business units have acceleration programmes | 0.528 | 0.423 | 0.164 | 0.727 | 0.314 |
| MCO business units collaborate with consumers to create new products | | | | | |
| *Technological proximity - Cronbach's alpha = 0.83* | | | | | |
| All MCO business units have their own R&D departments | 0.618 | 0.184 | 0.241 | 0.406 | 0.831 |
| MCO has a single centre for managing innovation activities | 0.522 | 0.215 | 0.262 | 0.321 | 0.779 |
| MCO reconfigures its organisational structure to better match existing competencies with the conditions for developing new markets or launching new products. | 0.563 | 0.173 | 0.309 | 0.307 | 0.693 |
| ***Efficiency of innovation activities*** | | | | | |
| *Net profit from new product sales - Cronbach's alpha = 0.85* | | | | | |
| Increase in relative level of net profit from new product sales compared to industry average | 0.768 | 0.804 | 0.451 | 0.166 | 0.632 |
| Increase in the profitability of new product sales | 0.534 | 0.722 | 0.369 | 0.191 | 0.587 |
| Growth in the market share of new products | 0.664 | 0.463 | 0.581 | 0.287 | 0.713 |
| *Number of new products launched during the year (Cronbach's alpha coefficient = 0.84)* | | | | | |
| Entering new sales markets | 0.793 | 0.621 | 0.239 | 0.564 | 0.783 |
| Expanding the range of new products | 0.814 | 0.793 | 0.303 | 0.383 | 0.732 |
| *Number of registered patents - Cronbach's alpha = 0.87* | | | | | |
| Number of patent applications | 0.748 | 0.824 | 0.311 | 0.676 | 0.258 |
| Number of registered patents | 0.884 | 0.728 | 0.254 | 0.896 | 0.221 |

*Source:* compiled by the authors.

and managerial. The analysis confirmed the presence of four factors with values greater than one according to the Kaiser criterion. Overall, the four types of economic proximity explained 73.6% of the variation in responses to the questions (this result corresponds to the recommended value of at least 70%) (Table 2). Similarly, factor analysis using the principal components method (Varimax) was used for the indicators of the effectiveness of MCO innovation activities: the share of net profit from the sale of new products, the number of new products introduced to the market, and the number of patents registered. The analysis confirmed the three performance factors identified, which together accounted for 72.6% of the variation in the questions (Table 3).

The values of the indicators obtained were then used in a regression analysis carried out using a mathematical model:

$$Y_i = \beta_0 + \beta_1 GEOGR_i + \beta_2 TECHN_i + \beta_3 ORG_i + \beta_4 SOC_i + \\ + \beta_5 MODERN_i + \beta_6 SIZE + \beta_7 RD_i + \varepsilon_i \quad (1),$$

where $GEORG_i$ – geographical proximity, $TECHN_i$ – technological proximity, $ORG_i$ – organisational proximity, $SOC_i$ – social proximity, $SIZE$ – MCO size, $MODERN_i$ – equipment modernisation, $RD_i$ – own research and development department. The indicators of MCO size, equipment modernisation, and the presence of an in-house R&D unit were introduced to control for characteristics that might affect the effectiveness of MCO innovation activities.

Standardised and unstandardised coefficients were obtained using the maximum likelihood method, with standardised coefficients used to determine the strength of the influence of the factors on the resulting indicator, and unstandardised coefficients used to test the research hypotheses.

## 3. Research findings

Tables 4-6 present the results of the regression analysis reflecting the influence of different types of economic proximity (geographical, social, organisational, and technological) on the effectiveness of the innovative activities of multi-industry commercial organisations. Overall, the results of the regression analysis confirmed the hypotheses of the study. Models based on equation (1) were able to explain 28% of the variation in MCO profits from new products, 17% of the variation in the number of products launched, and 24% of the variation in patent activity.

When analysing the growth of net profit from new products (Table 4), technological proximity ($\beta = 0.437$; $p < 0.01$) and social proximity ($\beta = 0.123$; $p < 0.01$). had the largest positive effect. At the same time, organisational ($\beta = 0.06$; $p < 0.10$) and geographical ($\beta = 0.092$; $p < 0.05$) proximity have no significant effect on this indicator. The variables of having an in-house R&D unit ($\beta = 0.061$; $p < 0.05$) and the size of the MCO ($\beta = 0.073$; $p < 0.05$) also have no effect on this indicator. At the same time, the indicator of the level of modernisation of equipment ($\beta = 0.248$; $p < 0.05$) has a negative effect on the level of net profit. Thus, technological and social proximity are key factors in increasing net profit from the sale of new MCO's products in the sample studied.

Table 4
The impact of various types of economic proximity on the level of net profit from the sale of new MCO products

| Independent indicators | Unstandardised coefficients | Standardised coefficients |
|---|---|---|
| Constant ($\beta_0$) | 0.227 (0.117) | |
| Geographical proximity ($GEORG_i$) | 0.092** (0.094) | 0.098*** |
| Technological proximity ($TECHN_i$) | 0.437*** (0.107) | 0.444 ** |
| Organisational proximity ($ORG_i$) | 0.060* (0.047) | 0.069* |
| Social proximity ($SOC_i$) | 0.123*** (0.019) | 0.143*** |
| Level of investment in equipment modernisation ($MODERN_i$) | –0.248** (0.069) | –0.235** |
| MCO size ($SIZE$) | 0.073** (0.029) | 0.082** |
| In-house R&D ($RD_i$) | 0.061** (0.053) | 0.058** |
| Corrected $R^2$ | 0.28 | |
| Number of observations | 189 | |

*Note.* * – $p < 0.10$; ** – $p < 0.05$; *** – $p < 0.01$. Standard errors are given in brackets.
*Source:* compiled by the authors.

Table 5
The impact of different types of economic proximity on the number of new MCO products launched in the reporting year

| Independent indicators | Unstandardised coefficients | Standardised coefficients |
|---|---|---|
| Constant ($\beta_0$) | 0.384 (0.093) | |
| Geographical proximity ($GEORG_i$) | 0.192** (0.011) | 0.198** |
| Technological proximity ($TECHN_i$) | 0.174** (0.028) | 0.183** |
| Organisational proximity ($ORG_i$) | 0.138** (0.051) | 0.149** |
| Social proximity ($SOC_i$) | 0.131** (0.072) | 0.139** |
| Level of investment in equipment modernisation ($MODERN_i$) | –0.125** (0.069) | 0.131** |
| MCO size ($SIZE$) | 0.119** (0.039) | 0.122** |
| In-house R&D ($RD_i$) | 0.133** (0.067) | 0.138** |
| Corrected $R^2$ | 0.17 | |
| Number of observations | 189 | |

*Note.* * – $p < 0.10$; ** – $p < 0.05$; *** – $p < 0.01$. Standard errors are given in brackets.
*Source:* compiled by the authors.

An analysis of the number of new products launched on the MCO market in the reporting year (Table 5) shows that all types of business proximity have a positive impact: geographical proximity has the largest impact (β = 0.192; $p < 0.05$), followed by technological (β = 0.174; $p < 0.05$), organisational (β = 0.138; $p < 0.05$) and social (β = 0.131; $p < 0.05$) proximity. The level of investment in equipment modernisation (β = 0.125; $p < 0.05$) has a negative effect on the number of new products, while the size of the MCO (β = 0.119; $p < 0.05$) and the presence of its own R&D department (β = 0.138; $p < 0.05$) have a positive effect on the introduction of new products.

Finally, the analysis of the number of registered patents (Table 6) shows that organisational proximity (β = 0.318; $p < 0.01$), technological proximity (β = 0.282; $p < 0.01$), geographical proximity (β = 0.165; $p < 0.10$) and the presence of an in-house R&D unit (β = 0.268; $p < 0.67$) have a positive effect on the number of registered patents. At the same time, social proximity (β = 0.084; $p < 0.05$), the size of the MCO (β = 0.063; $p < 0.05$), and the level of investment in equipment modernisation (β = 0.071; $p < 0.05$) do not have a significant impact on the effectiveness of MCO innovation activities.

Table 6
The impact of different types of economic proximity on the number of patents registered by the MCO in the reporting year

| Independent indicators | Unstandardised coefficients | Standardised coefficients |
|---|---|---|
| Constant ($\beta_0$) | –0.424* (0.066) | |
| Geographical proximity ($GEORG_i$) | 0.165 *** (0.171) | 0.179 *** |
| Technological proximity ($TECHN_i$) | 0.282*** (0.127) | 0.288*** |
| Organisational proximity ($ORG_i$) | 0.318*** (0.048) | 0.324*** |
| Social proximity ($SOC_i$) | 0.084** (0.064) | 0.079** |
| Level of investment in equipment modernisation ($MODERN_i$) | 0.063** (0.009) | 0.067** |
| MCO size ($SIZE$) | 0.055** (0.013) | 0.052** |
| In-house R&D ($RD_i$) | 0.271** (0.067) | 0.268** |
| Corrected $R^2$ | 0.24 | |
| Number of observations | 189 | |

*Note*. * – $p < 0.10$; ** – $p < 0.05$; *** – $p < 0.01$. Standard errors are given in brackets.
*Source:* compiled by the authors.

To test the first hypothesis regarding the relationship between geographical proximity and the effectiveness of MCOs' innovative activities, we can conclude that it is confirmed: geographical proximity has a positive effect on two of the three analysed indicators of the effectiveness of innovative activities - the number of new products launched on the market and the number of patents registered.

The second hypothesis, which describes the influence of organisational proximity on the innovative efficiency of MCOs, was partially confirmed for the indicators of the efficiency of innovative activities: the number of new products introduced to the market and the number of patents registered.

Interviews with MCO representatives revealed an association between organisational and social proximity ($\rho_s = 0.57$) supporting the notion that social closeness leads to higher levels of organisational proximity.

The third hypothesis about the influence of social proximity was partially confirmed for the indicators of the effectiveness of innovation activities: the amount of net profit from the sale of new products and the number of new products introduced to the market.

Finally, the fourth hypothesis on the impact of technological proximity was fully confirmed: technological proximity has the greatest impact on profits from the sale of new products, followed by the number of patents filed and the number of new products launched.

Thus, we have demonstrated the significance of the constructed model describing the influence of different types of economic proximity. We also confirmed the influence of different types of MCO business units' economic proximity on the efficiency of their innovation activities, expressed by indicators of increasing net profit from the sale of new products, the number of new products introduced to the market, and the number of patents registered.

According to the results obtained, when modelling the net profit from the sale of new MCO products, the key factor in the growth of net profit is technological and social proximity. In modelling the number of new product introductions, geographical and technological proximity emerged as key factors, followed by social and organisational proximity. When modelling the increase in the number of registered MCO patents, organisational, technological, and organisational proximity are significant factors. Social proximity is the least significant factor.

## Conclusion

The article presents a comprehensive multifactorial study of the influence of different types of economic proximity of business units of multi-industry commercial organisations on the effectiveness of their innovative activities. The assessment of the effectiveness of innovation activities is linked to the possibility of implementing a number of tasks set by the State Programme of the Russian Federation 'Development of Industry and Improvement of its Competitiveness'. It is assumed that the MCOs will become key enterprises, competitive in the Russian and global markets, creating products with high added value, which will help maintain high rates of industrial production growth in 2025-2030 and increase the production of modern innovative products even in an unfavourable economic situation.

This study identified four types of economic proximity of MCO business units: geographical, technological, organisational, and social, which were measured as a result of a survey of a sample of 83 MCO member companies (189 respondents) and used to analyse the effectiveness of MCO innovation activities. The survey confirmed that the majority of companies surveyed associate increased efficiency of innovation activities with organisational and technological proximity, while geographical and social proximity are significantly underestimated by respondents.

The results of the quantitative analysis confirmed most of the hypotheses. It was also possible to identify individual profiles of different types of economic proximity of the business units of the MCO sample. For example, net income from the sale of new products is strongly influenced by technological and social proximity, the launch of new products is influenced by technological and geographical proximity, and the growth in the number of patents filed is influenced by organisational, technological, and social proximity.

In this way, depending on the objectives set by an MCO, it is possible to combine investments in certain types of economic proximity in order to achieve the objectives set.

By analysing the combination of different types of economic proximity on the performance indicators of MCOs, the study can be extended in the future.

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# Economic security of digital ecosystem solutions in logistics

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## Abstract

The article discusses issues of ensuring economic security as one of the most important qualitative characteristics of logistics systems, which determines the ability to ensure the established parameters of material flows in the process of goods distribution when implementing digital systems and technologies. Contemporary risks and threats characteristic of the development of digital transport and logistics ecosystems are analysed. The key factors for ensuring economic security and their importance in logistics are examined from the point of view of ensuring operational control over compliance with established key indicators of product distribution. An interpretation of the concept of 'economic security' is given from the point of view of protecting a business entity from external and internal threats in order to increase the level of competitiveness and sustainability of business in the market. The issues of ensuring the parameters of goods distribution within the established thresholds are addressed in order to achieve the optimal functioning of the goods distribution system and to ensure the economic activity of the enterprise with all the necessary resources. Logistics systems are studied for the effective organisation and management of material flows, aimed at ensuring the reliability of operations and the implementation of the strategy of economic entities. The need to use modern digital technologies to increase the level of economic security in logistics systems and to ensure the transparency, controllability and traceability of material flows in the field of goods distribution has been demonstrated. At the same time, the very fact of digitising cargo delivery processes is considered from the perspective of the ecosystem paradigm and the platform concept. The patterns of transformation of traditional logistics operators into providers of digital logistics services are substantiated. A model of a cyber-physical ecosystem in logistics has been developed, enabling end-to-end management of business processes and data exchange in the distribution of goods.

**Keywords:** economic security, logistics, digital ecosystems, transport, digital technologies, digital platforms.

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# 物流领域数字生态系统解决方案的经济安全

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## 简介

文章讨论了经济安全性作为物流系统中最重要的质量特征之一的问题，这些特征决定了在数字化系统和技术的应用过程中，物流系统在货物流动过程中实现设定的物质流参数的能力。 对运输物流服务数字生态系统发展中的现代风险和威胁进行分析。研究了在物流中确保经济安全的关键因素以及它们在确保货物流动的关键指标得到遵守方面的重要性。 给出了对"经济安全性"概念的解释，从经济主体受到内部和外部威胁的程度角度来看，以提高企业在市场上的竞争力和稳定性。讨论了在设定的门槛值范围内确保货物流动参数以实现货物传送系统的最佳运作和企业经营活动所需的所有必要资源的问题。研究了物流系统的有效组织和管理物流流程，以确保经济主体的可靠运作和战略实施。论证了在物流系统中提高经济安全水平和确保货物流动领域的透明度、可控性和追溯性的必要性，这需要使用现代数字技术。同时，将货物交付过程数字化的事实从生态系统范式和平台概念的角度进行了考察。论证了传统物流运营商转变为数字物流服务提供商的规律性。提出了一种在物流中实现端到端业务流程管理和数据交换的模型，即物理-数字生态系统模型。

**关键词:** 经济安全，物流，数字生态系统，运输，数字技术，数字平台。

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## Introduction

At present, one of the key quality features of modern transport and logistics systems is economic security, which provides control over compliance with the established parameters of material and related flows in the process of goods movement, as well as sufficient supply of enterprises with all types of resources for their economic activities.

In this case, economic security not only ensures the protection of economic entities from internal and external threats, but also stimulates the sustainable and stable functioning of entities in the context of effective counteraction to the negative impact of environmental conditions.

In this context, logistics as a science and a sphere of practical activity is aimed at the implementation of strategies of economic entities, maintaining the efficiency of their work and is connected with the optimisation of organisational and managerial efforts to promote material flows. It is obvious that in this case the absence of a well-established and effective system of economic security in the enterprise will lead to the failure of the implementation of its strategy and the risk of losing competitive advantages in the market.

In addition, the high stability and functionality of modern mechanisms for the movement of goods, including in international traffic, make it possible to increase the efficiency of all entities involved in the integrated logistics system and to optimise business processes for the delivery of goods to end users.

The purpose of this study is to substantiate the use of a methodology to ensure economic and information security in the implementation of modern digital ecosystem solutions in logistics, in the context of increasing cybersecurity threats.

## 1. Theoretical review

The use of digital technologies in logistics systems is now an objective and established reality. However, despite all the advantages of digitalisation, which make it possible to speed up the execution of logistics operations and track them online, digital ecosystems can be exposed to a fairly high level of external and internal threats, primarily related to the vulnerability of the information infrastructure of economic entities. Since logistics as a practical sphere of activity is closely related to the sphere of material production and delivery of products to end consumers, its sustainable functioning, including the use of modern information technologies, is one of the key factors of the state's economic security and the key to maintaining a high level of well-being of the population.

Quite a lot of scientific research is devoted to the problems of implementing digital technologies and ensuring economic security in the field of logistics and supply chain management. The authors of the work [Plotnikov et al., 2023] focus on the emergence of a wide range of new threats that give rise to the possibility of weakening national and economic security caused by turbulence and instability of the global economy, which leads to the need to strengthen the industrial potential and accelerate technological development of our country.

In the article [Malyukov et al., 2023], the authors characterise the sustainability of economic systems from the perspective of strategic content using a balanced scorecard system, which allows for the synchronicity of managing the overall efficiency of the enterprise, risks arising in the course of work, and the implementation of the economic security agenda of business systems when they operate in a wide range of modern threats and challenges.

The study [Trachuk, Linder, 2023] is devoted to the impact of digital platforms on the performance indicators of industrial enterprises in the context of creating and developing unique competitive advantages and increasing the efficiency of primary and auxiliary processes in the field of real production in order to find sources of internationalisation and enter new markets in the context of negative network effects.

The work [Nosov, 2019] substantiates the strategic role of logistics in ensuring the economic security of the country, and the effectiveness of logistics activities is defined as the basis of the economy of any state. At the same time, the methodology of logistics should be closely related to the basic tasks that ensure the comprehensive modernisation of the industrial production and technological base to neutralise external and internal threats in the economy, including in the transport and logistics sector.

## 2. Research material and methods

In today's conditions, the use of digital innovations and modern information technologies in the field of goods transport, ensuring online transparency and controllability of all types of flows, including material, information and financial, contributes to increasing the level of economic security in the field of transport and logistics services.

The generally accepted methods used in logistics for a long time assumed that economic benefits were only generated by the functioning of the company itself, its supply chain and its immediate business environment. Now and in the foreseeable future, we will see the dominance of the digital paradigm in the provision of transport and logistics services, based on the application of the platform concept and the creation of the necessary conditions for the formation of mature ecosystems that integrate a large number of participating entities and jointly generate high indicators of added value. At the same time, a highly secure and sustainable digital logistics information infrastructure should become a key prerequisite for implementing the new methodology.

The author's view in the publication [Bag et al., 2020] follows these trends and aims to analyse the structural and transformational processes that ensure the development of network telecommunications convergence and the expansion of information and analytical spatial interaction at various levels, including regional, state and global.

The advantages of implementing and integrating digital platform solutions in the transport logistics of a single country, as well as digital integrated platforms with global coverage, achieved by overcoming time and space gaps and barriers in the interaction of subjects of transport and logistics processes, are noted. In this context, a number of scientific studies, such as 'The State as a Platform', carried out by the

Fig. 1. Economic security factors in logistics

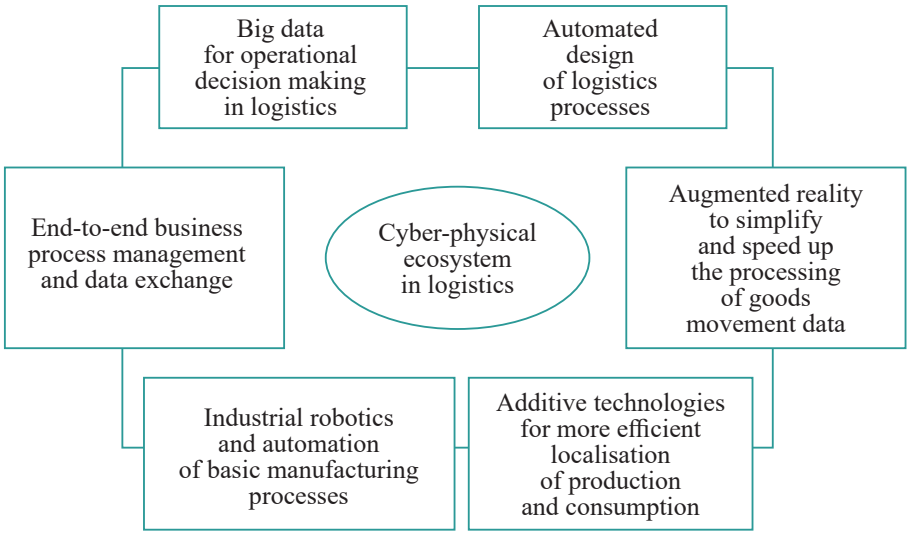
| Factors | Meaning |
|---|---|
| – Well established and streamlined rules and procedures for managing logistics business processes | – Ensuring operational control over compliance with established key indicators of product movement |
| – Documented internal policies and accountability for compliance | – Reducing the risk of illegal actions by officials |
| – Compliance with workplace safety regulations | – Increasing labour productivity, reduce disruption to work schedules |
| – Pre-litigation handling of claims | – Reducing the number of complaints and fines |
| – Working with unified, standardised technologies | – Using of uniform forms of documentation and technological solutions by all subjects of the supply chain |
| – Use of specialised closed digital networks for data exchange | – Preventing unauthorised access to information by third parties |
| – Confidentiality and protection and storage of trade secrets | – Countering industrial espionage and insider attacks |
| – Professional retraining of employees | – Strengthening the human component of economic security |

*Source:* [Dmitriev, 2012].

Centre for Strategic Studies, consider individuals and legal entities as priority consumers of digital government services, if all connected entities have the possibility to work with universal databases, but with a differentiated level of access. At the same time, an additional synergistic effect for users of digital services can be achieved through the use of innovative methods of network coordination and control of network interaction [Bogachev, Trifonov, 2022].

It should be recognized that the goals of the future world order and its features will be directly related to the further universal and widespread implementation of digital solutions caused by the increasing modernisation of microelectronics, telecommunications and information technologies [Khalin, Chernova, 2023].

Fig. 2. Model of a cyber-physical ecosystem in logistics




*Source:* [Dmitriev, 2018].

In their generality, digital tools form a model of a cyber-physical ecosystem in logistics (Figure 2), allowing the creation of a set of integrated interactions in the 'consumer-supplier' systems in the functional logistics circuit to coordinate end-to-end business processes of goods movement and data exchange on deliveries, based on big data analytics on the characteristics of goods and information on the cargo owners to make informed and rapid decisions online[1].

However, it should be recognised that the process of digital transformation in general is characterised by a number of serious risks and threats, in particular the risk of data privacy breaches, the use of malicious software and imperfect regulatory frameworks.

[1] Logistics and Supply Chain Management: Textbook for Universities (2019). Edited by V.V. Shcherbakov. M., Yurait.

Table 1
Volumetric structural and market indicators by type and category of digital privacy tools

| Digital data protection tools | Market share (%) | Market share (billion roubles) | Growth rate (%) |
|---|---|---|---|
| Computer network security | 45 | 61 | 20 |
| User data protection | 15 | 20 | 13 |
| Automated workstation security tools | 13 | 18 | 17 |
| Infrastructure security | 12 | 17 | 32 |
| Application package and application protection | 8 | 11 | 34 |
| Protecting user accounts | 7 | 9 | 10 |

*Source:* Forecast of the development of the cybersecurity market in Russia The Russian Federation for 2022-2026 (2022). https://www.csr.ru/ru/research/prognoz-razvitiya-rynka-resheniy-dlya-informatsionnoy-bezopasnosti-v-rossiyskoy-federatsii-v-2022–2026-godakh/.

## 3. Research findings and their discussion

As mentioned above, one of the forms of implementing business processes that has recently become quite widespread in logistics is a digital ecosystem organisation based on the platform concept of managing the movement of goods. This concept is a driver for the transformation of the methods of providing digital logistics services to consumers and allows for a significant increase in the level of competitiveness of companies in the market compared to the traditional approach to the activities of logistics operators.

Logistics and Supply Chain Management: Textbook for Universities (2019). Edited by V.V. Shcherbakov. M., Yurait.

Since the provision of logistics services in digital form and the development of cyber-physical systems directly depend on the level of security of the digital infrastructure of goods distribution, in this context it is advisable to dwell on the analysis and assessment of the cybersecurity market based on the results of 2021, published in 2022 by the Centre for Strategic Research Foundation. (CSR)[2].

First of all, let's consider the structural indicators for market share volumes for 2021 by categories of information security tools (Table 1). The average annual growth rate of the cybersecurity market in Russia at the end of 2021 is estimated at more than 17%.

This value exceeds the growth of global cybersecurity market indicators, which, although historically quite high due to the industrially developed countries of Western Europe and North America, are currently growing at a lower rate (on average about 11% per year) due to the maturity and saturation that has developed in recent years. At the same time, according to CSR forecasts, the Russian cybersecurity market could reach RUB 446 billion by 2026 (Figure 3).

The above results of the study by the Centre for Strategic Research 'Forecast of the Development of the Information Security Solutions Market in the Russian Federation in 2022-2026' are also interesting because recently the Russian cybersecurity market has been significantly affected by changes in the geopolitical situation. This led to a mass exodus of Western developers and vendors of integrated solutions and information security tools from Russia in the first quarter of 2022, predicting a significant restructuring of market shares in the next five years [Bashirzade, 2022].

According to the estimates of the analytical agency CSR, from 2023 to 2027 the volume indicators of the Russian cybersecurity market should grow by at least 2.5 times. At the same time, from 2023, almost the entire budget of customers for information security tools in the B2G and B2B sectors will be spent on products from Russian suppliers, which will allow this part of the market to grow from 113 billion roubles in 2021 to 446 billion roubles in 2026.

The cybersecurity market is also significantly influenced by the active position of regulators and government bodies regarding the need for import substitution (ensuring technological independence) of technical solutions related to ensuring the secure operation of critical information infrastructure facilities[3].

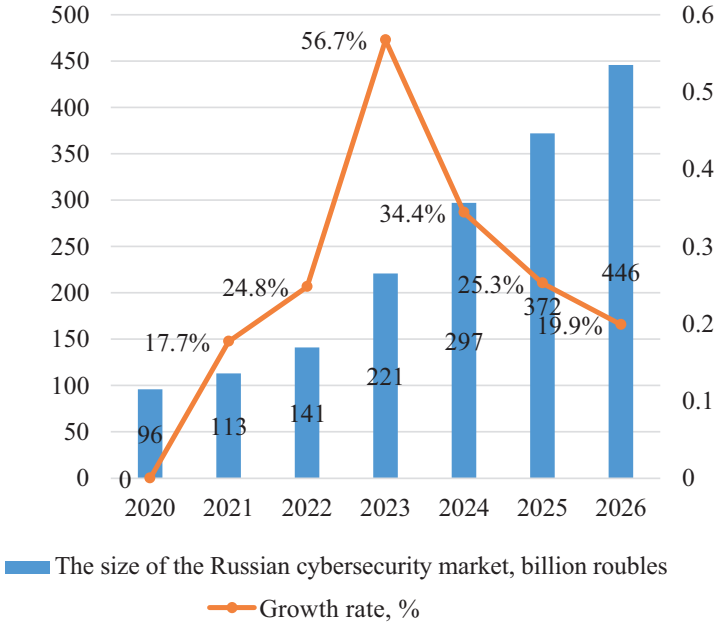
Transport logistics, on the other hand, is subject to the negative impact of a whole range of risks and threats resulting from the introduction of modern digital tools (Table 2).

According to statistics, the total number of cyber-attacks on Russia has increased by 65% since the beginning of 2023. The number of cyber-attacks on Russian services has increased 15 times. About 25,000 cyber-attacks on state digital resources were neutralised. About 1,200 cyber-attacks were directed at critical infrastructure facilities (energy, water, environmental monitoring, transport and other key systems that ensure the life of the population) [Dmitriev, Shcherbakov, 2023].

In maritime transport, the traditional systems used for safety and reporting of accidents and disasters have been replaced by fully digital local networks based on the use of

[2] The number of cyber attacks on Russian information systems has increased by 65% (2023). https://www.vedomosti.ru/technology/news/2023/03/03/965181-chislo-kiberatak.
[3] Forecast of the development of the cybersecurity market in the Russian Federation for 2022-2026 (2022). https://www.csr.ru/ru/research/prognoz-razvitiya-rynka-resheniy-dlya-informatsionnoy-bezopasnosti-v-rossiyskoy-federatsii-v-2022-2026-godakh/.

Fig. 3. Dynamics and volume forecast of the cybersecurity market in Russia




*Source:* Forecast of the development of the cybersecurity market in the Russian Federation for 2022-2026 (2022). https://www.csr.ru/ru/research/prognoz-razvitiya-rynka-resheniy-dlya-informatsionnoy-bezopasnosti-v-rossiyskoy-federatsii-v-2022–2026-godakh/.

cloud technologies, in particular software that controls electronic navigation. These networks have become a tempting target for hackers because they are designed to continuously collect, integrate and analyse on-board information to track a vessel's location, cargo data, technical issues and a range of navigational issues in different parts of the world's oceans and coastal waters. Rail transport is facing a similar situation. Traditional wired train control systems, which were limited in their ability to share information with the outside world, are being replaced by wireless standards that ensure the operability of wide networks linking freight and passenger trains to the station attendant's control room. And this can also be an attractive target for cyber attacks.

In order to neutralise the above risks and threats, it is necessary to increasingly implement digital ecosystems in transport logistics, whose infrastructure will include a set of modern information systems and technologies that have potential benefits for the economy and society, and also allow

Table 2
Threats to the introduction of digital tools in transport logistics

| Risks of Big Data | Risks of the Industrial Internet | Artificial intelligence and robotics risks | Risks of a distributed ledger system |
|---|---|---|---|
| • Breach of data privacy<br>• Suboptimal system for collecting and storing big data<br>• Partial or complete loss of data due to processing errors<br>• Big data processing does not produce results for analysts<br>• Unwillingness to change on the part of staff and management | • Malware injection, device control interception, device destruction and theft<br>• Software vulnerability<br>• DDoS attacks on a computer system<br>• System, network and device failure due to power outages and other man-made and natural factors | • Lack of machine capacity to solve problems<br>• Displacement of labour by artificial intelligence<br>• Errors in the training of artificial intelligence and the implementation of robotics<br>• Vulnerability of robotics (programming, calibration, controllers)<br>• Most people prefer human interaction | • ББlockage and loss of funds due to code vulnerability or smart contract looping<br>• Loss of personal data<br>• Attacks on transaction sending and receiving nodes<br>• Gain control through dominant computing power<br>• Lack of regulation |

*Source:* [Dmitriev, 2018].

Table 3
Advanced digital information technologies in transport and logistics service ecosystems

| Work actively | Supposed to be implemented | Перспективные |
|---|---|---|
| • Development of internet sales (e-commerce)<br>• Omni-channel (working with customers through all possible channels)<br>• Mobile access to business information systems | • Customising production for specific orders<br>• Customer behaviour analysis and forecasting<br>• Digital design and modelling | • Using blockchain technology to protect information<br>• Using cryptocurrency for peer-to-peer payments<br>• Implementing the Internet of Things for automated production management<br>• Artificial intelligence for automated decision making |

*Source:* [Chernysheva et al., 2021].

for a significant increase in the efficiency of business processes in transport logistics (Table 3).

The digital information technologies from Table 3 used in transport logistics ecosystems provide access to a number of control and monitoring indicators:

– Reporting of abnormal events;
– Monitoring the temperature of perishable goods;
– Ensuring the operation of sensors and detectors;
– determining travel time, possible delays, duration of stops and date of arrival at destination;
– Determining the location of transport, navigation and routing;
– calculating the time of loading and unloading operations [Shabaeva, Shabaev, 2023].

## Conclusion

Therefore, in order to eliminate the problematic issues related to the security of ecosystem solutions in logistics and supply chain management, it is necessary to use digital information services that have the following advantages [Dmitriev, Shcherbakov, 2023]:

– improving the efficiency of logistics business processes related to the movement and delivery of shipments;
– meeting the urgency requirements of current shipments and integrated planning of subsequent shipments;
– reducing the rate of damaged or stolen goods during the movement process;
– quick reaction to abnormal events and situations;
– monitoring the condition of goods during transport and monitoring consignments[4].

The development of the Russian information and ecosystem security market in the context of neutralising the threats posed by the introduction of digital tools in transport and logistics systems is the key to maintaining the country's technological sovereignty. In the context of the ongoing digitalisation of all sectors of the economy, in particular industry and the transport and logistics complex, it is the strengthening of information security that will ensure control over sovereign digital assets and systems for managing the flow of goods [Plotnikov, 2023]. At the same time, since the share of foreign digital solutions in Russia will be quite high by 2022, this has made it possible to set high requirements for products from Russian manufacturers.

The process of import substitution of information security solutions, which began before 2022, is progressing at a fairly high pace, but it needs to be accelerated not only in terms of transition to Russian software, but also in terms of developing an information infrastructure built on a domestic material, technical and technological base.

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# Conceptual aspects of constructing and interpreting of digital transformation indices for manufacturing enterprises

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## Abstract

The article focuses on the problem of designing, constructing, measuring and interpreting indices for assessing the digital transformation of manufacturing companies. We analyse the compositional features, advantages and limitations of the three indices, which are a fairly focused on comparing industrial sectors (or at least extended groups of industries) according to their level of digital transformation or digital maturity: Industrial Digitalisation Index MGI McKinsey, Smart Industry Readiness Index (SIRI) of the World Economic Forum, Digitalisation Index for Economy and Social Sectors by the Higher School of Economics. The main thesis of the article is the need to develop a unified, continuous and relevant index of digital transformation for manufacturing companies, taking into account all the positive experiences in the conceptual and methodological development of digitalisation assessment indices that research and analysis teams have managed to develop so far. At the same time, the author points out the need to avoid retrospective construction of indices based on lagging statistical data. It seems very important to take into account the need to introduce a strategic vector when measuring the level of digital transformation of manufacturing companies. It is not enough to simply aggregate indicators of digital adoption and identify certain indices or sub-indices as the main markers of digital transformation. From a statistical point of view, such an approach can be perfectly correct, reliable, and verifiable.Questions arise about the productive potential of clustered technologies in the context of evolving business models, particularly in manufacturing. As a part of constructing any indices and methods for assessing the dynamics of digital maturity, digitalisation, digital transformation, it is better to face the inevitable uncertainty about the potential of some frontier technologies in an attempt to foresee the intersections of technological factors and future niches for business models, than to try to generalise the trajectory already traversed with a more retrospective logic based only on the verified and more tested parts and layers of the technologies. With this approach, digital transformation indices for manufacturing companies take on projective and instrumental functions, as they serve, in a sense, as a roadmap. They make it possible to improve the strategic vision of companies in different sectors, as well as their stakeholders, associations and public authorities (especially those in charge of digitalisation and industrial policy), with a view to achieving later stages of digital maturity.

**Keywords:** manufacturing companies, manufacturing enterprises, manufacturing, industry, digital transformation, digital transformation indices, digital maturity, digital technologies.

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# 工业企业数字化转型指数构建和解释的概念性方面

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## 简介

本文的重点是工业企业数字化转型评估指数的形成、构建、测量和动态跟踪问题。 本文分析了三个指数的组合特征、优势和局限性，这些指数在工业数字化转型或数字成熟度水平的行业比较（至少是大类行业）方面具有相当好的聚焦度，并且已经编制了至少几年时间：麦肯锡全球研究院的《工业数字化指数》、世界经济论坛的《智慧产业准备指数》、和高等经济学院的《经济和社会领域行业数字化指数》。 本文的主要论点是有必要开发一个统一的、连续的且与俄罗斯实践相关的工业企业数字化转型指数，同时借鉴国际和俄罗斯项目中研究分析团队在数字化评估指数的概念和方法开发方面积累的所有积极经验。同时，作者指出，应避免基于滞后的统计数据进行回顾性指数构建和仅关注已成熟的数字技术。非常重要的是在测量工业企业数字化转型水平的方法中纳入战略性方向。 简单地将数字技术应用指标进行粗略分组并称之为某些指数或子指数作为数字化转型的主要标志是不够的。从统计学的角度来看，这种方法可能是完全正确、可靠且可验证的。然而，这引发了一个关于在商业模式演变，特别是在工业领域背景下，分组技术的生产潜力的问题。在构建任何数字成熟度、数字化和数字化转型的指数和评估方法时，最好面对某些前沿技术潜力中不可避免的不确定性，尝试预测技术因素与未来商业模式新领域的交汇。采用这种方法，工业企业的数字化转型指数获得了前瞻性和工具性功能，因为它们在某种意义上成为了路线图。这些指数有助于提升各行业和工业部门公司及其利益相关者、协会、政府机构（尤其是负责数字化和工业政策的机构）在实现更高阶段数字成熟度方面的战略视野。

**关键词：** 工业公司、工业企业、工业、数字化转型、数字化转型指数、数字化成熟度、数字化技术。

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## 致谢

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## 1. Why do we need industry and sector digital transformation indices?

In the current circumstances and parameters of the development of Russian industrial enterprises, taking into account the specifics of their innovative activities, industrial policy trends and external constraints, the problem of constructing, monitoring and interpreting the dynamics of indices for assessing the digital transformation of industrial enterprises is of particular conceptual and practical interest. This issue has become particularly important in recent years because it is increasingly linked to a whole range of other issues in the field of industrial digitalisation and the consideration of digitalisation as a tool for increasing production efficiency, among which the following six aspects can be highlighted:

- accelerating the pace of digital transformation, making it more continuous and comprehensive in later stages;
- increasing the level and stability of demand for digital technologies from many industry sectors;расширение государственных программ и проектов поддержки цифровой трансформации;
- accelerating the pace of implementation of artificial intelligence in various industries, especially in recent years;
- intensifying the transition of Russian industrial enterprises to home-grown software; developing models, methodologies and techniques to measure the impact of the level of digital transformation on increasing the productivity of industrial enterprises.

Technological development in a broad sense represents not only a conglomerate of aspects related to progress along the technological trajectory itself, but also a number of aspects of interaction with categories such as ‘industry life cycle’, ‘product life cycle’ and ‘technology life cycle’ [Taylor, Taylor, 2012]. Technological growth is defined as the accumulation of new ideas or methods developed by firms and scaled up across industries to create economic value [Priestley et al., 2020]. Industrial companies that have begun to digitise their business processes and digitally reinvent their business models are now moving to the next level of integration of their digital processes: the digital integration of plants and factories, which helps them to better use data to gain new insights and facilitate real-time decision making. Such significant progress in digitisation within a decade makes it very difficult to assess its effectiveness and to determine the optimal and timely phasing. In addition, the development of recommendations based on maturity models will in many cases have a lagging effect, both for individual industrial companies and at the level of industries, sub-industries and sectors. This is particularly relevant when

the methods and methodologies of digitisation models are themselves characterised by a high degree of retrospectivity, in the desire to ensure the greatest validity and verifiability of technological solutions, since attempts to anticipate the future technological landscape are associated with greater uncertainty as to which junctions of technologies and business processes will be the most productive and promising in terms of competitive positioning [Bota-Avram, 2023], as well as in terms of the formation of innovative business models [Acciarini et al., 2022]. Also of great importance is the combination of factors that contribute to the development of digital technologies in specific industry contexts, taking into account non-technological, organisational factors [Titov et al., 20-23].

A separate area of the digital transformation of industrial companies is the creation of competitive advantages by expanding their presence on digital platforms. Research shows that building uncopyable competitive advantage through partner relationships has subtle dynamics and consequences. In addition to the positive network effects of digital platforms, industrial firms face negative network effects - both direct (various types of platform failures and congestion) and cross-cutting, indirect (reduced profitability due to the redistribution of market power and bargaining power in favour of the platform), as well as component-based network effects [Trachuk, Linder, 2023]. It is therefore difficult to say whether a high degree of integration of industrial companies in a specific industry, sectoral context, is an indicator of digital maturity. Technologically, it may seem so, but from the point of view of sustainability (and even long-term innovation) of the business model, such digitalisation may lead to lower efficiency and effectiveness of the strategy and model of an industrial enterprise.

Nevertheless, approaches and methods for determining the dynamics of aggregated states of technological development (technological development indices, digitalisation indices or digital transformation indices) can become an important source of information for timely management decisions at all levels: both by the management of individual industrial enterprises and at the regional and sectoral levels, in the context of a more accurate determination of the parameters of industrial policy and digitalisation, the dissemination of best practices to increase labour productivity, as well as for macroeconomic forecasting and the stimulation of innovative structural restructuring of the economy.

Indices for assessing the digital transformation (or digitalisation) of industrial enterprises, like any other, are intended to act as a kind of marker and tool for comparing the degree and/or stages of digital maturity of industrial enterprises in the context of individual industries/sub-industries/sectors, as well as individual digital technologies and/or complexes of digital technologies (also known as end-to-end complexes of digital technologies). The availability of sufficiently accurate and representative digital transformation indices can stimulate the interaction of all stakeholders and investment activities in the development and implementation of industrial business strategies. Here we can also speak about the feasibility of a product approach (or product aspect) in understanding the stages of digital technology development, where all stakeholders in the technological development of an industrial enterprise set the goal of achieving a complete and seamless integration of end-to-end technologies, from the shop floor to enterprise management, based on a holistic architecture that supports the management of the entire product life cycle [Ferreira et al., 2021]. This paradigm is not only applicable to individual companies, but also to the digital transformation of homogeneous companies within sectors, industries and sub-industries.

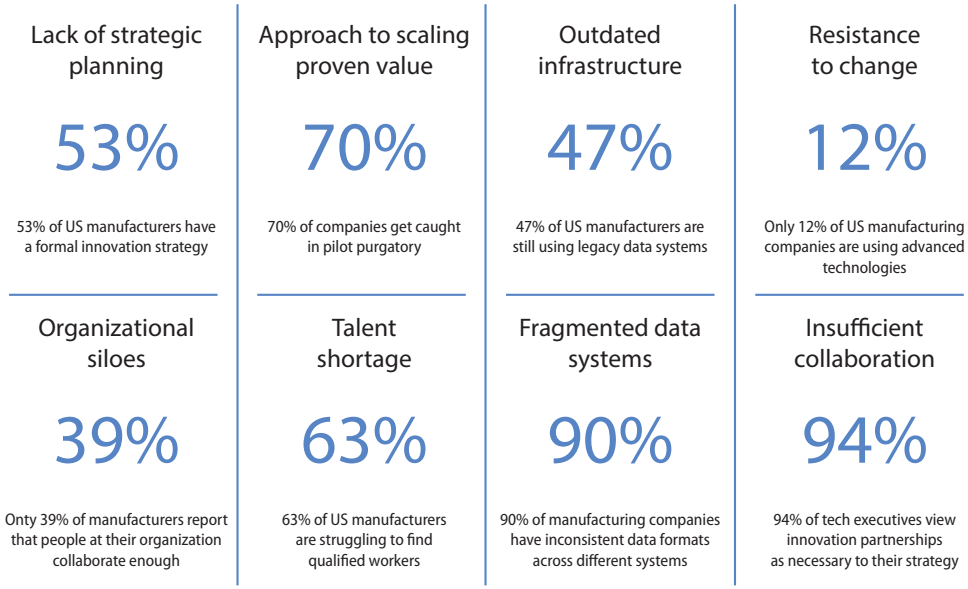
However, it seems particularly important to understand the reliability, accuracy, relevance, information content and completeness of the toolkit of indices for assessing the digital transformation of industrial enterprises, as well as to identify problems and possible directions and approaches for improving such indices. It should be emphasised that the very existence of a set of indices for assessing digital transformation, which to one degree or another (directly or indirectly) are relevant for industrial enterprises, is already a significant conceptual and methodological achievement in international and Russian practice of assessing digital maturity at the level of individual industries/sub-industries/sectors, and not only at the level of individual enterprises.

However, because of the imprecision and incompleteness of the instruments, the adaptation of many parameters to a certain standard methodology, and the simplified interpretation of indices by companies, their stakeholders, analysts and government agencies, the problem of distorted perception becomes relevant. To be convinced of this, it is enough to look at how news about the publication of certain indices, ratings and rankings is integrated into the general media field. The media, including business publications, simply reproduce them without any analysis of the basis of the components and their relevance, and even many academic publications cite the ratings as some kind of self-evident proof of the state of affairs, without bothering to note the limitations of the methods. What ends up happening is a kind of halo effect, whereby the research and professional community, relying on the overall research reputation of an institution, then uncritically passes on the assessments of an index. The point here is not so much that research groups might have chosen non-ideal ratios of parameters for scoring on certain scales, or that the methodology might have simplified interpretations or fitted some indicators into a single format.

The central issue is to find errors or inaccuracies (this is a natural part of the work of a healthy research community) and to supplement, clarify, modify and, above all, concretise the methods, also in the context of individual industries. This is also necessary for a more accurate measurement of the dynamics of indices of more finely structured industries within a large industry group (e.g. manufacturing). This will certainly require a somewhat different composition of private indicators than a more abstract comparison of all major sectors of the economy.

When we speak about the dynamics of indices for assessing the digital transformation (or digitalisation) of in-

Fig. 1. Barriers to digital transformation for 14 groups of manufacturing industries, SIRI




*Sourse:* [Unleashing business model.., 2023].

dustrial enterprises, we cannot fail to mention the particular importance of the problem of comparing the intertemporal values of the indices and the timely clarification and updating of the calculation base. In this context, it is important to understand that some components of digital technologies may remain relevant for a long time as essential elements for assessing digital maturity and digital transformation, while others quickly lose their informative value as a basis for comparing the stages and trajectories of digital restructuring of business processes and business models.

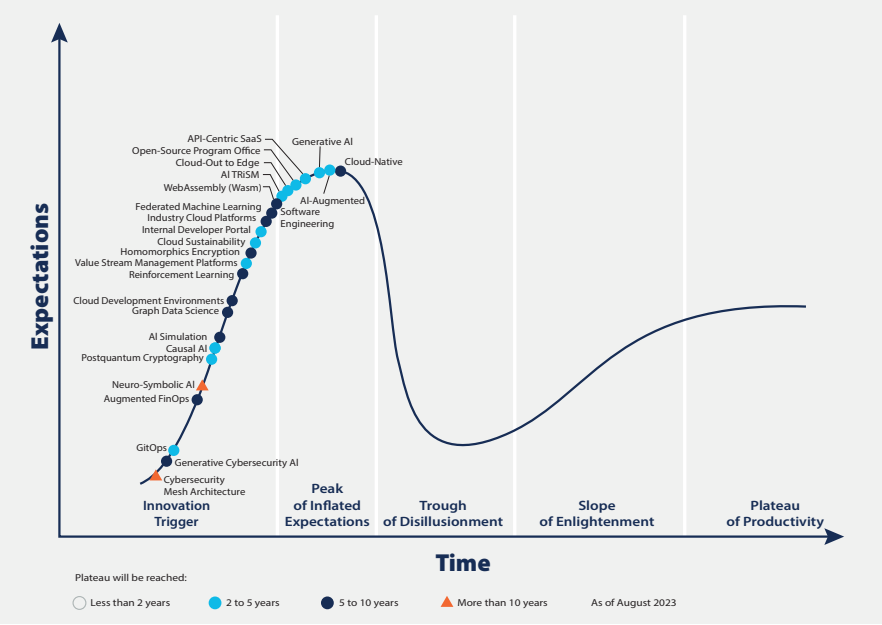
When a given digital transformation assessment index begins to include a significant proportion of rather mundane and outdated metrics and markers of digital maturity, this becomes a significant problem, both in terms of measurement and concept. Solving this problem is by no means trivial, as it involves simultaneously assessing technological novelty, practical feasibility and scalability, as well as the potential for integrating digital technologies into business processes and their overall significance in the context of transforming business models. This is a conglomerate of frontier issues on which even expert communities can be wrong. Otherwise, by definition, there would be no disruptor companies that break through industries, since dominant companies in industrial and non-industrial sectors would have seen the entire promising technological landscape in advance and directed their resources there. Numerous examples show that both the boards of the most powerful high-tech companies and leading analytical and research institutions can predict the most promising intersections of technologies and business models with very different degrees of success, leaving enough room for new companies and innovative business models.

To illustrate the difficulties of the transition to the productive integration of technologies as a factor of innovation in the business models of industrial enterprises, we can cite a recent study by the World Economic Forum, which identified certain barriers to the implementation of innovative models in US industry (Fig. 1).

The problem of constructing and monitoring the dynamics of indices for assessing the digital transformation of industrial enterprises must be seen as a more general consideration of the technological prospects of the economy and society as a whole, in the context of managing the change of generations of technologies in order to maximise the benefits that society receives from the introduction, deployment and use of a given technological paradigm. A separate important question is how the key and determining factors in the selection and use of technologies and their complexes interact over time [Kim, 2003]. If this is not done, the digital transformation assessment indices themselves will face the ‘garbage in - garbage out’ (GIGO) problem, well known in the field of digitisation and general computer science. The GIGO principle means that incorrect input data will produce incorrect results, even if the algorithm itself is correct. When constructing digital transformation assessment indices, it is important to navigate between Scylla and Charybdis. On the one hand, it is important to promptly remove outdated technological components that are no longer representative as markers and parameters for characterising the quality of the digital transformation shift. This in itself makes it difficult to correctly compare the dynamics of the digitisation indices over longer periods (3-5 years). On the other hand, when including frontier technologies, it is important to avoid speculative reasoning and excessive ‘techno-optimism’ and excitement, as ‘digitalisation’ does not always lead to a clear increase in the productivity and efficiency of industrial enterprises.

Research shows that the relationship between technology investment, innovation outcomes and productivity growth is non-linear and shows a stable positive relationship only after

Fig. 2. Gartner hype cycle for emerging technologies




*Source:* https://www.gartner.com/en/articles/what-s-new-in-the-2023-gartner-hype-cycle-for-emerging-technologies.

a certain critical mass of investment is reached and the functionality of product solutions is ensured [Trachuk, Linder, 2020]. Цифровая трансформация может значительно повысить общую факторную производительность, но снизить производительность промышленных предприятий за счет увеличения уровня операционных затрат, снижения общего оборота активов и увеличения управленческих расходов [Guo et al., 2023]. From this point of view, the effectiveness of innovative activities of industrial enterprises can be negatively affected by excessive initial excitement. It is unrealistic to deny the influence of hype, manipulation and, in general, narratives on the fundamental development of companies actively implementing technologies within the framework of the emerging paradigm and financial and investment mechanisms of the effective interpreter model [Ilkevich, 2022].

To normally assess the degree of hype, the Gartner Hype Cycle model is used, which tracks the evolution of technological innovations as they go through successive stages expressed in the peak, disappointment and recovery of expectations of a technology or set of technologies [Dedehayir, Steinert, 2016]. Identifying potentially disruptive technologies allows us to predict the technological landscape and effectively allocate resources and funding for research and development [Chen, Han, 2019]. The Gartner Hype Cycle 2023 is shown in Figure 2.

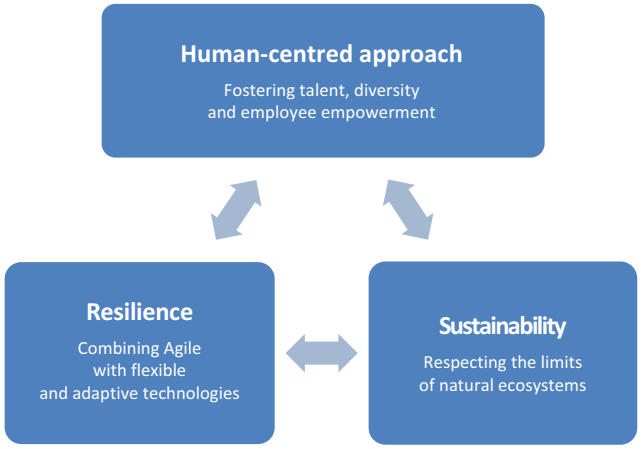
Because the hype cycle is a snapshot forecast that is taken only once a year, it provides no guidance to stakeholders on the most appropriate time to invest in and support technology initiatives [Kondo et al., 2022]. At the same time, it has been shown that some technologies can become sufficiently mature without going through a phase of significant decline in expectations [Kregel et al., 2021]. One explanation for such significant variability in the Gartner cycle in practice is the particular convergence potential of digital technologies. According to S.D. Bodrunov, highly convergent technologies include elements of digital technologies in their contours and thus stimulate digital transformation in various industries within a system with positive feedback, which by definition becomes very attractive for investors, including those with a high risk appetite [Bodrunov, 2018].

Another theoretical and methodological omission in the construction, analysis of the dynamics and interpretation of indices for assessing the digital transformation of industrial enterprises may be the neglect of the importance of the human factor and aspects of technological-human complementarity. Researchers have proposed the concept of ‘Design for the Human Factor in Industry 4.0’ (DfHFinI4.0), based on ensuring the affective-cognitive integration of the human factor in technological progress [Suarez-Fernandez de Miranda et al., 2020].

The DfHFinI4.0 concept is well aligned with the original vision of Industry 5.0 presented in 2020-2021: Industry 4.0 is technology-focused, while Industry 5.0 is value-focused [Xu et al., 2021]. Industry 5.0 is understood as recognising the potential of industry to achieve social goals beyond jobs and growth, as a sustainable source of prosperity with an understanding of the ecological limits of our planet and the well-being of workers (Figure 3).

As part of the core value emphasis of Industry 5.0, industrial workers must continue to upskill and reskill to improve career opportunities and work-life balance. In the advanced economies of the world, despite the general progressive transformation trend in industry, including an increase in entrepreneurial potential due to the formation of new niches [Nambisan et al., 2019], there has been a general deteriora-

Fig. 3. Core values of the Industry 5.0 concept




*Source*: [Xu et al., 2021].

tion in socio-economic well-being over the past two decades, both at the local community and national levels. Digital technologies have so far done little to address growing problems such as long-term stagnation of real wages, precarious employment, slow productivity growth of the average worker in the economy in a number of OECD countries, worsening social inequality, a significant erosion of the middle class, territorial deprivation and declining housing affordability (measured as average annual income on a typical property) even in countries with nominally very high levels of economic development. Between 2005 and 2019, for example, annual productivity growth in the United States averaged just 1.4%, despite incredible advances in digital technology that put supercomputers at the fingertips of every worker and consumer. Meanwhile, real incomes grew at a slower rate of 0.7%. Labour productivity growth has also declined in most OECD countries since 2005. Investment of all kinds has slowed despite record low interest rates and rising corporate profitability and foreign investment [Atkins et al., 20-23]. All this constitutes a major socio-economic and technological paradox: how a society that can be considered increasingly innovative turns out to be less and less productive (at least in terms of growth rates) and socially prosperous (according to a number of metrics - even in absolute terms); how the acceleration of innovation processes can be combined with a stagnation of social well-being and a slowdown of economic growth [Gordon, 2018]. There are two logical answers. Either digital technologies do not generate the measured productivity gains, or they lead directly or indirectly to some 'leakage' of wealth. Although it must be acknowledged that the stagnation of economic growth is a systemic problem to which many third factors contribute, it is probably not quite the right way to put the question to expect digital technologies to solve all the problems.

Of great importance for interpreting the socio-economic consequences of the digital transformation of industrial enterprises is a conglomerate of problems centred on the question of how quickly and to what extent new technologies will be able to create highly skilled jobs to adequately compensate for the rapidly outdated and disappearing professions from the economy [Grenčíková et al., 2020; Anackovski et al., 2021].

Taking into account the aspects identified, it seems appropriate to include, within the framework of indices for assessing the digital transformation of industrial companies, those metrics and parameters that are responsible for measuring or assessing the broader social context. And not only at the level of ESG factors (without diminishing the importance of this paradigm), but also at the level of the integrative paradigm of technological change within the framework of general socio-economic strategies at the level of society and individual communities. An integrative paradigm of technological development, taking into account the extended social context and the long-term orientation of all stakeholders, seems to be applicable both to the assessment of the life cycle of technologies [Ilkevich, 2023] and to the ranking (evaluation of indices) of the digital transformation of industrial enterprises.

## 2. Composition and dynamics of the main indices for assessing the digital transformation of industry

Measuring the level of development of the digital economy has become an important research topic over the last decade. A number of fairly well-known and relatively reputable international and all-Russian indices, rankings and ratings of the development of information and communication technologies, digital society, global digital competitiveness, digital development, as well as innovation with a large weight in the indicators of digital components have appeared [Gorbachev et al., 2019]. In terms of composite components, the clear majority of them have rather limited relevance for assessing the digital transformation of industrial companies. Some indices primarily reflect the level of development of countries' scientific research capabilities, the level of development of information and communication technologies, and cybersecurity. Other indices focus on taking into account aspects of the socio-economic integration of digitalisation, which is good in itself, but there is a disconnect from the tasks of assessing productivity, efficiency and effectiveness in the context of building an innovative and competitive business in industry and other sectors of the economy. As a result, neither index from the two designated groups focuses to any significant extent on business opportunities in terms of restructuring business processes and building new business models, let alone making comparisons of digital maturity or digital transformation specifically for these attributes in the context of individual sectors of the economy - agriculture, commerce, industry.

Even when determining the level of digitisation by country or city, many indices do not fully disclose the details of the methodology used, suggesting that, at least for certain parameters, comparisons may be oversimplified and ignore the specificities of individual countries, cities, regions or large groups of industries to fit the methodology.

The central problem in the area of the dynamics of indices for assessing the digital transformation (digitalisation) of industrial enterprises is that there are not many indices as such (i.e. annual or other frequency of measured indicators). This is despite the fact that by the end of the 2010s various methods of measuring the degree, level and maturity of digitalisation had become quite widespread, including those methods, approaches and even literally named 'indices' (but not calculated with any frequency or on any sample of enterprises) proposed by academic institutions, international organisations and leading consulting companies [Gileva, 2019].

Nevertheless, several indices still have a fairly good focus on comparing industries (at least large groups of industries) by their level of digital transformation or digital maturity, taking into account their specificities, and have been compiled for at least several years. Unfortunately, however, the publication of a number of indices has been discontinued, despite a whole series of conceptual and methodological developments of considerable value. For example, the McKinsey Global Institute has been developing and publishing the MGI McKinsey Industrial Digitalisation Index for several years. In the Russian context, the HSE Digitalisation Index of Economic and Social Sectors as an aggregated assessment of the level of digital technology penetration in large economic sectors was proposed by the HSE Institute for Statistical Studies and Economics of Knowledge in 2022, but comparisons within the framework of the completed HSE project were carried out for 2020 and 2021 and have not yet been continued.

Among other relevant indices, the World Economic Forum's Industry 4.0 Maturity Index and Smart Industry Readiness Index are also of conceptual and methodological interest.

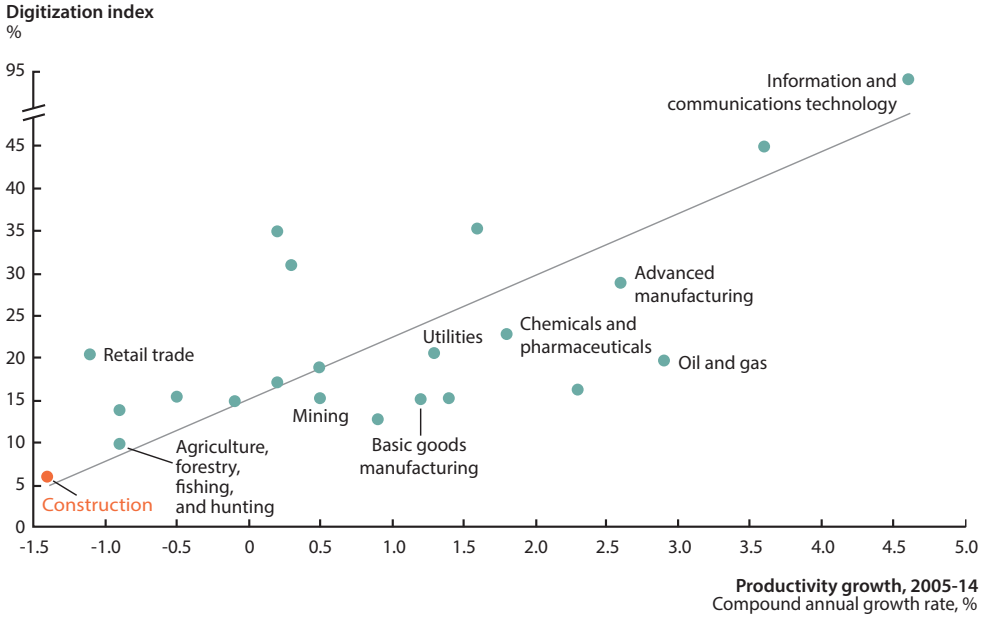
Next, we will consider the conceptual and methodological approaches of the mentioned indices, as well as what each of them brings to the multi-aspect picture of the assessment of digital transformation related to industrial enterprises, and how this entire accumulated conceptual and methodological arsenal can be used in the future if the stakeholders of the digital transformation processes of the Russian industry intend to develop the direction of indicators and indices for assessing its level.

## Industrial Digitalisation Index MGI

Figure 4 shows the correlation between the Industrial Digitalisation Index (MGI) and productivity growth in different sectors of the US economy, including industries such as basic materials, chemicals and pharmaceuticals, mining, oil and gas separately, and advanced manufacturing.

Of particular interest are basic industries and advanced manufacturing. The position of these two large groups of industries in the coordinates of the relationship between digitalisation and productivity growth is quite expected. Perhaps the fact that both large groups are below the trend line can be taken as an indication that the benefits of digitisation in 2005-2015 have been used quite effectively. Unfortunately, there are no more recent comparable data for the period since 2016, as the Industrial Digitalisation Index MGI has not been published since 2015This is particularly unfortunate given that the conceptual and computational basis of the index was probably the most balanced of all available and also highly relevant for assessing the digitalisation potential of industrial sectors. It can be assumed that the further progress of the industrial sectors in increasing the level of digitalisation since 2015 has been translated into comparable rates of productivity growth, since around this time the scaling of entire complexes of end-to-end industrial tech-

Fig. 4. The relationship between the Industrial Digitalisation Index MGI and productivity growth in different sectors of the US economy



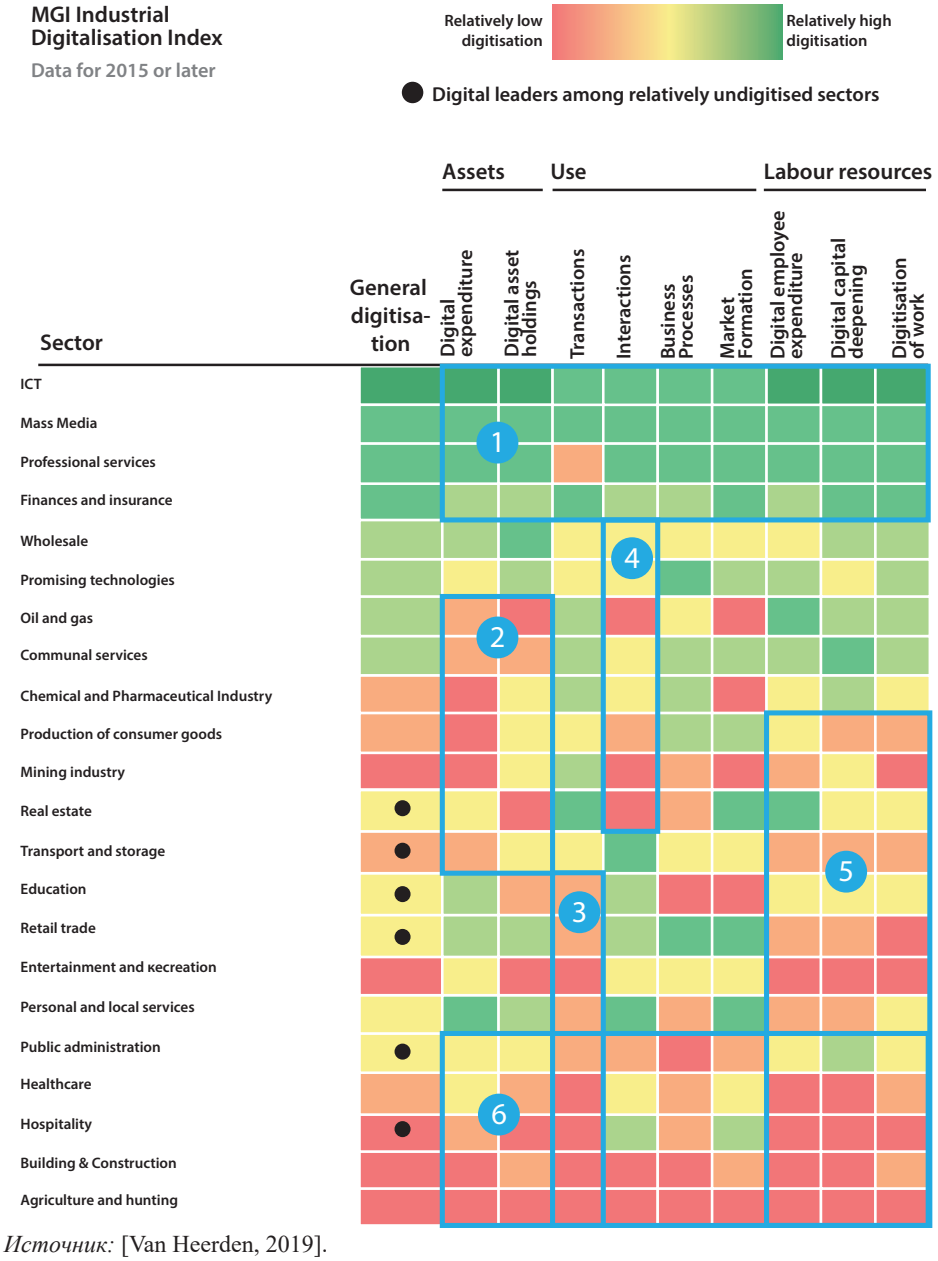

*Source*: [Bonini et al., 2019].

nologies was fully deployed in many industrial sectors and subsectors.

Figure 5 shows the composition of the Industrial Digitalisation Index MGI and the colour coding of the digitalisation parameters for US industries. A study by the McKinsey Global Institute (MGI) aimed to diagnose the state of digitalisation in US economic sectors and found large and growing gaps between sectors and between companies within those sectors. The metrics of the Industrial Digitalisation Index MGI were grouped into three broad categories: digital assets, digital usage and digital workforce. The latter two categories were critical.

Digital assets across the economy have grown dramatically in recent years as companies have invested not only in IT but also in digitising their physical assets. Leading industries continue to have a huge advantage in the use of digital technologies in the form of transactions, interactions with customers and suppliers, and in internal business processes. The biggest difference is in the presence of a digitally literate workforce. Over the past two decades, the leading sectors of the economy have seen an eightfold increase in their performance on various digital labour metrics, such as the share of tasks involving digital tools and the number of new digital jobs, while the rest of the economy has remained virtually idle [Van Heerden, 2019]. Is it any wonder that labour productivity in construction has stagnated over the past two decades, while it has almost doubled in manufacturing?

Fig. 5. Composition of the Industrial Digitalisation Index MGI and colour coding according to digitalisation parameters for sectors of the US economy




*Источник:* [Van Heerden, 2019].

Figure 6 shows a visualisation of the level of digitalisation of industries in Europe using the MGI Industrial Digitalisation Index methodology (compiled in 2016).

Figure 7 shows the methodology and metrics of the Industrial Digitalisation Index MGI.

## World Economic Forum's Smart Industry Readiness Index (SIRI)

The Global Smart Industry Readiness Index (SIRI), developed as a global initiative by experts at the World Economic Forum [Global smart industry..., 2021], includes a set of frameworks and tools to help manufacturers - regardless of size or industry - start, scale and sustain their manufacturing transformation journey. As a global indicator of Industry 4.0 transformation maturity, SIRI helps to raise awareness and set goals that organisations can strive to achieve. The index also provides manufacturers with a structured basis for benchmarking against their peers, identifying their strengths and weaknesses to better prioritise development efforts and resources, and tracking their progress towards digital transformation. The SIRI Smart Industry Readiness Index is shown in Figure 8.

In addition to the compositional elements of the Smart Industry Readiness Index, experts from the World Economic Forum proposed industry archetypes of digital transformation for 14 groups of industries. The archetypes were identified using the mapping method within a plane with two axes -

digital maturity and digital variability (Figure 9).

Regarding the assessment of the dynamics of individual digital transformation archetypes, the World Economic Forum expert group provided only selective ordinal data, ranking the five most mature industries for 2019 and 2022 without specifying numerical values (Figure 10).

## HSE index of the digitalisation of economic and social sectors

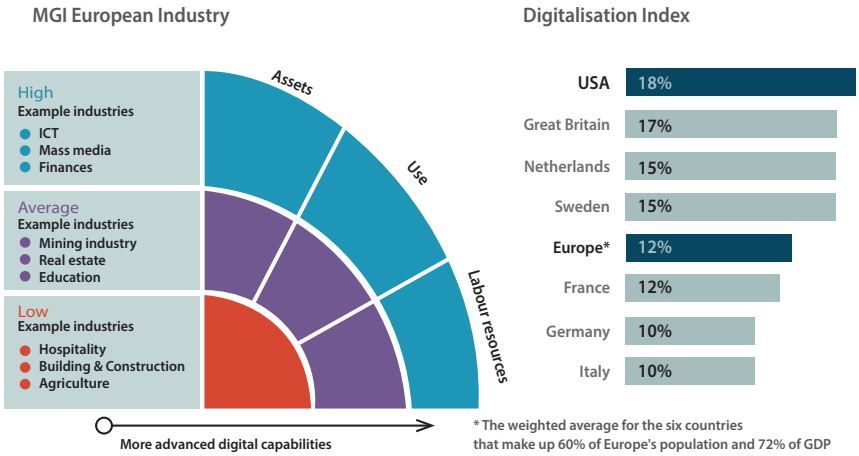
Figure 11 shows the dynamics of the integral index and sub-indices of the HSE index of the digitalisation of economic sectors and the social sphere.

Figure 12 shows the value of the HSE Digitalisation Index of Economic and Social Sectors by industry for 2021.

As the authors of the material prepared by the Institute for Statistical Studies and Economics of Knowledge of the National Research University Higher School of Economics note, 'the manufacturing industry is characterised by high activity in the use of specialised software for design/modeling (28.9%), systems for managing automated production and/or individual technical processes (22.2%), industrial robots/automated lines (19%) and digital twin technology (3.8%). At the same time, industrial organisations have a low level of digital skills of employees (10th place in the corresponding subindex) and costs for the implementation and use of digital technologies (they are among the bottom five industries in terms of the subindex value)' [Vasilkovsky et al., 2022].

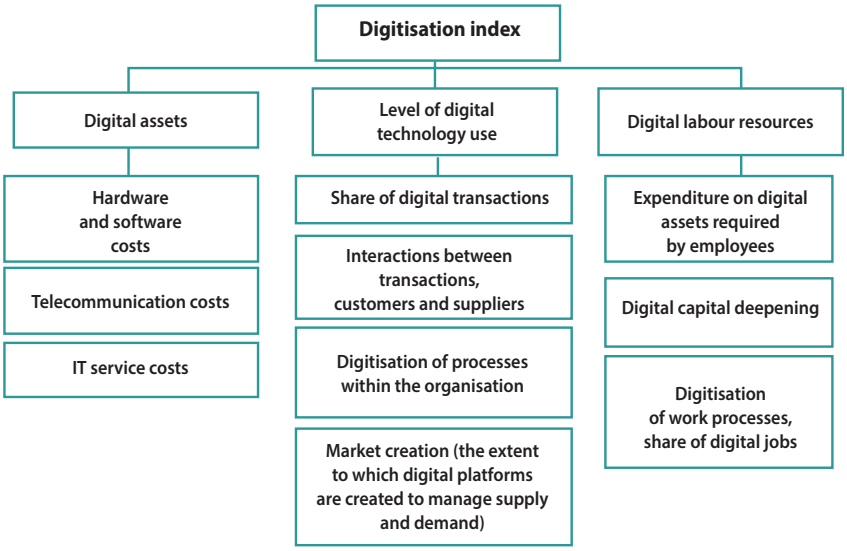
It is regrettable that the publication of the HSE Index for 2022 and 2023 has not been continued, at least for the time being. This large and productive layer of developments, maintained in a single economic and statistical logic, is extremely important for Russian researchers of the digital economy and digital transformation. Apparently, the lack of publication of the index for 2022 and 2023 is due to the fact that this very significant result, both conceptually and methodologically, in terms of the composition and dynamics of the index for 2020 and 2021, was achieved by researchers as part of the implementation of the project 'Examination of strategies for digital transformation of economic sectors and the social sphere,

Fig. 6. MGI European Industry Digitalisation Index



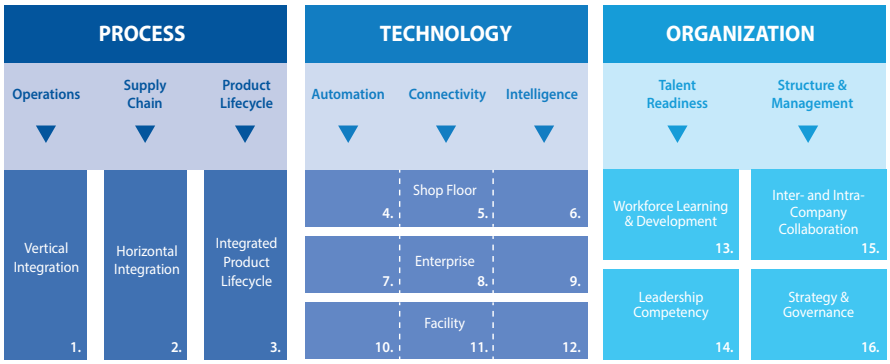

*Note.* The MGI Industrial Digitalisation Index includes 20 indicators to measure digital assets, digital technology usage and digital workers in each industry.
*Source:* [Kobzev et al., 2022].

Fig. 7. Methodology and metrics of the Industrial Digitalisation Index MGI



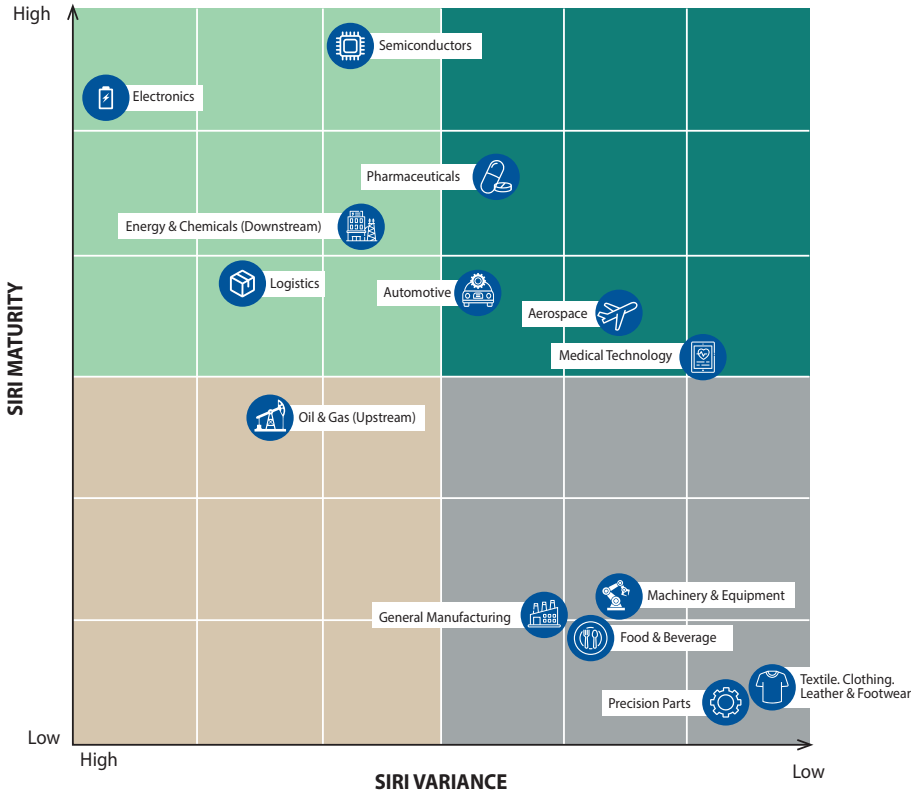

*Source:* [Pechatkin, Vildanova, 2021].

Fig. 8. SIRI Smart Industry Readiness Index




*Source:* [The Global smart industry.., 2022].

Fig. 9. Digital transformation archetypes for 14 industry groups, SIRI




*Source:* [The Global smart industry.., 2022].

including taking into account the best practices of foreign countries, and the development of proposals for their revision (2022)', which was completed in 2022.

At least at the time of the development of the Index of Digitalisation of Economic Sectors and the Social Sphere, it was a comprehensive methodology for assessing digital transformation, relevant to large groups of industries and characterised by a broad coverage of specific digitalisation indicators representative of each of the five sub-indices. The specific weights of the sub-indices also appear to have been chosen in a way that is appropriate and reflects socio-technological changes. The structure of the HSE Index of Digitalisation of Economic Sectors and Social Sphere is shown in the table.

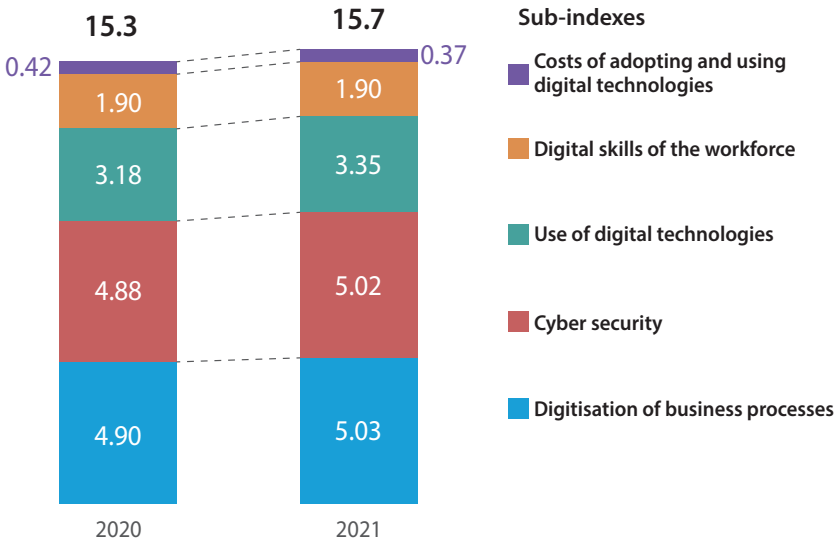
Of course, any methodology has its limitations, assumptions and simplifications. In order to realise the possibilities of a broad cross-sectoral comparison and to bring the sub-index indicators into a comparable form, the HSE methodology, as can be seen in Table 1, uses indicators calculated from the specific weight of organisations using a particular digital tool or technology when calculating the first, second and fifth sub-indices. It is clear that this indica-

Fig. 10. Five industries with the highest levels of digital maturity in 2019 and 2022, SIRI

| Rankings | | |
|---|---|---|
| **Ranking** | **2019** | **2022** |
| **1** | *Semiconductors* | *Semiconductors* |
| **2** | *Pharmaceuticals* | *Electronics* |
| **3** | *Electronics* | *Pharmaceuticals* |
| **4** | *Energy & Chemicals (Downstream)* | *Energy & Chemicals (Downstream)* |
| **5** | *Medical Technology* | *Logistics* |

*Source:* [The Global smart industry.., 2022].

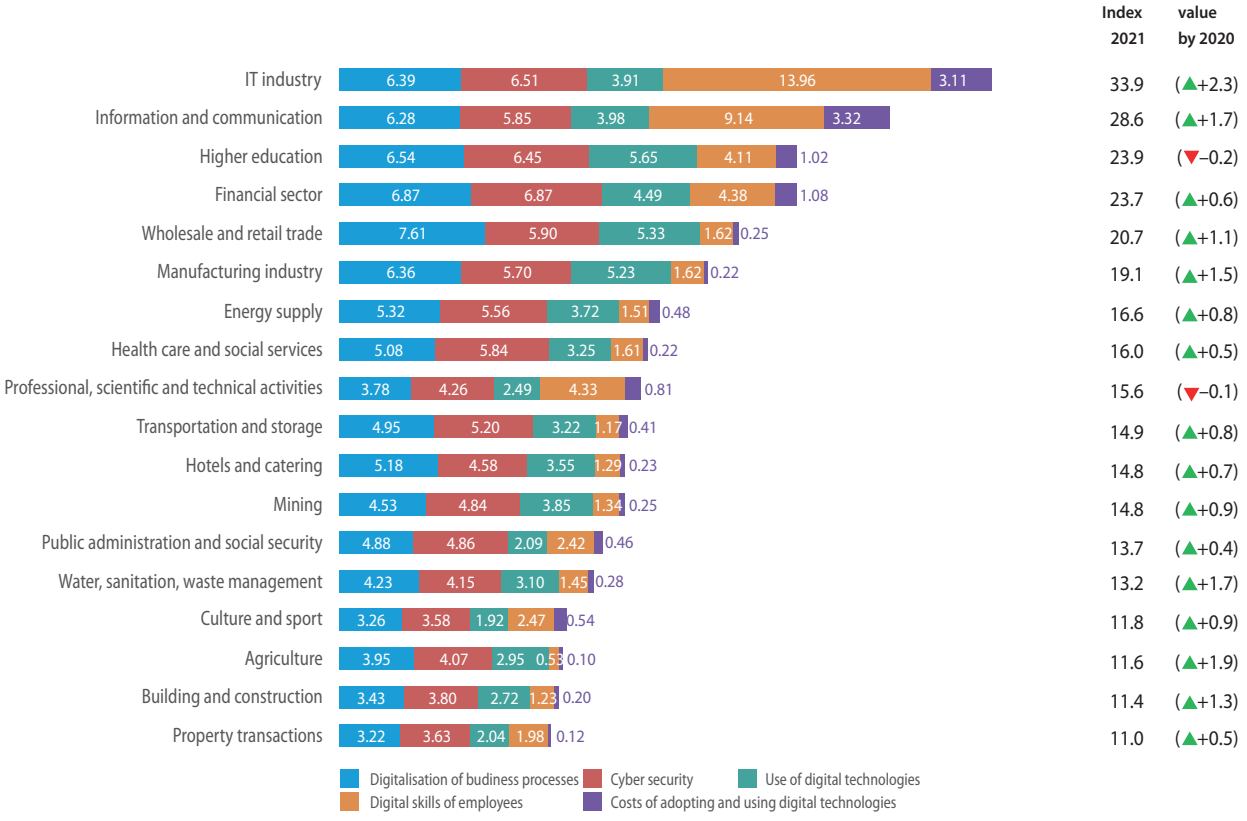
Fig. 11. Index of the digitalisation of the economicand social sphere by the Higher School of Economics




*Source:* [Vasilkovsky et al., 2022].

tor is very sensitive to the degree of industry consolidation. For example, if agriculture is dominated by small and medium-sized enterprises, this will lead to a decline in many indicators, even if more than half of the industry's output is provided by large enterprises that have adopted digital tools and technologies. At the same time, the use of correction factors reflecting market concentration and the dispersion of gross value added in the industry would greatly complicate and even confuse the methodology, at least when trying to compare the main large groups of industries in the economy. Another is that it is more possible and useful to do this within the framework of one or more close or homogeneous groups of industries, such as the extractive, manufacturing and advanced (high-tech) industries.

Fig. 12. Index of the digitalisation of the economy and the social sphere of the Higher School of Economics by industry for 2021




*Source:* [Vasilkovsky et al., 2022].

Table
The composition of the index of digitalisation of the economy and social sphere by the Higher School of Economics

| Sub-index | Sub-index weight | Indicators |
|---|---|---|
| Use of digital technologies | 0.3 | Proportion of enterprises using cloud services out of total number of enterprises<br>Proportion of organisations using Internet of Things technologies out of total number of organisations<br>Proportion of organisations using digital twin technology out of total number of organisations<br>Proportion of organisations using industrial robots/automated lines out of total number of organisations<br>Percentage of organisations using dedicated design/modelling software (CAD/CAE/CAM/CAO) out of total number of organisations<br>Percentage of organisations using PLM/PDM systems out of total number of organisations<br>Percentage of enterprises using Geographical Information Systems (GIS) in the total number of enterprises<br>Proportion of enterprises using special software for managing automated production and/or individual technical means and technological processes among the total number of enterprises<br>Share of organisations using technologies for collecting, processing and analysing large amounts of data in the total number of organisations<br>Proportion of enterprises using artificial intelligence technologies in the total number of enterprises |
| Digitalisation of business processes | 0.2 | Proportion of enterprises using ERP systems in total number of enterprises<br>Proportion of enterprises selling via e-commerce<br>Proportion of organisations using digital platforms out of total number of organisations<br>Proportion of enterprises using electronic document management systems<br>Proportion of ICT specialists in total number of employees<br>Proportion of employees with digital skills above basic level<br>Proportion of employees with digital skills above basic level |
| Digital skills of staff | 0.2 | Proportion of ICT specialists in the labour force<br>Proportion of persons employed with digital skills above basic level in number of persons employed |
| Costs of adopting and using digital technologies | 0.2 | Costs of adoption and use of digital technologies as % of GVA<br>Share of costs of advanced digital technologies in total costs of adoption and implementation of digital technologies |
| Cyber-security | 0.1 | Percentage of organisations using electronic signature tools out of total number of organisations<br>Percentage of organisations using computer or network intrusion detection systems out of total number of organisations<br>Percentage of organisations using strong authentication tools out of total number of organisations<br>Percentage of organisations using software/hardware to prevent unauthorised access of malicious programs from global information networks/local area networks (firewall), of total number of organisations |

*Source:* [Vasilkovsky et al., 2022].

## 3. Conclusions and recommendations for the development of digital transformation indices for industrial enterprises

The theoretical and conceptual aspects considered and the analysis of the dynamics of three indices for assessing the digital transformation of industrial companies allow us to speak about the general productive trajectory of the development of industrial digitalisation. However, the data available are fragmentary and intermittent, as two indices have already been discontinued (or at least paused), another has only recently been introduced, and there is no historical momentum as such to allow for methodologically correct comparisons. In addition, none of the existing and ongoing projects to develop and measure the level of digitisation of the economy by industry has provided sufficiently discrete comparisons of digitisation dynamics in the context of individual industries. The discussion was either about a single category of industrial production (or manufacturing), or about dividing the whole industry into several maximally

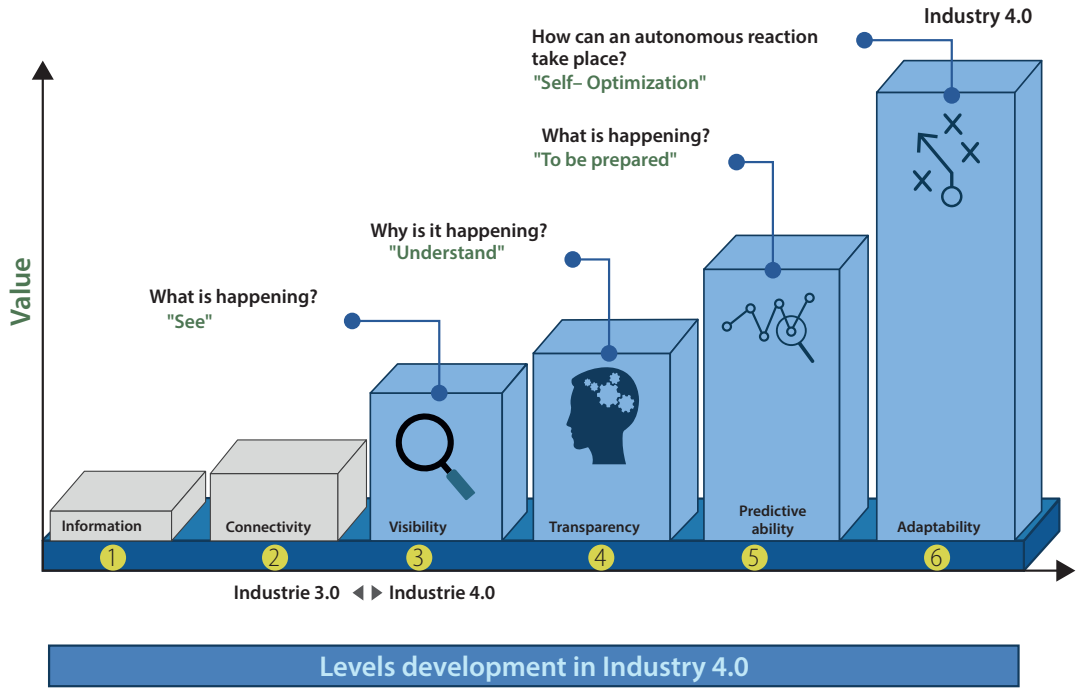
large categories: general manufacturing, advanced (high-tech) manufacturing, mining, chemicals, and oil and gas. Therefore, the main resulting thesis is the need to develop a unified and relevant to Russian practice index of digital transformation of industrial enterprises, taking into account all the positive experience in conceptual and methodological development of indices of assessment of digitalisation that research and analytical teams of international and Russian projects in this area have managed to accumulate.

It also seems very important to consider the need for a strategic vector in understanding the digital transformation of industrial companies. It is not enough to aggregate indicators and call some sub-indices the main markers of digital transformation. From a statistical point of view, such an approach can be perfectly correct, reliable, verifiable and even elegant in its own way. But the question arises about the productive potential of bundled technologies. In other words, how does it all work together to create value and what business model innovations will it lead to in the coming years? Of course, with such a more interdisciplinary formulation of the question, researchers of the dynamics of digital transformation will find themselves on shakier ground, but this is an unavoidable problem of uncertainty. The digital transformation of industrial enterprises does not simply exist as a neutral natural or social phenomenon, unconscious or poorly understood by its subjects. It is a highly subjective phenomenon, centred on the motivation of industrial companies to survive in a competitive environment and to ensure the sustainability and long-term value of their business. In the context of constructing indices and methods for assessing the dynamics of digital maturity, digitalisation and digital transformation, it is better to face the inevitable uncertainty regarding the potential of some frontier technologies. It is necessary to try anticipating the intersection of technological factors and future niches for business models, than with a more retrospective logic, try to generalise the trajectory already taken, based only on a verified and more tested part of the technologies. For the public electronic services or education sectors, the emphasis on the frontier aspects of assessing the dynamics of digital transformation and the projective function of the corresponding indices is probably not so necessary. However, for industry, especially high-tech industry, this aspect needs to be taken into account.

In order to implement the projective function of the indices, the expert community must promptly remove obsolete technological components that are no longer representative as markers, indicators and parameters for characterising the quality of the digital transformation shift in the context of individual industries or their extended groups. Otherwise, it is impossible to ensure the accuracy of the comparison of digitalisation indices in terms of dynamics over longer periods (3-5 years), even if they are compiled on the basis of a single research team or institution. This is particularly important for assessing the dynamics of the digital transformation of industrial enterprises.

As a result, with the approach described above, digital transformation indices for industrial companies acquire projective and instrumental functions, acting in a sense as a coordinate system and a roadmap. They enable companies

Fig. 13. Industry 4.0 Maturity Index




*Source:* [Gärtner, 2018].

from different industries, as well as their stakeholders, associations and government bodies (primarily those responsible for digitalisation and industrial policy) to improve their strategic vision for achieving later stages of digital maturity.

One of the possible approaches to interpret the strategic vector of digital transformation of industrial companies is the six levels of digital transformation within the framework of the Industry Maturity Index 4.0 model [Souhail et al., 2023] (Figure 13). As part of the digital evolution, industrial companies are moving from simply working with information flows and communications to a deeper and more comprehensive understanding of digitised business processes. At the highest levels, the potential for foresight and increased adaptability, including the ability to innovate, is revealed.

Of course, the path to Industry 4.0 will be different for each industrial company. Each industrial enterprise must make strategic decisions about the benefits it wants to achieve, its priorities, and the sequence of stages to achieve Industry 4.0. As a company's target state depends on its business strategy, each company must decide which stage represents the best balance of costs, opportunities and benefits, taking into account how these requirements may change over time in response to changes in the business environment. At the same time, in the context of industries or groups of industries in the industrial sector, it seems that we can talk about our own significant universals of digitalisation. And then it becomes possible to evaluate the dynamics of digital transformation in a more detailed industry context.

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# The influence of factors and conditions on export efficiency of Russian SMEs: Strategic and methodological aspects

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## Abstract

Entering foreign markets is an important area of strategic development for SMEs. It allows you to secure higher growth rates, expand the use of limited but often unique resources, gain access to key strategic partners, extend the life cycle of products, diversify risks, etc. Like any strategic decision, the organisation of export activities requires a thorough analysis of internal and external factors, both favorable and unfavorable, in order to justify the choice of the most promising and appropriate markets, to adapt your products or services to them, to assess their competitiveness, and to develop strategies for entering and promoting the selected markets. Recent years have seen many significant changes in the composition and nature of these influences. Therefore, the purpose of this article is to identify and structure the factors that influence the performance of Russian export-oriented SMEs, as well as to substantiate the methodological tools for assessing such influence in order to make informed strategic decisions. A comparative analysis of the factors influencing the efficiency of Russian SMEs in foreign markets was carried out with a view to assessing their export potential. The analysis is completed by highlighting the risks and opportunities associated with the spread of digital technologies and the introduction of sanctions restrictions. A classifier of factors and conditions affecting the efficiency of export activities is proposed. The structure of the indicator system for assessing the effectiveness of SME export activities has been defined. The SWOT matrix format highlights factors that have a significant impact on the ability and results of Russian SMEs' export activities. A comparative description of methods for assessing such influence is given. The advantages of the cognitive modelling method for reflecting the complex and dynamic nature of the relationships between factors and the outcomes of export activities are demonstrated. The basic rules for constructing cognitive maps are presented.

**Keywords:** export activity, SMEs, efficiency, classifier of factors and conditions, cognitive modelling.

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# 影响因素和条件对俄罗斯中小企业出口活动效率的影响：战略和方法学方面

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## 简介
进入国际市场对中小企业来说是一个重要的战略发展方向。它可以确保更高的增长速度，扩大有限且常常是独特资源的利用机会，获得关键战略合作伙伴的支持，延长产品的生命周期，分散风险等。与任何战略决策一样，组织出口活动需要仔细分析内部和外部的有利和不利因素，以证明选择最有前途和最合适市场的合理性，调整产品或服务以适应这些市场，评估其竞争力，并制定进入和推广所选市场的战略。 近年来，这些因素的构成和影响性质发生了许多重大变化，因此本文的目的是识别和结构化影响俄罗斯出口导向型中小企业绩效的因素，并为评估这种影响以做出战略决策提供方法工具。对影响俄罗斯中小企业在国际市场上绩效的因素进行了比较分析，评估了其出口潜力。分析还突出了与数字技术传播和制裁限制相关的风险和机遇。提出了影响出口活动效率的因素和条件的分类器。确定了中小企业出口活动绩效评估指标体系的结构。在SWOT矩阵中，确定了对俄罗斯中小企业出口活动的可能性和结果有重大影响的因素，并对评估这种影响的方法进行了比较描述。展示了认知建模方法在反映因素与出口活动结果之间复杂和动态关系方面的优势。介绍了构建认知图的基本规则。
**关键词:** 出口活动, 中小企业, 效率, 因素和条件分类器, 认知建模。

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## Introduction

Exporting is an opportunity for the development of small and medium-sized enterprises (SMEs). It is a strategic decision that can lead to new market entry and improved company competitiveness. The advantages of entering foreign markets for SMEs include: higher growth rates, expanded customer bases, increased efficiency (cost reduction) through increased sales, extended product life cycles, risk diversification, enhanced company image, and more [Budkova, 2015; Linder, 2020; Dabić et al., 2020; Calheiros-Lobo et al., 2023]. According to the OECD, SMEs that participate in global value chains tend to be more productive and have higher incomes [OECD SME and entrepreneurship, 2023]. However, this advantage can only be achieved by analysing and exploiting the factors that contribute to effective export performance.

In the majority of cases, when SMEs enter a foreign market and develop an export strategy or plan, the procedure generally follows the sequence of steps used in strategic planning when selecting a new market. These steps include clearly defining objectives, analysing consumers, assessing the competitiveness of products or services, adapting them to the characteristics of the new market, assessing resource requirements and risks, considering channels and promotion strategy, exploring partnership opportunities in the new market, and so on [Gileva, Galimova, 2016][1]. The alternatives that have traditionally been considered for the implementation of the export strategy are as follows:

- direct export, where all transactions are conducted directly between companies, without intermediaries. This strategy provides a direct link with buyers, facilitates the establishment of closer business relationships, and strengthens the company's image in the foreign market. It also allows for greater control over processes, but requires more resources, including the necessary knowledge of the foreign market;
- indirect exports, which require the involvement of one or more intermediaries between the exporter

[1] See also: Are you export ready? Our guide to planning an export strategy for SMEs (2019). https://gb.solutions.kompass.com/blog/guide-to-planning-an-export-strategy-for-smes/. 5 export strategies for small businesses (2021). https://seller.alibaba.com/businessblogs/pxfh1ouh-5-export-strategies-for-small-businesses.

and the final consumers of its products. This approach facilitates market entry and allows for more informed market operations. However, it does not offer the same degree of responsiveness and customisation to customers and partners as the previous strategy.

It is also possible to enter foreign markets through joint ventures and direct investment in production (including assembly) in other countries. A more detailed examination reveals that export strategies can be more varied, depending on the combination of external and internal factors. For instance, [Vanninen et al., 2022] identify four strategies of multinationalisation (a term used by the authors of the cited article to refer to export activities or online sales to a foreign country, as opposed to the broader concept of internationalisation):

- resource-seeking strategy. The objective of resource seekers is to bring minimally viable products to market. They achieve this by drawing on the expertise and assistance of experienced employees, key customers, and other partners. This allows them to transform these products into cutting-edge solutions and innovative technologies for emerging markets. These companies typically operate in knowledge-intensive industries that require active collaboration, including with customers. The resources they require (partners, key customers and employees) are strategic for them and are not always available domestically. As firms develop new offerings that have not been previously sold, it can be challenging to identify suitable partners. The indicator is frequently the response to emerging needs. Therefore, the most appropriate way to implement this strategy is to create subsidiaries and/or hire people directly from the target market in order to start working closely with customers as soon as possible. This strategy represents one of the most time-efficient options for multinationalisation;
- hub-reaching strategy. The primary objective of this strategy is to establish an international presence in proximity to cluster areas or key industry locations with a high concentration of potential customers, investors, partners, and talent. This access allows smaller companies to gain insight into emerging customer needs and modern industry standards, which they can then leverage to reach peripheral markets at an opportune time. The strategy is typically adopted by companies that have already developed their core domestic offerings and are seeking new customers and investors to expand their operations. Additionally, they are seeking new business models to monetise their expertise and technology. The majority of their activities are conducted within the domestic market. International markets are managed directly by selected managers whose objective is to develop relationships with important customers or key partners. Despite the relatively small number of employees working in other countries, these subsidiaries frequently play a pivotal role in driving the company's growth;
- serendipitous resource-leveraging strategy. The primary objective of the strategy is to identify opportunities for transnationalisation based on the resources and competencies currently available. Typically, the utilisation of resources is driven by short-term capabilities and response strategies, rather than long-term goals and proactive planning. SMEs that adopt this strategy are often start-ups with limited resources. They typically commence operations on a relatively modest scale, utilising home offices and freelance personnel. As resources and experience are accumulated, growth is pursued in a gradual manner. It is important for businesses to meet customers and partners at various industry events and trade fairs, as well as make active use of digital communications;
- controlled-expansion strategy. The strategy's core objective is to initially absorb technology, develop products and establish production in the domestic market. This is followed by a cautious and gradual expansion into other regions. Such companies typically require time to build a robust and competitive position in their home markets. They only begin to pursue international growth when these markets reach a point of decline or saturation. The rationale behind a controlled-expansion strategy is typically geared towards optimising operational efficiency and service quality, rather than focusing on the underlying products or technology. Typically, such companies retain all key activities at their domestic head office. The creation of international subsidiaries may be driven by the need to respond rapidly to customer concerns.

The expansion of export strategy opportunities for SMEs is primarily linked to digital opportunities in market analysis, customer interaction formats, global supply chains and partner ecosystems [Denicolai et al., 2021; OECD SME and entrepreneurship., 2023; Higón, Bonvin, 2024]. Furthermore, the number of factors that directly or indirectly affect companies in the digital environment is growing rapidly, as is the pace of change in these factors. [Webb, 2020; Denicolai et al., 2021; Gileva, Shkarupeta, 2022]. As the development of a successful strategy relies on the analysis of combinations of external and internal factors and conditions, the task of assessing their impact on the performance of SMEs becomes all the more important because of the increasing diversity and dynamism of such factors.

In consideration of the aforementioned factors, the objective of this article is to identify and structure the factors that influence the performance of Russian export-oriented SMEs and to substantiate the methodological tools for assessing such influence, with a view to facilitating informed strategic decision-making.

## 1. Theoretical overview

The analysis of factors influencing the performance of export-oriented SMEs in Russia is primarily focused on assessing the export potential of the enterprise [Karachev, 2015]. Table 1 presents a comparative analysis of the approaches used to determine export potential (EP).

As illustrated in the table, the analysis and assessment of export potential primarily considers internal factors, particularly the various types of resources. However, external factors are frequently incorporated into the scope of the analysis and the resulting outcomes. A number of papers examine the constraints that hinder the export activities of SMEs. Such factors include: lack of necessary production base and opportunities for its expansion, lack of financial and human resources, high cost of borrowed capital, high transport costs, lack of information on sales markets and reliability of foreign partners, insufficient competitiveness of products on foreign markets, complexity of customs procedures and high export duties, certification requirements in the importing country, insufficient legal training in the field of foreign economic activity [Moseiko, Azmina, 2012; Budkova, 2015].

The introduction of sanctions had a profound impact on both SMEs in general and on the volume and nature of foreign economic activity. As indicated by the National Research University Higher School of Economics, the

Table 1
Analysis of Russian SMEs' foreign market activity factors regarding export potential

| Source | Structure of export potential | Additional features |
|---|---|---|
| [Karachev, 2015] | Production, financial, marketing and labour resources | Export potential is assessed based on the company's actual achievements and remaining opportunities. There are two levels of export potential: strategic and operational. The specific characteristics of SMEs are not considered |
| [Sukhikh, Katz, 2015] | Considered as the sum of internal and external export potential. The analysis of internal potential considers the utilisation of the company's resources (natural, labour, material, financial and information), the competitiveness of export products and the efficiency of the company's export activities. The analysis of external potential includes an assessment of external economic factors, the marketing and sales of export products, and the innovative potential of the enterprise | Understanding potential not as a simple set of resources, but as the results of their use. The attribution of innovation capacity to the external component is probably related to the nature of the technology and the development of the open innovation model. SME specifics are not considered |
| [Volkova, Karachev, 2016] | Groups of micro-level factors in the structure of export potential: factors of time and scale of operations, factors related to human capital, innovative and production technological development, factors of financial plan, marketing plan. Meso-level factors: factors of spatial location, factors of internationalisation (by attracting foreign experience, knowledge, capital and technology), factors of organisational interaction (clusters and networks); external factors (external economic, political and legal, scientific and technical, geographical) | A wide range of internal and external factors are taken into account. The specific characteristics of SMEs are taken into account |
| [Mazilov, 2015] | Aspects of the assessment of export potential: state of production, financial and human resources, organisation of marketing and logistics, quality of information resources, share of exports and products certified as complying with international standards in the total sales volume of the company's products | The resource and performance components of export potential are considered. When analysing the financial resources available, potential risks such as non-payment by customers and currency fluctuations are taken into account The specific characteristics of SMEs are taken into account |
| [Malysheva, 2019] | Socio-economic factors defined as a group of factors that reflect external market conditions. National and cultural. Productive and technological factors, reflecting the level of technical and technological development of the target country's economy. Political and legal factors, reflecting the political situation in the target country, the existence of protectionism in the industry and administrative barriers, including legal norms and rules for doing business | Export potential is considered in terms of external prospects and barriers to entering the market. The specific characteristics of SMEs are taken into account |

adverse effects of sanctions were primarily identified by representatives of small and medium-sized businesses as difficulties in importing raw materials, components, and associated costs, as well as a decline in domestic market demand [Adaptation of Russian industrial..., 2023]. The disruption of logistics chains, problems with settlements, disruption of transactions or breakdown of business relations with foreign partners, and reduction of demand from foreign consumers were identified as significant negative factors by large enterprises, and were also included in the top 10 risks for SMEs. Conclusions of a similar nature, with additional emphasis on the problems associated with the import substitution of software and telecommunications equipment, are presented in the works of [Ivanov, 2023; Koroleva, 2023; Repnikova, Dmitrieva, 2024]. Nevertheless, if we consider SMEs to be the most flexible and mobile agents of the economic system, the sanctions pressure on the SME sector can be regarded as a factor conducive to its development [Repnikova, Dmitrieva, 2024]. In light of the above, the findings of [Adaptation of Russian industrial..., 2023] indicate that a considerable number of SMEs have identified several beneficial outcomes of sanctions, including the potential to cultivate promising market segments for novel product lines and to penetrate new markets with established products. The withdrawal of numerous foreign enterprises from the Russian market has resulted in an increased opportunity for small and medium-sized enterprises (SMEs) to attract qualified personnel. Many SMEs utilise the newly available niches in the domestic market to address existing challenges. However, there are also numerous cases where SMEs adopt a strategy of reorientation towards foreign markets of friendly countries [Koroleva, 2023].

The following factors have also been identified as influencing the efficiency of SMEs' export activities:

1. A systematic literature review revealed that the most commonly cited factors are the qualifications of human capital and managerial skills, innovation and technology, marketing competencies, the experience of SMEs in general and in international markets in particular, knowledge of foreign markets and networking [Elsharnouby et al., 2024].

2. The export performance of SMEs is influenced by a number of factors, including organisational, entrepreneurial, production and market-related considerations [Kasema, 2023]. The results of the empirical analysis also indicate that efficiency is achieved through a combination of factors from all the identified groups.

3. Internal factors influencing firm export performance include firm resources and capabilities, such as experience and diversification of export activities; management characteristics, including export orientation, customer focus, innovation and technology; export marketing strategy, which includes adaptation of products and services to the external market, pricing policy, advertising and sales channels [Faruk, Subudhi, 2019]. The content and characteristics of the export marketing strategy implementation for SMEs are presented in more detail in [Obadia, Vida, 2024].

4. The export performance of SMEs is also influenced by a number of factors, including their export market orientation, the use of entrepreneurial and business networks, and the presence of Total Quality Management (TQM) in SMEs as a basis for ensuring product competitiveness in international markets [Imran et al., 2017].

5. The key factors that drive the export performance of modern SMEs are: access to networks and personnel with networking expertise, effective supply chain management, market analysis and monitoring, product diversification and the use of digital technologies [Elsharnouby et al., 2024]. It is important to note that the impact of diversification on the performance of export-oriented SMEs is not straightforward. Given the limited resources available to them, the most obvious strategy for SMEs to enter foreign markets is specialisation, i.e. concentrating available resources on a specific product or business area. However, the current global high-tech environment significantly increases the risks of failure and loss for such a strategy and limits the growth of SMEs. A diversification strategy helps to mitigate macroeconomic instability by spreading risks. However, decisions on the feasibility and direction of diversification for SMEs require careful analysis and evaluation.

6. In recent years, there has been a notable focus on the impact of digital technology development. They facilitate expansion of business networks, significantly enhance access to information about foreign markets, and enable utilisation of online formats in export activities [Denicolai et al., 2021; OECD SME and entrepreneurship..., 2023].

The pandemic has highlighted the crucial role of digital technologies for the sustained and expanded operations of SMEs, including their capacity to operate in foreign markets. The revolutionary impact of digitalisation provides SMEs with a competitive advantage, enabling them to grow and expand into global markets. This is achieved by optimising business processes, reducing costs and increasing productivity, facilitating networking, significantly expanding market intelligence on foreign markets, and utilising the online sales format in export activities. Content sharing platforms, e-procurement systems, social networks and websites have become essential tools for SMEs, enabling them to innovate, conduct research and development, improve international market research processes through immediate access to relevant information and thus capitalise on new market opportunities. Digital entrepreneurship has enabled SMEs to develop new configurations of activities in the value chain and participate in the development of modular architectures (ecosystems) that are scalable and flexible in their ability to evolve [Denicolai et al., 2021; Rosyidah et al., 2023; Higón, Bonvin, 2024].

However, analysts have highlighted the uncertain impact of technological trends, particularly in the digital technology sector, on the international business ac-

tivities of SMEs [Assessment of integration processes, 2023]. One of the principal constraints on the capacity of (SMEs) to engage in export activities within the digital environment is the dearth of requisite technical skills and knowledge. Another potential obstacle for SMEs is their vulnerability to cyber-attacks, which have increased in recent years. The reason is that SMEs are becoming vulnerable links in business networks that can "open the door" to complex supply chains [OECD SME and entrepreneurship..., 2023].

The final two points – rising macroeconomic instability and the utilisation of digital technologies – are especially relevant for Russian export-focused SMEs in the context of sanctions limitations.

## 2. Methodology and methods

The existence of a range of factors and conditions influencing the performance of export-oriented businesses provides a foundation for developing diverse approaches to analysing the success factors involved in internationalising companies. While these concepts are applicable to a range of enterprises, many researchers focus on SMEs, given that exporting is the initial step in the internationalisation process and represents a relatively straightforward and cost-effective route for SMEs to enter foreign markets. A general overview of the most common approaches to internationalisation is given in [Dabić et al., 2020; Calheiros-Lobo et al., 2023; Elsharnouby et al., 2024] and their summary is presented in Table 2.

Table 2
Approaches to analysing the factors and conditions affecting the SME export activities

| Approach | Essence and characteristics of the approach | Limitations |
|---|---|---|
| RBV- resource-based view | This is the most common approach. It is assumed that a business's ability to enter foreign markets and gain competitive advantage is determined by its sustainable and unique resources and capabilities, which require costly replication. Exporting provides SMEs with a unique opportunity to leverage their knowledge assets and expand their knowledge base. When applying the resource-based approach to reach foreign markets, particular attention is paid to geographical location and associated factors such as proximity in terms of language and culture. The resource-based view (RBV) is extended in the knowledge-based view (KBV). The fundamental premise of KBV is that firms possess the organisational capabilities, resources and processes that can be leveraged to create and utilise knowledge assets in the value creation process. It is also crucial for SMEs to be able to transfer knowledge in order to form networks and facilitate technology transfer | The diverse nature of SMEs and their operating environment makes it challenging to identify and define the essential resources required for internationalisation |
| Network approach | SMEs can successfully undertake international operations by joining a network. Networks, whether formal or informal, provide SMEs with a means of overcoming resource constraints. SMEs rely on external networks to gain access to strategic resources, including knowledge, technology, finance and skills. These networks also facilitate innovation and growth. Networks also provide resilience. Digital platforms are instrumental in facilitating knowledge transfer, scaling and network effects | There is an increasing risk of cybersecurity breaches |
| Uppsala model | The Uppsala model is a sequential approach that assumes a gradual internationalisation of the firm. The model assumes that there is a lack of knowledge about the external market, which presents a challenge to internationalisation. Accordingly, the firm should initially focus on establishing itself in its domestic market and then gradually expand its presence in the target country, moving to the next stage once sufficient understanding and knowledge of the external market conditions have been achieved. It is often the case that those working in a new market are the first to identify both the threats and the opportunities. Consequently, the most prudent strategy is to export products indirectly with the assistance of external export agents or traders. However, the advent of digital technologies has led to a growing body of evidence suggesting that SMEs are pursuing rapid globalisation despite limited resources | Models of rapid internationalisation based on the capabilities of digital technologies demonstrate that many firms do not follow a phased approach, but rather initiate their international activities from an early stage of their existence. Furthermore, digital technologies facilitate the identification and analysis of promising external markets, eliminating the need for a lengthy trial and error process |
| Innovation model (I-model) | The internationalisation process is considered in the context of new product development and commercialisation. The internationalisation process typically comprises three stages: the pre-export stage, the export footprint stage (during which exports to geographically proximate countries are initiated), and the advanced export stage (during which exports are expanded to more distant countries). There is a strong focus on organisational learning and support for senior management | Similar to the preceding paragraph |

Table 3
Classification of factors and conditions affecting the efficiency of SME export activities

| Factor | Description | | | | |
|---|---|---|---|---|---|
| A. Origin | A1. Internal | | | A2. External | |
| | A1.1. Resources (natural, material, financial, intellectual, information) | A1.2. Processes (operations, innovation, marketing, logistics) | A1.3. Results (competitiveness of products/ services, experience) | A2.1. Political and regulatory, technological, economic, social | A2.2. Industry and market |
| B. Impact potential | B1. Fully manageable | | B2. Partially manageable | B3. Unmanageable | |
| C. Nature of impact | C1. Direct impact | | C2. Indirect impact | | |
| D. Sphere of manifestation | D1. Entrepreneurship | D2. Production | D3. Market | D4. Networks and the 'digital' | D5. Other |

The following trends in research on the relationship between factors and conditions and SME export performance are highlighted:

- There is a notable and growing interest in knowledge management in SMEs. This is driven by the increasing opportunities and the growing role of networking and network cooperation. The capacity to generate new knowledge makes SMEs an attractive proposition as potential partners. Well-established knowledge transfer processes ensure the efficiency of networking. The preservation and protection of knowledge, on the one hand, and the co-creation of knowledge, on the other, are key factors in determining the competitiveness of SMEs in both domestic and foreign markets;
- growing emphasis on the human capital aspects of SMEs. A high level of human capital is recognised by a large number of researchers and practitioners as a primary factor for the effective internationalisation of SMEs. The human capital involved in the foreign economic activities of SMEs includes the export and entrepreneurial orientation of managers and employees, motivation to work in foreign markets, and the availability of necessary knowledge and competencies in different areas. These include unique knowledge and technologies that support the competitiveness of products and services in international markets, developed digital competencies, knowledge and understanding of promising foreign markets, and more;
- reorienting the geographical focus. This is a crucial consideration for Russian SMEs in light of the sanctions and restrictions [OECD SME and entrepreneurship.., 2023; Elsharnouby et al., 2024].

Table 4
SWOT analysis of factors and conditions affecting the efficiency of Russian SME export activities

| Opportunities (drivers) | Threats (constraints) |
|---|---|
| Development of digital technologies<br>Increased opportunities for networking<br>Government support programmes for SMEs and exports<br>Increased export cooperation with Asia and Africa | High geopolitical uncertainty<br>Sanction restrictions on countries/products to realise export opportunities<br>Supply chain disruptions<br>High cost of debt capital<br>Complex customs procedures and high export duties, certification requirements in importing country<br>Increase in cyber-attacks on SMEs as a weak link in global ecosystems and supply chains |
| **Strengths** | **Weaknesses** |
| Availability of in-house unique developments<br>Ambition and competence of entrepreneurs and managers | Insufficient competitiveness of products on foreign markets<br>Lack of necessary production base and opportunities for its expansion<br>Lack of financial and human resources<br>Lack of digital skills<br>High transport costs<br>Lack of information on markets and reliability of foreign partners |

The approaches presented in Table 2 consider the internationalisation process as a whole and export activities as one of its components from different angles, thus providing a complementary overview. The essence of this complementarity lies not only in the diversity of factors, but also in the fact that they are not static and isolated. Therefore, the model used to assess the impact of factors and conditions on the efficiency of Russian SMEs' export activities should be dynamic and consider the interrelations and interaction of different groups of factors.

Table 5
System of indicators to assess the effectiveness of SME export activities

| Financial indicators | Strategic indicators | Customer satisfaction indicators |
|---|---|---|
| 1. Sales-related: export sales volume, export sales growth, export sales efficiency | Contribution of exports to company growth<br>Contribution of exports to quality of company management<br>Building network relationships<br>Reputation building | Product/service quality relative to competitors<br>Customer satisfaction relative to competitors<br>Quality of customer relationships relative to competitors |
| 2. Profit-related: export margin, export profitability, export profitability growth | | |
| 3. Market-related: export diversification, export market share, export market share growth | | |

## 3. Results

To gain a structured overview of the factors and conditions that affect the effectiveness of SME export activities, the results of the analysis were classified (see Table 3). The composition of factors that are significant for Russian export-oriented SMEs, taking into account their type (internal or external) and the nature of their impact (facilitating or constraining), is presented in the format of a SWOT analysis in Table 4.

As with the identification of different sets of factors, there is no single approach to defining indicators for assessing export performance. The most common approach is the EXPERF export performance scale, which combines indicators on three aspects: financial performance, strategic performance and customer satisfaction of the exporting firm [Zou et al., 1998]. In this study, we will therefore use a multidimensional approach to assess export performance, combining both financial and non-financial indicators [Carneiro et al., 2016; Sadeghi et al., 2021]. Table 5 outlines the overarching structure of the indicator system for assessing the performance of export-oriented SMEs.

The analysis allows us to draw a number of significant conclusions that will inform the development of a model for analysing the impact of factors and conditions affecting the efficiency of Russian SMEs' export activities.

Firstly, a significant amount of research in this area is focused on analysing the characteristics and patterns of specific markets. The research findings show that the relative importance of different factors varies depending on the circumstances. However, the fundamental set of factors is largely consistent, as the construction of quantitative models is based on a comprehensive literature review. This analysis also considers the views of entrepreneurs and SME managers, as the sources examined include empirical survey results.

Secondly, the primary factors influencing the relative importance of specific elements are the type of market

Table 6
Methods for analysing the influence of factors on business performance

| | Visibility of relationships | Quantitative estimates | Accuracy of estimates | Consideration of the interaction of factors | Ease of application | Ease of adaptation |
|---|---|---|---|---|---|---|
| Expert assessment | Possible | Possible | Depends on the number and quality of experts | Possible | Depends on the format of the assessment | – |
| Ishikawa chart | ++ | – | – | – | ++ | –+ |
| Factorial analysis | – | ++ | + | – | +– | –+ |
| Correlation-regression analysis | – | ++ | ++ | –+ | – | – |
| Covariance matrices | –+ | + | +– | –+ | – | – |
| Functional charts (IDEF) | ++ | – | – | – | – | –+ |
| Cognitive maps | ++ | +– | –+ | ++ | – | + |

(developed or developing), the country-specific characteristics shaped by a unique combination of external and internal factors, and the nature of the business activity (industry, product/service type). The significance of the factors is also influenced by the stage of export activity. Factors such as market entry and the continuation of successful activities for already established SMEs carry greater weight at this stage.

Thirdly, the effect of factors is complex and contingent on their interaction. Consequently, graphs are frequently employed as the foundation for models designed to evaluate the influence of factors on export performance. One further development of this method is the use of system dynamics models or cognitive models, which are causal graphs with positive and negative feedback loops (Katalevsky, 2015). Subsequently, these models are used as the basis for simulation modelling and the generation of quantitative results. This format seems to be the most suitable for developing a qualitative model to assess the influence of factors and working conditions on the export activities of Russian SMEs.

Therefore, when evaluating the influence of factors and conditions on the performance of SME export activities with a view to identifying the most critical factors for strategic decision-making and assessing their impact, it is essential to consider:

- the presence of direct and indirect influence, as well as the interrelationships and mutual influence of the factors under consideration.
- visualisation, visual representation of the model, allowing a better understanding of the processes in progress and the possibility of organising expert discussions;
- the possibility of obtaining quantitative estimates, even if they are not absolutely precise (since this is hardly possible in view of the continuous and unpredictable changes), for comparative analyses of different scenarios and strategies for the development of SMEs in foreign markets;
- the flexibility and adaptability of the model, taking into account the dynamics of each set of factors.

Let us examine a number of the most common methods used to analyse the impact of various groups of factors on the results of this or that activity. The characteristics and examples of using some of them are provided in [Gorodnova, Haikin, 2009; Glebkova, Kachanova, 2015; Bereza, Bereza, 2022]. A brief comparative analysis of the methods is presented in Table 6.

The majority of the methods under consideration can be classified as either qualitative (mostly graphical) or quantitative (analytical), with the exception of cognitive modelling, which combines the capabilities of both approaches. The expert assessment method, although considered an independent method, forms the basis for many other methods. For example, it is used to create Ishikawa charts (factors are identified, structured, and prioritised), covariance matrices (probabilities are estimated), and cognitive maps. The cognitive map, which is an oriented graph (orgraph), is the foundation of cognitive modelling. Its construction marks the beginning of the entire process. The formal model of a cognitive map is as follows:

$$G = (V, E, X, F),$$

where V represents a set of vertices, E denotes a set of arcs connecting vertices, X signifies a set of vertex parameters, and F is a function defining the nature of links between vertices. In the simplest case, this function is given by a coefficient reflecting the closeness of such a connection in the range from 0 to 1.

The interaction between factors can be either positive or negative, allowing us to consider the mutual influence of factors in the format of both positive and negative feedback loops. The adjacency matrix reflects all potential connections between vertices. In the absence of a quantified strength of interconnections (i.e., an unweighted graph), the contents of this matrix will be represented by zeros and ones. In the event that the weights of edges are determined (i.e. a weighted graph is created), the matrix will contain the values assigned to each edge. The subsequent phase is to construct simulation models based on cognitive maps [Katalevsky, 2015], which facilitate sophisticated multivariate computations.

In consideration of the characteristics outlined in Table 6, it can be posited that the cognitive modelling method is the most suitable for the purpose of modelling and assessing the impact of external and internal factors and conditions on the export performance of SMEs. The construction of such a model represents a topic for further research.

## Conclusions

The justification of the feasibility and assessment of opportunities for SMEs to enter foreign markets, like any strategic decision, necessitates the analysis and consideration of the impact of external and internal factors on the effectiveness of the actions taken. The growing instability of the external environment and the emergence of new opportunities associated with the advancement and proliferation of digital technologies, on the one hand, and the implementation of extensive sanctions and restrictions, on the other hand, have resulted in a substantial transformation of the operational landscape of Russian SMEs in both domestic and foreign markets. Despite the complexity and ambiguity of the environment, export activities continue to offer Russian SMEs significant opportunities for growth and development. Concurrently, a significant trend is the accelerating pace of SME multinationalisation, with the majority of companies formulating strategies for entering foreign markets shortly after their inception. These strategies encompass sourcing, hub and spoke, and resource utilisation models.

The necessity for expedient decision-making and adaptation to an unpredictable environment necessitates the utilisation of novel analytical tools that supplement the conventional yet static PEST and SWOT analysis methodologies. This article demonstrates the viability and ad-

vantages of employing cognitive modelling to investigate and assess the influence of variables on SME export performance. The model has been created using a classifier of factors and conditions affecting the effectiveness of SME export activities (for the formation of input variables) and a system of indicators for assessing the effectiveness of SME export activities (for the selection of resulting indicators).

The significance of the factors in question is determined by three main factors: the country affiliation of SMEs (a particularly important factor, with the activities of Russian SMEs being significantly impacted by sanctions restrictions), sectoral characteristics and the stage of internationalisation. The latter can be further broken down into entering a foreign market or continuing successful activities in the existing market. As a result, further research will involve developing several cognitive models. This will eliminate the redundancy of the factors under consideration and provide a clearer adjustment of the parameters to the SME development scenario. Cognitive maps can also be used as a foundation for the development of simulation models, which enable the execution of complex multivariate computations in real-time to evaluate the influence of a network of interrelated variables on the outcomes of export operations for small and medium-sized enterprises (SMEs). This enables the formulation and subsequent refinement of export strategies.

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# Demand for jewellery: The main drivers

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## Abstract

Jewellery made of precious stones and metals is a luxury item, referring to goods with excessive consumer properties. At the same time, the sphere of turnover of precious metals, precious stones (PMPS) and products made from them is of strategic importance for the formation and development of the state economy. Businesses operating in this sphere are subject to compulsory registration in a special state register. The government is interested in supporting the jewellery industry and increasing its turnover, which is directly dependent on the population's demand for PMPS products.

Popular demand, in turn, depends on many factors that have their own specificities in relation to the area under study. An assessment of the factors based on expert opinion, conducted by the author with interviews of a group of consumers, the study of scientific research materials and journalistic articles from various Internet resources, indicates the acceptable superiority of offers of jewellery made of precious stones and metals, focused on the potential increase in the possibilities of sunlight.

The conclusions presented in the paper on the factors influencing demand are recommended for use in the development of business development strategies and may be useful in making decisions on state regulation of the sale of jewellery made from PMPS.

**Keywords:** demand, supply, precious stones, precious metals, jewellery, government regulation, the needs of the population.

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# 珠宝制品需求：主要影响因素

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## 简介

贵金属和宝石制成的珠宝制品是奢侈品，属于具有超额消费属性的商品。同时，贵金属、宝石及其制品的流通领域对国家经济的形成和发展具有战略意义。在该领域从事业务的企业必须进行特殊的国家登记。国家对支持珠宝业务、增加其营业额感兴趣，这直接取决于公众对贵金属和宝石制品的需求。

公众需求依赖于许多因素，这些因素在研究领域中具有其特定的特点。基于作者通过对广泛消费者群体的采访、研究科学研究材料和各种互联网资源的文章所获得的专家意见，对这些因素的评估表明，贵金属和宝石制成的珠宝首饰的供应量允许超过需求，目的是潜在地增加需求。

本文中关于影响需求因素的结论建议在制定业务发展战略时使用，并在国家对贵金属和宝石制成的珠宝制品流通的监管决策中提供参考。

**关键词：**需求因素、供给因素、贵重珠宝制品、国家监管、公众需求。

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## Introduction

Economic theory as a science has long been recognised by society. However, it does not offer ready-made solutions to specific situations, but rather proven economic laws for independent application. This can be explained by the purpose of the economy - to satisfy people's needs, which, as we know, are different for everyone. According to economic theory, needs create demand, which in turn directly regulates supply. The state is interested in increasing the volume of production, consumption, and the overall turnover of goods and services because it is focused on 'creating conditions that ensure a decent life and the free development of a person'[1]. Increasing the turnover of goods and services is, in turn, the basis for replenishing the state budget.

One of the government's roles is to support industries whose products are in demand by the majority of the population. At the same time, there are different opinions about how much demand there is for jewellery products and how much real income corresponds to this demand. 'The state corrects this imperfection, which the market itself is either unable to deal with or the solution will be ineffective. To this end, the State assumes responsibility for creating a level playing field for entrepreneurship, protecting competition and limiting the power of monopolies'[2].

It is necessary for the state to be involved in the regulation of the consumer market. Without a comprehensive assessment of the quantities required, it is difficult for companies to create a supply that meets demand, which is why situations of shortage or overproduction regularly arise. It is not always possible to apply the law of supply and demand in a preventive way. To solve this problem, the theory of economics and management is based on the interest of the state in supporting and maintaining a company in a situation of reduced profits. In the case of jewellery sales, a comprehensive scientific analysis is required to assess demand. Products made from precious stones and metals are not considered essential items; they are, by definition, luxury goods. At the same time, their circulation is regulated by the Federal Law 'On Precious Metals and Precious Stones'[3], which makes the analysis of supply and demand for this group of goods interesting from the point of view of government involvement. The article aims to identify the main factors influencing the formation of population demand.

[1] Article 7 of the Constitution of the Russian Federation. http://ivo.garant.ru/#/document/10103000/paragraph/52419:0.
[2] Kislinskikh Yu.V. (2016). State regulation of the economy: a textbook. Komsomolsk-on-Amur, Publishing House of the Amur State Pedagogical University.
[3] Federal Law No. 41-FZ of 26 March 1998 'On Precious Metals and Precious Stones' (as amended and supplemented). https://base.garant.ru/12111066/.

## 1. Research methods

The work uses the methods of scenario development and trend extrapolation, the case study method - situation analysis (due to the lack of statistical data allowing for comparative analysis), as well as the method of expert assessments based on the results of interviews and random questionnaires in various professional and social Internet communities in different regions of the Russian Federation. The survey was conducted using a Google form. All 251 respondents are adult citizens - direct consumers of goods and services - who independently determine their purchasing needs.

The survey questionnaire segmented potential consumers by gender, income, and age. Among the respondents there were more women - 79%, which can be explained by their greater involvement in the theme of jewellery. The income dividing line was set at 50 thousand roubles - the median salary[4], according to 'SberIndex' laboratory data[5]: 'In the summer of 2023, the median salary in the Russian Federation was 52,269 roubles.'[6] Monthly incomes above 50 thousand roubles were reported by 36.5% of respondents, which (taking into account the average subsistence minimum per capita in 2023 of 14,375 roubles[7]), methodologically classifies a third of respondents as able to take consumer loans and thus buy expensive durable goods. In terms of age, the criteria were determined by market segmentation based on expected consumer behavior informed by interviews with jewellery retailers:

1) young people under the age of 30 with an expected low income level, mostly not focused on buying and wearing jewellery, potential consumers with possible deferred demand - 22.5% of respondents;

2) working age 30-60 - the age of highest income, possible real consumers of jewellery - 58.6% of respondents;

3) 60+ is the age of 'achievement', saving, and giving - 18.9% of respondents.

The distribution of respondents by age is more representative of the second group of consumers, which is important for the study of demand. It is to this group that the main production should be directed in order to obtain the maximum profit at the present time. The opinions of potential consumers in other age groups should be taken into account when implementing a long-term sales policy. Shoppers are the experts on all goods and services, and they vote with their wallets.

In evaluating the expert opinions obtained as a result of the survey, the author of this work relied on open data from the jewellery industry, government regulatory agencies, and the opinions of fellow researchers gathered during the analysis of a wide range of periodical literature and information from various Internet sources. In this way, the article reflects the entire empirical cycle of demand assessment, starting with observation, collecting and grouping facts, forming a hypothesis, and ending with the evaluation of the results.

## 2. Forming a hypothesis

The hypothesis formulated on the basis of a review of periodical and scientific literature and assessments of the conclusions of the implementation of the technical assignments of the Ministry of Finance of the Russian Federation for 2022-2023 on state regulation of the studied area with the direct participation of the author: there is a clear excess of supply of precious jewellery over demand. An examination of the factors influencing demand will allow this hypothesis to be confirmed or refuted. Let us take a look at the main factors identified by researchers that can be applied to the creation of demand for jewellery. Thus, E.V. Kovaleva and M.V. Tsymbalyuk highlight institutional, demographic, psychological, and economic factors in the list, while classifying the 'covid' crisis as an economic change that 'forces us to rethink the problem of stimulating consumption as a factor of economic growth' [Kovaleva, Tsymbalyuk, 2023, p. 104]. M.S. Shakhova also notes a change in consumer behaviour after prolonged isolation during the COVID-19 pandemic, characterised by a 'qualitative leap "into digital" (increased adoption and use of online platforms) [Shakhova, 2021, p. 131]. The benefits of digital commerce are undeniable, but a lack of digital literacy among the population can be a barrier to purchase. This conclusion is confirmed by the work of E.I. Brichka and Yu.S. Evlakhova: 'The level of digital literacy, including knowledge and use of Internet services for work and life, skills in effective use of technology, as well as the basics of security in the Internet space affect the participation of the population in placing orders for financial services via the Internet' [Brichka, Evlakhova, 2023, p. 103]. G.G. Ivanov and co-authors note that the effectiveness of the implementation of various forms of product promotion depends on management decisions, which is also a factor influencing demand. 'Practice shows that enterprises and organisations, including those in the trade sector, can have an identical material and financial base. At the same time, the results of their activities will be different: some enterprises will develop successfully, others will be forced to leave the market' [Ivanov et al., 2021, p. 61]. Successful management is the key to fair competition for the consumer. 'In modern conditions, consumer demand is formed in accordance with the laws of competition and is a key element of the market' [Glukhova, 2019, p. 34]. Most demand researchers still define the main factor as citizens' income, which in its real measurement directly depends on the inflation rate. 'High inflation will affect the redistribution of spending in favour of the purchase of essential goods and the reduction of spending on food in restaurants, the purchase of equipment and recreation' [Trachuk, Linder, 2016, p. 62]. Inflation is important to the jewellery business in two ways: refusal to buy and buying as an investment.

The state policy of the Russian Federation aimed at reducing the poverty level of the population is a positive fac-

[4] The level of pay received by the same number of employees (50% above, 50% below).
[5] At the time of writing, Rosstat data on the median salary were published only for 2022 - 40.3 thousand roubles. https://gogov.ru/articles/median-salary.
[6] https://www.banki.ru/news/lenta/?id=10993096.
[7] https://www.garant.ru/news/1589280/.

tor in curbing inflation and increasing consumer demand. 'One of the directions in this connection is the reduction of excessive income differentiation and the level of poverty of the population' [Kusurgasheva, Chernovol, 2023, p. 106]. The factors listed are changeable. The impact of most of them on demand is only relevant in the present. To determine the profitable volumes of jewellery production, as with any other commodity, demand analysis must be carried out on a regular basis.

## 3. Factor collection and grouping

The hypothesis of an excess of supply over demand cannot claim to be reliable without a corresponding market analysis from the point of view of jewellery manufacturers and retailers. With the aim of increasing sales, almost all jewellery manufacturers conduct market research through their retail chains.

For example, the reporting data for the 2023 results were published by the '2022 sales leaders' - Sunlight, 585*Golden, and Sokolov (1st, 2nd, and 3rd in the NFOLine rating respectively). The NFOLine rating included 11 retail chains whose total sales volume grew by 9.8% last year to 148.8 billion roubles. Moreover, more than 73% of this amount was contributed to the market by the top three sellers[8]. Sunlight forecasts a 49% increase in total revenues to RUB 78 billion by 2023. 'Sunlight's share of total sales in the Russian jewellery market will increase by 5 percentage points to 22% in 2023, compared to the chain's share of 17% in 2022'[9]. The 585*Gold chain reports an increase in sales in physical terms (in pieces) compared to 2022 of precious 'products with semi-precious stones'[10]: earrings by 44%; rings by 57%; pendants by 70%. According to the same network, sales of items with precious stones[11] also increased, but not as significantly: pendants by 23% and rings by 27%. Premium gold watches also entered the market with the same annual growth rate (+27%)'[12]. Another company - a sales leader - the Sokolov brand retail chain reports a 47% increase in sales for the first half of 2023 compared to the same period last year - up to 19.8 billion roubles. 'Wholesale sales grew by 67%, while online and offline retail sales grew by 42%'[13].

The sales growth statistics of the listed companies do not refute the author's hypothesis, as the jewellery market is generally represented by a much larger number of manufacturers and sellers. Moreover, even among the 11 leaders of the given rating, there are companies whose sales in January-June 2023 showed a negative result as a percentage of the previous year. For example, the company 'Adamas' of the Belgorod jewellery factory - -3%, 'Liniya Lyubvi' of the Kostroma jewellery factory 'Topaz' - -5%[14].

A possible confirmation of the growth in sales is the increase in production volumes announced by the Russian Ministry of Finance for 2023. In 2022, 26 million items were hallmarked, weighing 48.5 tonnes. By 2023, this had increased to 30.8 million items, with a total weight of 55.5 tonnes. Thus, the production of gold items in pieces increased by 18.5% per year'[15]. The phrase 'possible confirmation' is related to different measures of calculation: the state counts the volume of production in units, while business counts it in roubles. Additionally, the volume of hallmarking does not always indicate an increase in production; inventory stock could have been sent for hallmarking.

Unfortunately, there are no consolidated official statistics on the range of jewellery sold, and information from retail chains is contradictory. When analysing sales, experts from the 585*Gold chain note an increase in the sale of gold products, which they explain by the desire to protect savings in a period of economic uncertainty. 'It should be noted that in 2023, sales growth was largely influenced by the fact that gold and jewellery began to be perceived as an investment.'[16]. This statement is controversial: when gold items are pawned, resold, or otherwise redeemed, they are valued at the price of precious metal scrap. 'Stones are a completely different matter. Even if they are genuine and part of a piece, no one in our market will pay a fair price for them in a buy-back or pawn shop. Unfortunately, there is no secondary market for jewellery stones in Russia - neither semi-precious nor precious'[17]. There is undoubtedly a segment of consumers who find it worthwhile to invest their savings in buying jewellery. In this case, due to the current situation on the secondary market for precious stones, you will need to buy products without inlays, made only of precious metal. 'By the end of 2023, sales of this type of investment-attractive jewellery - heavy gold chains and bracelets - have grown significantly. Moreover, in certain categories, sales growth in the autumn of this year looked quite impressive: gold chains - +51%, gold bracelets - +81%'[18]. In any case, the conclusions of the 585*Gold chain, based on its own statistics, do not reflect the level of demand in the industry as a whole.

Nevertheless, statistics from individual companies allow us to evaluate and extrapolate promising trends for the jewellery industry as a whole. For example, the Sokolov brand network, increasing production volumes and understanding the limited demand for PMPS products (precious metals and precious stones), is actively promoting its products, developing a partnership on the franchise model, expanding

[8] https://www.forbes.ru/biznes/489893-dragocennyj-retejl-krupnejsie-uvelirnye-seti-rossii-natorgovali-na-149-mlrd-rublej?ysclid=lr9i9osd12239102338.
[9] https://www.retail.ru/news/sunlight-po-itogam-2023-goda-obshchiy-obem-prodazh-vyros-na-49-12-fevralya-2024-237583/.
[10] Semi-precious stones: natural topaz, garnet, amethyst, chrysolite, amber, agate, quartz and others.
[11] Precious stones: diamonds, sapphires, emeralds, rubies and pearls.
[12] https://salt.news/ekonomika-i-biznes/yuvelirnyj-rynok-predvaritelnye-itogi-2023-goda-i-prognozy-na-god-2024-j/?ysclid=lr9hug0crs515538912.
[13] https://sokolov.ru/blog/company-news/press-release-24-07-2023/?ysclid=lsbzk7kyo8992602143.
[14] https://www.kommersant.ru/doc/6350454?ysclid=lrtepbzkvf215542323.
[15] https://minfin.gov.ru/ru/press-center/?id_4=38812-kommentarii_zamestitelya_ministra_finansov_alekseya_moiseeva_o_situatsii_v_yuvelirnoi_otrasti_po_itogam_2023_goda.
[16] https://salt.news/ekonomika-i-biznes/yuvelirnyj-rynok-predvaritelnye-itogi-2023-goda-i-prognozy-na-god-2024-j/?ysclid=lr9hug0crs515538912.
[17] https://uvelir.info/news/yuvelirku-pod-upravlenie-ministerstva-schastya/.
[18] https://salt.news/ekonomika-i-biznes/yuvelirnyj-rynok-predvaritelnye-itogi-2023-goda-i-prognozy-na-god-2024-j/?ysclid=lr9hug0crs515538912.

wholesale: more than 4,5 thousand wholesale partners and franchisees by the end of 2023[19].

The modern forms of doing business that have made it possible to increase sales are not available to everyone. Given the mechanism of demand mobility and the factors that generate it, it is logical to assume that the increase in sales of the leading companies is offset by a decrease in sales of their potential competitors: there is no point in producing a product that cannot be sold. According to the Federal Tax Service, 'the number of small jewellery businesses has decreased by 35% since the beginning of 2023. Approximately seven thousand small manufacturers have closed or gone underground, and many of those that remain have reduced their production volumes and workforce[20]. Experts in the industry objectively link the reduction in production volumes among small jewelry businesses to the 'cancellation of the simplified tax system (STS) for small jewelry businesses, and the introduction of mandatory digital monitoring on the platform of the state integrated information system (SIIS) for controlling the turnover of precious metals, gemstones, and products made from them at all stages of this turnover (PMPS SIIS)'[21], rather than with a drop in demand. Statistics from the Federal Tax Service confirm that small companies could not withstand the competition. The vacated niches also allowed the leading distributors to increase production.

In any case, the consumer of jewellery remains the same, as does the volume of demand. An analysis of the statistics and expert opinions available shows that the visible abundance, with constant marketing promotions and discounts, perceived from the buyer's point of view as overproduction or overstocking, is, according to the laws of the market, supply in proportion to demand. There are many reasons why it is possible to maintain volumes and even increase production in the face of growing demand: jewellery made from PMPS does not become obsolete, does not deteriorate, does not require maintenance or large storage areas, etc.

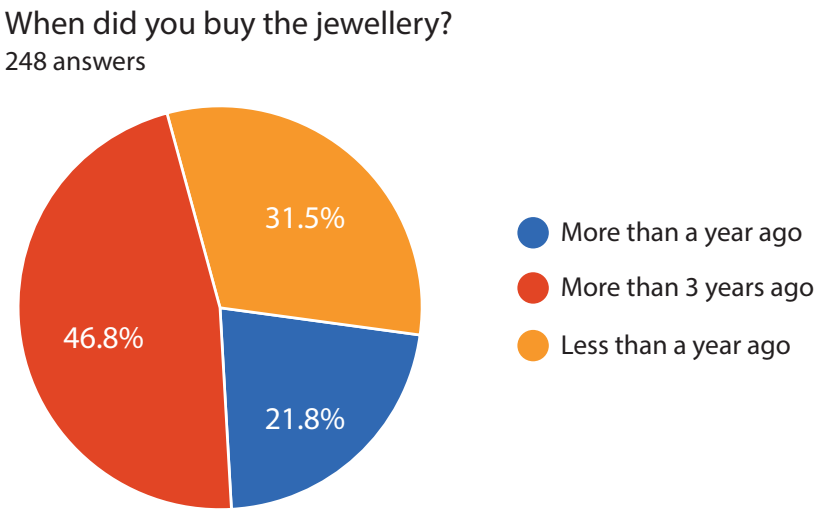
The conclusion about the low demand for jewellery is confirmed by the data collected by the author during the survey. Almost half - 46.8% - of the respondents to the author's Google Form survey have not bought jewellery in the last three years (see the figure).

Moreover, according to the results of the research carried out, there is not even a hidden demand, i.e. the presence of desire in the absence of money. To the question: 'If you suddenly had 100 thousand roubles, would you spend it on jewellery?' - 69.6% answered 'No'.

The only exception when it comes to determining demand is for wedding rings. 'Gold wedding rings have an enviable stability, as their demand is completely independent of exchange rate fluctuations, gold prices, and all sorts of trends. Classic models of wedding rings for happy newlyweds are traditionally among the top 5 most popular jewellery items in Russia'[22]. At the beginning of 2024, according to Rosstat, wedding rings will be the only product from a wide range of precious jewellery items included in the structure of consumer expenditure. At the same time, the share of expenditure on wedding rings in the structure of consumer expenditure of the population is only 0.003% (product code 7503), which is the same level as in previous years, confirming the hypothesis of a consistently low, limited demand for the analysed group of goods[23].

Nevertheless, the preservation of traditions is an important demand factor. The degree of influence of the tradition factor can be seen in the distribution of jewellery sales in the country. According to Rosstat, in 2021 'Russians bought jewellery for 365.4 billion roubles - about 2,500 roubles per

Fig. Correlation of respondents' demand for jewellery by date of purchase (% of respondents)




[19] https://sokolov.ru/blog/company-news/press-release-24-07-2023/?ysclid=lsbzk7kyo8992602143.
[20] https://rg.ru/2023/10/17/reg-szfo/serebro-uhodit-v-podval.html?ysclid=lsd29m94pu60157483.
[21] https://rg.ru/2023/10/17/reg-szfo/serebro-uhodit-v-podval.html?ysclid=lsd29m94pu60157483.
[22] https://salt.news/ekonomika-i-biznes/yuvelirnyj-rynok-predvaritelnye-itogi-2023-goda-i-prognozy-na-god-2024-j/?ysclid=lr9hug0crs515538912.
[23] https://rosstat.gov.ru/statistics/price.

person per year, 29% of sales being in Moscow. However, on a per capita basis, Dagestan residents spend the most on jewellery: in 2021, jewellery sales in the republic amounted to 10,425 roubles per person. Yakutia is in second place with 8,580 roubles, and Moscow is only third with 8,401 roubles'[24]. Thus, a region without the highest incomes but with a strong tradition of wearing gold and silver jewellery confirms the importance of this factor in shaping demand.

There are a number of regions in the world where gold jewellery is traditionally in demand, with developed domestic production and a market that no one is in a hurry to abandon. Increasing global consumer demand for PMPS jewellery is a long-term task that the government is trying to help companies solve. A number of strategic directions for the development of international cooperation were adopted, including the expansion of trade relations: Main directions of economic development of the EAEU until 2030[25], Declaration on the further development of the Association until 2030 and for the period until 2045 'Eurasian economic path for the development of the EAEU until 2045'[26] etc. The documents provide for the expansion of trade relations with partners in the EAEU and jointly with countries such as Iran, India, and China.

Joint market entry in a highly competitive environment is complicated by a global decline in demand caused by a fall in savings. According to the head of the European Central Bank (ECB), K. Lagarde, at the beginning of 2024 'the volume of "excess" savings is declining all over the world, especially in the developed economies, and has now fallen to almost zero, although it was previously at the level of 10%'[27].

Comparing global and Russian trends of shifting demand towards essential goods, it is necessary to note changes in fashion: the quality of modern costume jewellery corresponds to this factor. During the survey, 58.9% of respondents admitted that they could not tell the difference between precious and non-precious jewellery. The high level of technology puts even specialists in a difficult position, who clearly state that they need the right equipment to determine quality. In the case of modern man-made, synthetic diamonds, laboratories confirm that 'the result is a stone that is also 100% diamond'[28].

Thus, an important factor in maintaining and increasing demand for Russian jewellry made from precious metals and gemstones is hallmarking and testing, and from March 1, 2024, physical marking of products will also be required to confirm the authenticity and quality of the jewelry.

## 4. Prospects for increased demand

As I mentioned, there is always a segment of consumers who are not fashion-conscious, who respect tradition, and who have a consistently high income. All these parameters can be shaped. 'The state, which is concerned with the welfare of the population as a whole, does not aim to reduce the supply of jewellery. On the contrary, in the interests of citizens, conditions are created for the expansion of the commodity market and the replenishment of the state budget' [Ivanova, Umgaeva, 2023, p. 16].

The creation of demand at home in order to maximise profits should go hand in hand with the search for potential consumers abroad and the creation of offers that meet their expectations. 'Two sets of factors influence this decision. These are push factors, caused by the lack of opportunities for business development in the local market due to some restrictions. Secondly, these are pull factors, which are caused by better conditions for business development abroad' [Volodin, Podkovyrov, 2018, p. 21]. In the case of Russian-made PMPS jewellery, push and pull are mutually significant reasons for seeking buyers abroad.

This conclusion also applies to the expansion of the online sales market. According to research by 585*Gold and Sokolov, the growth of the share and importance of online sales is a trend for 2023. At the same time, the expansion of online commerce should be seen as a potential for increasing demand and a direction for working with consumers. For example, the interviews revealed that virtually no one was aware of the SIIS PMPS mobile application for checking the authenticity of marked jewellery. The general reluctance to use online applications to check the authenticity of goods was also confirmed by the survey: 75% of respondents do not check barcodes when shopping via applications.

In the case of marking jewellery, it can be assumed that ordinary buyers are unlikely to download the authentication app en masse, let alone use it. Among the reasons: the information about the product is on its label and packaging; a Russian piece of jewellery is necessarily engraved with the manufacturer's name, and there is a hallmark of the Federal Assay Office. Therefore, it is necessary to take into account the acceptance factor when making various proposals.

In general, all the factors listed indicate a close interdependence between the economic categories of 'demand' and 'supply' and the need to take them into account when designing a production plan and developing a sales strategy for jewellery.

[24] https://journal.tinkoff.ru/jewelry-stat/?ysclid=lsc1xtvjrw92694301.
[25] https://eec.eaeunion.org/comission/department/dep_makroec_pol/oner2030.php?ysclid=lqpg9v8cvd949226154.
[26] https://rg.ru/2023/12/25/lidery-stran-eaes-utverdili-deklaraciiu-o-razvitii-do-2045 goda.html?ysclid=lqtvqvjisp101000295.
[27] https://dzen.ru/news/story/Lagard_obem_izbytochnykh_sberezhenij_snizhaetsya_osobenno_vrazvitykh_stranakh--7c9326b000c091b9207f77be01669c22?lang=ru&rubric=business&fan=1&stid=-Sox&t=1705662389&tt=true&persistent_id=2769250206&story=137a8802-8579-5b7a-8725-a44ad742ee71&issue_tld=ru.
[28] http://j-r.ru/news/analitika/vyrashhennye-v-laboratorii-brillianty-spros-na-nih-rastet-no.html.

## Conclusion

The dependence of supply on demand for a given product is an immutable law of economic theory. The state's participation in market regulation is necessary when there is an obvious shortage of products to meet the urgent needs of the population, when there is illegal trade in goods and services, and when there is a need to solve strategic tasks of the state. The analysis of open statistical data of leaders of the jewellery business in Russia indicates the existence of sufficient demand to maintain the volume of production and sales of products made of PMPS. Competition as a factor in business development has certainly redistributed jewellery production in the country in favour of large companies. There was also a redistribution between them: 73% of the total sales volume in 2023 was accounted for by the top three (they were also the sales leaders in 2022).

Without government support, small jewellery companies are disappearing from the market. It has not yet been possible to increase the demand for jewellery from Russian manufacturers on the world jewellery market, although some groundwork has been done. With the support of the state, which guarantees the free movement of goods to a number of countries, including those with a strong tradition of wearing jewellery, we can expect to see an increase in the number of consumers of jewellery products abroad and a corresponding increase in sales volumes.

State support is an important factor in creating demand for quality products. The introduction of a system of state testing and marking of products is aimed at protecting both producers from unfair competition and consumers from counterfeits. An analysis of the opinions of experts and respondents who took part in the survey confirmed the author's assumption about the significant influence of various factors on demand, primarily the level of income of the population, fashion, traditions, and the development of technologies, including digital ones. The combination and influence of the above factors on demand is significant, but for jewellery products, according to the analysis carried out, this demand will always remain stably low in the total volume of consumer demand due to the classification of the studied group of goods as luxury items.

Jewellery made from PMPS is a way for a certain segment of buyers to save money, but not an investment option. Identifying and expanding the potential consumer segment is the task of jewellery manufacturers and sellers. For the state system of regulating the circulation of PMPS and products made of them, the task has been defined: to maintain a sufficient supply of jewellery products and to develop measures that support fair competition in the fight for the consumer.

In general, all the factors analysed suggest that the oversupply is being offset by a reduction in production and sales by firms that have been unable to compete. The study confirms the hypothesis that while there is an oversupply of jewellry made from precious metals and gemstones in the Russian Federation market, this oversupply is minimal and is positioned to stimulate potential demand growth.

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# The ethical context as a historically significant factor of risk management efficiency

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## Abstract

The purpose of this study is to identify ways to improve the effectiveness of risk management, thereby bridging the gap between the increasing needs of organisations and their current capabilities based on the study of past civilisational crises. To solve this task the main ethical factors that contributed to the success of bifurcation transitions in the past were identified through the analysis of turning points in history: the Upper Paleolithic Revolution, the Axial Age Revolution and the Industrial Revolution, using the model of minimum necessary social stability developed by the author based on the hypothesis of techno-humanitarian balance. Starting from the current position of the society on the eve of the next bifurcation transition, a comparative analysis of the ethical factors that made past successes possible with the current practice of risk management in organisations was carried out. The following factors were highlighted as priorities for the implementation in risk management practice: working together to achieve common goals, establishing and adhering to uniform rules for achieving common goals, and creating a favourable environment for the targeted use of human creative potential. As a result, a scheme has been proposed to complement current risk management practices by incorporating higher level ethical factors that promote rational goal setting, as well as involving the creative skills and efforts of lower level stakeholders in situational response. The proposed scheme can help to strengthen the impact of risk management, both for the organisations themselves and, indirectly, for society.

**Keywords:** civilisational crises, risk management, ethical factors.

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# 伦理背景作为风险管理有效性的历史重要因素

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## 简介

本研究的目的是寻找提高风险管理效率的方法，以缩小组织日益增长的需求与其当前能力之间的差距，基于对历史文明危机经验的研究。为此，通过分析历史上的关键转折点：上旧石器时代革命、轴心时代革命和工业革命，作者使用基于技术-人文平衡假说开发的最低必要社会稳定性模型，确定了成功度过这些分叉过渡的主要伦理因素。假设当代社会正处于另一个分叉过渡的前夕，作者对促成过去成功的伦理因素与当前组织风险管理实践进行了比较分析。在风险管理实践中，优先考虑的因素包括：由于共同目标而进行的合作、在实现共同目标过程中制定和遵守统一规则、以及创造有利环境以有针对性地利用人的创造潜力。因此，提出了一种补充当前风险管理实践的方案，包括引入高层次的伦理因素以促进合理的目标设定，并在情境响应中利用利益相关者的创造能力和努力。所提出的方案可以增强风险管理的效果，不仅对组织本身有利，还能间接惠及整个社会。

**关键词：** 文明危机、风险管理、伦理因素。

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## Introduction

In times of instability, human activity is subject to a powerful current of unpredictable change. As a result, researchers are increasingly interested in studying the experience of past civilisational crises. Identifying the factors that ensured the survival and development of individuals or whole states in the context of universal history[1] allows us to better define the current position of society and, possibly, to propose more effective ways of development.

This type of historical analysis can also be carried out from the point of view of the development of risk management in organisations. Indeed, the current state of risk management activities can be characterised in two ways. On the one hand, there is a relatively high level of maturity of the risk management technologies used. Conversely, the current set of methods lacks the requisite degree of a priori readiness to respond effectively to the most serious and disruptive events. This raises the question of whether there is a proactive strategy that would enable risk management to be implemented at an earlier stage in its development. It is not yet clear which development vectors for risk management practice can be prioritised and whether they can be found in principle.

The objective of this study is to identify strategies for enhancing the efficacy of risk management in order to bridge the gap between the evolving needs of organisations and their current capabilities. This will be achieved by studying the experiences of past civilisational crises.

The first part of the article presents an analysis of interdisciplinary approaches to the study of past civilisational crises with a focus on the available data of universal history. It highlights examples of research conducted from a risk management perspective, as well as the contributions of philosophers, psychologists and mathematicians who consider risks within the context of historical circumstances, including climatic and social factors. Based on this source material, the author identifies the most pertinent directions for risk management development in the current environment.

The second part, based on the hypothesis of the techno-human balance [Nazaretyan, 2001], proposes a model for achieving the minimum necessary level of social sustainability, based on the level of its technological development. The proposed model is employed for the purpose of discerning the actual state of society.

The third part is devoted to analysing and identifying the key factors that have contributed to the success of overcoming civilisational crises in the past.

The main conclusions highlight possible options for the development of risk management strategies within organisations, based on the ethical factors identified.

[1] In this article, the term “universal history” is defined as a field of interdisciplinary historical research that considers the interdependence of societal and natural development.

## 1. General and specific studies of past civilisational crises as a source of new directions in risk management

If humanity still exists, it means that it knows how to overcome crises, or at least knew how to do so at the right moment. What made it possible for humans to survive and develop in the critical conditions of the past? Representatives of different fields of knowledge use different approaches to answer this question.

One of the most comprehensive examples of interdisciplinary systematisation of knowledge on the human experience of overcoming civilisational crises is the book [Nazaretyan, 2001]. The author identifies six anthropogenic crises that "culminated in a breakthrough into new cultural epochs":

1) Palaeolithic Revolution (0.7-1.2 million years ago);
2) Upper Palaeolithic Revolution, or Cro-Magnon Cultural Revolution (30,000-35,000 years ago);
3) Neolithic Revolution (10,000-12,000 years ago);
4) Urban Revolution (5,000-3,000 years ago);
5) Axial Age Revolution (mid-1st millennium BC);
6) Industrial Revolution (18$^{th}$-19$^{th}$ centuries).

These events are typically associated with a broad coverage area and, in most cases, are accompanied by notable climatic shifts. Nazaretyan's [Nazaretyan, 2001] analysis of how these crises were overcome led to an unexpected conclusion. While the specific recovery methods differed from case to case, each subsequent crisis resulted in a radically new stage of development for society. This was accompanied by growth in three main directions, which the author defines as "vectors of evolution" or "vectors of successive global changes":

1) technological advancement;
2) demographic growth;
3) increased organisational complexity.

In addition to the objectively observed post-crisis increments, the author puts forward a hypothesis regarding the existence of two further evolutionary vectors, which at this stage cannot be definitively accepted or refuted:

4) intellectual capacity and cognitive complexity;
5) the hypothesis of techno-humanistic balance.

The fourth point, while open to question, is intuitively clear. We will therefore focus our attention on the description of the final fifth vector of civilisational development, namely the hypothesis of the techno-humanitarian balance. In its most general form, the hypothesis reads as follows: "The higher the power of production and combat technologies, the more sophisticated are the cultural regulatory instruments needed to maintain social stability" [Nazaretyan, 2001]. This law is illustrated by the assessment presented in the book, derived from ethnographic data: "With the progressive increase in the lethality of weapons and the density of human settlement, the percentage of military casualties in the total population has remained constant over millennia. In fact, it seems to have decreased slowly and erratically, fluctuating between 4% and 1% per century".

The bifurcation behaviour of anthropogenesis is discussed by N.N. Moiseev in his book, Man and the Noosphere [Moiseev 1990]. He considers the Palaeolithic revolution and the Cro-Magnon cultural revolution according to the following scheme: "biological evolution – bifurcation – social development". The author posits that the transition from Australopithecus to Homo sapiens occurred in an instant on the scale of evolutionary change. He suggests that such a result could have been achieved through the process of self-organisation, given the potential variability of neoanthropic organisms and the extremely challenging conditions of the struggle for survival. As in the book [Nazaretyan, 2001], the significance of the principle "Thou shalt not kill!" is highlighted as occupying an exceptional position in the formation of human society. The reflections on potential prerequisites for bifurcation stability in early human communities have ultimately led the author to conclude that "it is not intelligence per se, but rather the comprehensive organisation of social life, capable of actualising its potential, that became the domain of selection".

The analysis of global catastrophes of past epochs is a topic of growing interest among a diverse range of professionals, including historians, philosophers, mathematicians, physicists, and researchers in the field of risk management. By way of illustration, the authors [Linkov et al., 2024] examine the collapse of a prosperous civilisation of Mediterranean states in the Late Bronze Age, which occurred between 1200 and 1100 BC. By using a modelling approach to trade and socio-political networks between states, the authors have identified potential causes that led to a cascading failure in the network. They have also proposed methods for establishing more resilient networks. One of the chapters in the book on organisational resilience methods [Linkov, Trump, 2019] analyses responses to the bubonic plague epidemic in Venice between 1575 and 1577. Another paper [Dibble, Finné, 2021] examines the increasing heterogeneity of food production methods in southern Greece in the Late Bronze Age and Early Iron Age as an adaptive response to climate change in the form of reduced rainfall. The conclusions presented in [Haldon et al., 2020] are based on an in-depth analysis of responses to a number of historical crises occurring concurrently. In particular, the authors examine the responses of the Western Roman Empire and England to plague epidemics in the 500s and 1346-1352, respectively. Furthermore, the paper considers responses to climate change and natural disasters in Antioch, the Roman and Ottoman Empires. The key finding is that societies with greater social stratification are less effective in responding to challenges. It is typical for the general population to respond to situations on an ad hoc basis, lacking awareness of the full extent of the event and the resources required to address it effectively. Meanwhile, those in positions of power and influence often react in a way that prioritises their personal interests over the

well-being of other, less socially protected segments of society. Ultimately, such tactics result in significant adverse effects for the entire society.

Another group of studies focuses on identifying the key factors that contribute to the occurrence of previous catastrophes. The article [Kaniewski et al., 2020] presents findings based on data on the reconstruction of temperature and precipitation in the Eastern Mediterranean over the past 6,000 years. The findings indicate that significant social changes and plague outbreaks occurred during relatively cooler periods, when precipitation patterns changed and droughts had a greater impact than temperature shifts. A separate study [Holdaway, 2023] based on data on glacial deposits in Greenland also indicates a significant correlation between precipitation levels and human well-being in Europe and the Eastern Mediterranean. In contrast to the findings of a previous study [Kaniewski et al., 2020], the impact of climate change may be either positive or negative, depending on the region. A comparable study [Zhang et al., 2020] assesses the correlation between climate change and warfare and rebellion in Imperial China (1-1911). It was found that the area of military operations shifted southwards during periods of cold weather and in the opposite direction during periods of warm weather and increased rainfall. Concurrently, the intensity of rebellions decreased during periods of cold and dry weather and increased during periods of warmer and wetter weather.

In addition to climate, the human factor, in particular individual and collective human error, is a significant contributing factor in the development of catastrophic events and their consequences. By way of illustration, the book [Moon, Popeta, 2022] examines the missteps and omissions of key individuals in the lead-up to these incidents, drawing on a substantial body of evidence from past man-made disasters.

A comparison of a group of studies dedicated to risk management with interdisciplinary studies of civilisational crises reveals a significant difference in approach. The majority of risk managers adopt a narrow focus in their studies, examining the efficacy of contemporary risk management techniques in historical contexts or identifying dependencies and consequences resulting from the impact of various factors. While such studies undoubtedly offer insights, it is evident that a retrospective analysis from the vantage point of current approaches is inadequate for identifying novel directions in risk management development.

Concurrently, studies of a generalisable nature, although they do not address the risk management toolkit in sufficient depth, provide insight into the principal factors and driving forces that are necessary for an individual to successfully navigate crisis periods.

It is of particular interest to consider historical studies of risk management that reveal contradictions and extend beyond the limits of modern standards and methods. To illustrate, the work [Haldon et al., 2020] presents a novel challenge: the organisation of mutually beneficial interactions between heterogeneous groups of people. The book [Moon, Popeta, 2022] places the human factor at the centre of its analysis, examining it as the primary driver of successful or unsuccessful risk management experiences. A comparison of these results with the main conclusions of interdisciplinary works, such as [Nazaretyan, 2001] and especially [Moiseev, 1990], suggests that the greatest potential for adaptation and development in times of crisis lies in the area of individual and collective human qualities. Consequently, a shift in focus from technocratic models and forecasts to the development of individual qualities and the organisation of human relationships in an environment of increasing risk tension may prove to be the missing element that will significantly increase the effectiveness of risk management activities.

Therefore, the following sections of this article will examine the theoretical assumption regarding the importance of revealing a person's potential and abilities for self-organisation in crisis periods in the context of risk management tasks.

## 2. A model for achieving the minimum level of necessary social sustainability based on the concept of techno-humanitarian balance

The hypothesis that a favourable environment is necessary for the development of human adaptive potential requires further delineation in order to facilitate the resolution of practical issues. To this end, a model for the growth of the minimum necessary social sustainability was developed on the basis of the hypothesis of techno-humanitarian balance proposed in the book [Nazaretyan, 2001].

Akop P. Nazaretyan suggests the following approach to formalising the law of techno-humanitarian balance:

$$S_i = \frac{f_i(R)}{h_i(T)}, T > 0, \quad (1)$$

where $S_i$ – internal stability of the social system, $i$ – internal, $R$ – quality of regulatory mechanisms of culture, $T$ – technological potential.

Concurrently, Nazaretyan postulates the existence of external stability within the social system $S_e$, which, in his view, should serve as a positive function of technological potential:

$$S_e = g(T,\ldots), \quad (2)$$

where $e$ – external.

The above expressions (1) and (2) illustrate the idea that "the expanding technological potential diminishes the social system's reliance on the states and fluctuations of the external environment, while simultaneously rendering it more susceptible to the conditions of mass and individual consciousness" [Nazaretyan, 2001].

The author of this publication rejects the assertion that the growth of technological potential makes the social system less dependent on environmental fluctuations. Currently, the expansion of technology represents

a considerable contributing factor to climate change and the intensification of natural disasters. Consequently, at values of $T$ proximate to the limiting values at a given level of stability, the direct dependence (2) may not be observed and may even be reversed.

Furthermore, it is logical to assume that the complete sustainability of society $S$ with respect to external and internal influences can only be attained by simultaneously achieving the minimum requisite values of both internal and external sustainability. This convergence of the multiple factors can then be expressed by the following equation:

$$S = S_i \times S_e. \quad (3)$$

In view of the above assumptions and in recognition of the fact that the precise form of the minimum necessary social sustainability function cannot be determined at this time, it seems reasonable to propose the following simplified representation of the law of techno-humanitarian balance for the purposes of this article:

$$S \sim \frac{R}{T}, \quad (4)$$

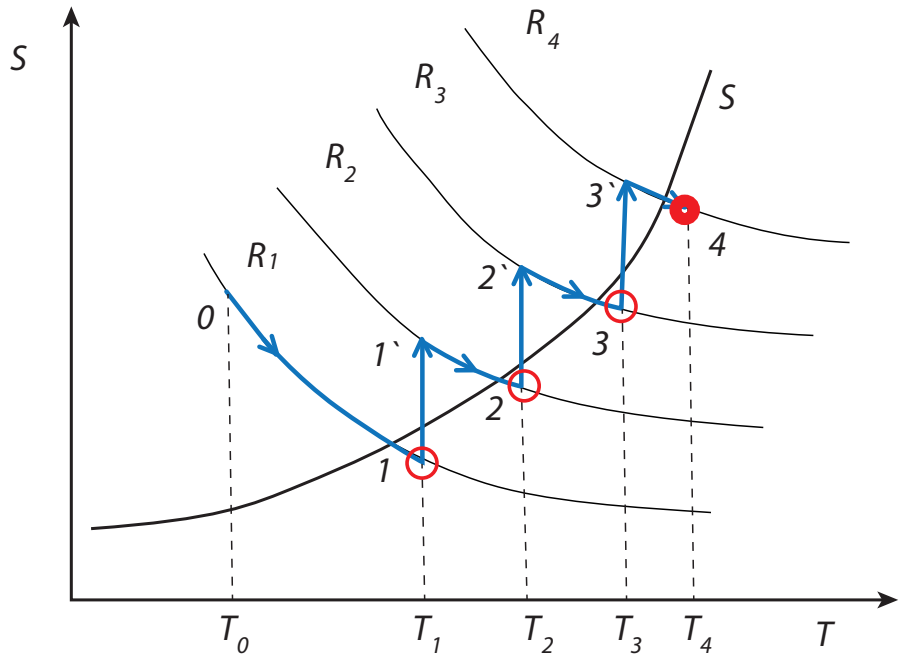
where $S$ – full social sustainability for external and internal impacts.

Furthermore, it can be assumed that as society develops technologically, the minimum level of total sustainability $S_{min}$, required to maintain stable life activity will increase. Consequently, the trajectory of social development can be schematically represented as an iterative process (blue trajectory 0-1-1`-2`-2`-3`-3`-4) (Fig. 1).

The resulting iterative trajectory of social development 0-4 (Fig. 1) aligns with the observed historical pattern of civilisational crises. Indeed, starting from an arbitrary point $T_0$, society increases its technological level while maintaining cultural regulation at a constant level $R_1$. At a certain point, there is a limit to the extensive development of technologies $T_1$, Once the curve of minimum necessary sustainability $S_{min}$ is crossed, society begins to experience various kinds of shocks, including acute shortages of basic resources and a series of related problems that raise questions about the very existence of the society. The critical deviation from the equilibrium state and the subsequent transition can be defined as a bifurcation moment. Figure 1 illustrates a bifurcation transition, indicated by the vertical line 1-1`, which can occur almost instantaneously, according to evolutionary standards [Moiseyev, 1990]. Upon reaching a new cultural level $R_2$, the society develops technologically to the point of minimum sustainability, and subsequently progresses to the next bifurcation point $T_2$. The process repeats itself.

The only certainty regarding the outcome of the bifurcation process is that it is unpredictable. Is there a way to increase the probability of a favourable outcome? What factors contributed to the success of past civilisational transitions? In order to address these questions, the following section will attempt to consolidate the information within the context of the model presented in Figure 1, with the aid of three well-known civilisational crises: the Cro-Magnon Cultural Revolution, the Axial Age Revolution and the Industrial Revolution.

Fig. 1. An iterative process model for achieving the minimum level of necessary social sustainability Smin




*Notes*. $S$ – social sustainability; $T$ – level of technological development; $S_{min}$ – minimum necessary level of social sustainability; $R_1$–$R_4$ – lines of constant level of cultural regulatory mechanisms, and $R_4 > R_3 > R_2 > R_1$; $T_0$ – $T_4$ – levels of technological development at moments of bifurcation of cultural development of society, $T_4 > T_3 > T_2 > T_1 > T_0$; $T_4$ – position at the current moment.

## 3. Lessons from civilisational crises and an analysis of the current situation from the perspective of the model for achieving a minimum level of social sustainability

Let us posit that at the level of technological advancement corresponding to the $T_1$ stage of fire and chopping (Fig. 1), there was a cultural revolution among the Cro-Magnons (Indeed, the Neanderthals had a physical and intellectual advantage over their competitors, and their brains were larger in volume. 30-35 thousand years ago), resulting in their near-complete displacement of the Neanderthals. The initial position at $T_0$ did not indicate that this would be the result. What could have been the cause of their complete extinction? One of the proposed explanations posits that fire was used not only for domestic purposes, such as heating and cooking, but also for the purpose of burning vegetation [Roebroeks et al., 2021]. This advanced method of hunting permitted the acquisition of heat-treated food with minimal risk. Furthermore, it was possible to intentionally direct the prey towards a desired location. However, this also resulted in a catastrophic decline in biodiversity, which in turn led to the extinction of Neanderthal tribes. At the same time, Cro-Magnon tribes capitalised on their primary strength, namely effective community organisation (Gilpin et al., 2016). Despite their comparatively less advanced physical condition, their more developed speech and prohibition against the killing of their own tribesmen facilitated the evolution of cooperative abilities and the potential for the division of labour. Those members of the community who were unable to participate in hunting could assume auxiliary roles, such as the preservation of knowledge, the provision of medical treatment, and the manufacture of tools, including chisels, spear-throwers, fishing devices, and potentially even bows. Ultimately, the Cro-Magnon population completely displaced the Neanderthals. The form of selection in which "the herd with better developed cooperative relations, which provided a greater diversity of individual qualities, gained an advantage in competition" (cit. ex [Nazaretyan, 2001]) ensured the leap 1-1` to a new cultural level $R_2$ (Fig. 1). The Cro-Magnon people won because they prioritised the interests of the community over their own personal interests.

The next significant turning point in human cultural development was the Axial Age Revolution (mid-first millennium BC). This followed the Bronze Age Catastrophe, which saw the fall of numerous powerful states in the Middle East and Eastern Mediterranean. Expensive and heavy bronze weapons were replaced by relatively light and cheap steel weapons. Consequently, the size of armies and the intensity of battles increased significantly. This, while maintaining the same values and norms, threatened the collapse of the most advanced societies [Nazaretyan, 2001]. In order for society to survive the uncontrollable increase in violence, higher levels of cultural regulation were required. This is illustrated by point 2 at the level of "iron" technology $T_2$ (Fig. 1).

The cultural response manifested in the almost simultaneous emergence of the world's major religions. K. Jaspers [Jaspers, 1991] observed that this was a period marked by the spread of ideas of Confucius and Lao Tzu in China, Buddha in India, Zarathustra in Iran, prophets Elijah, Isaiah, Jeremiah and Deuteronomy in Palestine, Homer, philosophers Parmenides, Heraclitus, Plato, tragedians, Thucydides and Archimedes in Greece. "The new element in this age is that man everywhere became aware of being as a whole, of himself and his limits" [Jaspers, 1991]. Man ceased to be guided only by the interests of the species, he sought moral support in himself, "he discovered in himself the principle through which he could rise above both himself and the world" [Jaspers, 1991]. Conscience is formed as an instrument of self-control.

The transition from 2–2` to the new cultural level $R_3$ at point $T_2$ (Fig. 1) was accompanied by a notable shift in the "centre of ethical development" from the interests of the genus to the individual. It is possible to distinguish two main focus areas for personal development: creativity and self-control. As a result of this cultural breakthrough, K. Jaspers identifies a group of people he refers to as the axial peoples, who were able to make a leap forward and continue their cultural history. He identifies the Chinese, Indians, Iranians, Jews and Greeks as key examples of these nations. Those that did not achieve the breakthrough – Egypt and Babylon – subsequently experienced a decline in their cultural influence.

Once more, at the midpoint of the second millennium AD, a set of prerequisites for another evolutionary leap manifested (point 3 at the apogee of extensive agrarian technologies $T_3$ in Fig. 1). A prolonged period of anomalous cooling (commonly referred to as the Little Ice Age, spanning the 14th to 19th centuries) was accompanied by demographic growth and the degradation of natural landscapes, including deforestation and river pollution. Plague epidemics and violent conflicts also indicated that the limits of social sustainability had been reached, necessitating a shift in approach.

The solution to this impasse was the industrial revolution of the 18th and 19th centuries. This period saw a significant shift from manual to machine labour, which subsequently led to industrialisation and a notable increase in labour productivity. The transition from agrarian to industrial society has been a significant driver of economic growth and improved living standards.

The ethical context that made such changes possible was the legislative enshrinement of the rights and freedoms of the individual, which had been recognised as early as the Axial Age and developed in the Renaissance and later. This context enabled the abolition of slavery and the emancipation of peasants. It took more than two thousand years for the notion that every human being is a creative, free being to mature and be reflected in the state system. This notion ultimately bore fruit. Britain

served as the primary driver of the Industrial Revolution. The accumulation of resources from conquered colonies, the novel form of social contract, and the free movement of labor played a pivotal role in this historical phenomenon.

The years preceding the Industrial Revolution were also a period of significant philosophical and cultural advancement. The early evolutionary ideas of F. Bacon, R. Descartes and P. Fermat can be attributed to this period. The significance of education, qualifications and individual development grew within society. The words of Descartes, who proposed utilising the forces of nature "in the same way to all the uses to which they are adapted, and thus render ourselves the lords and possessors of nature"[Descartes, 2022], can be regarded as a defining statement of the general characterisation of the direction of human development during this period.

In light of the aforementioned, the cultural transition 3-3` at the point $T_3$ to the level $R_4$ can be considered the logical conclusion of the transition 2-2`, which was primarily driven by the "pressure from below," namely the advancement of individual qualities and human freedoms. Concurrently, the significance of the family and the state as cultural constraints "from above" persisted. Nevertheless, the vector of development, articulated by Descartes with remarkable clarity, can be identified as the primary trajectory.

Thus, in examining the three bifurcation cultural transitions at points $T_1$, $T_2$, $T_3$ the initial transition was predominantly shaped by external forces, while the subsequent transitions were largely driven by the necessity for internal human development.

Let us assume that modern society is approaching the limit of extensive development of industrial technologies and is on the verge of transitioning to information technologies $T_4$ at point 4 in Fig. 1, which represents a pivotal moment of cultural and technological change. Let us examine the necessary directions of development and identify the factors that can increase the probability of a favourable outcome.

Firstly, the priority of external circumstances is obvious today; it dictates the need for cooperation between states on a global scale. K.E. Tsiolkovsky wrote: "There must be unification, for the benefits of beings demand it. If they are mature, they are reasonable, and if they are reasonable, they will not do evil to themselves' [Tsiolkovsky, 2001]. However, as usual, the actual picture observed is far from the ideal. The demise of the Neanderthals in the Upper Paleolithic era was precipitated by external pressures, whereas the Cro-Magnons were able to unite and survive. In the modern era, the question of survival is faced by the entire global population, transcending the boundaries of states and nations. Studies on the economics of common pool resources have identified three fundamental factors for success in this area: a common understanding of the value of the resource, the inevitability of adopting common rules, and the absence of discrimination [Olson, 1995; Ostrom, 2015]. It is clear that there is still a long way to go before we reach this distant goal. The Cro-Magnon people were able to achieve this in a relatively short period of time at the individual level. It would be interesting to speculate as to whether we will be able to solve the same ethical question at the state level.

Secondly, the 'Cartesian' man was so quick to recognise his freedoms and importance that he failed to consider the boundaries of sustainability. The current generation of consumers has a high demand for a certain standard of living. Furthermore, there is a notable lack of awareness regarding the influence of individual decisions on the final outcome. In other words, if goals are not clearly defined and risks are not assessed, it is unclear whether it is more efficient for an individual household to sort rubbish, or if it is sufficient for just one neighbour to do so, with the others being exempt. It is not only about rubbish disposal, but also about making moral choices regarding the use of the totality of benefits and freedoms. Consequently, the second most important task is to decompose global goals and objectives into norms of law and self-perception, which can then be internalised as limitations for each individual.

Thirdly, in order of priority but not in terms of importance, it is essential to make full use of human creativity and business abilities in order to solve the bifurcation task, which is to be carried out from the category of the impossible. It is insufficient to rely solely on the ethical considerations of the law to facilitate a collective moral transition. Indeed, as Nikolai A. Berdyaev wrote, "the ethics of law is both very human and well adopted to human needs and standards, and extremely inhuman and pitiless towards the human personality, its individual destiny and intimate life... The law neither cares about the individual's life nor gives him strength to fulfil the good which it requires of him" [Berdyaev 2019]. Prigogine also posits that individual actions can influence the overall result. He states, "We live in the era of fluctuations, when individual action remains essential" [Prigogine, 2000]. Consequently, the creation of favourable conditions for the implementation of individual creative potential represents a crucial factor in the transition to a new level of civilisation development.

## 4. Some suggestions for addressing the practical problems of modern risk management

What practical insights can be derived from the historical analysis for effective risk management in organisations? Let us compare the current practice of the main standard of risk management, GOST R ISO 31000-2019[2] with the three priority global ethical tasks highlighted at the end of the previous section, which have been identified as success factors in the forthcoming transition to a new civilisational era.

[2] GOST R ISO 31000-2019. Risk management. Principles and guidelines. Moscow, Standardinform, 2020.

Fig.2. The organisational risk management system in an ethical context


Firstly, it is important to identify the specific circumstances that currently prevail in order to ascertain the best course of action. It seems likely that as planetary sustainability approaches its limits, it will have a significant impact on the activities of the global human community. It is evident that the objectives of organisations, which have a substantial impact on the economy, must be aligned with those of society. The current principal risk management standard, ISO 31000:2019, simply states that the objective of risk management is to create and safeguard the value of an organisation. "Managing risk improves performance, encourages innovation and supports the achievement of objectives"[3]. It should be noted that the objectives may vary in terms of their specific content. Therefore, the arbitrary selection of goals does not provide companies with any guidance in navigating global processes, while the impact of external risks is likely to intensify in the near future. While many businesses do consider the United Nations Sustainable Development Goals (UN SDGs) in their strategic planning, this is often done in a highly selective and unsystematic way. The lack of clear logical linkages among the SDGs and their inability to be correctly decomposed presents a significant challenge to their achievement. Goal setting serves as the foundation for all future risk management activities, making it crucial for organisations to develop this component of risk management with a global ethical objective in mind.

Another critical global task is the decomposition of objectives, the establishment of robust frameworks for risk-aware behaviour of personnel, and the implementation of appropriate risk management procedures at all levels of the organisation. These are standard procedures within the field of modern risk management. It is possible to identify varying levels of maturity across different companies, but these tasks represent a significant portion of the risk management workload. The ISO 31000:2019 standard requires managers to communicate to relevant individuals in the organisation "that risk management is a fundamental responsibility" and to define the authority, duties and responsibilities for the respective roles in relation to risk management. It is evident that these requirements align with and adhere to the ethical principles set forth in the law.

With regard to the third global ethical task, namely the utilisation of human creativity, this invaluable resource is not yet fully integrated into risk management practices. GOST R ISO 31000-2019 merely states that "human behaviour and culture significantly influence all aspects of risk management at every level and stage". The guidelines of the International Institute of Risk Management[4], mention personal ethics and behavioural models in the context of identifying undesirable behaviours and excessive risk-taking. Only a few studies have focused on developing a new approach to risk management, namely resilience[5] [Park et al., 2013; Reid, Rout,

[3] Ibid.
[4] Risk culture. Under the Microscope. Guidance for Boards. The Institute of Risk Management, 2012.
[5] Resilience.

2020], and have emphasised the significance of 'bottom-up initiatives' in incident response tasks. However, if such a situational response is not adequately prepared and guided, its effectiveness is limited, as highlighted in [Haldon et al., 2020]. Conversely, a well-directed, adequately resourced and motivated initiative can significantly enhance the agility and effectiveness of risk management activities.

In light of the parallels between civilisational crises and the ethical factors that contributed to their successful resolution in the past, it is evident that only one of the three identified factors remains relevant in the context of modern organisational risk management: the one responsible for the ethics of the law. Figure 2 demonstrates the significance of this factor in the context of contemporary organisational risk management in Box 2.

Integrating ethical considerations into existing risk management practices can enhance the effectiveness of risk management activities in organisations. This can be achieved by incorporating elements that address the ethical context at the global level (Fig. 2, Box 1) and at the level of individual stakeholders (Fig. 2, Box 3). For instance, integrating global processes into the objective-setting process will ensure the organisation prioritises external risks and enables prompt involvement in their management. Furthermore, efforts to support and coordinate individual initiatives can result in notable enhancements in the quality, speed and depth of situational responses.

## Conclusion

In order to respond effectively to new threats and challenges, modern enterprises require new risk management tools. The study indicates that the greatest potential for responding to crises lies in the realm of individual and collective human qualities. A historical analysis conducted from this perspective identified three main ethical factors that contributed to the successful resolution of global crises in the past. These were: collaboration in pursuit of shared objectives, the establishment and enforcement of shared standards for achieving shared objectives, and the creation of an environment conducive to the directed utilisation of human creativity.

The proposed framework enables the enhancement of current risk management practices by aligning individual efforts with societal objectives through the lens of organisational risk management. Therefore, an ethical context can not only significantly enhance the impact of risk management activities for a specific organisation, but also contribute to the achievement of societal goals.

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# Development of the strategy for a socially responsible bank

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## Abstract

The article highlights relevance of a socially oriented bank in the financial sector of the country's economy, the specifics of its strategy and banking services. The relevance of the study lies in the need to examine complex issues of access to financial services. The purpose of the article is to substantiate the author's position on the relevance of the strategy of a socially oriented bank. The research methodology used in the work includes: a historical method, a systematic method, a method of scientific abstraction and theoretical knowledge, not excluding logical approaches and mathematical calculations. In the course of the research, a scientific hypothesis is put forward about the impossibility of the existence of a socially oriented bank without banking services that differ in criteria from the general market. The conclusions drawn help us to actively discuss the need to increase the level of accessibility of financial services to the population of the country and to raise issues of competition in the banking sector. They broaden the discussion on commercial bank interest rates and their role in stabilising the country's economy. The author's position, in the conclusions, reflects the relationship of the bank's customer, as a part of society and a commercial bank, with its services as a platform for the availability of financial services. The author concludes that there is virtually no competition between the leading banks and that the total cost of the loan varies in the range of 20-40%. Considering the bank's customers as a part of society, the author raises social issues of financial stability of the country's citizens through the prism of accessibility of financial services. And the financial stability of the company and the attractiveness of internal financing are important, relevant and complex issues in modern Russia.

The scientific novelty of the article lies in the fact that it explains the relationship between society and the state through financial institutions and the services they provide, reflecting the bank's social policy as an integral part of its strategy.

**Keywords:** bank strategy, full cost of credit, postal bank, banking services, interest rates.

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# 社会导向型银行的战略

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## 简介

本文探讨了社会导向型银行在国家金融部门中的重要性，其战略特点和银行服务的特殊性。研究的现实意义在于需要了解金融服务的可获得性。本文的目的是论证作者关于社会导向型银行战略重要性的观点。研究方法包括历史和系统方法、科学抽象方法和理论认知方法，同时也运用了逻辑方法和数学计算。在研究过程中提出了一项科学假设，即没有在某些标准上区别于一般市场的银行服务，社会导向型银行就无法存在。 得出的结论有助于扩大关于提高国家金融服务可及性和银行业竞争的讨论，扩展了对商业银行利率及其在国家经济稳定中的作用的讨论。作者的观点反映了作为社会一部分的银行客户与提供可及金融服务平台的商业银行之间的相互关系。作者得出了以下结论：领先银行之间实际上没有竞争；贷款的总成本在40.00%以上波动。将银行客户视为社会的一部分，作者通过金融服务的可得性提出了公民金融稳定的社会问题。社会的金融稳定和吸引内部融资是当代俄罗斯的重要、现实且复杂的问题。本文的科学创新之处在于论证了社会和国家通过金融机构及其提供的服务之间的相互关系，反映了社会导向型银行政策作为其战略组成部分的重要性。

**关键词：**银行战略、贷款总成本、邮政银行、银行服务、 利率。

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## Introduction

The concept of a social bank was first developed at the University of Hamburg in 1992. However, the concept gained traction from 2007 to 2010 in response to the global financial and economic crisis that began in 2007 and lasted until 2010, prompting a reassessment of business practices in many parts of the world. The social banking models that emerged between 2007 and 2010 were among the most successful economic organisations worldwide, with annual growth rates of up to 30% [Weber, 2014]. In contrast, the majority of large banks suffered during the global crisis. The concept of social banking aims to enhance the fundamental aspects of banking by operationalising the triple bottom line principle, which delineates the three domains of a bank: profit, people and planet, with a focus on more than just profit [Krause, Battenfeld, 2019].

The comparison of social banks in Europe and the United States, as presented in numerous studies by researchers (e.g., [Cornée et al., 2016; Krause, Battenfeld, 2019]), addresses the significant challenge of enhancing the global financial system.

The objective of this article is to examine the social nature of Russian banks and the main criteria for their banking services and products. To distinguish between the classical and social banking models, it is essential to examine academic sources that illustrate the evolution of social banks and the products they provide within the context of the social banking model.

The Russian banking sector is undergoing a period of rapid growth, with an increasing number of users of financial services. These services are used extensively to implement government social projects, thereby facilitating the development of accessible financial services for the population[1]. From an economic and social standpoint, financial institutions exert a significant influence on society through their pursuit of social policy. It can therefore be seen that the involvement of Russian financial institutions in major social and economic projects is contributing to the growth of social banking in Russia, as they are offering significant social services and products to the population.

The term ‘social banking’ is currently employed in a number of different contexts [Weber, Remer, 2011]. First-

[1] Main directions of development for the financial market of the Russian Federation for 2023 and the periods of 2024 and 2025 (2022). https://www.cbr.ru/Content/Document/File/143773/onfr_2023-2025.pdf.

ly, the term is used to refer to banking operations based on new 'social' media, such as the internet and related software. In this context, the 'social' component is mainly about establishing direct links between lenders and borrowers, and is not necessarily aimed at social impact (see e.g. [Cornée, Szafarz, 2014; Kuchciak, Wiktorowicz, 2021]).

Secondly, social banking, particularly in developing countries, is often seen as a form of government-backed (subsidised) or development-oriented banking (e.g. [Marini, 2005; Boyle, 2014]).

Thirdly, social banking is frequently linked to microfinance or microlending, particularly in the context of developing countries [Lyne et al., 2009].

Fourthly, the term is used to refer to banks that primarily or exclusively serve socially oriented or charitable clients [Bosheim, 2013].

Finally, the term 'social banking' is used to refer to banks that seek to do business only with a positive impact. In this sense, the terms 'social banking' and 'socially responsible banking' are often used interchangeably [Weber, 2011].

This article analyses social bank models in Russia, including their corporate and social policies. Furthermore, it analyses the efficacy of social banking models in the Russian market.

## 1. Review of literature

The internal rules of the European Federation of Ethical and Alternative Banks and Financiers (FEBEA) require that the activities of banks promote sustainable development, social inclusion and orientation towards the social economy[2]. The key objective is to pursue social objectives through the creation of a common good, rather than focusing on profit. The Global Alliance for Banking on Values emphasises the importance of promoting social financial products and services, such as local and regional community development, lending to vulnerable enterprises to build sustainable businesses using human resources[3].

Social banks define themselves as "socially responsible banks" [Cornée et al., 2016]. Their investment strategy is focused on community development, providing opportunities for disadvantaged groups and supporting social, environmental and ethical programmes. Social banks aim to invest their capital exclusively in initiatives that enhance societal well-being, as opposed to those that yield private profits for a select few. This implies that social banks evaluate social and economic sustainability as key factors in financial decision-making. Sustainable investment and lending practices are defined as those methods that provide a better quality of life for as many people as possible and whose impact persists over time, continuing to have many positive effects long after the initial investment has been made.

The primary distinction between conventional banks and social banks is the following: whereas conventional banks prioritize the pursuit of profit, social banking adheres to the triple bottom line, which encompasses profit, people, and planet. Social banks are concerned not only with profit, but also with the well-being of people and the environment. This triple bottom line informs their decision-making process regarding investment and purpose. For social banks, responsibility for the wider society is the primary criterion for sound lending practices, outweighing profit considerations. This is why social banking is often described as banking for social cohesion or co-operative banking.

The objective of this function is to enhance the quality of life and living standards of citizens, while driving social development through the provision of financial services. Additionally, it aims to reinforce the aforementioned functions by ensuring financial sustainability and increasing the public relevance of the financial institution. A comparison of traditional banks and socially oriented banks reveals not only differences in target preferences, transparency of functioning, resource base, attitude towards clients, policy (lending and investment), management system and geography of activity, but also a product that is socially oriented.

A socially oriented bank product is designed to align with the interests of the population and adhere to the bank's principles, enabling a balance between financial performance and social impact. Socially oriented products and services may include a variety of banking programmes, such as housing loans (e.g. 'Young Family', 'Rural Mortgage', mortgages for the military, IT-mortgage, etc.), car loans with state support and subsidies, social cards of regions, and deposits for specific groups of citizens. Many banks have developed their own products to meet the specific needs of their customers. It is also worth noting that social projects are often implemented by commercial banks in collaboration with government agencies.

There is currently no significant difference in service costs within the Russian financial sector, with fluctuations remaining minimal. For the majority of people, particularly those not involved in the financial sector, it can be challenging to ascertain the cost of financial services. In making decisions, customers often consider factors such as a bank's reputation, social impact, clarity, transparency and accessibility [Mikryukov, 2020].

The concept of social responsibility has traditionally been associated with charitable giving and sponsorship. However, it is a much broader concept that should inform the entire policy of the bank. The objective for a financial institution that provides high-quality services and meets high standards of business ethics is to retain and expand its customer base. The author builds on the existing features of the social bank business model, suggesting that the list

[2] http://www.febea.org/sites/ default/files/page-files/febea_charter_eng_1.pdf.
[3] http://www.gabv.org/wp-content/ uploads/2017-Research-Report.

of features could be expanded to include products and services that are important for society:

- specificity of products, services - availability of favourable and special conditions for certain groups of citizens, intermediary activities;
- specificity of banking services - accessibility, convenience, improvement of financial literacy - inclusive finance;
- specificity of the quality of the bank's processes, social image - reliability, security.

There is a substantial body of academic literature that defines the concept of bank strategy. For example, according to L.Y. Piterskaya and D.Y. Rodnin, strategy is "a mechanism for achieving the set goal" [Piterskaya, Rodnin, 2010]. V.M. Poletaeva and A.M. Smulov describe the strategy of a commercial bank as "a set of bespoke strategies for the development of individual areas, which represent the primary means of implementing the bank's overarching concept" [Poletaeva, Smulov, 2019]. In [Hossain et al., 2019], the strategy is viewed as a process of profitable development of banking functions with the objective of increasing turnover.

In the context of strategic planning, the selection of competitive advantages represents a pivotal aspect, particularly within the financial sector. It encompasses the resolution of strategic tasks, the realisation of a financial institution's mission and the attainment of organisational goals. The definition of strategy presented in [Lento, 1993] is worthy of further consideration. It is presented as a comprehensive development plan that is aligned with the investment activities of the bank. The company offers a comprehensive range of services, including financial planning and management for small business clients, marketing and other consulting services for commercial clients, accounting and cash management services, housing and real estate services, homeownership counselling, including loan origination and financial management, leadership and community development training, and support for social and humanitarian services.

This definition of strategy is particularly pertinent to the context of social banking, given the growing importance of services to society and the increasing demand from customers for sophisticated and personalised solutions. The development of innovative services and the creation of new service development processes represent a significant priority for social banking [Karniouchina et al., 2006]. The topic of network-based innovation is an emerging area of interest [Bessant & Tidd, 2011], while the evolution of service theory has shifted from a benefits-based logic to a service-based logic, in which customers co-create value through the provision of services [Vargo, Lusch, 2004]. The advancement of social banking is prompting financial institutions to adopt more open, flexible, integrated, complex, multi-stakeholder, and network-centred innovation processes [Tellis et al., 2008].

However, a crucial question remains: what should a social bank strategy entail and what differentiates it from other strategies?

In addition to their economic function, social banks seek to develop a community of values by bringing together the two sides of financial intermediation: socially oriented investors (i.e. shareholders and depositors) and motivated borrowers. T Social banks are financial intermediaries with a dual purpose [McLeish, Oxoby, 2011]. The primary objective of social banks is the publicisation of social gains, with financial concerns justified by the necessity of economic sustainability rather than profit maximization [Becchetti, Garcia, 2011; Becchetti et al., 2011; San-Jose et al., 2011]. Their operations are guided by fundamental principles such as transparency, accountability and fair redistribution of profits [Cowton, Thompson, 2000; Cowton, 2002; Bechetti et al., 2011; San-Jose et al., 2011]. In terms of investment strategy, social banks adhere to two fundamental principles. First and foremost, they are committed to financing projects that have a positive social impact. They provide loans for projects with social value. Secondly, they prohibit purely speculative operations [San-Jose et al., 2011]. heir financial operations are based on simple intermediation and result in high deposit-to-asset ratios and loan-to-asset ratios. Social banks also differ from their commercial counterparts by adopting specific corporate governance rules. They encourage stakeholder involvement in strategic and operational decision-making processes [San-Jose et al., 2011]. The legal status of the majority of social banks is that of a cooperative, which precludes the possibility of a dominant shareholder [Global alliance..., 2012].

The few banks that are privately owned rely on self-regulatory mechanisms to ensure a fair distribution of power. For example, the voting rights of shareholders of Alternative Bank Schweiz (Switzerland) and Triodos Bank (Netherlands and Belgium) are limited.

They encourage alternative forms of stakeholder engagement, such as the participation of non-shareholders in management and executive bodies.

How do social banks operationalise their social mission in practice? In accordance with the theory proposed by J. Akerlof and R. Kranton, socially oriented investors channel their financial resources towards socially oriented banks with the dual objective of generating additional income and reinforcing their pro-social identity [Akerlof, Kranton, 2000]. Consequently, they are prepared to relinquish a considerable proportion of their financial income, provided that the socially oriented bank in question finances motivated borrowers, that is to say, individuals pursuing the financing of a pro-social business venture. The level of social motivation among investors can be gauged by the extent of their financial investments. This is defined as the difference between the interest paid to them by a social bank and that paid to them by a comparable mainstream bank.

Gaining insight into the operational dynamics of social banks within the credit market is a challenging endeavour, for two key reasons. Firstly, as demonstrated by J. Stiglitz and E. Weiss, in imperfect markets with asymmetric information, interest rates will not fulfil their clearing

function [Stiglitz, Weiss, 1981]. Secondly, the assessment of creditworthiness is contingent upon the bank's strategy. For social banks, this issue is particularly significant due to the presence of dual outcomes. Furthermore, the relationship between the social and financial missions of these institutions is not yet fully understood. In the context of microcredit, M. Hudon posits that the level of interest rates plays an important role from an ethical standpoint [Hudon, 2007]. In the social bank model, the interest rate serves as a tool for social banks to demonstrate to motivated borrowers that they are sharing their personal finances in pursuit of social goals.

The following section will examine the strategic decision-making processes of Russian banks.

## 2. Research methodology

The aim of this study is to examine the socially oriented strategy of a financial institution and its impact on consumers. In order to achieve this aim, an initial investigation was conducted into the theoretical aspects of the following concepts: 'social bank', 'social product', 'bank strategy', 'socially oriented strategy of the bank', 'mission', 'goals and policy of the bank'. Moreover, an empirical investigation was conducted into the interest rates applied to consumer loans in Russia. The objective of the theoretical study was to establish the characteristics employed and the structure of definitions and concepts. The detailed characterisation provided by Russian and foreign researchers, supplemented by the author's conclusions and generalisation, constituted the foundation for the theoretical section of this article.

The practical component employed empirical research methodologies. The research involved an examination of interest rates on consumer loans in the most popular segment of the Russian market. Calculations were made using the interest rate calculators provided on the websites of the country's leading banks. The study enabled the identification of whether the services offered by the bank exhibited a social orientation vector.

The second section of the paper presents an analysis of the cost of borrowed funds. Two key indicators were selected for this purpose: the true interest cost of loan (hereinafter referred to as TIC) and the marginal cost of loan. The source data for these indicators was obtained from the website of the Central Bank of the Russian Federation. The calculations were conducted by the Central Bank in accordance with the Federal Law of 24 July 2023 No. 359-FZ[4] "On Amendments to the Federal Law 'On Consumer Credit (Loan)' and Certain Legislative Acts of the Russian Federation"[5].

The study focused on three types of consumer loans: non-target, target without collateral (except POS loans), and consumer loans for debt refinancing for up to a year and over a year. These were divided into three categories: up to 30 thousand roubles, 30-100 thousand roubles, 100-

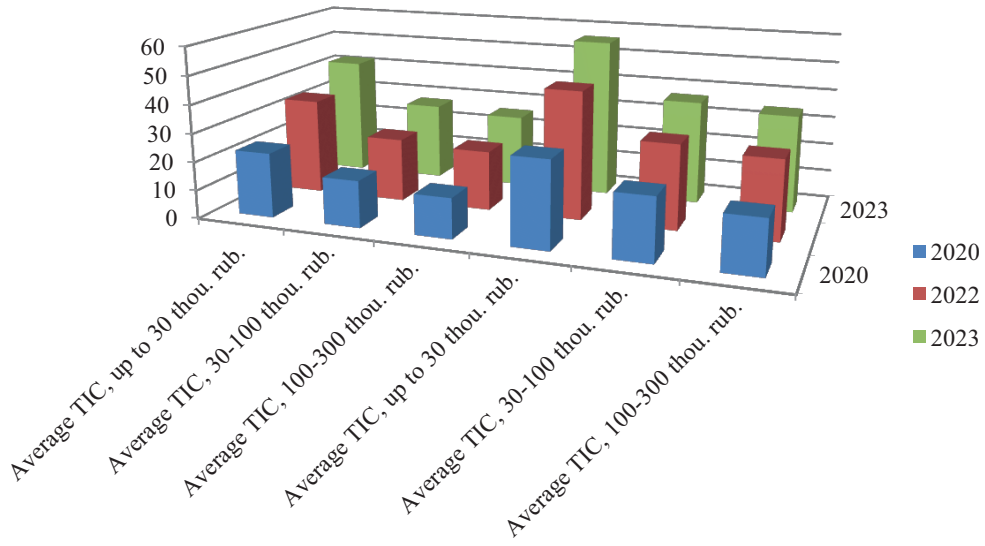
Table 1
Data on marginal costs and average market value of the entire amount loaned from 2020 to 2023 (% per year)

| Categories of consumer loans (credits) | Average market value of total consumer loans (credits) | | | Marginal values of the true interest cost of consumer loans (credits) | | |
|---|---|---|---|---|---|---|
| — | 01.10–31.12.2020 | 01.10–31.12.2022 | 01.10–31.12.2023 | 01.10–31.12.2020 | 01.10–31.12.2022 | 01.10–31.12.2023 |
| *Under 1 year* | | | | | | |
| Up to 30 thou. roub. | 22.737 | 33.835 | 42.020 | 30.316 | 45.113 | 56.027 |
| 30-100 thou. roub. | 16.43 | 22.367 | 27.462 | 21.907 | 29.823 | 36.616 |
| 100-300 thou. roub. | 14.11 | 20.976 | 25.764 | 18.813 | 27.968 | 34.352 |
| Over 300 thou. roub. | 10.424 | 13.945 | 19.314 | 13.899 | 18.593 | 25.752 |
| *Over 1 year* | | | | | | |
| Up to 30 thou. roub. | 20.123 | 26.175 | 29.949 | 26.831 | 34.900 | 39.932 |
| 30-100 thou. roub. | 17.772 | 24.906 | 28.561 | 23.696 | 33.208 | 38.081 |
| 100-300 thou. roub. | 15.838 | 24.010 | 28.027 | 21.117 | 32.013 | 37.369 |
| Over 300 thou. roub. | 12.699 | 18.290 | 22.463 | 16.932 | 24.387 | 29.951 |

*Source:* compiled by the author using data from: https://www.cbr.ru/statistics/bank_sector/psk/.

[4] https://www.cbr.ru/explan/359-fz/.
[5] http://publication.pravo.gov.ru/document/0001202307240031.

Fig. 1. Marginal cost and average market value data for entire amount loaned from 2020 to 2023 (% per year)




*Source:* compiled by the author using data from: https://www.cbr.ru/statistics/bank_sector/psk/.

300 thousand roubles, and over 300 thousand roubles. The analysis included the average market values of the TIC of loans (credits) in per cent per annum and the limit values of the full value of consumer loans (credits) in per cent per annum. The average difference between the average market rate and the limit rate (in per cent per annum) was then calculated. The analysis covered three time periods: from 1 October to 31 December 2020, from 1 October to 31 October 2022, and from 1 October to 31 December 2023.

Table 1 illustrates the interest rates applicable to marginal and average values of non-target consumer loans, categorised by year and the most active categories. There is a discernible upward trend in interest rates across all categories under study, year on year. A more illustrative analysis of the TIC is presented in Figure 1.

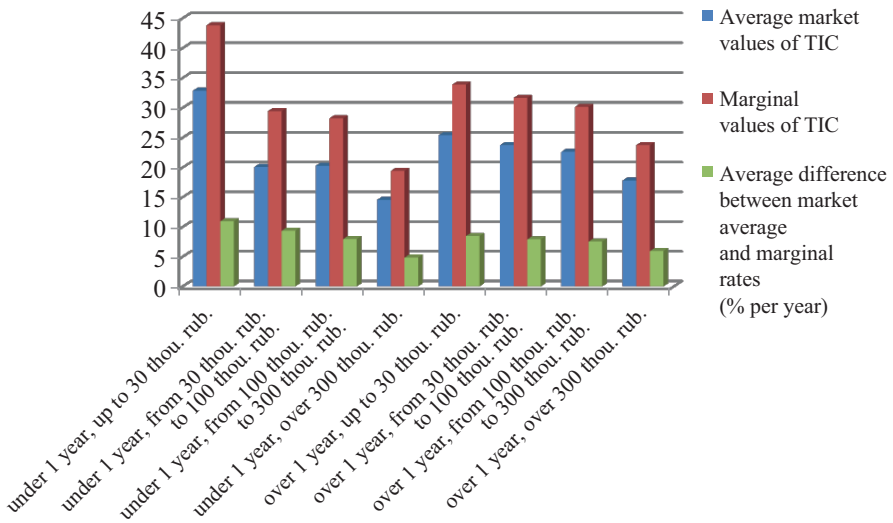
It seems interesting to undertake an analysis of the mean value of the market average and the marginal indicators across the selected time periods. It is notable that the

Table 2
Average marginal costs and average market values of entire amount loaned from 2020 to 2023 (%per year)

| Categories of consumer loans (credits) | Average market value of total consumer loans (credits) | Marginal values of the true interest cost of consumer loans (credits) | Mean deviation |
|---|---|---|---|
| *Under 1 year* | | | |
| Up to 30 thou. roub. | 32.86 | 43.81 | 10.95 |
| 30-100 thou. roub. | 20.08 | 29.44 | 9.36 |
| 100-300 thou. roub. | 20.28 | 28.24 | 7.96 |
| Over 300 thou. roub. | 14.56 | 19.41 | 4.85 |
| *Over 1 year* | | | |
| Up to 30 thou. roub. | 25.41 | 33.88 | 8.47 |
| 30-100 thou. roub. | 23.74 | 31.66 | 7.92 |
| 100-300 thou. roub. | 22.62 | 30.16 | 7.54 |
| Over 300 thou. roub. | 17.81 | 23.75 | 5.94 |

*Source: compiled by the author using data from*: https://www.cbr.ru/statistics/bank_sector/psk/.

Fig. 2. Average marginal costs and average market values of entire amount loaned from 2020 to 2023 (thousand roubles)




*Source:* compiled by the author using data from: https://www.cbr.ru/statistics/bank_sector/psk/.

deviation exceeds 10% only in the category of loans with the minimum amount and maturity of up to one year. The minimum deviation is observed in loans over 300 thousand roubles and maturity of over one year (Table 2, Fig. 2).

Figure 3 and Table 3 illustrate the mean values for all selected periods. It can be seen that the maximum deviations in the studied groups are 8.28 p.p. and 7.47 p.p., which may indicate a disproportionate increase in interest rates (Table 3).

The Sberbank of Russia calculator indicates that the monthly payment for the sum of 250,000.00 roubles over a one-year period of one year would be 23,147.00 roubles (in accordance with the general terms and conditions, effective as of 07.04.2024)[6]. The overpayment on such a loan would amount to 27,764.00 roubles per year.

According to the VTB Bank website, the monthly payment for a 250,000.00 rouble loan over a one-year period would be 22,679.00 roubles. The total overpayment will be 22,148.00 roubles (in accordance with the general terms and conditions, effective as of 07.04.2024)[7].

The Alfa-Bank website indicates that a loan of 250,000.00 roubles for one year would require a monthly payment of 22,900.00 roubles. This equates to a total overpayment of 24,800.00 roubles. The interest rate is also stated to vary from 14,800 to 55,990% (in accordance with the general terms and conditions, effective as of 07.04.2024)[8].

The case of these three banks illustrates that loan offers under general conditions exhibit minimal variation. However, the total cost of credit may vary and could exceed the minimum by as much as 41,100 percent.

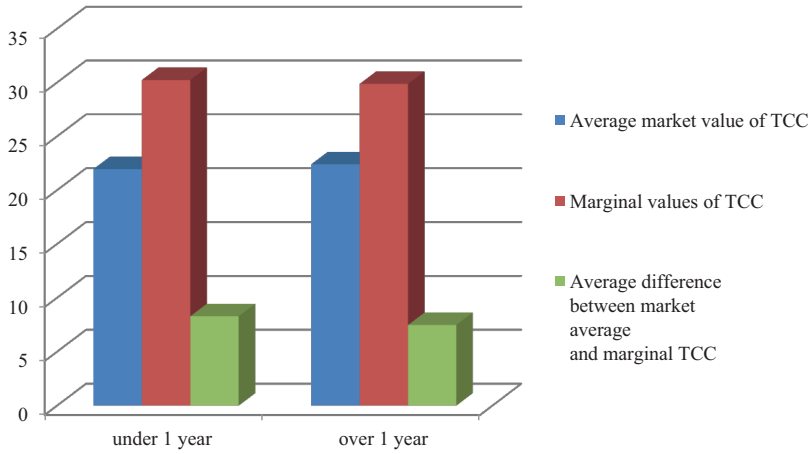
## 3. Research outcomes

1. There is no clear, scientifically defined definition of a social bank. The available definitions tend to reflect the importance of influencing societal development. International organisations that deal with social banking in one form or another can be seen to reflect the structuring of the commons to realise social objectives, rather than profit, by increasing the availability of financial services.

2. The multitude of definitions of the social banking product illustrates a shared objective: to address social issues affecting citizens through financial instruments. When examining the nuances of social responsibility, it is essential to distinguish between charity and the responsibility to an individual citizen.

3. The significance and function of strategy in a financial institution are as considerable and complex as the processes of its formation, due to a number of factors. It is the responsibility of the management and owners of a financial institution to implement the strategy developed for the organisation, which should be achieved through the effective use of resources at all levels. For successful implementation, the strategy should be based on the perspective of the entire financial institution, rather than on the interests of specific individuals,

Fig. 3. Average marginal costs and average market values of entire amount loaned from 2020 to 2023 (billion roubles)




*Source:* compiled by the author using statistics from the Central Bank of Russia.

[6] https://www.sberbank.com/ru/person/credits/money/kreditnyj_kalkulyator.
[7] https://www.vtb.ru/personal/kredit/nalichnymi/.
[8] https://alfabank.ru/get-money/credit/calculator/.

Table 3
Average marginal costs and average market values of entire amount loaned from 2020 to 2023 (% per year)

| Non-target consumer loans, target consumer loans without collateral (except POS loans), consumer loans for debt refinancing | | |
|---|---|---|
| **Categories of consumer loans (credits)** | **Under 1 year** | **Over 1 year** |
| Average market value of total consumer loans (credits) | 21.94 | 22.39 |
| Marginal values of the true interest cost of consumer loans (credits) | 30.22 | 29.86 |
| Average difference between market average and marginal rates | 8.28 | 7.47 |

*Source:* compiled by the author using data from the Central Bank of the Russian Federation.

which is often not the case. Strategic planning should be based on comprehensive data on the financial industry, competitors, target segments, technologies, and the market as a whole. This requires extensive research into actual financial performance. This is a complex, lengthy and costly process. The effectiveness of a financial institution's policy depends on having an informed strategy. This allows for a highly effective personnel policy. The strategy should be designed with the long-term aim of preserving the integrity of the financial institution. However, there is scope for flexible partial reorientation over the medium term, depending on the environmental conditions.

The author emphasises the cyclical nature of planning, which encompasses defining the mission, setting goals, assessing and analysing the external environment, studying the business, evaluating strategic alternatives, defining the strategy and its implementation, evaluating the chosen strategy, and so on in a continuous loop. The author identifies two main types of cyclical planning: mission and goal planning. These are based on the hierarchical logic of strategy formation and the sequence of stages involved in planning, goal formation and the planning of sequential actions to achieve goals.

4. The analysis of interest rates offered by the market leaders revealed no significant differences in the terms available. In essence, the offers are similar and do not differ greatly, although there are special conditions for certain groups of citizens (almost the same in the market leaders – pensioners, budgetary employees, etc.). It is the author's opinion that none of the banks has a pronounced social focus.

5. The data published on the website of the Central Bank of Russia over recent years indicates that loans with the minimum amount and minimum term are the most expensive, while loans with the maximum amount and maximum term are the least expensive. This reflects the low attractiveness of lending to citizens for minimum amounts and the disinterest of financial institutions in such lending. This is corroborated by the fact that the average marginal cost of credit for a term of over one year is consistently lower than for a term of up to one year. Furthermore, the period under review has seen a year-on-year increase in interest rates.

## Conclusion

All financial institutions, banks and companies, regardless of their specific activities, that have a long-term focus and are important for all participants in the business process will always show high financial results and competitive advantages. This is a clear indication of a well-defined and effective strategy.

In order to gain a competitive advantage, the company has implemented and continues to adhere to a customer-oriented policy. Primarily, it reflects the cost of the services provided, the characteristics of the product itself, and the services provided as a whole. At the same time, the quality of the service and product is the primary factor in the implementation of the strategy, which is designed to achieve cost reduction and the availability of financial services.

Currently, there are no socially oriented banks operating in the Russian market. While some banks do offer products tailored to specific customer groups, this does not necessarily reflect their overall social orientation. Pochta Bank appears to have the potential to become a socially oriented bank, with a vast network of locations and access to customers in remote areas who are currently unable to use the services of other credit institutions [Mezentseva, 2014]. Recognising the distinctive role and prospects of the social bank "Pochta Bank" within the financial landscape of the country's economy, it is essential to consider the social implications in the stated goals and objectives. The fundamental document of such a financial institution should be that which prescribes social responsibility or social policy.

The results of the conducted research suggest that the accessibility of financial services has diminished in recent years, particularly in light of the observed growth in interest rates for loans extended to the general public. This decline can be attributed, at least in part, to external influences. The findings of these studies can inform the strategic direction of financial institutions and the implementation of social projects at the state level, particularly in terms of attracting internal financing.

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