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战略决策和风险管理

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“战略决策和风险管理” 是一本国际同行审稿开放期刊，出版在战略管理的关键领域，有先进的理论和应用研究成果的原创研究文章、管理决策的基本原理以及风险管理政策的形成。该期刊向读者介绍了未来可能出现的情况，以便在正确的时间做出正确的战略决策，并了解风险、决策和战略形成之间的关系。

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Investments, liquidity of shares and quality of management

S.I. Lutsenko[1, 2]
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Abstract
The author examines the complex relationship between stock liquidity, financial flexibility, management quality and investments of Russian public companies. The cost and volume of fixed assets affect the size of an organisation's assets, which, in turn, determines the share price. The share price is an objective indicator of the financial position of the company. The quality of management allows you to assess the company's ability to attract investments. The liquidity of shares has a causal relationship with investments. Financial flexibility affects management's ability to adjust the capital structure in order to attract additional capital investments. In addition, financial flexibility allows the company to respond quckly to investor proposals in the face of restrictive (sanction) measures. The management of Russian companies affects not only the share price (risk adjustment), but also the investment opportunities. The author identifies criteria for management integrity in the implementation of investments. Information asymmetry affects the financial policy of the company. Investment opportunities are favourable under a balanced financial policy and in the presence of high quality property collateral. Companies with a high level of property security have the necessary debt capacity, i.e. the ability to meet their obligations to creditors in a timely manner. Assets determine not only the share price, but also the financial position and investment attractiveness of a commercial organisation. Property security is an important factor in deciding on the choice of funding source, taking into account its price (adverse selection problem). The author presents the evaluation results using a dynamic panel data model (the Arellano-Bond – the generalised method of moments). The model allows us to solve the problem of endogeneity – the correlation of explanatory variables with an error in the regression.

Keywords: liquidity of shares, investments, financial flexibility, information asymmetry, capital structure, adverse selection problem, generalised method of moments.

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投资、股票流动性和管理质量

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简介
文章探讨了俄罗斯上市公司的股票流动性、财务灵活性、管理质量和投资之间的复杂关系。固定资产的成本和数量影响着企业的资产价值，而资产价值又决定着股价。股价是决定公司财务状况的客观指标。通过管理质量可以评估公司吸引投资的能力。股权流动性与投资有因果关系。财务灵活性影响管理层为吸引更多资本投资而调整资本结构的活动。此外，财务灵活性还能使公司在限制（制裁）措施下对投资者的建议做出迅速反应。俄罗斯公司的管理层不仅影响股价（通过调整风险），还影响投资机会。
作者指出了投资时管理层诚信的标准。信息不对称会影响公司的财务政策。在平衡的财务政策和高质量的财产支持条件下，投资机会是有利的。拥有高水平财产支持的公司具有必要的债务潜力，即有能力及时履行对债权人的义务。资产不仅决定股价，还决定商业机构的财务状况和投资吸引力。财产抵押是决定选择融资来源的一个重要因素，要考虑到其价格（逆向选择问题）。作者介绍了使用动态面板数据模型（阿雷利诺-邦德广义矩法）进行估算的结果。该模型使我们能够解决内生性问题--解释变量与回归误差的相关性。
关键词: 股票流动性、投资、财务灵活性、信息不对称、资本结构、逆向选择问题、广义矩方法。

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Introduction

The National Security Strategy of the Russian Federation[1] states that the goals of ensuring economic security will be achieved, inter alia, by accelerating the rate of growth of investment in fixed capital, increasing the availability of credit, protecting and promoting capital investment, and stimulating the use of domestic sources of investment.

A joint-stock company is based on the pooling of capital invested by shareholders in the company's activities (attracted to the organisation as a result of the placement of shares), with the expectation of receiving benefits from its management - an increase in the value of the shares, the receipt of dividends.

The structure of a joint-stock company assumes that the shareholders are an extension of the company itself (alter ego), since the interests of the shareholders are an integral part of the economic interests of the organisation. A shareholder's property rights are inseparable from the company's property rights.

The shareholder is interested in the development and investment attractiveness of the company, its financial stability and the growth of economic indicators that have a direct impact on the value of the company's shares and future capital growth. In addition, the shareholder is obliged to take an active part in the management of the company, since the person who has acquired a block of shares has a natural desire to increase the return on his investment. The shareholder is interested in the fate of his investments: obtaining information on the activities of the joint-stock company, checking the validity of his own forecasts of the development of the share price, including by analysing the documents published by the joint-stock company, monitoring the income due on the shares (dividends), etc.[2]

[1] Decree of the President of the Russian Federation dated 02.07.2021 No. 400 'National Security Strategy of the Russian Federation'. http://www.kremlin.ru/acts/bank/47046.
[2] Decree of the Presidium of the Supreme Arbitration Court of the Russian Federation dated 18.06.2013 No. 3221/13. https://clck.ru/3EAEtL.

The value of shares and their attractiveness to potential buyers (liquidity) is primarily determined by the value of the company's assets and the profitability of the activities carried out with them[3].

The market value of shares is the secondary market price of shares as quoted on the stock exchange. This price is formed during trading under the influence of supply, demand and liquidity of shares[4]. In turn, the liquidity of shares depends largely on the solvency of the issuer.

Equity liquidity is the ability to convert a given security into the most liquid asset - cash - at short notice and with minimal transaction costs.

Stock liquidity is an indicator used to analyse investment returns. In addition, no investment strategy or analytical model can exclude the risk of changes in the market situation and fluctuations (shocks) caused solely by external circumstances (e.g. impact of external sanctions on systemically important sectors of the economy, tightening of government monetary policy) that are beyond the investor's control.

In other words, an investor who wants to make a profit has to take into account the instability of the stock market, the price fluctuations and the different types of risk factors, since the specifics of the stock market involve not only making profits, but also financial losses[5].

1. Literature review

As a number of authors note, stock prices influence investment decisions. The stock market discloses the necessary information about securities in the form of market prices. The strength of the market lies in its ability to incorporate information about the company and its investment potential into the share price [Schleifer, Vischny, 1997; Chen, Horstman, 2023]. Some researchers have examined the impact of stock prices on investment [Edmans et al., 2012; Dong et al., 2021]. Studies have been conducted on the causal relationship between investment and stock returns [Titman et al., 2004; Polk, Sapienza, 2009]. Other scholars have noted that stock prices are an objective and key factor in determining a company's financial position [Holmstrom, Tirole, 1993].

In addition to stock liquidity, financial flexibility should be mentioned as a factor determining the economic activity of a company. Financial flexibility is understood as the ability of a company to finance a cash deficit in the shortest possible time with minimal impact of negative external circumstances (shocks). In other words, it is the ability of a company to respond to investment proposals under financial constraints.

Sanctions imposed by foreign countries on a number of Russian companies (in particular, the ban on debt financing of Russian oil and energy companies included in the sample of this study) impose economic and business restrictions, negatively affecting the production process and the ability to meet their obligations to counterparties. At the same time, sanctions (restrictive measures) cannot be considered a normal and predictable business risk, and the overall economic effect of the sanctions imposed can lead to a difficult financial situation in the company.

Financial flexibility is also seen as an important factor in determining a firm's choice of capital structure. For example, [Graham, Harvey, 2001] show that managers cite financial flexibility as a critical factor in the firm's choice of funding source.

Firms retain financial flexibility to pursue their investment opportunities. In particular, flexibility has a much greater impact on capital structure adjustment for firms with attractive investment opportunities [Liu, Shivdasani, 2022]. In addition, financial resources are important for adjusting the capital structure. The firm tries to adjust the timing of capital investment in response to changing conditions [Barry et al., 2022]. Organisations build cash reserves to increase financial flexibility, even in the context of high equity returns [Acharya, Steffen, 2020; Ramelli,Wagner, 2020; Fahlenbrach et al., 2021].

Finally, another important factor in the economic policy of a company is the quality of its management. The quality of management is reflected in all areas of the company's existence. In a sense, a company is what its management has done to it, i.e. the current state of the company and investment prospects are largely determined by the quality of management. In particular, management influences the level of net assets (share price) and financial position[6].

Effective management of an organisation enables a balance to be struck between the interests of shareholders, managers, employees and the public limited company itself. In determining the effectiveness of a manager's actions, the effectiveness of the manager's actions is taken into account.

In particular, the company must have stable financial indicators; there must be no signs of insolvency; there must be no shortage of funds to meet obligations to counterparties; free funds must be used for financing;

[3] Decree of the Arbitration Court of the Moscow District of 04.09.2024 in Case No. A40-32328/2020. https://clck.ru/3EAF7W.
[4] Decree of the First Arbitration Court of Appeal dated 20.08.2024 in case No. A11-1507/2023. https://clck.ru/3EAFN3.
[5] Decree of the Federal Arbitration Court of the Moscow District of 01.07.2009 in Case No. A40-51789/08-97-425. https://clck.ru/3EAFdA.
[6] Decree of the Fourth Arbitration Court of Appeal dated 09.09.2024 in Case No. A10-5639/2017. https://clck.ru/3EAKtE.

there must be no diversion of assets without which the company itself would be in financial difficulty[7].

The price of shares is not a constant value. The growth in the market value of shares traded freely on the securities market depends directly on management policy, which is subject to the influence of unforeseen circumstances, including changes in market conditions (shocks).

In contrast to previous studies, this paper extends the horizon by considering the combined impact of stock liquidity, financial flexibility and management quality on investment. In addition, the regression model presented below includes an indicator of information asymmetry - asset tangibility.

Since the value and amount of fixed assets reflected in the company's financial statements affect the size of its assets, which in turn determine the price of its shares, a decline in the value of fixed assets will affect the attractiveness of the organisation as an investment and the liquidity of its shares[8].

Fixed assets are a guarantee to creditors that the company will fulfil its obligations properly. In other words, the creditor can use them as a control over the borrower's economic activity [Costello, 2019].

The study [Chang et al., 2006] considers the tangibility of assets as an important element influencing the financial policy of the company, and the indicator itself is a determinant of the property security of the loan. Moreover, a company with a high value of fixed assets has sufficient debt potential, i.e. the ability to repay a loan of a certain amount in a timely manner [Lutsenko, 2021].

The article attempts to prove that stock liquidity reduces the level of risk by increasing the range of investment options. In addition, the quality of management policy affects the level of investment. Finally, a favourable investment situation is achieved with a flexible financial policy.

2. Research methodology and sample description

To conduct the study, a sample of Russian public companies was selected for the period 2018-2023. The purpose of the sample was to study the impact of share liquidity, financial flexibility and management quality on investment. The sample included 24 companies from ten key economic sectors with revenues exceeding RUB 10 billion[9] and financial statements prepared in accordance with international standards (IFRS). The companies' shares are traded on the Moscow Exchange PJSC. The following industries are represented: agriculture, oil and gas, food industry, ferrous and non-ferrous metallurgy, electric power, construction, trade, transport, telecommunications.

The number of observations for each Russian public company is differentiated (for some the period is 2018-2021, for others 2020-2023), so the data are unbalanced. Econometric calculations were performed using the Stata statistical package.

Table 1
Descriptive statistics

Variable	Mean value	Standard deviation	Minimum value	Maximum value
Investments (*Invest*)	0.077	0.052	0.01	0.29
Tangibility of assets (*PPE/A*)	0.436	0.238	0.02	0.89
Company size (*Assets*)	13.076	1.676	9.40	17.1
Financial leverage (*Lev*)	0.617	0.241	0.16	1.00
Total dividend payments (*Dividend*)	0.038	0.053	0	0.29
Liquidity of shares (*Liquidity_stock*)	12.158	1.855	8.50	15.90
Financial flexibility (*Flex*)	0.488	0.251	0.02	1.00

Source: The author's calculations are based on Stata.

[7] Decision of the Eighteenth Arbitration Court of Appeal dated 13 September 2024 in Case No. A07-4179/2018. https://clck.ru/3EALDh.
[8] Decree of the Ninth Arbitration Court of Appeal dated 12.10.2023 in Case No. A40-239027/16. https://clck.ru/3EALey.
[9] Order of the Federal Tax Service of the Russian Federation dated 16.05.2007 No. MM-3-06/308@. https://clck.ru/3EALtY.

2.1. Description of variables

When evaluating the regression model, a dependent (explained) variable was used - investments, which allows us to analyse the company's investment opportunities.

Some independent (explanatory) variables were borrowed from studies [Hoberg, Maksimovic, 2015; Chen, Horstman, 2023]: asset tangibility, firm size, financial leverage (an indicator of management quality) and dividend payments (a determinant of financial constraints).

The following independent variables are also included in the model: stock liquidity and financial flexibility.

Investment - the ratio of the cost of creating and acquiring tangible and intangible assets to the total value of assets.

The indicator of information asymmetry is the tangibility of assets (*PPE/A*) - the ratio of fixed assets to the total value of assets. This indicator allows the organisation to select capital taking into account its price.

The size of the company is the natural logarithm of the balance sheet total. This indicator is a determinant of the company's *Asset* security when applying for debt financing.

One indicator of management quality is financial leverage (*Lev*) - the ratio of total debt to total assets.

The total dividend payout ratio is the ratio of dividends paid to the total value of assets. This indicator is an indicator of financial constraints, as profit is not only a source of dividend payments but also a reserve for financing investments.

The liquidity of shares (*Liquidity_stock*) is the natural logarithm of the market capitalisation of assets. The method of calculation has been proposed in [Amihud, 2002].

Financial flexibility (*Flex*) is the ratio of cash and short-term financial investments to total assets plus one minus the financial leverage value. The calculation is based on the methodology of [Barry et al., 2022].

The independent variables are lagged one year. Descriptive statistics are presented in Table 1.

The capital structure of a Russian company is, on average, 62% debt and 38% equity. On average, for every ruble of total assets, there are 7.7 kopecks of investments and 43.6 kopecks of fixed assets.

2.2. Model evaluation and analysis

Below is a regression model estimating the impact of stock liquidity, financial flexibility and management quality on investment:

$$Invest_t = a_0 + a_1(PPE/A)_{t-1} + a_2(Assets)_{t-1} + a_3(Lev)_{t-1} + a_4(Dividend)_{t-1} + a_5(Liquidity\_stock)_{t-1} + a_6(Flex)_{t-1} + \varepsilon_t$$

where t - period of time for the company, a_0 - regression constant, a_1, a_2, a_3, a_4, a_5, a_6 – regression coefficients, ε – random error.

The regression model is estimated using the instrumental variables method - a dynamic panel data model.

To obtain significant coefficients (in terms of their predictive power), the model must be free from problems such as heteroscedasticity, multicollinearity and autocorrelation.

One of the advantages of panel data estimation (Arellano-Bover/Blundell-Bond estimation using the generalised moments method) is the mechanism for automatically cleaning the regression from multicollinearity. In this way, we avoid the problem of endogeneity of a possible correlation of the explanatory variables with the error term in the regression model.

Lagged variables are used as instruments in the regression model.

Heteroscedasticity can also lead to incorrect conclusions from the model. The pooled data method avoids this problem by removing heteroskedasticity. In other words, the values at different times should be independent and identically distributed, and the regression residuals should look like 'white noise'.

To check the consistency of the estimates obtained, it remains to test the model for the absence of autocorrelation (stationarity of the time series) by means of a test for autocorrelation of the first and second order residuals.

The Arellano-Bond test or the test for first and second order autocorrelation is presented in Table 2.

Table 2
First and second order autocorrelation test

Order	Z	Prob > z
1	–1.666	0.0957
2	–1.112	0.2661

The test results presented in Table 2 indicate that the null hypothesis of no autocorrelation of the residuals is satisfied. Based on the model presented, consistent and high quality estimates have been obtained and it appears to be correct.

The coefficients obtained in the regression model, significant at the 5% level, are presented in Table 3.

Table 3
A model examining the impact of liquidity, financial flexibility and management quality on investments of Russian public companies

Independent variables	Coefficient	$P>\|Z\|$
PPE/A	0.082	0.000
Assets	– 0.017	0.014
Lev	0.167	0.012
Dividend	– 0.098	0.150
Liquidity_stock	0.014	0.001
Flex	0.150	0.026

Note. Number of observations - 86.
Source: The author's calculations are based on Stata.

In addition, the Sargan test for the limits of over-identification was carried out. It is based on the assessment of the validity of the instruments (the possible presence of a correlation of explanatory variables with an error). The validity category determines the appropriateness of the instruments selected for evaluation.

The Sargan test shows that the selected instruments in the model are valid. The null hypothesis regarding the effective use of the instrumental variables matrix cannot be rejected, as the p-value is above the 5% significance level and is 36.13%.

All independent variables, except the total dividend payout ratio, are significant at the 5% level and the structural model appears to be correct.

High stock returns are associated with increased investment opportunities, financial flexibility and capital investment (positive relationship between stock liquidity, financial flexibility and investment).

The author agrees with some researchers that corporate investment improves the value of stock liquidity while reducing its risk level: a high level of investment is associated with high stock returns [Eisfeldt, 2004; Becker-Blease, Paul, 2006; Derrien, Kecskes, 2013].

At the same time, one cannot agree with the authors of [Titman et al., 2004; Polk, Sapienza, 2009] that higher investment values are associated with lower future stock returns. Investment opportunities are favourable when there is a flexible financial policy and high quality property security (positive relationship between financial leverage, flexibility, tangibility and investment). Larger companies have easier access to debt financing (negative relationship between company size and investment). The high liquidity of the shares gives the company a broad perspective when approaching an investor, as it is the investor who focuses on the quality of the company's management.

The management of public companies acts actively and prudently, positively influencing investment opportunities (positive relationship between financial flexibility, leverage and investment). The management influences the share price by adjusting the risk taking into account the information signals from the stock market, which is confirmed by the positive relationship between asset tangibility and investments [Lutsenko, 2024].

The information asymmetry associated with the security of ownership (an indicator of asset tangibility) allows the company to attract capital at a lower price. The company's ownership makes it possible to solve the problem of adverse selection - the choice of capital taking into account its price.

The author partially agrees with [Chen, Horstman, 2023] that the share price influences management's investment decisions. However, as mentioned above, the stock price is not the only factor determining management's financing decision. Information asymmetry (tangibility of assets) and financial flexibility must also be taken into account.

Conclusions

The paper attempts to prove the extended influence of factors such as stock liquidity, financial flexibility and management quality on the investments of Russian public companies. The share price creates an economic image of the company and makes it possible to extend the financing horizon and attract investment for the implementation of activities. Financial flexibility influences the active adjustment of the capital structure for the subsequent attraction of capital investment. Information asymmetry (tangibility of assets) also influences management policy in the area of financing, since tangibility is an indicator of the creditor's ownership security. Russian public companies are striving for a balanced financial policy in the context of restrictive measures and tight monetary policy. High stock liquidity allows companies to identify investment opportunities. Finally, corporate assets allow them to choose financing in terms of price, thus solving the problem of adverse selection.

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SME internationalisation decision-making: An innovation-based knowledge model

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Abstract

The internationalisation of small and medium-sized enterprises (SMEs) is an important topic in economics, with numerous studies focusing on this process over the past decades. Many researchers have concluded that internationalisation of SMEs is a complex task requiring the consideration of many factors. A key issue in existing research is the insufficient attention given to the role of knowledge in the internationalisation process. Despite the recognition of the importance of knowledge, most studies focus on other aspects such as innovation activities, network structures, and management. While these aspects are important, the potential of SMEs remains untapped without adequate attention to the knowledge that underpins successful international operations.

This article proposes a new model of internationalisation based on knowledge-driven innovation, which views international market entry through the lens of knowledge acquired by SMEs and the resulting innovations implemented. The model is based on empirical research with 179 respondents representing SMEs operating in international markets.

The model views internationalisation as a dynamic process in which knowledge-based innovation plays a crucial role at each stage, helping SMEs adapt to international conditions and enhance their competitiveness. The study found that successful internationalisation of SMEs depends on the creation of knowledge-based innovations. Effective knowledge management - including collection, storage, dissemination and exploitation - is essential for the development of such innovations. To achieve better results, SMEs should prioritise aspects such as regular knowledge sharing, the use of efficient information systems, and the involvement of management in knowledge management processes. The knowledge-driven innovation model provides a structured approach to internationalisation, covering the stages of preparation, initiation, and experienced market penetration.

To successfully enter international markets, it is essential to create an environment where employees understand their role and the importance of knowledge, and where mangement actively supports knowledge sharing and innovation processes. Such approaches will help SMEs achieve sustainable success and remain competitive in international markets.

Keywords: knowledge management, effects of knowledge management, internationalisation, entering foreign markets, small and medium-sized enterprises (SMEs).

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中小企业国际化决策：基于知识创新的模式

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简介

中小型企业进入国际市场是经济科学中的一个重要课题，近几十年来，有大量研究都是针对这一过程的。许多研究人员认为，中小企业的国际化进程是一项复杂的任务，需要考虑许多因素。现有研究的主要问题是对知识在国际化过程中的作用缺乏关注。

尽管认识到知识的重要性，但大多数研究还是把重点放在创新、网络和管理等其他方面。尽管这些方面都很重要，但如果不适当关注知识和以知识为基础的创新，中小企业的国际化可能仍然无法实现。

本文提出了一种通过知识创新实现国际化的新模式，即从中小企业的知识和在此基础上进行的创新的角度来研究中小企业进入国际市场的过程。此外，本文还提出了作者对知识创新的分类。

该模型基于对179家中小企业的实证研究。所研究的所有中小企业都在国际市场上运营。该模型将国际化视为一个动态过程，其中以知识为基础的创新在每个阶段都发挥着关键作用，帮助中小企业适应国际环境并提高竞争力。

研究发现，中小企业的成功国际化有赖于创造以知识为基础的创新。为了创造这种创新，适当的知识管理，包括知识的获取、存储、传播和利用，是非常重要的。为了取得更好的成果，中小企业应注意定期分享知识、使用有效的信息系统以及管理人员参与知识管理过程等方面。以知识为基础的创新模式为国际化提供了一种结构化方法，涵盖了国际市场的准备、启动和试点阶段。为了成功进入国际市场，必须创造一种环境，让员工了解自己的作用和知识的重要性，让管理层积极支持知识共享和创新进程。这些方法将有助于中小企业在国际市场上取得可持续的成功并保持竞争力。

关键词: 知识管理、知识管理效应、国际化、进入外国市场、中小型企业。

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Introduction

In the research literature, the internationalisation of small and medium-sized enterprises (hereafter referred to as SMEs) has been examined from different perspectives and, to date, many theories and models have been proposed to explain the processes of SME internationalisation, such as process or stage models[1] [Johanson, Wiedersheim-Paul, 1975; Johanson, Vahlne, 1977], innovation models (I-models)[2] [Simmonds, Smith, 1968; Lee, Brasch, 1978; Reid, 1981], pre-export and export initiation models[3] [Olson, Wiedersheim-Paul, 1978; Wiedersheim-Paul et al., 1978], network theory [Johanson, Mattsson, 1986; Johanson, Vahlne, 1990] and international entrepreneurship theory [McDougall, Oviatt, 2000]. However, most theories have their limitations: while they consider some aspects of internationalisation, they ignore others. Although there are some studies in the research literature that attempt to develop a holistic approach to internationalisation, such as [Leonidou, Katsikeas, 1996; Coviello, McAuley, 1999; Bell et al., 2003; Etemad, 2004; Ruzzier et al., 2006], there is a lack of studies that address the role of knowledge-based innovation.

The aim of this article is to develop a decision-making model for the internationalisation of small and medium-sized enterprises based on the creation of knowledge-based innovations.

Small and medium-sized entrepreneurship is a very important and complex phenomenon, the level of development of which largely determines the development of the economy and society. In this regard, the State tries to develop SMEs through various forms of support and popularisation of entrepreneurial activity in society.

At present, the impact of SMEs on the Russian economy is more than double that of their counterparts in the US and

[1] Process or stage models of internationalisation are approaches that view internationalisation as a gradual process that proceeds through several stages or phases. These models assume that firms start with small steps in international markets and increase their involvement over time, acquiring new knowledge and experience. Such models include the Uppsala model and the Welch-Luostarinen model. These models help firms to structure their efforts to enter international markets, taking into account factors such as risk, complexity and the need to accumulate knowledge.

[2] Innovation models (I-models) of market entry focus on how firms can use innovation to successfully penetrate international markets. These models emphasise the importance of new products, services, business processes and management approaches in achieving competitive advantage on a global scale.

[3] Pre-export and export initiation models describe the processes that occur in the early stages of a firm's entry into international markets. These models focus on understanding how firms prepare to export their products and what steps are taken to successfully initiate export activities. For example, the Wiedersheim-Paul, Olson, and Welch model [Wiedersheim-Paul et al., 1978] describes the sequence of actions a firm must take before starting to export and includes market research, strategy development, and resource preparation.

Table 1
Comparative analysis of the share of SMEs in the GDP of Russia, the USA, and Germany, 2021 (%)

Country	Share of SMEs in GDP	Share of employed	Share of SMEs in total export volume
Russia	20.3	27	8.6
The USA	56	52	28
Germany	43	57	28

Source: compiled by the authors on the basis of Rosstat data https://rosstat.gov.ru/.

Germany, as measured by their share of GDP and their share of employment (Table 1).

Special attention should be paid to the share of SMEs in the total volume of the country's exports, where the difference is already more than three times. Under the sanctions imposed since 2022, the share of SMEs in the total volume of Russian exports has decreased, and therefore the state aims to support SME export entrepreneurship.

It should be noted that many SMEs have also begun to use the realities to start their activities or are trying to discover new opportunities for themselves. This is shown by statistics from the Federal Tax Service[4]: As of 10 April 2024, the total number of registered legal entities in the Russian Federation reached 6,503,649, compared with 6,184,495 a year earlier. In recent years, despite various crises and sanctions, a positive dynamic has been observed.

The growth and development of new SMEs is linked to their internationalisation, which raises the issue of developing a model for SMEs to enter international markets, including the use of knowledge-based innovation as the most effective tool.

1. Theoretical review of the literature

Research on the internationalisation of SMEs is relatively recent compared to research on the internationalisation of large firms. Among the first works were [Leonidou, Katsikeas, 1996], devoted to a review of research on the construction of export models of manufacturing SMEs from 1975 to 1995; [Leonidou et al., 1998], devoted to a review of research from 1960 to 1995 on the influence of management on exports, etc.

Most researchers agreed that the process of internationalisation of SMEs is quite complex and that it requires the construction of integrative models to explain it. For example, N. Coviello and A. McAuley [Coviello, McAuley, 1999], based on a review of empirical studies conducted between 1989 and 1998 describing the process of SME internationalisation, constructed a model of SME internationalisation based on the integration of three theoretical approaches: step modelling, the network approach and the theory of foreign direct investment. Similarly, H. Etemad and R. Wright [Etemad, Wright, 1999] concluded that 'no single established model adequately explains the success of small firms in their internationalisation'. Therefore, the behaviour of SMEs in the internationalisation process 'should be viewed as a holistic process based on a number of theoretical models, including stage models, FDI theories and network theories'.

In 2001, R. Fletcher [Fletcher, 2001] proposed his conceptual framework for a comprehensive approach to the internationalisation of a firm. The framework was based on a survey of Australian firms, the majority of which were SMEs. Fletcher identified three forms of SME internationalisation: outbound (e.g. direct export), inbound (e.g. import) and linked (e.g. strategic alliances). The choice of these three forms was determined by the state of the internal and external environment of the SME.

In a study [Ruzzier et al., 2006], five models were proposed to be combined to explain the internationalisation of SMEs: process models, innovation models, the network approach, the resource-based theory of the firm and the theory of international entrepreneurship.

Another integrative model is that of Bell et al [2003], which presents different paths that small firms can take to internationalise. Three paths were identified: the first was to enter foreign markets gradually (traditional firms); the second was to internationalise at a very fast pace (born globalists); the third was to enter foreign markets like traditional firms, but to accelerate the pace of penetration by introducing innovations and improvements (born globalists). The concept first identified knowledge as a source of competitive advantage for born globalists.

Subsequently, many researchers have demonstrated the importance of knowledge for internationalisation; for example, [Saarenketo et al., 2004] presents a knowledge management model for internationalisation based on evolutionary economics. In this model, the role of the entrepreneur is to find new combinations of internal and external knowledge factors that lead to a sustainable international competitive advantage. The study [Prashantham, 2005] presents two types of factors as drivers of internationalisation: social capital (involving knowledge of local markets) and information technologies

[4] https://rmsp.nalog.ru/statistics.html.

such as the Internet, which influence internationalisation through the dissemination, acquisition and exchange of information.

[Ipe, 2003] shows that knowledge helps to reduce uncertainty, risk and the state of ambiguity, i.e. general ignorance. In this sense, the highest level of understanding is manifested in a person's use of data, information and knowledge.

The article [Zhou, 2007] argues that the key value of knowledge is the ability to predict possible scenarios of events based on a given set of input data. Forecasting is used to develop strategies and set intermediate and final objectives. In the context of the internationalisation of companies, knowledge of foreign markets, their evolution, threats and opportunities plays a key role in planning the implementation of future strategies in these markets [Billore, Billore, 2020].

The study [Sudhir, 2016] emphasises that internationalisation places special emphasis on the quality and efficiency of knowledge use, as well as its reliability, timeliness and value. In this context, information and knowledge management plays an important role in needs analysis, knowledge transfer and dissemination, and database formation. It is necessary to know what information and data are needed to solve a problem and to have quick access to them [Varadarajan, 2020].

2. Methodology and findings of the study

In order to develop a decision-making model for the internationalisation of small and medium-sized enterprises based on the creation of knowledge-based innovations, the authors conducted a survey between November 2023 and March 2024, for which the questionnaire was sent electronically to 315 respondents - representatives of SMEs. The selection criteria for the interviewees were their employment in companies characterised by possible participation in internationalisation. The selection was made among the authors' immediate acquaintances and colleagues, as well as people who met the established criteria, identified through communication and electronic correspondence. Respondents were informed of the scientific nature of the study. 183 completed questionnaires were received, of which 4 were excluded due to incorrect completion; the final sample consisted of 179 respondents.

The questionnaire consisted of fifteen questions, the first four of which were designed to identify and characterise the respondent and the SME in which he or she worked; another four questions were devoted to the nature of internationalisation. The characteristics of the respondents, the SMEs included in the sample and the characteristics of their internationalisation are presented in Table 2.

The remaining seven questions (9-15) focused on the role of knowledge and knowledge-based innovation in the internationalisation process. The ninth question concerned the influence of accumulated knowledge in SMEs on the success of the internationalisation process (Fig. 1).

Table 2
Characteristics of respondents and sampled SMEs
(% of respondents)

Characteristics of respondents	Share
Sex structure:	
– men	57
– women	43
Respondents' experience in implementing the internationalisation process	
– up to 3 years	27
– from 3 to 5 years	21
– from 5 to 7 years	19
– from 7 to 10 years	12
– from 10 to 15 years	15
– over 15 years	6
Characteristics of SMEs	
Field of activity:	
– retail trade	34
– industrial production	31
– services	7
– transport and logistics	15
– IT	8
– other	5
SME size (number of employees):	
– up to 10 people	3
– from 10 to 19 people	12
– from 20 to 49 people	19
– from 50 to 79 people	34
– from 80 to 100 people	32
Form of SME internationalisation (several possible answers):	
– export	35
– import	70
– organization of a branch/subsidiary	30
– joint venture	2
– direct investment	
Time of work in foreign markets:	
– up to 3 years	37
– from 3 to 5 years	24
– from 6 to 8 years	18
– from 9 to 12 years	11
– from 12 to 15 years	6
– over 15 years	4
Geography of internationalisation	
– CIS countries	69
– CIS and neighbouring countries	23
– Neighbouring and distant countries	8
Number of markets where SMEs operate	
– 1-2	73
– 3-4	14
– 5-6	4
– 7-9	7
– over 10	2

Source: compiled by the author.

Fig. 1. Impact of knowledge on internationalisation success (% of respondents)

Source: compiled by the authors.

One of the important areas of knowledge in the context of internationalisation is awareness and understanding of the nature of the problems and difficulties that may arise during its implementation. Therefore, the tenth question concerned the difficulties faced by SMEs in the process of internationalisation. Respondents could give more than one answer. The most commonly cited difficulties were fierce competition (72% of respondents) and logistics, cited by 64% of respondents. The third and fourth most frequently mentioned obstacles were sanction pressure (54% of respondents) and communication failures between participants and organisers of the process (38% of respondents). Communication problems were cited by 32% of participants and general difficulties in managing the internationalisation process by 37% of respondents.

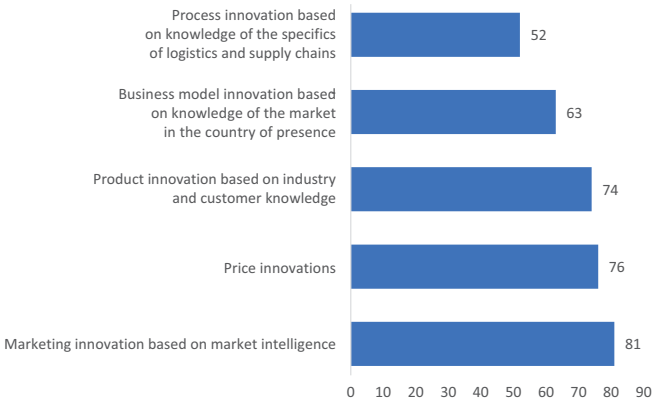
Fig. 2. Barriers to internationalisation (% of respondents)

Source: compiled by the authors.

Innovation plays an important role in the internationalisation process; question eleven asked about the type of knowledge-based innovation used by firms in the internationalisation process.

The most frequently cited were marketing innovations based on market knowledge (81% of respondents), including price innovations (76%), product innovations based on industry and customer knowledge (74%), business model innovations based on knowledge of doing business in the country of presence (63%), and process innovations based on knowledge of the specifics of logistics and supply chains (52%) (Fig. 3).

Fig. 3. Implementation of different types of innovation based on SME knowledge in the process of internationalisation (% of respondents)



Source: compiled by the authors.

The next question was about the impact of implementing knowledge-based innovations (Figure 4).

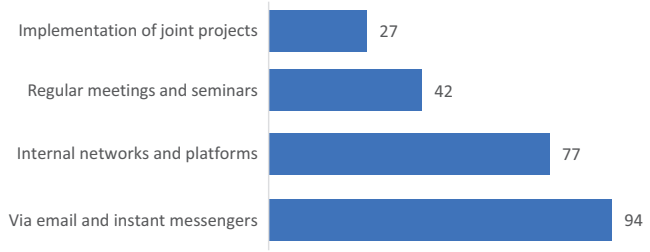
Fig. 4. Impact od implementing knowledge-based innovation (% of respondents)

Source: compiled by the authors.

The most frequently cited benefits of knowledge-based innovation were competitive prices (39% of respondents), a wide range of products, their uniqueness and distinctive features (63% of respondents). Less frequently selected responses were better product quality (26%) and shorter delivery times (11%).

The effectiveness of information and knowledge sharing depends on the methods and forms used. Undoubtedly, IT tools play an important role in this process, but the importance of face-to-face communication should not be underestimated, where information and knowledge can be clarified, improved through discussion and enriched with non-verbal signals. In order to identify the methods used to disseminate knowledge, respondents were asked to give their opinion, with the possibility of selecting more than one answer (Figure 5).

Fig. 5. Methods of sharing knowledge and information (% of respondents)

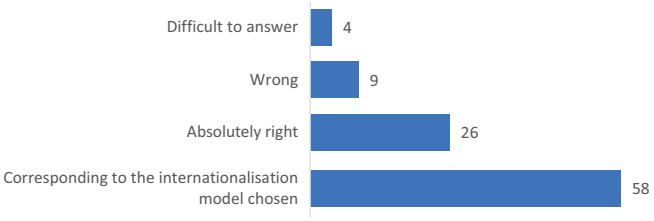


Source: compiled by the authors.

Almost all respondents - 94% - said that knowledge is shared via email and various online messengers. 77% of respondents said that their companies use internal company networks or platforms to manage information and documents; 42% cited regular meetings and seminars as a form of knowledge sharing; 27% cited the implementation of joint projects as a source of knowledge acquisition and sharing.

Respondents were also asked to assess the appropriateness and effectiveness of knowledge management activities in the company, taking into account their impact on the decision-making process in the context of internationalisation (Fig. 6).

Fig. 6. Policy in the area of knowledge creation and management (% of respondents)



Source: compiled by the authors.

The company's knowledge creation and management policy was considered to be in line with the chosen internationalisation model by 58% of respondents. 26% of respondents thought the policy was absolutely correct, 9% thought it was incorrect, and 4% had no opinion.

The final question in the questionnaire asked respondents to describe the difficulties they felt their company had experienced or was experiencing in relation to knowledge management during the internationalisation process. Participants could choose more than one answer (Fig. 7).

The most commonly cited problem was identifying and obtaining information about foreign markets, cited by 87% of respondents. This was followed by the lack of a mechanism and motivation for employees to share knowledge (76% of respondents). In third place were problems related to the lack of appropriate IT tools (44%). Low management involvement was cited by 22% of respondents and 2% found it difficult to answer. These results suggest that despite positive feedback on knowledge management policies, many respondents encountered challenges that indicate a need for improvement in this area.

Fig. 7. Knowledge management challenges in internationalisation faced by SMEs (% of respondents)

Source: compiled by the authors.

3. Development of a model for the internationalisation of SMEs

In developing the internationalisation model for SMEs, the main criterion identified was the level of experience: pre-internationalisation (no experience), first internationalisation (up to 5 years) and experienced internationalisation (more than 5 years).

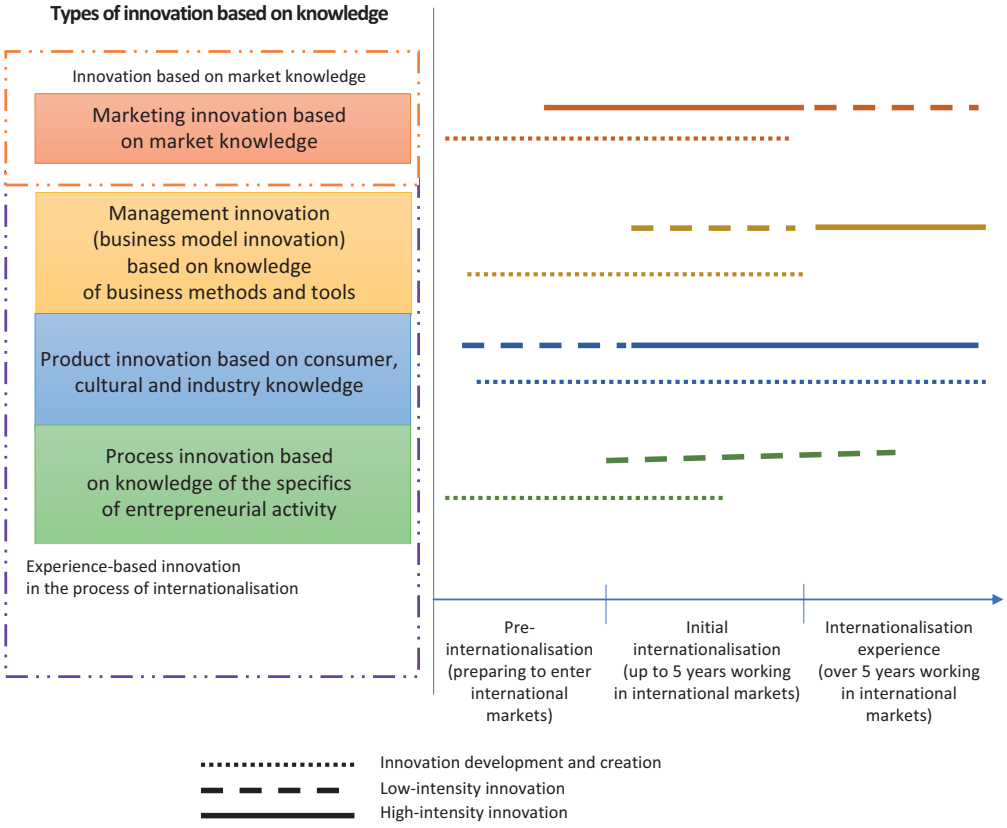
As shown in Figure 8, the developed model of knowledge-based innovation internationalisation consists of three phases influenced by four types of knowledge-based innovation. These phases include pre-internationalisation, initial internationalisation and experimental internationalisation. The boundary between initial internationalisation and experienced internationalisation was drawn on the basis of a period of 5 years working in foreign markets. This boundary was determined taking into account the opinions of the respondents who answered that the company becomes experienced in terms of internationalisation over time as knowledge is accumulated. According to the respondents, the average period of such knowledge accumulation is about 5 years of work in foreign markets.

We now turn to a consideration of knowledge-based innovations that influence the success of SME internationalisation.

4. Classification of innovations based on knowledge gained in the process of internationalisation

Based on the empirical study described above, it was found that four types of innovation based on different knowledge influence the internationalisation process. These include market knowledge and empirical knowledge, which consists of knowledge of the ways and methods of doing business in specific international markets, knowledge of consumers and their cultural characteristics, and entrepreneurial knowledge based on knowledge of internationalisation processes.

Fig. 8. Internationalisation model for knowledge-based innovation



Source: compiled by the authors.

The proposed classification of innovations is based on the different types of knowledge generated in the process of internationalisation and the source of the knowledge. The presented classification of knowledge-based innovations is useful for SMEs to understand the impact of knowledge on the internationalisation of firms.

There are two types of knowledge: one is more objective, or explicit, and the other is more hidden, or empirical. Objective knowledge comes from written documents, reports, and materials. Empirical knowledge comes only from experience. In this study on internationalisation, the first type of knowledge is called market knowledge and the second type is empirical knowledge. Table 3 shows the types of innovation and the knowledge on which they are based.

Marketing innovation based on market knowledge

Market knowledge refers to objective, or explicit, information about foreign markets. It includes information about market size, competitors, regulations, etc. A number of studies have shown that market information obtained during the pre-internationalisation phase is crucial for the initiation of international activity and its first phase. Before entering an international market, a company tries to gather as much information as possible because of the high risk of first-time entry. In the pre-export and export entry models, market knowledge serves as a starting point for developing marketing innovations that facilitate successful entry into the international market.

The creation and implementation of marketing innovations by SMEs in the initial and experimental stages of internationalisation is aimed at maintaining and increasing their market share and improving their competitive position, which depends on knowledge of the factors that create competitive advantages. Competitive advantages are a set of factors or capabilities that allow a company to consistently achieve better results than other competitors [Gnizy, 2024].

Marketing innovation is also based on knowledge of customer and market interests, which in turn leads to the development of sustainable competitive advantages.

It should also be noted that the intensity of the use of market knowledge and the introduction of marketing innovations decreases as the firm progresses along the path of internationalisation. Instead, SMEs rely more on the adoption of other types of knowledge-based innovation, such as networking, cultural and entrepreneurial innovation.

Management innovation (business model innovation) based on knowledge of methods and tools for doing business abroad

The results of this study show that empirical knowledge underpins both internationalisation and managerial innovation in SMEs, but the impact of empirical knowledge on internationalisation success depends on the extent to which it is used to build innovative business models in SMEs. For example, [Orieno et al., 2024] found that firms using innovative business models export more; moreover,

Table 3
Types of knowledge-based innovation generated during the internationalisation process

Types of knowledge-based innovation	Types of knowledge acquired in the process of internationalisation								
	Market knowledge		Empirical knowledge gained in the process of internationalisation						
	Market knowledge	Competitor knowledge	Consumer knowledge	Knowledge of product features offered in specific markets	Knowledge of internationalisation processes	Knowledge of business models used by competitors	Logistics knowledge	Business and industry knowledge	Knowledge of technologies used by competitors
Marketing innovation	V	V	V						
Management innovation	V		V	V	V	V	V	V	
Process innovation					V		V	V	V
Product innovation			V	V				V	V

Source: compiled by the authors.

this work shows that the relationship between innovation and internationalisation depends on the type of innovation, with managerial innovation being particularly important.

Knowledge of the methods and tools for doing business in a particular foreign market is the basis for management innovation, the successful implementation of which takes SMEs further along the path of internationalisation.

Product innovation based on knowledge of consumers in foreign markets, their cultural characteristics and industry knowledge

The accumulation of knowledge about new products, technologies, consumer behaviour, their taste preferences and cultural characteristics leads to the creation and launch of new products and the creation of value for the company [Gui et al., 2024]. This advantage is due to access to knowledge and resources that support business activities. High profits for SMEs in foreign markets are achieved exclusively through innovation. SMEs with a high level of innovation show higher performance [Zuhroh, Rini, 2024]. In order to create product innovations in foreign markets, knowledge of the cultural characteristics of the consumers in a given market plays an important role - an understanding of the values, manners and ways of thinking of the consumers in that market.

The acquisition of this knowledge for innovation begins when the SME starts the process of internationalisation. The SME gradually learns how to do business with partners in foreign markets. As the company acquires more and more knowledge about cultural particularities, the intensity of its use increases.

Research on process models of internationalisation shows that cultural differences play an important role in the choice of country for entering a foreign market. The company will initially choose markets with similar cultures and minor differences. After gaining knowledge in one market, it may seek to expand into other markets that are less culturally similar.

Process innovation based on knowledge of the specifics of entrepreneurial activity

Process innovations for internationalisation are primarily based on reducing costs, improving product quality and introducing new logistics methods. Indeed, improvements resulting from the implementation of process innovations based on internationalisation knowledge can include increased flexibility and quality, rationalisation of production processes [Olu-lawal et al., 2024; Shehzad et al., 2024] and reduction of labour and other costs [Gledson, 2022; Radicic, Alkaraan, 2024], which has an impact on the success of SME internationalisation. Knowledge of how companies operate in foreign markets, their technological characteristics and ways to increase productivity plays an important role in creating such innovations.

The acquisition of such knowledge begins in the pre-internationalisation stage and continues in the early stages of internationalisation. Innovations based on knowledge of entrepreneurial activities abroad are used at different stages of internationalisation. However, the extent to which network knowledge is used and process innovations are implemented varies according to the stage of internationalisation.

The authors of this article found in their survey that experienced SMEs that have already internationalised in several countries develop and implement innovations based on the acquired entrepreneurial knowledge in order to enter a new foreign market. While new exporters strive to acquire this knowledge, experienced companies make greater use of the knowledge they have already acquired. This is because experienced internationalising SMEs implement their innovations more intensively on the basis of previously acquired knowledge. Hence, Fig. 8 shows that in the initial stage of internationalisation, the intensity of innovation implementation based on the use of entrepreneurial knowledge is low, but that this intensity increases in the stage of gaining experience. In addition, entrepreneurial knowledge enables SMEs to recognise opportunities, which is a key factor for a company to survive and grow in foreign markets.

Thus, the creation and implementation of all types of knowledge-based innovations contribute to successful internationalisation. To create such innovations, however, it is necessary to implement a knowledge management system.

5. Conclusions and further research

Since the end of the 20th century, scholars have been actively studying the internationalisation of SMEs. Most have come to the conclusion that integrated models incorporating different aspects are needed to explain the success of SME internationalisation. More recent studies have shown the importance of knowledge accumulation and management processes for internationalisation.

This study is based on an empirical analysis of 179 Russian SMEs operating in foreign markets. Based on the study, it can be concluded that the predominant form of internationalisation in the companies where the respondents work is the export of goods and services to international markets. However, a significant proportion of respondents are setting up branches or divisions abroad. The most commonly cited reasons for doing so are the desire to expand the organisation's market opportunities, to circumvent sanctions, and to diversify sources of income.

All respondents confirmed the importance of acquiring, accumulating and managing knowledge gained through internationalisation, as well as implementing innovations based on knowledge gained through internationalisation.

The main effects of introducing innovations based on the knowledge gained in the process of internationalisation are competitive prices, uniqueness and distinctiveness of product characteristics and their range.

Most respondents recognised the aims of internationalisation, but many also acknowledged that its implementation had been fraught with problems and setbacks. The main problems identified were: fierce competition, sanctions pressure, logistical, communication, language and management difficulties arising from a lack of understanding of the characteristics of the community and the market in a particular region. It can be assumed that the key factor in solving the problems is the introduction of various types of innovation based on the knowledge gained in the process of internationalisation.

In this context, the article develops a model of internationalisation for SMEs based on knowledge innovation. The model includes four types of knowledge-based innovations in the internationalisation process: marketing innovations, based on knowledge of the market; management innovations (business model innovations), based on knowledge of the methods and tools for doing business abroad; product innovations, based on knowledge of consumers in foreign markets, their cultural characteristics and industry knowledge; and process innovations, based on knowledge of the characteristics of entrepreneurial activity.

These innovations, based on knowledge gained through the internationalisation process, are important in explaining the success of SME internationalisation. The creation and intensity of implementation of each of these types of innovation varies according to the stage of internationalisation of SMEs. In addition, the process of knowledge management in SMEs in the context of internationalisation is important for the creation and implementation of such innovations. The study revealed a lack of mechanism and motivation for employees to transfer knowledge, as well as a lack of appropriate IT tools. When asked about ways to share information and knowledge, respondents also emphasised the importance of regular meetings and seminars.

Future research could examine the impact of the considered types of knowledge-based innovation generated during internationalisation on internationalisation performance indicators. A broader empirical test of the proposed model is also needed.

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On the strategic importance of developing scientific and technical cooperation among BRICS members

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Abstract

The author examined the strategic importance and promising areas for the development of scientific and technical cooperation (STC) among the BRICS (and BRICS+) countries. The emergence of the New World Order (NWO) has created conditions for the expansion cooperation among the BRICS members, and the development and, in particular, deepening of the scientific and technical cooperation among the BRICS countries (BRICS+) should make it possible to create a sustainable strategic basis for the development of all BRICS members (and BRICS as a whole). The most important condition for the development of the international STC is the existence of innovative technological and scientific technical potential in the participating countries. Their study allowed the author to establish: 1) their presence in the BRICS countries; 2) the presence of interest of all BRICS countries in the development of STC and in the development of STC with Russia; 3) that the pace of development of STC of the BRICS countries is significantly inferior to the pace of trade and economic cooperation; 3) the presence of both intergovernmental documents and facts of implementation of joint events and programmes in the field of academic and university science, in the field of education. The directions for the development of the BRICS S&T cooperation agreed upon by the participating countries so far should be considered as justified, but it is advisable to develop and deepen them, especially in the direction of environmental protection and in response to the digital transformations taking place in the modern economy. However, for the development of the STC of the BRICS members, it is necessary to define the strategic significance and formulate the principles of understanding the strategic significance of the implementation of the ISTC at this stage of development of science, technology and economy, which is important for almost all BRICS members. For this purpose, the author has formulated the main points that determine the decisions that need to be made, including those related to the assumption of relevant risks, and has first recorded the stages of development of the STC of the BRICS members. The author also suggests considering the possibility of creating cross-border inter-firm innovation ecosystems. In conclusion, it is emphasised that the formation of the strategy of the STC of the BRICS members requires respect for their interests and the use of an ecosystem approach and fine-tuning.

Keywords: strategies for international scientific and technical cooperation, strategies for innovative development, scientific and technical cooperation, BRICS, new world order, deglobalisation.

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论金砖国家科技合作发展的战略意义

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简介
文章致力于研究金砖五国（和金砖五国+）科技合作的战略重要性和发展前景。正在形成的世界新秩序为扩大金砖国家之间的合作创造了条件，金砖国家（金砖+）之间科技合作的发展乃至深化，应能为每个金砖国家乃至整个金砖+的发展奠定可持续的战略基础。发展国际科技合作最重要的条件是成员国具备创新技术和科技潜力，本研究揭示了金砖国家具备这种潜力的情况，并确定了以下两点：第一，所有金砖国家都有兴趣发展科技合作以及与俄罗斯发展科技合作；第二，金砖国家间科技合作的发展速度明显低于与俄罗斯的经贸合作速度；第三，在学术和大学科学与教育领域开展联合活动和计划的国家间文件和事实。参与国迄今商定的科技合作发展方向应被视为是合理的，但最好发展和深化这些方　向，首先是在自然保护方面，以及在应对现代经济中发生的数字变革方面。为了发展金砖国家之间的科技合作，有必要确定战略重要性并制定原则，以理解现阶段国际科技合作在科技和经济发展中的战略重要性（这对几乎所有"金砖+"成员都很重要），制定决定所要采取的决策的要点，包括与承担适当风险有关的要点，并初步确定科技合作的发展阶段。文章建议考虑形成跨境企业间创新生态系统的可能性。文章强调，金砖国家科技合作战略的形成需要尊重各国的利益，采用生态系统方法并进行微调。
关键词： 国际科技合作战略；创新发展战略；金砖国家；国际科技合作；世界新秩序；去全球化。

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Introduction

The world community is faced with the need to solve (or at least mitigate the effects of) a number of problems caused by the so-called major challenges, the solution to which is beyond the capacity of any single country. Until recently, it seemed that humanity was ready to act together to solve these problems (including by achieving the Sustainable Development Goals, SDGs[1]), but the emerging world order is limiting the possibilities of solving global problems, because their solution is impossible without the consolidation of joint efforts and the development of international scientific and technological cooperation (hereinafter referred to as STC and ISTC) at various levels and in various forms, naturally taking into account aspects related to the observance of the interests of all countries of the international community. It is important to note that a characteristic feature of the emerging world order is not only the creation of conditions of disunity and confrontation, but also the fact that its ambassadors try in every possible way not so much to develop their innovative and technological potential, but to hinder the development of the scientific and technological potential of other countries, thus artificially maintaining their leadership. In the author's opinion, such a policy is counterproductive, not only in terms of solving global problems, but also in terms of developing such ambassadors themselves, and not only in the long term, but also in the medium term[2]. In this regard, given the growing innovative technological and scientific-technical potential of 'non-Western' countries, it can be assumed that efforts to develop ISTC between different groups of countries, including the BRICS (and BRICS+) countries, will be intensified in the near future. Of course, one should not expect BRICS (and BRICS+) to respond to all major challenges overnight, but it is highly advisable to act together, including in the direction of creating conditions for mutually beneficial cooperation. The reasons can be formulated in the following simple way: It is the ISTC that creates conditions for increasing the effectiveness of the scientific and technological activities of the association and of each of the participating countries, allowing them to solve together (and each individually) various problems related both to increasing the innovative and technological activity of the subjects of their economies, and to achieving technological leadership or technological sovereignty, depending on the goals that each country has set for itself, which is becoming particularly important given the growing importance, power, scale (and in some ways unpredictability) of the development of machine learning and generative artificial intelligence; it is the STC that is capable of creating absolute conditions for strengthening cooperation between the BRICS member countries and for the development and qualitative transformation of this international platform. In these conditions, the scientific and technological cooperation of the BRICS countries, which are becoming more and

[1] https://www.un.org/sustainabledevelopment/ru/sustainable-development-goals/.
[2] This has been noted in a number of the author's works devoted to the study of deglobalisation processes and the phenomenon of techno-nationalism, see, for example: [Matkovskaya, 2023a; 2022b].

more important players and successful in innovative-technological and scientific-technical development, is of strategic importance for the development of each of the countries included in the BRICS (BRICS+) and for the creation of a strategic basis for this association, which is aimed at ensuring the technological security of the participating countries, as well as facilitating the exchange of knowledge, the development of educational initiatives and a system for training highly qualified personnel and, of course, achieving sustainable development and improving the quality of life of the population. All these aspects characterise the content of the article's purpose, which is to explore and record the strategic importance of the development of scientific and technological cooperation among the BRICS countries.

The methodological basis for the study of the problem investigated in this article was a combination of general scientific methods (analysis and synthesis, scientific abstraction, generalisations, analogies), methods of economic analysis, classification and grouping, ranking and structuring, quantitative and qualitative analysis of data, methods of systemic, logical, structural, comparative and graphical analysis, and design methods.

1. New World Order

1.1. Facts

So what is the emerging new world order, and how destructive is it? And it is destructive, first of all, because of its lack of objectivity. Its characteristics, the new world order, can be very voluminous, but in this work only a few facts will be presented to outline it, highlighting the most important ones for the subject under study. So, fact one: 'new world order' has become a fairly stable term, but the meaning behind this concept is sometimes the opposite: from creating fair and equal conditions for all countries striving for development, to creating new conditions to maintain the previous proportions and support one's own superiority[3]. Fact two: the characteristics of the 'new world order' are characterised by processes such as the formation of a multipolar world, polarisation, deglobalisation, regionalisation, techno-nationalism, as well as 'glocalisation', 'friendshoring', etc. Fact three: the formation of trends that characterise the awareness of the depletion of their own sources of innovative development (for countries - ambassadors of techno-nationalism), in connection with which the rhetoric is changing: the concepts of 'third world countries', 'fourth world countries' are encountered less and less, they give way to the concepts of: countries with developing economies (not developing countries), high-income countries, middle-income countries, etc., for which 'green windows' are opening, etc., which is reflected in a number of reviews and reports[4]. Perhaps the change in rhetoric is largely due to the desire to preserve by all means the inflationary supranational institutions created after the Second World War, including the WTO, as demonstrated by the speech of its head in the autumn of 2024[5]. In addition, the proportion of foreigners among researchers in the United States is consistently high and even growing, although not yet dominant [Minate, Chepik, 2020; Petrovskaya, 2021][6], although a number of Chinese researchers are also returning home (although this trend has other causes, including the implementation of the personnel policies of the PRC government). Fact 4 is substantiated by the results of the regular monitoring conducted by the author, dedicated to the study of the nature and direction of globalisation (deglobalisation) processes occurring in the modern world, which allows us to assume that the modern world remains globalised, most economies of the world are 20-30% dependent on imports[7]. And finally, the fifth fact is the fact about the growing and developing BRICS. The formation and expansion of BRICS is truly the most reasonable response to the current situation - a situation in which the need has arisen to create conditions for the development of countries, including the countries of the global South and East, as well as countries whose rights are being trampled on by states that have appropriated the right to decide the fate of the entire world. Moreover, the policy of technological containment, together with digital transformation processes, creates conditions for understanding the strategic importance of the development of the scientific and technological complex of countries and BRICS+.

Thus, it is becoming more and more obvious that the established world order has a limiting effect on the possibilities of solving problems related to major challenges, since the solution of global problems is impossible without the consolidation of joint efforts and the development of ISTC at various levels and in various forms, naturally taking into account aspects related to the observance of the interests of all countries of the international community.

[3] The New World Order through the eyes of Putin and Biden. How will Russia and the United States divide the world? (2024). https://tsargrad.tv/articles/novyj-miroporjadok-glazami-putina-i-bajdena-kak-rossija-i-ssha-podeljat-mir_895260.

[4] Related links: The 2023/2024 human development report copyright (2024). https://report.hdr.undp.org/how-can-we-turn-things-around; Open green windows. Technology opportunities for low-carbon world: Technology and innovation report (2023). https://unctad.org/system/files/official-document/tir2023_en.pdf; The middle-income trap: World development report (2024). https://www.worldbank.org/en/publication/wdr2024?cid=ECR_E_NewsletterWeekly_EN_EXT&deliveryName=DM226534.

[5] WTO News items - DG Okonjo-Iweala calls for re-imagining of global trade system amid increasing challenges (2024). https://www.wto.org/english/news_e/news24_e/igo_31oct24_e.htm.

[6] Related links: The number of international scholars and students in the US has increased (2024). https://allterra.ru/news/v-ssha-stalo-bolshe-inostrannykh-uchyenykh-i-studentov/; Hamilton J. (2024). Foreign nationals propel U.S. science. If Trump limits immigration again, that could change. https://www.npr.org/sections/shots-health-news/2024/11/21/nx-s1-5187926/u-s-science-could-suffer-if-trump-limits-h-1b-visas-again.

[7] The complication of concentration in global trade (2023). https://www.mckinsey.com/mgi/our-research/the-complication-of-concentration-in-global-trade; KOF Globalization Index 2023 (2023). https://gtmarket.ru/ratings/kof-globalization-index?ysclid=ldbgd1lq7u96105360; The 2023/2024 human development report copyright (2024). https://report.hdr.undp.org/how-can-we-turn-things-around.

1.2. Review of sources dedicated to the study of the BRICS STC

An analysis of the level of research on the issues under study revealed a lack of studies in modern foreign scientific literature in recent years that are directly devoted to the study of scientific and technological cooperation among the BRICS countries. An analysis of publications in foreign peer-reviewed journals showed that the issue of the development of the STC of the BRICS countries is studied by authors mainly in the context of studying the prospects for the development of "green" energy and the economy, in which the STC are considered, but in a correspondingly subordinate context (much less often the STC of the BRICS countries are considered in the context of the development of financial institutions in general and the New Development Bank (hereinafter NDB) in particular), which, without being interpreted as a negative point, indicates a lack of independent, sufficiently effective studies devoted to the development of the STC (namely in foreign peer-reviewed publications of recent years, mainly for 2014-2024 and earlier). However, it is worth paying attention to the work of some researchers who have addressed the issues of the STC of the BRICS countries. Among them, the article [Andrew et al., 2024], devoted to the study of environmental aspects and the formation of the 'green economy', stands out. Its authors study the holistic production potential of the BRICS member countries (this is what 'economic complexity' consists of). By examining the moderating role of innovative technologies and 'economic complexity' in the relationship between financial development and environmental quality in the BRICS economies, these researchers conclude that, taken together, innovative technologies create much greater opportunities for reducing the carbon footprint of these economies than economic growth, and that the transfer of environmental technologies creates the conditions for increasing the environmental sustainability of the BRICS countries.

Magazzino et al. [Magazzino et al., 2024] analysed the transformation strategies in cereal production in the BRICS countries over a period of three decades (until 2021) and made several recommendations to improve policies aimed at achieving several SDGs by the BRICS countries: in the area of innovative technology development, land use management, ecology and crop diversification.

[Xu et al., 2022] find that green growth has an uneven impact on economic performance across BRICS countries, while [Gu et al., 2018] find that the concept of a green economy in BRICS countries 'should be seen as a means to achieve fundamental and overarching priorities, rather than an end in itself'. The same authors also point out the differences in potential among the BRICS countries and the fact that Russia and Brazil are characterised by technical and political limitations, while an important area of trade and economic relations between Russia and South Africa is the development of cooperation in the field of nuclear energy.

The authors [Özkan et al., 2024] note that the BRICS countries эhave become major players in the global economy over the past decadeэ, including in the field of green energy. They also point out that for countries such as Russia and Brazil, the development of green energy financial initiatives has a positive impact in the short and medium term, but turns negative in the long term, in contrast to South Africa, where the impact of financial development on green growth is predominantly negative.

It should be noted that the work of other authors, for example [Chen et al., 2023], also makes a significant contribution to the study of these issues.

Among the studies focused on the study of the NBR and issues of innovative development of the BRICS countries, it is worth highlighting [Rowlands, 2012; Abdenur, 2014; Chin, 2014; Schablitzki, 2014; Kan, 2015; Dixon, 2015].

In contrast to foreign researchers, Russian researchers are quite active in studying the possibilities and prospects for the development of S&T cooperation in the BRICS countries and try to cover a wider range of issues related to the development of BRICS and the ISTC within its framework. It is worth highlighting the work [Sokolov et al., 2017], which conducted a serious study and formulated 'a list of promising areas and fields of science and technology in which the BRICS countries may be interested in cooperation with Russia'. The authors rightly note that the effectiveness of interaction between the BRICS countries will be facilitated by such an approach, which is aimed at the implementation of STC by these countries throughout the entire cycle of innovation creation. Examining the prerequisites and prospects for cooperation between BRICS countries in the field of innovation, the author of the work [Sidorova, 2018] notes the 'uneven development and innovation gap of the national economies of the member countries', considers China's leadership as 'obvious' but 'not completely dominant', and concludes that 'further stimulation of the innovative development of the countries is necessary', calling for the creation of a 'single BRICS innovation space'.

It is also worth paying attention to other work. For example, [Govorova, 2018] examines the national innovation systems (NIS) of the BRICS countries, studies the prospects for cooperation among them, and suggests that China and South Africa may become leaders in the field of BRICS innovation. The authors [Luzina, Dudareva, 2019] believe that the condition for the development of integration processes between the BRICS countries, their science and business is 'the creation and support of the development of innovative infrastructure to attract scientists and highly qualified specialists'.

At the same time, Russian researchers are also studying other aspects of the development of the NIS, for example, legal issues of the formation of a global research infrastructure [Kozheurov, Teymurov, 2019]. A number of other Russian scientists have conducted in-depth studies in the field of the formation and development of the Russian ISTC. A significant contribution to the development of this issue is provided by the works of [Kotsemir et al., 2015; Balyakin et al., 2018; Danilin, 2019; Dezhina, Klyucharev, 2020] and others. The researchers also touch on issues of productivity and the choice of implementation directions, drawing attention to the similarities and differences in the scientific and technological potential of the BRICS countries.

Despite the fact that the interest of foreign authors in the study of the BRICS STC is somewhat subordinate, which is compensated by a broader definition of the object of research by Russian scientists, the trends emerging in the modern world make the study of the BRICS STC (and ISTC in general) increasingly relevant. This suggests that the study of S&T cooperation in the BRICS countries should be intensified, especially in the area of developing strategies for its implementation by the participating countries and developing integration strategies for S&T development, and that research on the development and implementation of infrastructure and institutional projects should be intensified, especially in the context of digital transformations and the formation of a new world order, developing models that allow creating conditions for the development of both the participating BRICS countries and the association as a whole.

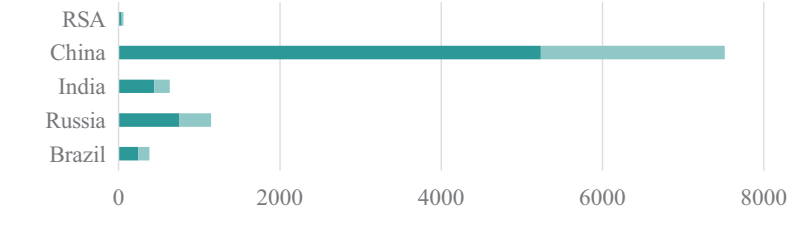
2. Assessing the innovative potential of the BRICS countries

Two important comments should be made at the beginning of this section. The first is that while much could be said about the importance of the development of the BRICS STC, any assessment should be based on numerical indicators. The second observation is the methodological complexity of the systemic nature of determining the innovative potential of a country (as opposed to the assessment of the innovative potential of organisations, although this is not close to perfection), which is due to many factors, such as the heterogeneity of data, the asynchronous nature of investments in research and development (R&D) and their returns, the differentiation between investments and returns in basic and applied science, the uncertainty of results, etc. Methodological shortcomings are recognised by researchers, statistical agencies and international organisations, but they all try to assess the innovation potential of a particular country. As a result, all assessments of the innovative potential of economies are imperfect, but a tradition has emerged that defines a set of parameters against which these assessments are made. These are usually estimates of the number of organisations performing R&D, the number of R&D personnel, internal R&D costs, budget allocations for civil science, available fixed assets, etc. (this attribution logic is mainly used by statistical organisations). The World Intellectual Property Organisation (WIPO) uses a system of indicators to construct a global innovation rating, grouped under the following headings: institutions, human capital and research, infrastructure, market sophistication, business sophistication, knowledge and technological outputs, creative outputs (the names of which can be translated as ‘institutions’, ‘human capital and research’, ‘infrastructure’, ‘market and business sophistication’, ‘knowledge and technological outputs’, ‘creative outputs’)[8]. At the same time, WIPO (like many other international organisations) presents relative results, while statistical bodies more often present absolute results.

There is no guarantee that the system of indicators used by statistical offices, WIPO or other organisations to calculate indicators reflecting the innovative activity or innovative potential of a given economy is sufficient, homogeneous, relevant and, above all, capable of providing comprehensive and reliable information. In this regard, the author presents only some of the most important indicators for this study: (1) adherence to the logic of statistical bodies, WIPO and other expert and international organisations; (2) attention to the most significant, comparable indicators; (3) emphasis that the study of the innovative potential of the BRICS countries is not the main objective of this work.

Let us first look at key indicators such as the number of persons employed in R&D and the number of researchers (Fig.1).

Fig. 1. Number of R&D personnel and researchers in BRICS countries in full-time equivalents, 2010–2021 (thousand person-years, median)



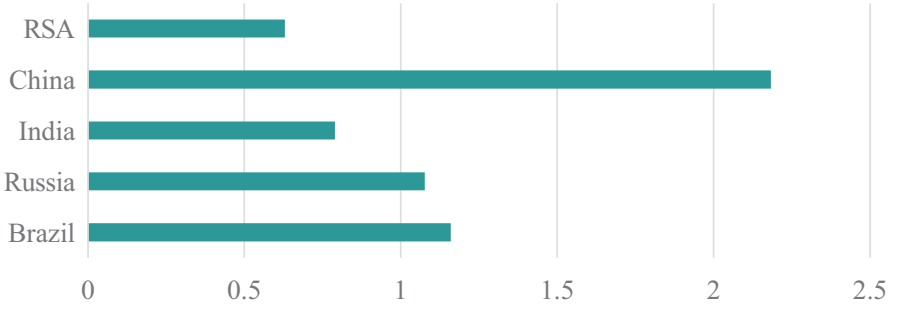
Source: compiled by the author on the basis of: Russian Statistical Yearbook (2023). Moscow, Rosstat: 689.

[8] Global Innovation Index 2024: Unlocking the promise of social entrepreneurship. https://www.wipo.int/documents/d/global-innovation-index/docs-en-2024-gii-2024-clusters-top100-ranking.pdf.

Fig. 1 shows that the absolute leader in both indicators is China, with Russia in second place among the BRICS countries. To estimate the ratio, the number of persons employed in R&D in the BRICS countries during this period should be taken as 100%. China's share will then be 78%, Russia's 11%, India's 7%, Brazil's 4% and South Africa's less than 1%. If we take the number of full-time equivalent researchers in the BRICS countries over the same period as 100%, China's share remains high at 75%, Russia at 13%, India at 6%, Brazil at 5% and South Africa at 1%.

The next important indicator is domestic R&D expenditure in the BRICS countries (Fig. 2).

Fig. 2. BRICS domestic R&D expenditure, 2010–2021 (% of GDP, median)

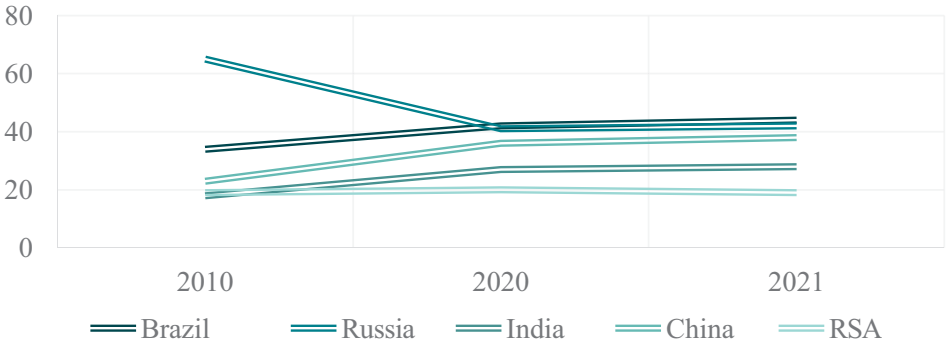


Source: compiled by the author on the basis of: Russian Statistical Yearbook (2023). Moscow, Rosstat: 690.

The data presented in Fig. 2 again show China's leading position in relation to other BRICS countries, but at the same time, with an indicator of 2.43%, China is well behind the world leaders, including the Republic of Korea - 4.93%, the United States - 3.46%, Belgium - 3.46% and Sweden - 3.4% (2021). In Russia, this indicator will be 1% in 2021[9].

The next indicator that the author considers worthy of attention is the dynamics of student numbers (Fig. 3).

Fig. 3. Dynamics of the number of students in the BRICS countries (per 1000 inhabitants)



Source: compiled by the author on the basis of: Russian Statistical Yearbook (2023): 656.

In addition to the data shown in Figure 3, it should be noted that the largest number of students among the BRICS countries in 2021 will be observed in Brazil - 44 people per 1000 inhabitants, the second place among the BRICS countries is taken by Russia with an indicator of 42 people, the third place belongs to the PR China - 38 people, in India - 28 people, in South Africa - 19 people. At the same time, the number of students in 2022 will increase to 43 per 1000 in Russia and 40 in China (data for 2022 are not available for the other BRICS countries). It should be noted that the world leaders in the number of students are Australia (67 students per 1000 inhabitants) and Kazakhstan (59 students per 1000 inhabitants), the USA (55 students) and Germany (40 students)[10].

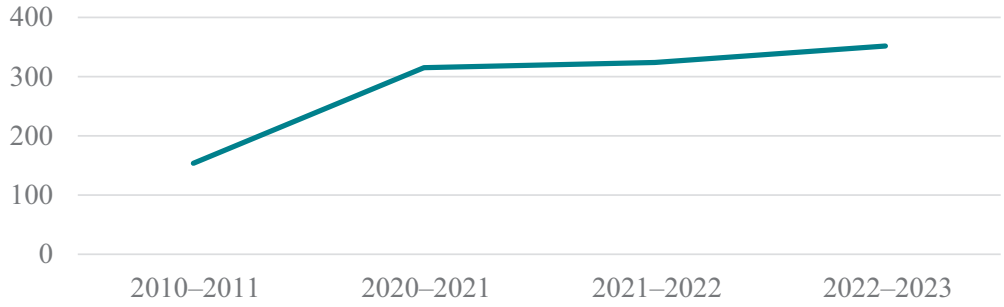
Statistical data also suggest that Russia leads the BRICS countries in the number of foreign students. The growth in the number of foreign students studying in various programmes at higher education institutions and scientific organisations in Russia is shown in Fig. 4.

It should be added that students from a significant number of countries around the world study in Russia (listed in descending order of number): from the CIS countries, the Baltic States, Georgia, Europe, Vietnam, India, China, the DPRK, Malaysia, Mongolia, the Republic of Korea, the Syrian Arab Republic, Central and South America, North America (USA and Canada), Zambia, Cameroon, Kenya, Morocco, Nigeria, etc. (stateless persons also study). Foreign students accounted for 8.4% of the total number of students in 2022-2023.

To further analyse the innovative potential of the BRICS countries, it is necessary to pay attention to the HDI (Human Development Index) indicator calculated by the UNDP (United Nations Development Programme). This index is calculated as a summary indicator of average performance in three main dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living. The HDI estimate for 2023-24 shows that all BRICS (and BRICS+) countries, including

[9] Russian Statistical Yearbook (2023). Moscow, Rosstat: 690.
[10] Id.: 656.

Fig. 4. Dynamics of the number of foreign students studying in bachelor's, specialist's, master's degree programmes in higher education institutions and scientific organisations of the Russian Federation (at the beginning of the academic year), on average (thsnd people)



Source: compiled by the author on the basis of Russian Statistical Yearbook (2023): 215.

Russia, have experienced growth in this indicator. Let us add that Russia's HDI increased by almost 11% between 1990 and 2002, which, according to UNDP researchers, is due to growth in GNI per capita (up 25.8%), an increase in life expectancy in Russia of 3 years and an increase in the average length of education by 2.8 years[11].

Focusing on just a few of the most relevant indicators for this study to characterise the innovative potential of the BRICS countries, we can come to a fairly simple conclusion (expected and confirmed by the assessments of other indicators), according to which the leader among the BRICS countries is China, with Russia occupying a stable second place. However, this does not mean that the PRC is the unconditional leader among the BRICS countries, as each of them is characterised by the presence of strengths and weaknesses in their scientific and technological development and innovation potential, which further realises the importance of deepening scientific and technological cooperation among them[12] and determines the strategic directions of scientific and technological cooperation among the BRICS countries.

It should be added that, firstly, the realisation of innovative potential is facilitated by a dynamic competitive environment within the country, as well as the presence of infrastructure, an innovation-oriented business environment, etc., and in this respect the PRC appears to 'win' (but again, not fully). But this is what makes the STC so important for the development of the BRICS countries. Second, an important indicator of a country's innovation potential is the presence of high-tech products in its overall export structure. These estimates will not be presented in this article, but the author refers to some of her other works, in which the results of the study of the dynamics of Russian high-tech exports (positive) are presented in more detail, international comparative assessments of this parameter are carried out, and the results of the critical analysis of the state of scientific and technical potential are presented [Matkovskaya, 2022a; 2024].

3. BRICS NTS: current documents, programmes, events

The results of the analysis of the composition of current documents, programmes and events that form the basis for the implementation of the BRICS STC are presented in the form of a set of facts (as above). The first fact is that in 2019 Russia adopted a (new) Concept of International Scientific and Technical Cooperation of the Russian Federation (8 February 2019, No. TG-P8-952)[13], which defines its content, principles, activities and areas of implementation, and the Concept of ISTC of Russia, STC with the BRICS countries is highlighted as one of the priority areas. A comprehensive positive assessment and critical analysis of the concept of the International Scientific and Technical Council of Russia is presented in the works [Danilin, 2019; Dezhina, Klyucharev, 2020].

The second fact is that in 2015, a 'Memorandum of Cooperation in Science, Technology and Innovation between the Governments of the Federative Republic of Brazil, the Russian Federation, the Republic of India, the People's Republic of China and the Republic of South Africa' was signed[14].

[11] 2023–2024 human development report (2024). https://hdr.undp.org/data-center.

[12] The author does not present the results of the analysis of the number of articles indexed in international databases and the number of publications co-authored with foreign colleagues, given the difficulties that have been created, for example, for domestic researchers in recent years, but notes that the leader among the BRICS countries in the number of publications co-authored with foreign authors is South Africa. It seems that this aspect is a competitive advantage of this country and can be considered as one of the areas for deepening BRICS S&T cooperation.

[13] The concept of international scientific and technical cooperation of the Russian Federation (2019). https://нтр.рф/analytics/kontseptsiya-mezhdunarodnogo-nauchno-tekhnicheskogo-sotrudnichestva-rossiyskoy-federatsii/.

[14] Order of the Government of the Russian Federation dated 14.03.2015 No. 434-r 'On the signing of a Memorandum on cooperation in the field of science, technology and innovation between the Government of the Federative Republic of Brazil, the Government of the Russian Federation, the Government of the Republic of India, the Government of the People's Republic of China and the Government of the Republic of South Africa'. ttps://rulaws.ru/goverment/Rasporyazhenie-Pravitelstva-RF-ot-14.03.2015-N-434-r/?ysclid=m4h24bux2574991251.

The third fact is that the institutions of the BRICS STC are functioning. For example, the body that coordinates the initiatives and activities of the thematic working groups of the BRICS STC is the BRICS Steering Committee on Science, Technology and Innovation, which determines the priority areas for the development of cooperation[15]. Other institutes are also in operation, such as the BRICS Scientific Council (since 2013), the BRICS Network University (established in 2015 and operational since 2017), the BRICS Network Centre for Materials Science and Nanotechnology (since 2017), and the BRICS Baikal Institute (at the Irkutsk Scientific Research Technical University, since 2018). The BRICS Energy Research Platform meetings are being organised; in 2024, the BRICS Ministers of Labour and Employment adopted a joint declaration; in October 2024, the BRICS University Rectors Forum, 'the first event of this format'[16]; was held in Moscow; the BRICS Academic Forum and the BRICS Young Scientists Forum are in operation; flagship projects are being implemented; the BRICS GRAIN Platform [Kortunov, 2024] and other initiatives are in operation.

According to the work [Gerasimov, Kodaneva, 2023], referring to the report of I.E. Ilyina, within the framework of BRICS '93 projects in 11 scientific fields were supported, of which 59 projects were implemented with the support of the Russian side' (with the participation of Russia). This article also indicates that cooperation is developing in the area of access to scientific infrastructure. Thus, 'Russia is represented by 6 active infrastructure facilities, Brazil - 4, India - 6, China - 4, South Africa - 1; another 7 research infrastructure facilities are under development, of which 1 is in South Africa, 1 in India, 1 in Brazil, 4 in Russia'.

The fourth fact is that Russia is implementing scientific and technological cooperation with each of the BRICS countries. For example, in 2021 the 'Roadmap for Russian-Indian cooperation in science, technology and innovation' was signed, which should ensure the development of cooperation and the implementation of a number of programmes, including those related to innovative entrepreneurship, grant support for R&D, it also indicates the presence of initiatives in the field of forming technology parks and innovation clusters that can be localised in both countries. The areas in which cooperation is being developed are mainly medicine, nuclear physics and space geodesy, and joint research is beginning to be carried out in the Arctic and Antarctic regions[17].

Perhaps the most active development of S&T cooperation among the BRICS countries is taking place between Russia and China, which is largely explained by the structural proximity of our S&T cooperation and the presence of National Academies of Sciences in both countries (RAS and CAN, respectively). This creates an institutional basis for the implementation of quite active work aimed at interaction between the institutes of the Russian Academy of Sciences and the Chinese Academy of Sciences (and the Chinese Academy of Social Sciences), implying joint R&D; interactions also take place within the framework of university science. Some of the priority areas of the Russian-Chinese STC are joint research in the field of digital technologies, ecology, geology and geophysics, medicine, physics and astronomy (including a focus on cooperation in the field of space research, lunar exploration - the Memorandum of Understanding on cooperation in the field of creation of the International Scientific Lunar Station, in the field of improvement of optical devices), as well as joint research in hard-to-reach but promising regions (the Arctic, the Tibetan Plateau, deep-sea research). Of course, there is also the 'Roadmap for Russian-Chinese cooperation in science, technology and innovation'. It was developed for the five-year period 2020-2025 and defines the priority areas of scientific and technical cooperation between Russia and China, including: research and development activities and scientific and technical exchanges, innovative cooperation, scientific and technical cooperation in the implementation of mega-science projects, in the field of creating scientific foundations and world-class scientific and educational centres, etc. The roadmap also provides for the holding of scientific and technical congresses and exhibitions, etc[18].

The STC with Brazil is not very active, but is considered to be of interest to both parties. The website of the Ministry of Education and Science of the Russian Federation states that 'Russia and Brazil are expanding inter-university and scientific cooperation. The Brazilian Ministry of Science, Technology and Innovation has expressed interest in creating an exchange programme for Russian and Brazilian researchers in the field of quantum computing, communications and cryptography'[19]. The key areas of STC between Russia and South Africa are recognised as cooperation in higher education and astronomy[20]. The new members of BRICS (BRICS+) have also expressed interest in an STC with Russia.

[15] Scientific, technological and innovative cooperation within BRICS: from oceanology to astronomy (2024). https://minobrnauki.gov.ru/press-center/news/mezhdunarodnoe-sotrudnichestvo/82323/.
[16] What is known about BRICS and the stages of its expansion (2024). https://tass.ru/info/18558683.
[17] Russian-Indian cooperation in high technology: through thorns (2024). https://russiancouncil.ru/analytics-and-comments/analytics/rossiysko-indiyskoe-sotrudnichestvo-v-sfere-vysokikh-tekhnologiy-cherez-ternii/; Russia and India strengthen cooperation in science and technology (2024). https://minobrnauki.gov.ru/press-center/news/mezhdunarodnoe-sotrudnichestvo/63021; The future of innovation: Russian-Indian partnership in science and technology (2024). https://infobrics.org/post/41081/.
[18] Areas of cooperation: Russian-Chinese associations of specialised universities (2024). https://ruschinalliance.unecon.ru/napravleniya-sotrudnichestva/; Russia and China are implementing 80 investment projects worth almost 20 trillion roubles (2024). https://www.interfax.ru/business/937120.
[19] Russia and Brazil expand inter-university and scientific cooperation (2024). https://minobrnauki.gov.ru/press-center/news/mezhdunarodnoe-sotrudnichestvo/79652/.
[20] Russia and RSA are developing cooperation in astronomy and higher education (2024). https://minobrnauki.gov.ru/press-center/news/mezhdunarodnoe-sotrudnichestvo/50279/.

4. Prospective directions of development of BRICS STC cooperation, strategic choices and risk taking

The above analysis has shown that, firstly, the development of the STC between the BRICS+ countries is seen as promising by all participating countries, although the rate of development of the BRICS countries' STC lags significantly behind the rate of growth of trade between the countries. Secondly, a number of documents have been developed, some institutions or outlines of future institutions have already been formed, which creates conditions for the development of the STC of the BRICS countries. Thirdly, events and programmes related to the development of STC are being implemented.

The main and most promising directions of development of STC cooperation in the BRICS countries are determined by the presence of significant reserves in certain areas and/or the existing needs of the countries for interaction. As mentioned above, in Russia these areas are formulated in the concept of the ISTC. The agreed direction of development of the STC of the BRICS countries is cooperation in a number of areas[21]. These areas, taking into account the most advanced aspects defining promising areas, can be presented as follows ICT and digital technologies, including cybersecurity, data transmission, big data processing, machine learning (AI); mechanical engineering and robotics; energy development (including renewable energy sources); materials science; earth sciences; medicine; space research and peaceful exploration of space; education; agronomy, etc[22].

Of course, the listed areas do not exhaust the possibilities for the development of BRICS STC. Very important areas for the development of STC could be cooperation in the field of carbon capture and storage, development of environmental standards for the BRICS countries, development of hard-to-reach terrestrial and extraterrestrial territories, environmental protection and reduction of the anthropogenic burden on the planet[23].

At the same time, there are a number of factors hindering the development of scientific and technological cooperation in the BRICS countries, such as 'insufficient coordination of activities to determine cooperation priorities, taking into account the interests of the countries and the most promising areas'; 'problems with the protection of intellectual property rights'; 'uneven development of the scientific and technological sphere'; 'high cost of transportation'; 'the existence of visa regimes'; 'language barriers'. According to the author, the following problems are of great importance 'insufficiently intensive information exchange between national scientific, technical and innovation systems', lack of knowledge about 'scientific potential, strategic priorities, research programmes, allocated funds and interaction mechanisms' [Krasnova, 2024].

The author, who agrees with the opinion of the RIAC experts on the composition of factors hindering the development of the STC of the BRICS countries, believes that a more serious obstacle, a systemic obstacle, is the insufficient (but not the lack of) understanding of the strategic importance of the development of the STC of the BRICS+ countries. Therefore, it is very important to establish the strategic importance of ISTC at this stage of development of science, technology and economy in general, and to formulate principles for understanding its strategic importance and the importance of developing STC between BRICS+ countries. This is a serious undertaking, and we propose to begin by formulating certain points (the content of which is evidence of the strategic importance of the ISTC in general and the BRICS+ STC in particular) and by identifying the decisions to be taken, including those relating to the assumption of relevant risks.

1. There are a growing number of areas of knowledge where a country's resources are not sufficient to achieve results. In addition, the whole range of digital technologies, including the processing of large amounts of data and the operation of large language models, requires computing power, which in turn requires energy capacity for data processing. In addition, the energy supply for data processing will soon be impossible for individual countries to provide, and joining forces is an important step that opens up new prospects.

2. For each country participating in the ISTC, there are risks of losing R&D results, but also opportunities to gain access to information and R&D results that the country might not have received or that would have required more resources to produce. In most cases, the 'economies of scale' outweigh the opportunities.

3. The policy of technological containment will only become more active, and any participant in modern international relations may find themselves in the crosshairs of techno-nationalism[24]. However, in modern conditions (2020s), not every economy is able to withstand sanctions (here we mean sanctions primarily of a technical and technological nature), so it is necessary to create conditions for maintaining an independent position and access to advanced scientific achievements.

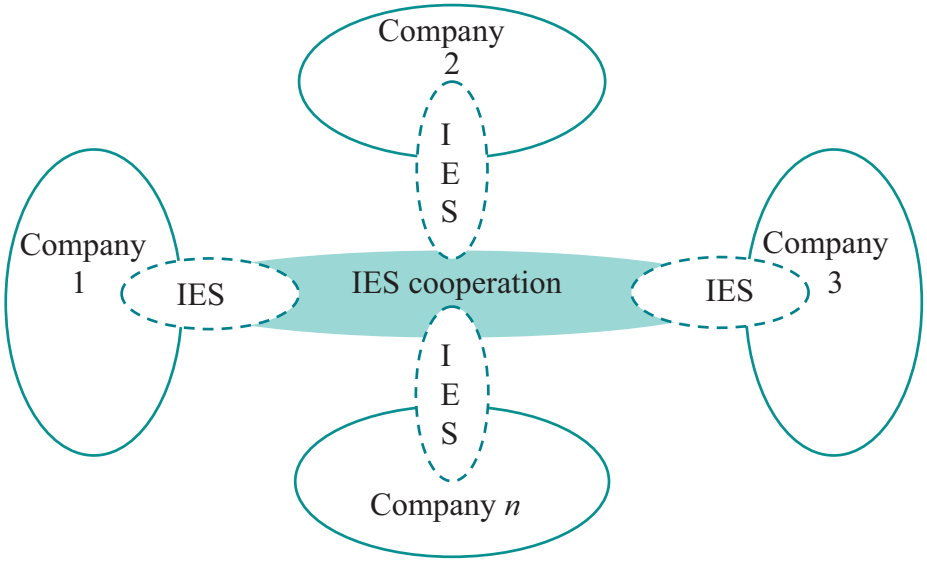
[21] Scientific, technological and innovative cooperation within the BRICS... https://minobrnauki.gov.ru/press-center/news/mezhdunarodnoe-sotrudnichestvo/82323/.

[22] The concept of international scientific and technological cooperation... https://нтр.рф/analytics/kontseptsiya-mezhdunarodnogo-nauchno-tekhnicheskogo-sotrudnichestva-rossiyskoy-federatsii/; Russia and China are implementing 80 investment projects worth… https://www.interfax.ru/business/937120; Areas of cooperation… https://ruschinalliance.unecon.ru/napravleniya-sotrudnichestva/.

[23] As suggested by [Matkovskaya, 2024].

[24] Thus, sanctions against Iran have been in place for several decades, sanctions against Russia have been in place since 2014 (the active phase, although they were in place before), and the trade war between China and the United States continues. Of the BRICS+ countries, only the United Arab Emirates and India have not yet been openly sanctioned, but such sanctions could be imposed on India if it becomes clear that its technological development threatens the interests of other countries.

Fig. 5. Inter-firm innovation ecosystem model



Источник: [Матковская, 2023b].

4. Technological, economic, financial and cybersecurity risks will only increase as the impact of major challenges on the development opportunities of individual economies, the economies of the BRICS+ countries and the global economy will grow.

5. A deepening of the STC between the BRICS+ countries may not take place, but this does not mean that the implementation of the STC is inappropriate.

6. The level of innovation-technological and scientific-technical development of the BRICS countries varies; the areas in which the countries have achieved success differ, as do the resources available to them and necessary for the further development of these areas. In addition to the conclusion on the feasibility of the implementation of the STC of the BRICS countries, it follows from this thesis that the STC should be mutually beneficial, the contributions should be proportionate (we cannot talk about donations, unless special international support programmes are meant), and the STC itself should bring significant innovative-technological and scientific-technical results for the participants, creating a basis for increasing the competitiveness of the BRICS+ countries and contributing to the achievement of the goals of technological and economic security of these countries.

7. It may be that the BRICS+ countries will have to take on the task of solving the problem of climate change, as well as the task of creating regulatory documents in the field of digital regulation (especially the part that affects everyone's concerns - in the field of AI).

In this regard, it is important.

1) to achieve an understanding of the strategic importance of the development of the STC by the BRICS+ countries (and for each of them);
2) to continue developing action programmes and gradual development of scientific and technological cooperation of the BRICS countries, including the development of mechanisms to protect the interests of the participating countries and the association as a whole (including the development of institutions for the protection of intellectual property), taking into account the legal status of the BRICS;
3) to strengthen actions to establish the infrastructure necessary for the implementation of scientific and technological cooperation by the countries of the Association, including digital infrastructure.

It is obvious that the list of tasks should only grow, but at the same time it should remain structured within the framework of mutually beneficial STC of the BRICS+ countries.

It has to be said that the work to solve these problems has already begun and is being carried out with varying degrees of productivity. In this regard, I would like to emphasise the importance of the announced decision on the formation by BRICS member countries of a 'single technological space, including on issues of the development of artificial intelligence (AI)', which is cited in the BRICS material[25], where it is also noted that the Chairman of the PRC already in 2023 'called for the creation of a common structure for the management of artificial intelligence'.

[25] https://www.tadviser.ru/index.php/Article:BRICS_(BRICS)#.2A_.D0.92_.D0.91.D0.A0.D0.98.D0.9A.D0.A1_.D0.BF.D0.BE.D1.8F.D0.B2.D0.B8.D1.82.D1.81.D1.8F_.D0.B5.D0.B4.D0.B8.D0.BD.D0.BE.D0.B5_.D1.82.D0.B5.D1.85.D0.BD.D0.BE.D0.BB.D0.BE.D0.B3.D0.B8.D1.87.D0.B5.D1.81.D0.BA.D0.BE.D0.B5_.D0.BF.D1.80.D0.BE.D1.81.D1.82.D1.80.D0.B0.D0.BD.D1.81.D1.82.D0.B2.D0.BE.

5. Prospects for the development of cross-border inter-enterprise innovation ecosystems of International Research Cooperation

Complementing his proposals for the development of S&T cooperation with the BRICS+ countries and revealing its microeconomic aspects, the author would like to draw attention to the prospects for the implementation of International Research Cooperation (IRC) between companies of the BRICS+ countries. First, however, it is necessary to consider the role of the state and intergovernmental agreements in the development of international scientific and technological cooperation. It can be qualified as 'initiative' or 'ensuring'. In the first case, states form relevant intergovernmental agreements and projects, combining efforts to create regulatory, institutional, technological, communication, infrastructural and other foundations for the implementation of ISTC, and also work to create incentives for the development of scientific, technical and innovative technological cooperation between their national business structures. In the second case, the governments of states, noting the activity in the development of the STC between their national companies and recognising its strategic importance for the development of their national economies, may enter into contractual relations and formulate appropriate policies in the field of the STC between these (two or more) countries. The purpose of such documents and related activities is to create more productive conditions for the development of scientific and technical cooperation between enterprises of these countries, as well as to structure and streamline the forms and methods of implementing such (in this case, scientific and technical) cross-border inter-enterprise cooperation. Of course, these 'strategies' are not diametrically opposed to each other, since no intergovernmental document, no matter how competently formulated, will be able to create the conditions for the real development of STC cooperation between certain countries if it is not supported by economic entities and, above all, if there are no objective prerequisites for its creation or if it does not create real conditions for the implementation of cross-border inter-enterprise cooperation in the field of STC cooperation. Finally, it should be emphasised that it is precisely the intensification of cross-border cooperation between companies, especially in the field of STC cooperation, that creates more dynamic relations in the field of ISTC cooperation.

More specifically, in relation to the development of international research cooperation between BRICS (and BRICS+) companies, it is necessary to propose for discussion the issue of the prospects for the formation of innovation ecosystems (IES) between BRICS companies, based on the proposal for the formation of intercorporate innovation ecosystems (ICIES) in Russia, which was presented in the author's previously published work [Matkovskaya, 2023b]. There is every reason to believe that the model proposed in it is also relevant for the development of cross-border ICIES (CBICIES) and can be implemented to form such innovative ecosystems between companies of the BRICS+ countries. In this respect, it should be noted, firstly, that the universality of the inter-enterprise IES matrix presented in Fig. 5 allows it to be used not only for ICIES but also for CBICIES (including the BRICS+ countries), due to the possibility of including an unlimited number of enterprises in ICIES (and CBICIES). However, in the case of the BRICS+ CBICIES, there are limitations due to the membership of the BRICS (BRICS+) countries whose CBICIES are included in the BRICS+ CBICIES. In other words, CBICIES can consist of n companies from m countries (currently $m \in [2, 9]$). Secondly, in the case of CBICIES, as in the case of ICIES, it can be assumed that the partial integration of two or more ICIES will make it possible to exploit the potential of the companies and obtain a synergy effect from inter-company cooperation. The development of CBICIES can both become one of the key factors in accelerating the innovative development of individual companies in the BRICS countries and create conditions for accelerating the innovative development of the BRICS countries whose companies become participants in such CBICIES[26].

At the same time, when developing such a practice, it is advisable to focus on the proposals made in [Gao et al., 2018]. The authors of the work point to the problem of corporate interference in the activities of foreign companies, including those implementing STC with companies on the territory of the host country, and propose two strategies, the first of which is that companies 'must demonstrate their legitimacy and usefulness to the host country'. At the same time, the researchers also point out that in the case of 'cross-border research alliances, the legitimacy of a foreign firm is partly based on its ability to develop and disseminate technologies that support the interests of the host country' and, referring to [Ge et al, 2021], they cite the example of the Chinese government 'forcing foreign automakers to establish R&D cooperation with domestic firms in order to facilitate the transfer of knowledge to local firms' (while the open exchange of technological knowledge can, according to these authors, 'meet government expectations' and help reduce the 'likelihood of government intervention'). Another strategy identified by these authors is based on 'engagement with host country politicians' [Gao et al., 2018; Jean et al., 2018].

[26] It is important to note that while this article was being prepared, an event occurred that confirmed the timeliness of such a question: on 11 December 2024, it was announced that 'the Russian Direct Investment Fund (RDIF), together with 20 companies from six countries, is creating the BRICS Alliance for the Development of Artificial Intelligence'. It is noted that this initiative was supported by 'more than 50 international companies'. https://www.gazeta.ru/tech/news/2024/12/11/24601442.shtml.

6. Conclusion: priority strategic guidelines

Despite the high rates of economic growth and development demonstrated by the BRICS countries (not to mention the rates of growth of mutual trade), our countries are still not interacting effectively enough; more precisely, the greatest effectiveness in interaction (in all areas) is achieved primarily by China, but even this country is extremely far from using the full potential of benefits from cooperation with the BRICS countries (including the STC).

Barriers to development are created by institutional constraints, primarily formed by the status of BRICS (BRICS is only a 'platform'), the differentiation of countries' positions on the direction in which BRICS should develop: expansion or deepening. Moreover, if the growth of mutual trade volumes contributes to the further development of integration processes, a number of other aspects (including those caused by the existence of long-standing territorial conflicts between individual BRICS countries, not to mention differentiation in ideology, religion, etc.) should have the opposite effect. However, the fact that the BRICS countries are intensifying their cooperation means that the integration processes between them are determined by the influence of a special deep-rooted factor, which is also innovative in relation to the factors that dominated in the industrial and previous eras, and that they are apparently guaranteed success in this integration. This is the phenomenon of the BRICS countries and it remains to be explored while continuing to work on the design and implementation of the STC strategy of the BRICS countries, including the use of an ecosystem approach and fine-tuning.

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An integrative concept of the knowledge management cycle and organisational distinctive competences

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Abstract
This article develops a complement to the integrative concept of the knowledge management cycle with a strategic competence subsystem, aimed at the sustainable growth of distinctive competences. The presented integrative concept of the knowledge management cycle and the organisation's distinctive competences allows to extend the conceptual framework of the approach aimed at combining the paradigms of the resource approach to strategic management and knowledge management. It is an attempt at a broader and more systemic interpretation of the approach that has emerged in recent years around the concept of knowledge-based dynamic capabilities (KBDC). As the organisation evolves, capabilities and competencies are constantly and dynamically recombined in updated configurations that allow for a flexible response to changing business conditions while maintaining a conscious focus on the organisation's significant long-term goals. At the same time, it is important to integrate knowledge as a kind of circulatory system that will circulate between the various competence bodies of the organisation, especially in relation to distinctive competences, although many of the principles are equally applicable to core competences. An organisation within the framework of such a paradigm in the context of the modern knowledge economy, can be defined as an intentionally directed knowledge system that strategically builds its pool of distinctive, key and unique competencies within the framework of an ascending and increasingly complex spiral reproduction of data, information and knowledge flows.
Keywords: knowledge economy, knowledge management, knowledge management cycle, distinctive competencies, core competencies, dynamic capabilities, information, knowledge-based dynamic capabilities, KBDC.

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知识管理周期和组织独特能力的综合概念

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简介
本文对知识管理周期的综合概念进行了扩展，增加了一个战略能力子系统，旨在持续增强与众不同的能力。所提出的组织知识和独特能力管理周期的综合概念，有助于扩展该方法的概念框架，旨在将基于资源的战略管理方法和知识管理范例结合起来。它试图以基于知识的动态能力概念为中心，对过去几年中出现的方法进行更广泛、更系统的解释。随着组织的发展，能力和胜任能力会不断动态重组，更新配置，以便灵活应对不断变化的业务条件，同时有意识地关注有意义的长期目标。重要的是，要把知识作为一种循环系统，在组织的不同能力之间进行循环，特别是从独特能力的角度来看，尽管许多原则同样适用于核心能力。在现代知识经济的背景下，这种范式下的组织可以被定义为一个密集导向的知识系统，它在数据、信息和知识流的螺旋式上升和日益复杂的再生产过程中，战略性地建立起自己独特、关键和独一无二的能力库。
关键词： 知识经济、知识管理、知识管理周期、独特能力、关键能力、动态能力、数据、基于知识的动态能力。

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Introduction

Within the modern understanding of the characteristics of knowledge as distinct from information and data, it is widely recognised that knowledge is formed and expanded through the analysis and interpretation of information, and that the mere structuring and organisation of data is not sufficient to produce reliable - and more importantly, productive - meanings in the context of achieving business objectives and implementing business strategies. In order to form knowledge, it is necessary to achieve a more holistic and deeper understanding based on concepts and theories (not necessarily within the strict academic canon as we usually understand these words), as well as principles. As a result, knowledge (as opposed to information) allows one to rely on deductive principles when making complex decisions, according to the famous statement of R. Descartes: 'The knowledge of principles frees one from the need to know many facts.' In the context of the implementation of business tasks and strategies, this deductive principle is largely associated with the distinctive competencies of the organisation, which are initially developed in a largely inductive manner, as the implementation of projects and business functions involves a constant grinding of resources against each other and a dynamic ascent from resources to capabilities and then to competencies, including key, distinctive and even unique competencies. As competences are formed, they become increasingly consistent with Descartes' understanding of knowledge as a kind of integral meta-ability to deal holistically with the solution of relatively homogeneous problems and tasks based on the principles of deduction.

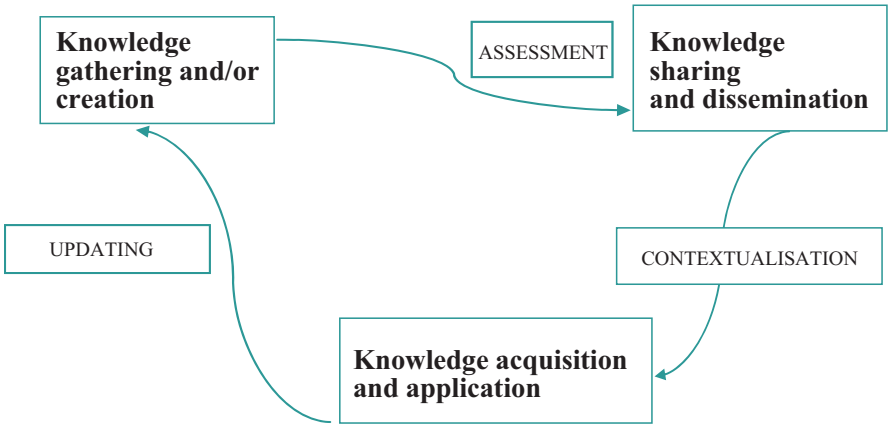
In recent years, the term 'knowledge-based dynamic capabilities' (KBDC) has been consolidated in research within the framework of a theoretical approach that aims to combine the paradigms of the resource-based approach to strategic management and knowledge management [Kaur, 2023]. The paper [Hernández-Linares et al., 2024] showed that knowledge-based dynamic capabilities are related to firm performance and that this relationship is partially mediated by the entrepreneurial orientation of the firm. [Songkajorn et al., 2022] examined the positive relationship between organisational strategic intuition and knowledge-based dynamic capabilities in high performance organisations.

The above-mentioned research direction to deepen the understanding of knowledge-based dynamic capabilities seems to be very important and productive, also because the theory of dynamic capabilities, in conjunction and in mutual complementarity with knowledge management, has proven to be particularly useful in the study of digital business transformation and organisational change [Mele et al., 2024]. This article presents an attempt at a more integrated view at the intersection of knowledge management and organisational capabilities/competencies. The aim is to complement the integrative concept of the knowledge management cycle with a strategic competence subsystem aimed at a sustainable increase in distinctive competences.

1. Integrative concept of the Dalkir Knowledge Management Cycle

A systematic review of various approaches to the knowledge management cycle [Wiig, 1993; Meyer, Zack, 1996; Bukowitz, Williams, 2000; McElroy, 2003] allowed K. Dalkir in 2005 to develop an integrated (a kind of consolidated) model with three main stages that are the most universal and sufficiently complete within the framework of systemic and cyclical knowledge management in an organisation: knowledge collection and/or creation, knowledge exchange and dissemination, knowledge acquisition and application [Dalkir, 2005; 2011]. The three main processes between these stages are evaluation, contextualisation and actualisation. Dalkir's integrative model is shown in Fig. 1.

Fig. 1. Integrative concept of the knowledge management cycle by Dalkir



Source: [Dalkir, 2005].

As is well known, the integrative concept of the Dalkir Knowledge Management Cycle has received a great deal of recognition due to its successful systematisation of previous, more specific concepts that were more disparate and less universal in their applicability and explanatory power. Among the strengths of the model is its high degree of complementarity with key business concepts such as competitive advantage, innovation potential and business processes. For example, researchers note that knowledge creation in the context of business is primarily the development of new innovations that did not previously exist in the organisation; and contextualisation is fully successful when new knowledge content and innovative increments are organised and integrated into the business processes of companies with obvious benefits for the owners [Mohajan, 2016].

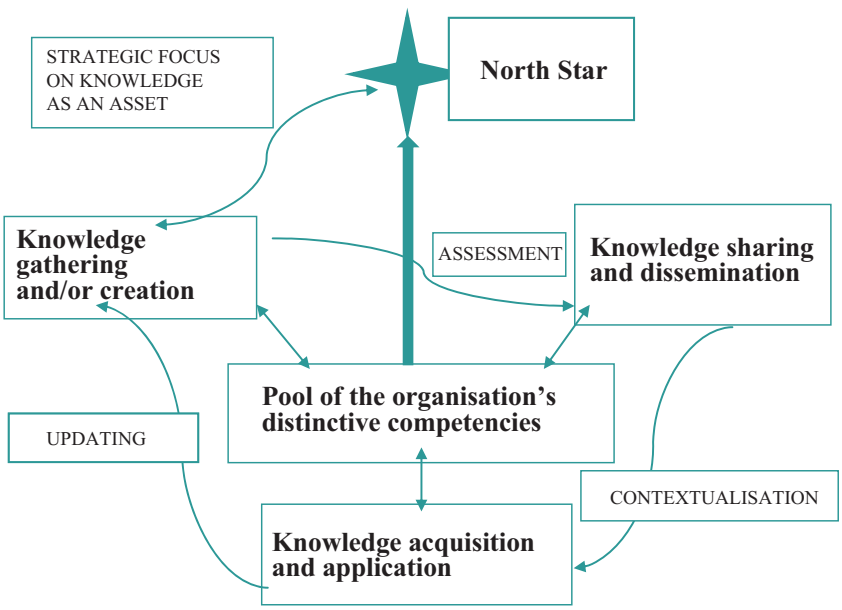
At the same time, however, it is possible to note that researchers have paid insufficient attention to integrating aspects of the knowledge management cycle with aspects of the strategic development of the organisation's capabilities and competencies in a broader context than knowledge capabilities, i.e. with a general model of competencies on the basis of which the organisation not only solves its current problems (especially business problems), but also implements its long-term vision and strategy. Although such research has emerged in recent years, this conceptual interface seems very promising and deserves more attention. Among recent studies, an attempt to integrate knowledge management processes, innovative capabilities and organisational activities is worth mentioning [Migdadi, 2022]. Another study examined the mediating mechanism of knowledge management capability in the relationship between human resource management and firms' innovative capabilities [Lei et al., 2021].

2. An integrative approach to the knowledge management cycle, complemented by a strategic competence subsystem

In order to emphasise the spiral nature of the knowledge management cycle in modern organisations, the explanation of Dalkir's integrative knowledge management concept can be supplemented with a vertical arrow reflecting the growth of the organisation's competences and the corresponding complication of the decision-making context, which in turn, through feedback, leads to a more ambitious demand for knowledge updating in line with important organisational goals. This combination of the integrative concept of the knowledge management cycle with the conscious development by the organisation of its pool of distinctive, key and unique competencies seems very productive, since it answers both the 'how' and the 'why' questions. An organisation within such a paradigm in the context of the modern knowledge economy can be defined as an intentionally directed knowledge system that strategically builds its pool of distinctive, key and unique competencies within the framework of an ascending spiral reproduction of data, information and knowledge flows. The integrative concept of the Dalkir knowledge management cycle, complemented by a strategic competence subsystem, is shown in Fig. 2. It can also be called an integrative concept of the knowledge management cycle and the distinctive competences of the organisation. It should be separately emphasised that within the framework of the presented integrative scheme it is the distinctive competences that are emphasised, and not the key competences. This emphasises that, in the context of the proposed addition to the integrative concept of the knowledge management cycle, the strategic competence subsystem even increases distinctive capabilities, while key competences (by definition less specific and easier to copy) are also present here by default and are built into the same mechanism of mutual reinforcement with the organisation's knowledge subsystem.

The North Star, shown in Fig. 2, represents the sense of identity and the underlying (meaning-generating) organisational purpose. Knowledge is organised and largely self-organises around the organisational purpose.

Fig. 2. An integrative concept of the knowledge management cycle and the distinctive competencies of an organisation



Source: developed by the author (supplemented by a strategic competence subsystem) on the basis of the integrative concept of the Dalkir Knowledge Management Cycle [Dalkir, 2005].

Knowledge-based organisations create deliberate, long-term and sustainable pathways for knowledge creation. They build a strategic architecture of processes that support the creation, acquisition, dissemination and renewal of knowledge.

Companies such as Google, Amazon and Microsoft organise their innovation activities in such a way that they constantly monopolise knowledge while outsourcing the development of individual innovative solutions to other companies and research institutes. Intellectual monopolies accelerate the accumulation of knowledge within their corporate innovation systems, which they then effectively transform into intangible assets [Rikap, Lundvall, 2020]. In this sense, distinctive competencies, especially in digital companies, are increasingly the result not only of data assetisation [Zhang et al., 2022], but in a broader interpretation - knowledge assetisation. The result is an intensification of the use of intangible assets in value chains and the creation of a kind of knowledge-based source of market power, which some researchers not without reason call intellectual monopoly capitalism [Durand, Milberg, 2019]. And this in turn leads to a wide range of socio-economic consequences - both positive and negative. The negative consequences also include a phenomenon such as digital rentiership [Birch, Cochrane, 2021], which is also largely the result of advanced knowledge.

Conclusions

As W. Churchill put it: 'The empires of the future are empires of the mind'. The same can be said about the current and especially future business empires that will be able to fully build a knowledge-centric model of organisational development on productive principles, including awareness and self-awareness in building their knowledge and competence profile based on the systemic interaction of these two cycles. It is particularly important to synchronise growth and focus knowledge on the strategic and deliberate development of skills in the organisation. Each organisation has a unique organisational identity based on how it integrates its competencies, which in turn determines many of the routines of self-learning, building a knowledge management cycle and forming a composition of distinctive competencies. As an organisation evolves, capabilities and competencies are continuously and dynamically recombined into updated configurations that allow flexible responses to changing operating conditions while maintaining a conscious focus on the organisation's meaningful long-term goals. It is important to integrate knowledge as a kind of circulatory system that circulates between the different competences of the organisation. An organisation, within the integral concept presented in this article, can be defined as an intentionally directed knowledge system that strategically builds its pool of distinctive, key and unique competencies within the framework of an ascending spiral reproduction of data, information and knowledge flows.

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Wind energy market in Russia and abroad: Problems and prospects development

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Abstract
Wind energy is a renewable energy source, and wind power is a dynamically developing new branch of non-traditional green energy in Russia and in the world. Despite the sanctions and the unfavourable economic situation in the country, Russian energy specialists are pursuing a course for the wind energy development, supported by government programmes. The difficult situation for the implementation of the green energy programme is linked to objective difficulties: Russia has accumulated a surplus of oil and gas that is not needed in Europe, and Western manufacturers have left the Russian market, without which it is difficult to build new wind turbines. The industry has also accumulated methodological problems - on the choice of a methodology for calculating the efficiency of wind farms and tools for internal and strategic planning. This article is an overview of the amount of energy production from wind farms in Russia and countries around the world.
Keywords: green energy, wind energy, efficiency calculation methodology, planning, wind farms in the world, wind farms in Russia.

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俄罗斯和国外的风力发电市场：风力发电发展的问题和前景

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简介
风能属于可再生能源，在俄罗斯和世界上，风能是非常规绿色能源中一个蓬勃发展的新部门。尽管俄罗斯面临制裁和不利的经济形势，但国内能源部门仍在政府计划的支持下发展风力发电。由于客观困难，绿色能源计划的实施面临困难：俄罗斯积累了欧洲不需要的过剩石油和天然气，西方制造商离开了俄罗斯市场，没有这些资源，建设新的风力发电厂就成了问题。该行业还积累了一些方法论问题，如风电场效率计算方法的选择以及内部和战略规划工具的选择。文章概述了俄罗斯和世界风电场的发电量。
关键词：绿色能源、风力发电、效率计算方法、规划、世界风电场、俄罗斯风电场。

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Introduction

Wind energy is a non-traditional branch of the power industry and an important branch of the national economy of any country, creating the necessary conditions for efficient production, economic growth and improvement of the conditions for social development of society. In the last two decades of the 20th century, renewable energy sources (hereafter referred to as RES) have been increasingly used worldwide: sun, water, wind, tides, underground currents, geothermal sources, biomass, instead of traditional hydrocarbons. Unlike water, the sun and wind are clean, renewable and ubiquitous sources of energy. The kinetic energy of air masses moving under the force of wind is caused by the uneven heating of the atmosphere by the sun and the rotation of the Earth. Wind energy is estimated at 175-219 thousand TWh per year, while the power it develops is approximately 2.7 times greater than the total energy consumption on the planet [Gvozdev, 2019]. The potential of renewable energy sources, including wind, is great and offers innovative solutions to the problem of energy supply, while at the same time solving environmental problems.

Today, wind power is a part of the green energy programme and a dynamically developing sector of the global and Russian energy sector. In 2023, the installed capacity of wind power plants in the world will reach 1TW, and by 2030, subject to strengthening of supply chains and solving other problems, it will reach 2TW[1].

According to experts, renewable energy sources will be the fastest growing segment of the global energy market over the next 20 years, and their share of global electricity generation will increase significantly by 2035 - about one and a half times the current 21%. Currently, 65% of Russia's electricity is generated by thermal power plants, 18.3% by the ten nuclear power plants in operation, and 15.9% by hydroelectric power plants. However, alternative energy, including wind power, is still underdeveloped in Russia, accounting for less than 1% of electricity[2].

In 2009, the Russian energy industry for the first time set a course for the development of renewable energy sources, setting a target of 4.5% of total production by 2024. Wind power is therefore a very young part of green energy, both in Russia and in other countries around the world.

In 2021, the Government of the Russian Federation decided to extend the validity of the basic document in the field of alternative energy 'Main directions of state policy in the field of increasing the energy efficiency of the electric power industry based on the use of renewable energy sources' from 2025 to 2035[3]. By the end of the programme, the systematic development of the Russian energy sector is expected to result in the introduction of more than 12 GW of renewable generation capacity. The estimated volume of investment in green energy is 360 billion roubles[4]. The expected effect of extending the renewables programme to 2035 is to make green electricity cheaper than electricity from conventional sources.

Energy-efficient wind zones in Russia are mainly located on the coasts of seas and oceans. According to the Russian Wind Energy Association[5], the most promising areas for wind energy development are Kalmykia, Krasnodar and Stavropol Krai, Astrakhan, Volgograd and Rostov oblasts, the Far Eastern, North-Western, North Caucasian, Siberian and Ural Federal Districts, territories beyond the Arctic Circle and coastal areas in the north-east of the country.

1. Basic concepts and terms of wind energy, a brief history of its origins

Wind energy is a branch of science and technology that develops the theoretical foundations, methods and means of harnessing wind energy for the production of mechanical, electrical and thermal energy, and determines the areas and scales of appropriate use of wind energy in the national economy [Klimov, 2013]. Wind energy consists of wind engineering, which develops the theoretical bases and practical methods for designing technical means (units and installations), and wind use, which includes theoretical and practical issues of optimal use of wind energy, rational operation of installations and their technical and economic indicators, and generalisation of experience in the use of installations in the national economy. Wind energy is based on the results of aerological studies, on the basis of which a wind energy cadastre is being developed.

Wind power plants (WPPs) convert the kinetic energy of the wind into electrical energy. Wind power plants are grouped into wind power plants (WPPs). Such plants are classified as onshore and offshore depending on their location. Onshore WPPs are located on land, while offshore WPPs are located above the water surface.

Wind power is one of the most efficient and environmentally friendly sources of renewable energy in the world. In Russia, which has a huge potential for wind energy resources, the development of wind energy is of great importance for increasing the country's energy security and reducing its environmental impact. The

[1] Current status and prospects for the development of wind energy. https://eenergy.media/news/29774?ysclid=m345k6kwk166671424.
[2] Green energy: sun and wind instead of oil and gas. https://tass.ru/ekonomika/4083895.
[3] Order of the Government of the Russian Federation dated 08.01.2009 N 1-r (as amended on 03.09.2024) 'On the Main Directions of State Policy in the Field of Increasing the Energy Efficiency of the Power Industry on the Basis of the Use of Renewable Energy Sources for the Period up to 2035'. LRS 'Consultant+'.
[4] The government has clarified the target indicators and conditions for supporting green energy projects. http://government.ru/docs/42377/.
[5] Current status and prospects for the development of wind energy. https://eenergy.media/news/29774.

wind energy industry is relatively young, both in Russia and globally, but has great potential for development.

Historically, people have used wind power to move sailing ships and to power windmills to grind grain. The first research into wind power in the USSR began in the 1930s. In 1931, the All-Union Committee for the Study of Wind and Wind Energy began research into the possibilities of using wind to generate electricity. As a result of these studies, the first wind engines and wind generators were created to supply energy to remote settlements and radio stations. Research institutes were opened to study wind power. The world's first modern horizontal axis wind turbine with a capacity of 100 kW was built in Crimea in 1931.

Throughout the 1940s and 1950s, research continued and many new wind turbine technologies and designs were developed. One of the first examples of successful wind energy use in the USSR was an experimental station on the Kola Peninsula, which began operating in 1954. The period from the 1960s to the 1980s was characterised by the development of new technologies and designs for wind turbines.

However, the development of wind energy in the USSR was more of a scientific interest than an economic one, given the abundance and availability of traditional energy sources such as oil, gas, coal and nuclear power. However, some wind energy projects have been successfully implemented in remote areas of the country where the use of wind was economically viable. After the collapse of the Soviet Union in 1991, research into wind energy declined due to a lack of funding and government support.

Since the early 2000s, interest in wind energy has been growing in Russia, in line with the global trend towards the development of renewable energy sources and the global trend towards the reduction of greenhouse gas emissions. In 2009, the Russian government adopted the first Federal Target Programme for the Development of Renewable Energy for the period up to 2020, which includes the development of wind energy in the country. The programme was later extended to 2025 and then to 2030. As a result, the first large-scale wind farm in Russia was commissioned in 2017 - the Ustyansky wind farm in the Republic of Karelia with an installed capacity of 35 MW. Several other large projects were implemented in the following years: Kochubeevsky (Krasnodar Region) and Adygeysky wind farms with an installed capacity of 60 MW and 150 MW respectively. In 2020, the Rodnikovsky wind farm in Stavropol Krai will be commissioned with an installed capacity of 210 MW[6].

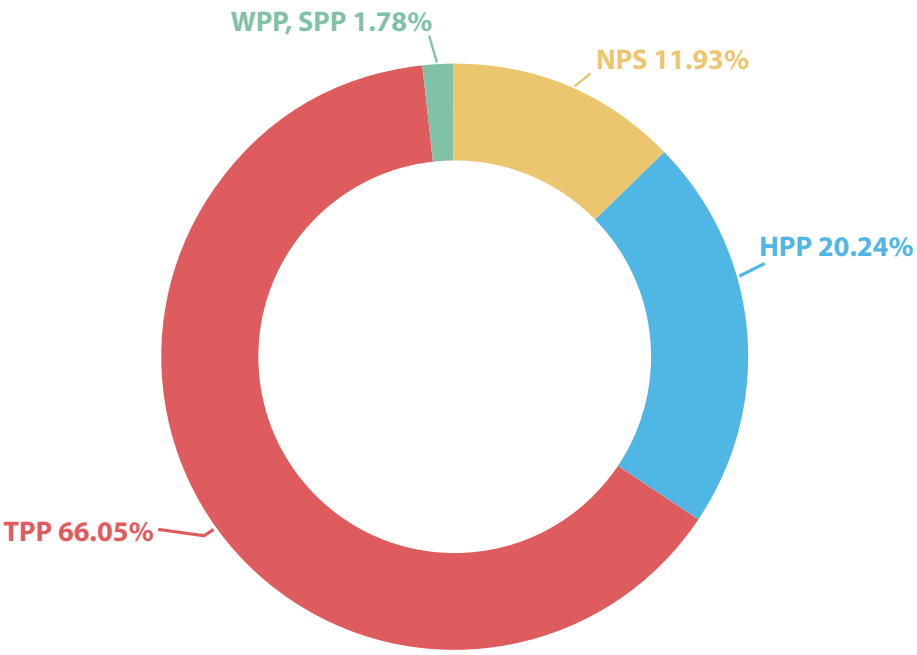
2. Current state of the wind energy market in Russia

According to some estimates, about 65-70% of the territory of Russia, with a population of 20-25 million people, either has no centralised energy supply or the facilities are in poor condition[7], which makes the development of alternative energy sources extremely important for the country's national economy.

In Russia, the main wind energy zones are located on the coast of the Arctic Ocean, on the islands of the sea from the Kola Peninsula to Kamchatka, in the Lower and Middle Volga and Don regions, on the coasts of the Caspian, Okhotsk, Barents, Baltic, Black and Azov Seas. Separate zones are also found in Karelia, Altai, Tuva and Lake Baikal, areas with the highest average wind speed in the autumn-winter period of the year.

The current state of the Russian energy system by type of energy produced is shown in Fig. 1. The total installed capacity of Russian power plants at the beginning of 2023 was 247,601.8 MW, which is 0.41% higher than

Fig. 1. Structure of the installed capacity of the UES in Russia as of 01.01.2023



Source: Kindratyshin R. (2023). Energy system of Russia: forecast for 2023-2028. https://conomy.ru/analysis/articles/1020.

[6] Russia revives wind power. https://www.cdu.ru/tek_russia/issue/2024/8/1289/.
[7] Renewable energy as a new evolutionary step for oil and gas companies. https://assets.kpmg/content/dam/kpmg/ru/pdf/2019/12/ru-ru-renewable-energy-sources-for-oil-and-gas.pdf.

Table
Installed capacity and electricity production of wind farms in Russia, 2019–2023

Indicator	2019	2020	2021	2022	2023
Installed capacity (MW)	184	1 027	2 036	2 218	2420
Electricity generation (thousand GWh)	0.32	1.38	3.62	5.5	5.49
Share of wind power in electricity generation (%)	0.03	0.13	0.32	0.47	0.49

Source: compiled by the authors based on: WWEA annual report 2023: Record year for windpower. https://wwindea.org/AnnualReport2023.

the values at the beginning of 2022 (246,590.9 MW). In 2022, 1610.7 MW of new generating capacity came on stream and 972.2 MW was decommissioned. As a result, the change, taking into account the re-labelling of existing plants (372.4 MW), is +010.9 MW.

In 2022, total electricity generation from power plants in Russia was 1121.6 billion kWh, 0.63% higher than in 2021 (1114.55 billion kWh), and only 1.78% of the total energy generated was from wind power.

Russia first embarked on a course to develop renewable energy sources in 2009, setting a target of 4.5% of total production by 2024 (excluding hydroelectric plants over 25 MW). The programme to promote the construction of renewable energy sources was launched in 2013. It is based on supporting investments in this sector at the expense of energy market consumers with a fixed tariff for capacity over 15 years with a return of 12%.

The main foreign investors in the construction of Russian wind farms in 2022 were Enel (Italy), Fortum (Finland), Lagerwey (Holland), Siemens Gamesa (Germany). Russian companies - major investors in wind farms - Gazprombank, Rosatom, Rusnano, RDIF, etc.

Russia's wind energy zones, promising for wind energy development, cover almost 5 million km [8]. Across Russia, the technical potential of wind energy is estimated at 17,100 billion kWh at a height of 100 metres (the height of the hub of a modern wind turbine), which is almost 17 times higher than the power generation in the Unified Energy System of Russia for 2023. At the same time, the duration of wind energy flow is from 2000 to 5000 h/year[9]. It is clear that the technical potential of wind energy in Russia exceeds the volume of electricity consumption in the country.

The most promising areas for the installation of wind turbines are the coasts of the seas and parts of their shelves. The development of wind energy is most expedient in the Astrakhan, Volgograd and Rostov regions, the Krasnodar and Stavropol territories, the Republic of Kalmykia, the North-West, North Caucasian, Siberian and Ural Federal Districts, the Arctic, Kamchatka and Sakhalin.

By the end of 2023, Russia will have 37 wind power plants in operation, 7 isolated power systems, 17 under design and construction, and 6 decommissioned[10]. Data from previous years from the World Wind Energy Association (WWEA) annual report for the first half of 2023 are summarised in a table, reflecting the gradual growth of installed capacity and electricity production of wind power plants in Russia in 2019-2023. It is no coincidence that WWEA's 2023 Annual Report is entitled: 'A record year for wind energy'.

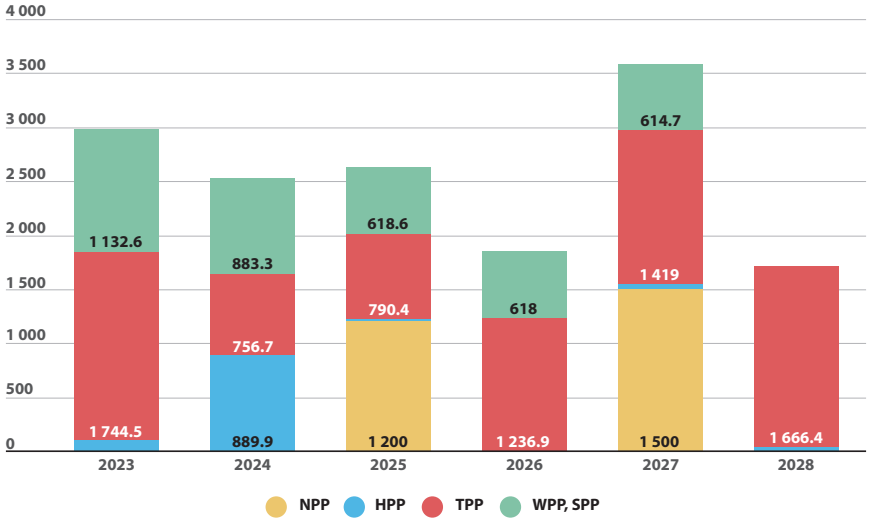
Wind farms are being built most actively in the south of Russia. In the Rostov region, for example, there are 6 wind farms with a total capacity of 610 MW. The Adygeya wind farm consists of 60 wind turbines, each with a capacity of 2.5 MW. The Kochubeevskaya wind farm in Stavropol consists of 84 such turbines spread over 75 hectares and is capable of supplying electricity to a city of 200,000 people.

Russia's largest export wind farm is to be built in the Amur region; the project aims to export up to 3 billion kWh of energy per year to China. The wind farm will have a capacity of 1058 MW and an investment of 100 billion roubles, part of which will be provided by Chinese partners.

In Stavropol Krai, three major projects for the construction and commissioning of renewable energy production facilities with a total capacity of 163.8 MW are planned for 2024-2029: the second stage of the Trunovskaya wind farm with a capacity of 35 MW, to be commissioned in 2024; the Simonovskaya wind farm with a capacity of 57.5 MW and the Sotnikovskaya wind farm with a capacity of 71.3 MW, to be commissioned

[8] Green energy: sun and wind instead of oil and gas. . https://tass.ru/ekonomika/4083895.
[9] Current status and prospects for the development of wind energy. https://eenergy.media/news/29774.
[10] Current status and development prospects of wind energy. https://eenergy.media/news/29774.

Fig. 2. Russian energy system in 2023–2024, forecast for 2025–2028



Source: Kindratyshin R. (2023). https://conomy.ru/analysis/articles/1020.

in 2025[11]. The capacity of the power stations is expected to increase by a further 6 MW as a result of equipment modernisation.

Overall, the Russian Wind Industry Association (RAWI) predicts that the total installed capacity of wind turbines will reach 8 GW by 2035[12].

Today, the wind energy sector in Russia is gradually regaining momentum after a decline in 2022 caused by the geopolitical situation and sanctions. The structure of the wind energy market has remained stable, and the total amount of electricity generated by wind farms has increased. Despite the withdrawal of foreign companies from the Russian market, domestic companies are continuing to expand their own activities, adapting to the changed operating conditions and rebuilding logistical routes for the receipt of necessary technologies.

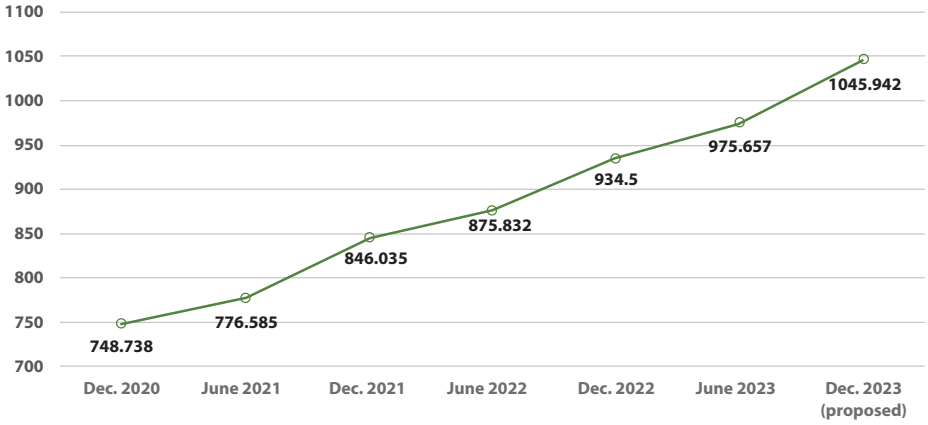
The ratio of energy produced from different types of sources in Russia and the forecast for the medium term are shown in Fig. 2.

Wind energy is currently seen as an alternative to traditional energy and should be used as a complement to the main forms of electricity generation.

3. World wind energy

According to the World Wind Energy Association (WWEA), 41.2 GW of wind power capacity was installed worldwide in the first half of 2023, 38% more than in the same period of 2022[13]. The most effective way of harnessing wind energy abroad is to combine wind turbines into wind power plants that operate on unified electricity grids of large and comparable capacity to wind power plants. Such wind farms, operating in parallel with

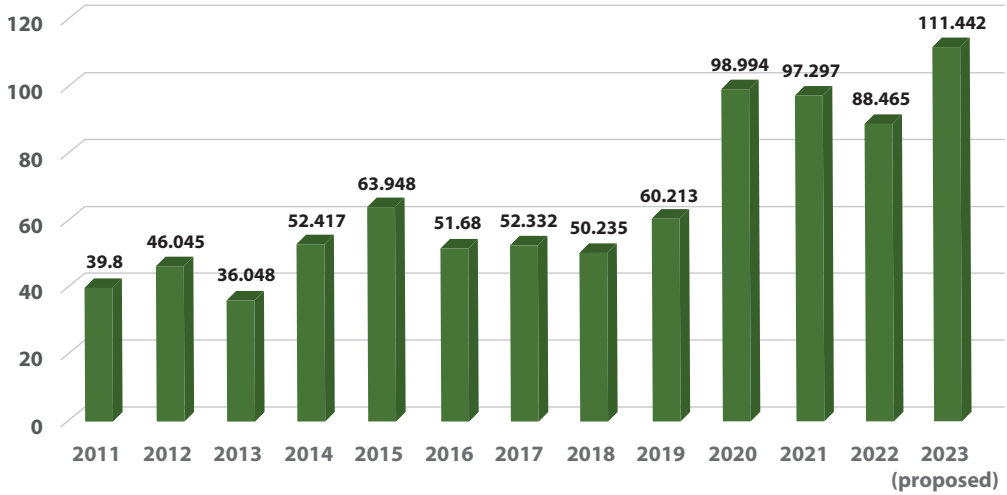
Fig. 3. Global installed wind power capacity



Source: WWEA annual report 2023: Record year for windpower. https://wwindea.org/AnnualReport2023.

[11] Five power plants will be built and modernised in Stavropol by 2029. https://www.metalinfo.ru/ru/news/157534.
[12] Wind energy: is it cheaper than conventional kilowatts? https://nangs.org/news/renewables/wind/energiya-vetra-deshevle-li-ona-v-sravnenii-s-traditsionnymi-kilovattami.
[13] This year, the world is expected to see a record increase in wind power - more than 110 GW. https://www.in-power.ru/news/alternativnayaenergetika/53648-v-tekuschem-godu-ozhidaetsja-rekordnyi-prirost-vetroenergetiki-v-mire.html.

Fig. 4. Dynamics of change in global wind power capacity, 2011–2023



Source: WWEA annual report 2023: Record year for windpower. https://wwindea.org/AnnualReport2023.

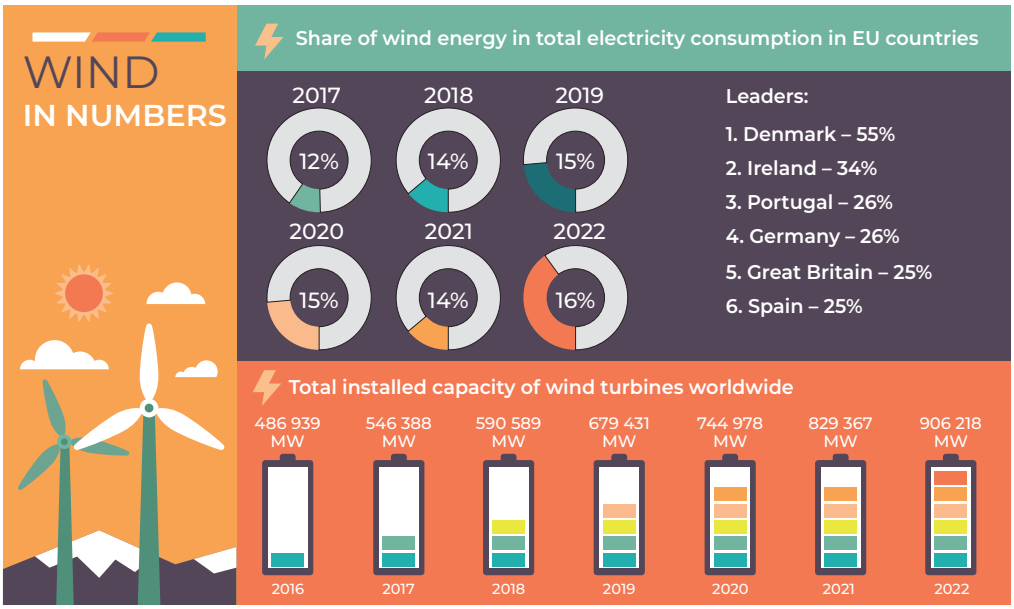
electricity grids, produce about 95% of the world's wind power.

Analysis of the WWEA[14] report data for the first half of 2023 shows a smooth and stable trend in global wind power capacity growth (Fig. 3).

From 2011 to 2023, there is a general upward trend in installed wind power capacity (Figure 4), with small periods of fluctuation, and global installed wind power capacity reaches more than 1045 GW by the end of 2023, in line with the report's forecast.

According to the WWEA report, China leads the world market with 23.8 GW of installed capacity in the first half of 2023. China was the first country to pass a renewable energy law on 1 January 2006 (Ontario, Canada did not pass the Green Energy Act until 2009). China is followed by India, Brazil and the US, each of which added more than 2 GW. In Europe, Germany and France had the highest growth in wind power, adding more than 1 GW each[15]. Russia is not included in this assessment. Figure 5 shows the distribution of

Fig. 5. Distribution of the share of wind energy in electricity consumption in EU countries



Source: World Wind Energy: 2022 Results. https://www.eprussia.ru/epr/460/1978524.htm

[14] WWEA annual report 2023: Record year for windpowerhttps://wwindea.org/AnnualReport2023.
[15] WWEA annual report 2023: Record year for windpower. https://wwindea.org/AnnualReport2023.

the share of wind energy in the provision of electricity consumption in the EU countries.

In 2022, 16,000 MW of new wind power capacity will be installed in EU countries, 40% more than in 2021. Germany leads the way, followed by Sweden, Finland, France and the UK. There is currently 255,000 MW of wind power capacity in operation in Europe and the share of wind power is growing[16] and the share of wind power is growing.

The European Union will add 17 GW of new wind power in 2023, more than ever before in a calendar year[17]. However, this is well below the EU's targets for 2030: 30GW of new wind capacity should be installed in the Union each year. Possible reasons include the deteriorating economic situation in EU countries due to the outflow of EU budget funds to support military conflicts and resolve humanitarian crises.

The European Commission has set a target of 43% of electricity consumption coming from wind power by 2030. To achieve this, the EU will need to build an average of 31,000 MW per year until 2030, with investment in wind energy declining from 2022. It should be noted that 87% of the new wind capacity to be built in Europe in 2022 were onshore, while only 2.5 GW of new offshore wind capacity were commissioned.

However, the Global Wind Energy Council (GWEC[18]) previously made an encouraging forecast of 680 GW of wind power installed worldwide by 2027, enough to power around 657 million homes per year. This forecast is likely to be revised for geopolitical reasons.

4. Problems with wind energy in Russia

The main directions of development of modern wind energy include:

- creation of large network wind power plants;
- creation of commercial megawatt-class wind power plants;
- reduction in the cost of electricity produced by them;
- environmental protection.

The Russian wind energy industry is influenced by a number of factors that need to be taken into account when developing the renewable energy grid:

- threats of non-use of renewable energy sources due to the vast reserves of natural resources used in traditional methods of generating electricity;
- low level of investment in the industry, insufficiently developed system of state support in this area;
- the impact of the geopolitical situation and sanctions restrictions;
- lack of own promising technologies and equipment necessary for the development of generation capacities on the territory of Russia;
- inadequate government regulation of the industry;
- high import dependency for wind energy, hence the importance of technical independence;
- lack of domestic competition;
- unfavorable economic indicators in the country (high inflation, price volatility, floating exchange rates, etc.).

An obstacle to the active use of alternative energies could be the Russian government's initiative to increase the tariffs for the technical connection of consumers to the power grid. The industry therefore needs well-considered government decisions.

There is some disagreement among Russian economists and engineers on the choice of methodology for calculating the efficiency of wind farms, issues of financing investment projects in the field of wind energy and some financial and economic aspects [Becker, 2007; Zinatullin, Chibisova, 2011; Sheryazov, Shelubaev, 2014; Kiryanov, Kudelin, 2021; Mokshin, Putilov, 2023]. The reasons for this were difficulties in accurately forecasting the energy supply for the project, uncertainty or irrelevance of data, the choice of design option for the wind farm energy equipment, etc. Thus, when calculating the financial efficiency indicators, the cost forecast does not raise any questions, but it is much more difficult to forecast the revenues of the project, since the bulk of them will be generated by the sale of the energy produced by the wind farm. There is a difficulty in predicting the price of energy resources over a long period of time, as this prediction is directly related to a random variable - the average annual wind speed.

The cost of electricity generated by wind power plants in Russia is 3.5 roubles/kWh (set from 1 March 2023), which is cheaper than traditional electricity. This price can be fixed for 15 years, which allows wind turbine owners to plan their investments and returns in the long term. The price of electricity generated by wind turbines is highly dependent on the economic, regulatory and geographical characteristics of the region to which it is supplied. Despite the methodological difficulties in accounting and planning, evaluating investments in wind farms, assessing efficiency, etc., the wind energy market is promising and has the necessary potential for long-term growth.

In addition to the economic and environmental impacts of wind energy, there are also negative environmental impacts associated with wind turbines, such as noise ('wind generator syndrome'[19]), which is audible to humans, and low-frequency vibrations that can only be

[16] Mogilenko A. World wind energy: results of 2022. https://www.eprussia.ru/epr/460/1978524.htm.
[17] The EU built 17 GW of new wind power in 2023. https://www.interfax.ru/world/940213.
[18] Global Wind Energy Council (GWEC). https://gwec.net/.
[19] People living near the wind turbine received a large sum of money: the power station caused serious damage to their health. https://www.techinsider.ru/science/1572635-zhivushchie-ryadom-s-vetryakom-lyudi-poluchili-krupnuyu-summu-deneg-elektrostanciya-nanesla-sereznyy-vred-ih-zdorovyu/.

detected with the use of equipment (impact on the human vestibular system).

5. Prospects for wind energy development in Russia

Russia plans to introduce 3 GW of wind power capacity by 2030, according to the Renewable Energy Development Association (REDA). Domestic wind power technologies are currently being developed. An important feature of wind farm projects is their low-cost operation, and the main investments are required for the construction of wind power plants[20].

In the long-term perspective of wind energy development in Russia, the share of renewable energy sources in the country's energy balance is expected to increase to 7-10% by 2035. To achieve this goal, the Russian government plans to hold additional auctions for the construction of new wind power plants, including with partners from countries friendly to Russia.

Particular attention will be paid to the development of wind energy in the northern and eastern regions of Russia, where wind has the greatest potential. There are also plans to develop a distributed generation network based on wind power plants to supply remote settlements and industrial enterprises. Wind energy is already included in Russia's energy strategy, and the reasons for this interest are as follows:

- the transition of developed countries to the next technological order [Glazyev, 2012] - the 'hydrogen economy', in which renewable energy sources can be easily integrated;
- the enormous energy potential of the country's wind energy sector, which makes it possible to include this area of renewable energy in the country's strategic energy plans;
- fast payback for wind farms - within 10 years;
- technical simplicity and speed of construction of wind farms;
- expanding the capabilities of the Rosatom Corporation, which has a range of solutions from nuclear to renewable energy;
- the climatic conditions in Russia are favourable for the development of wind farms;
- the absence of a fuel component in renewable energy generation that affects tariff formation and the environment;
- Government programmes for the development of wind energy, including investment.

In the area of research and development, Russia continues to work actively on improving technologies and materials to create more efficient and reliable wind turbines. Of particular interest are innovative technologies such as the creation of vertical axis wind turbines and the development of energy storage systems to improve the stability of wind farms.

It is also worth mentioning the introduction of digital technologies and solutions in wind energy, especially in the nuclear industry, which will improve management efficiency, optimise planning processes and electricity production in different regions, taking into account local characteristics [Mokshin, Putilov, 2023].

Meanwhile, the Russian government's initiative to increase tariffs for the technical connection of consumers to the electricity grid may become an obstacle to the active use of such electricity. As already mentioned, according to the decision of 30 June 2022, these rates have increased by 82 times[21].

By 2035, Russia plans to build about 12 GW of green power (based on wind, solar and small hydro), which will represent 4.8% of current total generation capacity[22].

Conclusion

Energy dependence is the main problem of the modern world economy and a national problem of every country's economy. In an attempt to solve this problem, engineers are using alternative renewable energy sources. The most effective and promising direction in the use of green renewable energy sources is considered to be wind energy, the development of which has recently received more attention in Russia due to the peculiarities of the country's territory. The use of wind power to supply energy to industrial and social facilities has developed in a number of countries in Europe, Asia and North America. According to some data, the total share of electricity generated by wind generators has exceeded the total output of nuclear energy[23].

The economic aspects of wind energy development, as opposed to its technical and technological features, are not yet sufficiently reflected in Russian scientific journals, since this is a new direction and wind energy occupies an insignificant share of the total volume of energy production in Russia. Therefore, the main sources of information here are statistical data, policy documents from government agencies and analytical reviews by experts, which are publicly available on the Internet [Golovko et al, 2022].

The new history of wind energy in Russia shows that despite the difficulties and limitations associated with the development of the energy sector in the country, wind energy continues to demonstrate its potential and prospects for ensuring energy security and sustainable development. Completed projects and ambitious plans

[20] Russia revives wind power. https://www.cdu.ru/tek_russia/issue/2024/8/1289/.
[21] Decree of the Government of the Russian Federation of 30 June 2022 No. 1178... https://www.consultant.ru/document/cons_doc_LAW_420866/92d969e26a4326c5d02fa79b8f9cf4994ee5633b/.
[22] By 2035, Russia could add 6.7 GW of hydroelectric capacity and 12.2 GW of nuclear capacity. https://tass.ru/ekonomika/17035803.
[23] Development of wind power in Russia. https://pkckinematika.ru/info/articles/ekonomika/razvitie-vetroenergetiki-v-rossii/.

for the future are opening up new opportunities to harness the country's wind resources, increase energy efficiency and reduce environmental impact.

An important aspect of the further development of wind energy in Russia is state support for investment projects and scientific research, as well as stimulating the development of industry companies and creating favourable conditions for their work. In this area, measures can be implemented to provide tax incentives and loan guarantees, as well as the development of specialised training programmes for industry in the context of the digital economy [Rimskaya et al, 2021].

Despite the geopolitical situation, Russian energy companies and research institutes are ready to cooperate with international partners and participate in global green energy initiatives, facilitating the exchange of experience and technologies, accelerating the development of new solutions and increasing the competitiveness of domestic wind energy in the global market.

Wind energy in Russia has every chance of becoming an important element of the country's energy system and playing a key role in the transition to sustainable and environmentally friendly development.

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Strategic analysis of the activities of state outpatient medical organisations

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Abstract

Since the entire healthcare system operates in a dynamically changing and unpredictable environment, it requires strategic management. In order to achieve a socio-economic outcome in the context of Russian healthcare, state outpatient clinics will be the most important, as most goals and objectives can be achieved in an outpatient setting.

The purpose of the study is a generalised assessment of the activities of all state outpatient medical institutions of the Russian Federation on key aspects of their activities in order to formulate a long-term development strategy for these institutions.

This study uses the method of strategic analysis of the organisation's activities by means of PEST analysis. The PEST analysis was carried out with the participation of experts from various areas of the Russian Healthcare System.

The results of the study. On the basis of the literature studied, the main factors that can influence the activities of the state polyclinic have been identified. These factors were selected by the author from a total of 40 questions and submitted for assessment by health professionals. Experts assessed the level of influence of the factor and the likelihood of the factor occurring in a state outpatient facility. On the basis of the estimates, a PEST analysis table has been compiled for the activities of governmental outpatient institutions. A weight-adjusted estimate is also calculated for each factor and a table of the influence of the factors in descending order is compiled. On the basis of this analysis, the main directions for the development of state outpatient medical institutions were formulated.

The practical application of the results is possible in the conditions of the state outpatient medical service of the Russian Federation, since the main points of the development direction are formulated. The economic aspect of this study is the effective economic functioning of an outpatient institution based on a scientific approach in the field of strategic management.

The originality and significance of this study lies in the fact that it conducts a PEST analysis in relation to state outpatient institutions of the Russian Federation, which has not been done before. The main scientifically based directions for the development of state outpatient medical institutions are also formulated.

Keywords: strategic management, PEST analysis, state outpatient medical institutions.

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公立门诊医疗机构活动的战略分析

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简介
由于整个医疗系统是在一个动态变化且难以预测的环境中运行，因此需要进行战略管理。为了在俄罗斯医疗保健领域取得社会经济成果，最重要的是国立门诊和综合医院，因为大多数目标和目的都可以在门诊环境中实现。这项研究的目的是对俄罗斯联邦所有国立门诊医疗机构在其活动的主要方面的业绩进行总体评估，以便制定这些机构的长期发展战略。
本文采用PEST分析法对该组织的活动进行战略分析。根据所研究的文献，确定了可能影响国立综合医院活动的主要因素。
作者编写并提供了40个问题，供卫生专家评估公共门诊机构受因素影响的程度及其发生的概率。根据评估结果，编制了公共门诊机构活动的PEST分析表。此外，还计算了每个因素的权重调整分值，并按从高到低的顺序编制了因素影响表。在此分析基础上，制定了公立门诊医疗机构的主要发展方向。
制定了国立门诊医疗机构的主要科学发展方向。研究成果可在俄罗斯联邦国立门诊医疗机构的条件下实际应用；研究的经济方面包括门诊机构在战略管理领域科学方法的基础上有效的经济运行。
关键词: 战略管理、PEST 分析、公立门诊医疗机构。

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Introduction

The peculiarities of health care management include the special responsibility of the decisions on which people's lives and health depend, the difficulty, and sometimes the impossibility, of predicting the long-term consequences of the decisions taken and of correcting wrong decisions [Evgrafova, 2016]. Thus, the main difference between the strategic management of medical organisations and other commercial institutions is that it should be based on a socially oriented approach, which means that all actions during the implementation of the strategic plan should be aimed at achieving a socio-economic result. [Khansuvarova, 2021]. The socio-economic outcome in the healthcare system of the Russian Federation can be understood as follows:

- rise in average life expectancy;
- reduction of mortality of the population due to various causes;
- increase in the birth rate;
- improvement in patients' quality of life;
- strengthening of the relationship of trust between the health care system and the population.

In order to achieve socio-economic outcomes in the context of Russian healthcare, state outpatient and polyclinic institutions will be the most important, as most goals and objectives can be achieved in outpatient settings. Outpatient and polyclinic care is the main link in the healthcare system of the Russian Federation and, therefore, the most popular type of medical care, which today is received by more than 80% of patients [Vlasova, Sergeeva, 2019]. The outpatient clinic provides prevention and early detection of socially relevant diseases. When analysing the consumers of medical services in the conditions of a budgetary outpatient institution, it is impossible not to notice that the main consumers of medical services are elderly and old people, patients with multiple chronic diseases, mostly people with average or low income due to the impossibility of obtaining alternative paid care. Therefore, the development of the organisation's goals and strategy should take into account the main consumers of medical services. In addition to the elderly and senile, anxious and depressed patients often become the main consumers of medical services in state institutions. This

places a significant burden on the public health system due to the high number of cost ineffective examinations and treatments, as well as sick leave. Given that the high social importance of health services leads to a conflict between social and economic efficiency, which consists in the fact that a number of services may be economically inefficient but have a high moral value, for example free medical care for a terminally ill patient [Oparin, 2022], the state health system must strike a balance between the quality of medical care and the economic efficiency of medical interventions. The state, unlike the private sector, takes responsibility for the provision of medical services to the population, even in the case of obvious economic inefficiency. However, the public sector still has to spend budget and compulsory health insurance (CHI) funds effectively.

Thus, the mission of an outpatient clinic can be formulated as follows: to provide high-quality, accessible and cost-effective preventive and curative outpatient medical care to all citizens equally, regardless of social status, race, political views, age, etc., and to maintain and strengthen healthy and trusting relationships between the population and medical personnel. That is why the efforts of each state outpatient medical organisation should be directed simultaneously at the improvement of social indicators (increase in life expectancy and quality of life of the population) and the effective use of economic potential (funds of the budget of the Russian Federation and the compulsory medical insurance fund in the implementation of the treatment process).

The objectives of a state medical organisation must be clear and demonstrate the desire of each outpatient and polyclinic to achieve socio-economic results. The improvement of socio-economic results within the framework of the work of a separate outpatient institution should be directed to the population allocated on a territorial basis, which will be a significant stimulating factor for its work. Thus, the main objectives of a public outpatient medical facility can be formulated as follows:

- increase in the life expectancy of the target population;
- improvement of the quality of life of the target population;
- early detection of socially important diseases;
- increase in the availability of medical care for the assigned population;
- early detection of complications of chronic diseases for which the patient is followed in the clinic;
- cost-effective use of funds received by the organisation;
- medical education of the assigned population;
- reduction of periods of temporary disability and prevention of disability in the target population;
- promotion of healthy and trusting relationships between clinic staff and the target population.

The main strategic goals of governmental medical organisations are to create conditions for achieving the set goals and to generate feedback for adjusting the strategy during its implementation. Given the specific nature of the work of outpatient institutions, it is necessary to strive to increase the coverage of the population that has undergone medical examinations and to increase the vaccination of the population against the most dangerous and costly diseases. The role of the state is to uphold the constitutional rights of the population, particularly in the area of health care. Given the ever-increasing demand for health services in terms of quantity and quality, as well as the general trend towards an ageing population, the state must attract private investment to implement national health programmes. In particular, it is necessary to take full responsibility for the provision of medical services to terminally ill patients and to allocate budget resources for this purpose. Optimisation of the treatment process in the public health care system should be carried out on an ongoing basis, primarily in order to avoid unjustified waste of budget and compulsory health insurance funds on useless treatment and diagnostic measures. In order to provide services to the relatively healthy population, it is necessary to actively attract private investors, while the main criterion for the consumer (patient) will be mental comfort when receiving medical services. The population needs to be informed about government support for the health sector and guarantees of medical care. The public health sector is seen as a pool of capacity and resources that plays a central role in the delivery of essential public services, while the private sector is valued for its ability to use its expertise to transform resource potential into improved service delivery. [Ondategui-Parra, 2009].

The main tasks of a state outpatient clinic can be summarised as follows:

- maximum coverage of the target population with screening and vaccination;
- a personalised approach to care for the elderly, senile and disabled;
- establishing active monitoring of the patient's test results, informing the patient and physician immediately of any significant deviations;
- organising the effective work of local practitioners;
- increasing the importance of the role of community nurses;
- destigmatisation of psychiatric services, early detection of mental disorders;
- prescribing cost-effective tests and treatments;
- collecting feedback from the consumer of medical services (patient);
- reducing bureaucracy and increasing the efficiency of the treatment process;
- promoting evidence-based medicine to the public;

- involving management in resolving conflict situations to build trust between medical staff and patients.

1. Research methodology

In essence, strategic analysis is a stage of pre-planning research where factors of the external environment, business environment and resource potential (opportunities) of the enterprise are systematically analysed in order to determine the current position of the enterprise and identify the conditions for its further successful development in a market economy [Zheltova, Fomicheva, 2015]. Effective management of an organisation is based on a deep understanding of the internal and external factors that can affect its functioning. Tools such as PEST analysis provide a broad overview of the internal and external environment that affects the functioning of the enterprise [Kharitonova, Nazarevich, 2023]. The methodological basis of the PEST analysis is the modern strategic analysis, the purpose of which is the systematic study of important elements of the external and internal environment and alternative strategies of the organisation[1]. The essence of the PEST analysis method consists in conducting an analysis of the external environment of the organisation, which is conditionally divided into four sectors: political, economic, social and technological environment [Dobrovolsky, 2013]. In order to carry out an analysis, it is usually necessary to obtain the opinion of at least three experts in the area under investigation. In order to obtain an objective picture of the influence of factors, a list of 40 factors influencing the activities of a public outpatient medical facility was compiled on the basis of the goals and objectives. The factors are arranged randomly, without reference to the sector, and are offered to experts for evaluation. The experts were: the head of a branch of one of the Moscow polyclinics; A.V. Volnukhin, M.D., professor of the Department of General Practice of Sechenov University; M.G. Panov, Ph.D., deputy chief physician for organisational and methodological work of Bryansk Polyclinic No. 4; S.V. Gavrilenko, consultant to the Bryansk City Health Department.

The experts were asked to give two ratings for each factor. The first rating is the influence of the factor:

1) the influence of the factor is small, any change in the factor has virtually no effect on the work of the clinic;
2) only a significant change in the factor will affect the work of the clinic;
3) the influence of the factor is high, any fluctuations cause significant changes in the work of the clinic.

Each factor was asked to be rated with a '+' or '-' sign.

We then assess the likelihood of the selected factors occurring on a scale of 1 to 5, where 1 means there is almost no chance of the factor changing and 5 is the maximum likelihood. The survey asked experts to rate the likelihood of each factor occurring in their organisation or country within 10 years.

On the basis of the assessments made, a table of the influence of environmental factors on the activities of a state outpatient medical organisation was compiled (Table 1).

The sum of the influence of all factors was 54.73. A table was then compiled of the likelihood of each factor

Table 1
Assessment of the influence of environmental factors on the activities of the state outpatient medical organisation

Description of the factor	Experts' assessment of the impact of factors 1-4				Average rating
	1	2	3	4	
Political factors					
1. Strengthening the influence of state medicine on the medical services market in the Russian Federation	–1	+1	+1	+2	0.75
2. Strengthening the influence of private medicine on the medical services market in the Russian Federation	+2	+2	+3	–2	1.25
3. Improving legislation on public-private partnerships in the health sector	+2	+1	+1	+1	1.25
4. Development of the Russian pharmaceutical industry	+2	+1	0	+2	1.25
5. Effective cooperation with countries where medicines are produced	+2	+1	0	+2	1.25
6. Orientation of the health care system towards outpatient care in the provision of medical services (increase in bed turnover, decrease in the number of inpatient treatments).	+2	+3	–3	+3	1.25
7. Reduction or suspension of the growth of the influence of the outpatient network in the sphere of provision of state medical services, development of the inpatient network in the Russian Federation.	–1	–3	+3	+3	0.5
8. Optimisation of outpatient care in your region (increase in the number of appointments, reduction in the time spent with the patient)	–3	+3	–3	+3	0
9. Development of outpatient psychiatric services in a polyclinic in your region	+2	+1	?	+1	1.33

[1] Modern strategic analysis (2014): textbook; edited by P.V. Ivanov. Rostov-on-Don, Phoenix.

Table 1 – remainder

Description of the factor	Experts' assessment of the impact of factors 1-4				Average rating
	1	2	3	4	
Economic factors					
1. Funding of a per capita polyclinic in the Russian Federation	+2	+1	–3	+3	0.75
2. Polyclinic financing based on labour efficiency in the Russian Federation	+2	+3	?	+2	2.33
3. Improvement of material incentive methods for the staff of your clinic	+3	+3	+3	+2	2.75
4. Outsourcing of non-core tasks in your clinic to private partners (organising meals, cleaning the premises, computer repair, etc.)	+1	+3	–3	+1	0.5
5. Improvement of the system of sanctions for the employees of your clinic (ability to influence the work of the employee)	+1	–2	+1	+1	0.25
6. Increasing the volume of budgetary and regional funding for public polyclinics (stability in times of crisis - COVID-19 pandemic) compared to increasing funding from the compulsory health insurance fund.	+2	+2	+3	+2	2.25
7. Increasing the volume of funding for the polyclinic from the compulsory health insurance fund (increasing the tax burden on the population, the population's understanding of the value of medical services) and reducing funding from the budget.	+2	+2	+3	+3	2.5
Social factors					
1. Further development of patient-centred care in the country	0	+3	–3	+2	0.5
2. Protecting the rights of outpatient medical staff from abuse by patients in your region	+1	+3	+2	+1	1.75
3. Protection of patients' rights against ill-treatment by medical staff in a health centre in your area	0	+1	+2	+1	1
4. The impact of general population ageing on outpatient care in your region	–1	–1	–3	+1	–1
5. Increasing public confidence in evidence-based medicine over other forms of treatment in your region (homeopathy, traditional medicine, etc.)	+1	+1	?	+1	1
6. Increasing public confidence in public healthcare in your region (compared to private healthcare)	+2	+3	+1	+1	1.75
7. Increasing public confidence in domestic medicine (versus foreign medicine) in the Russian Federation	+1	+3	?	+1	1.66
8. Increasing the importance of a nurse in a clinical setting (doing only specialised work, working on an equal footing with a doctor) in your organisation	+3	+2	?	+2	2.33
9. Strengthening the physician-nurse hierarchy in your organisation	+2	–1	?	–2	–0.33
10. Positive psychological climate among the staff of your clinic	+3	+3	+3	+3	3
11. Respect for the management decisions of your clinic staff	+2	+3	?	+3	2
12. Усиление текучки кадров вашей поликлиники	–3	–3	?	+3	–0.75
13. Work with the 'old' team under the conditions of your clinic (few new recruits and few dismissals)	0	+2	?	+2	1.33
14. Development of a mentoring system in your clinic (material incentives for mentors to adapt new employees)	+2	+3	?	+2	2.33
Technological factors					
1. Reduction in the level of bureaucracy in your clinic	+3	+3	+3	+3	3
2. Tightening control over document flow in your clinic	+1	–1	–3	+2	–0.25
3. Digitalisation of the health care system in the Russian Federation	+2	+2	+3	+2	2.25
4. Development of artificial intelligence in healthcare in your region	+2	+2	–3	+1	0.5
5. Improving the accuracy of feedback to the clinic manager and structural department managers (from staff and patients)	+2	+3	+3	+2	2.5
6. Improving the working environment of clinical staff (renovation of facilities)	+2	+1	+3	+2	2
7. Increasing the level of technical equipment of your clinic	+3	+3	+3	+3	3
8. Developing a corporate culture within your clinic	+2	+3	?	+1	2
9. Development of geriatric services in a polyclinic setting	0	+2	?	+1	1
10. Transfer some of the bureaucratic medical work to specially trained mid-level staff in your clinic	+1	+3	?	+2	2

Note. The experts marked questions with a '?' if they considered that they could not be scored due to incorrect composition.
Source: compiled by the author.

Table 2
Assessment of the likelihood of environmental factors occurring in a country or region within 10 years

Description of the factor	Experts' assessment of the impact of factors 1-4				Average rating	Weighted score
	1	2	3	4		
Political factors						
1. Strengthening the influence of state medicine on the medical services market in the Russian Federation	5	1	1	1	2	0.027
2. Strengthening the influence of private medicine on the medical services market in the Russian Federation	5	1	5	5	4	0.091
3. Improving legislation on public-private partnerships in the health sector	3	1	1	5	2.5	0.057
4. Development of the Russian pharmaceutical industry	4	5	?	5	4.7	0.107
5. Effective cooperation with countries where medicines are produced	3	1	?	3	2.33	0.053
6. Orientation of the health care system towards outpatient care in the provision of medical services (increase in bed turnover, decrease in the number of inpatient treatments).	3	1	1	5	2.5	0.057
7. Reduction or suspension of the growth of the influence of the outpatient network in the sphere of provision of state medical services, development of the inpatient network in the Russian Federation.	0	3	1	1	1.25	0.011
8. Optimisation of outpatient care in your region (increase in the number of appointments, reduction in the time spent with the patient)	1	1	3	2	1.75	0
9. Development of outpatient psychiatric services in a polyclinic setting in your region	1	1	?	2	1.33	0.032
Economic factors						
1. Funding of a per capita polyclinic in the Russian Federation	?	1	?	5	3	0.041
2. Polyclinic financing based on labour efficiency in the Russian Federation	2	1	?	5	2.67	0.114
3. Improvement of material incentive methods for the staff of your clinic	3	2	2	5	3	0.151
4. Outsourcing of non-core tasks in your clinic to private partners (organising meals, cleaning the premises, computer repair, etc.)	3	3	1	5	3	0.027
5. Improving the system of sanctions for your clinic's employees (ability to influence the employee's work)	2	4	1	5	3	0.014
6. Increase in the volume of budgetary and regional funding for public polyclinics (stability in times of crisis - COVID-19 pandemic) compared to an increase in funding from the compulsory health insurance fund.	5	3	1	1	2.5	0.103
7. Increasing the volume of funding for the polyclinic from the compulsory health insurance fund (increasing the tax burden on the population, the population's understanding of the value of medical services) and reducing funding from the budget.	4	2	1	3	2.5	0.114
Social factors						
1. Further development of patient-centred care in the country	2	1	5	5	3.25	0.03
2. Protect the rights of healthcare workers from abuse by patients in your region	2	1	1	2	1.5	0.048
3. Protect the rights of patients who are unjustly treated by medical staff in a polyclinic in your area	2	4	1	3	2.5	0.046

Table 2 – remainder

Description of the factor	Experts' assessment of the impact of factors 1-4				Average rating	Weighted score
	1	2	3	4		
4. The impact of population ageing on ambulatory care in your region	5	5	5	3	4.5	0.082 (-)
5. Increasing public confidence in evidence-based medicine over other forms of treatment in your region (homeopathy, traditional medicine, etc.)	2	1	?	3	2	0.037
6. Increasing the level of public trust in public healthcare in your region (compared to private healthcare)	1	2	1	3	1.75	0.06
7. Increasing the level of public trust in domestic medicine (compared to foreign medicine) in the Russian Federation	1	4	?	3	2.67	0.081
8. Increasing the importance of a nurse in a clinical setting (doing only specialised work, working on an equal footing with a doctor) in your organisation	2	1	?	5	2.67	0.098
9. Strengthening the physician-nurse hierarchy in your organisation	2	1	?	1	1.33	–0.008
10. Positive psychological climate among the staff of your clinic	2	1	5	2	2.5	0.137
11. Respect for the management decisions of your clinic staff	3	2	?	2	1.75	0.064
12. Increased staff turnover in your clinic	2	4	?	5	3.67	0.05 (-)
13. Work with the 'old' team under the conditions of your clinic (few new recruits and few dismissals)	1	2	?	5	2.67	0.065
14. Developing a mentoring system in your clinic (material incentives for mentors to adapt new employees)	3	1	?	3	2	0.085
Technological factors						
1. Reducing the level of bureaucracy in your clinic	1	1	5	1	2	0.11
2. Tightening control over document flow in your clinic	2	3	2	4	2.75	0.013 (-)
3. Digitising healthcare in the Russian Federation	3	5	4	5	4.25	0.175
4. Development of artificial intelligence in healthcare in your region	5	3	3	5	4	0.037
5. Improving the accuracy of feedback to the clinic manager and structural department managers (from staff and patients)	1	1	5	3	2.5	0.114
6. Improving the working environment of clinical staff (renovation of facilities)	5	4	5	3	4.25	0.155
7. Increasing the level of technical equipment of your clinic	2	4	5	5	4	0.22
8. Developing a corporate culture within your hospital	3	1	?	2	2	0.073
9. Development of geriatric services in a polyclinic setting	2	1	?	3	2	0.037
10. Transferring some of the bureaucratic medical work to specially trained mid-level staff in your clinic	2	1	?	5	2.67	0.098

Note. The experts have marked with the sign '?' questions which they consider to be unrateable due to incorrect composition.
Source: compiled by the author.

Table 3
The PEST analysis matrix of the state outpatient organisation

Political factors	Weighted score	Economic factors	Weighted score
The development of the pharmaceutical industry in Russia	0.107	Improving methods of material incentives for your clinic's employees	0.151
Strengthening the influence of private medicine on the medical services market in the Russian Federation	0.091	Polyclinic financing based on labour efficiency in the Russian Federation	0.114
Improving legislation on public-private partnerships in the health sector	0.057	Increasing the volume of funding for the polyclinic from the compulsory health insurance fund (increasing the tax burden on the population, the population's understanding of the value of medical services) and reducing funding from the budget.	0.114
Orientation of the health care system towards outpatient care in the provision of medical services (increase in bed turnover, decrease in the number of inpatient treatments)	0.057	Increase in the volume of budgetary and regional funding for public polyclinics (stability in times of crisis - COVID-19 pandemic) compared to an increase in funding from the compulsory health insurance fund.	0.103
Working effectively with countries that produce medicines	0.053	Funding of a per capita polyclinic in the Russian Federation *	0.041
Developing outpatient psychiatric services in a polyclinic in your region	0.032	Outsourcing of non-core tasks in your clinic to private partners (organising meals, cleaning the premises, computer repair, etc.)	0.027
Strengthening the influence of state medicine on the medical services market in the Russian Federation	0.027	Improving the system of sanctions for your clinic's employees (ability to influence the employee's work)	0.014
Reduction or suspension of the growth of the influence of the outpatient network in the sphere of provision of state medical services, development of the inpatient network in the Russian Federation.	0.011		
Optimisation of outpatient care in your region (increase in the number of appointments, reduction in the time spent with the patient)	0		
Social factors	**Weighted score**	**Technological factors**	**Weighted score**
Positive psychological climate among the staff of your clinic	0.137	Increasing the level of technical equipment in your clinic	0.22
Increasing the importance of a nurse in a clinical setting (doing only specialised work, working on an equal footing with a doctor) in your organisation	0.098	Digitalisation of healthcare in the Russian Federation	0.175
Development of a mentoring system in your clinic (material incentives for mentors to adapt new employees)	0.085	Improving the working environment of clinical staff (renovation of facilities)	0.155
The impact of general population ageing on outpatient care in your region	0.082	Improving the accuracy of feedback to the clinic manager and structural department managers (from staff and patients)	0.114
Increasing the level of public confidence in domestic medicine (compared to foreign medicine) in the Russian Federation.	0.081	Reducing bureaucracy in your clinic	0.11
Working in the 'old' team under the conditions of your clinic (few new recruits and few dismissals)	0.065	Transferring some of the bureaucratic medical work to specially trained mid-level staff in your clinic	0.098
Respect for the management decisions of your clinic staff	0.064	Developing a corporate culture within your clinic	0.073
Increasing the level of public trust in public healthcare in your region (compared to private healthcare)	0.06	Development of artificial intelligence in healthcare in your region	0.037
Increased staff turnover in your clinic	0.05 (-)	Development of geriatric services in a polyclinic setting	0.037
Protecting the rights of healthcare workers from abuse by patients in your region	0.048	Tightening control over your clinic's document flow	0.013 (-)
Protecting patients' rights against unkind treatment by medical staff at a clinic in your area	0.046		
Increasing public confidence in evidence-based medicine over other forms of treatment in your region (homeopathy, traditional medicine, etc.)	0.037		
Further development of patient-centred care in the country	0.03		

* According to two experts, the question on this criterion is wrongly worded because in the Russian Federation polyclinics are already financed on a per capita basis; therefore, this criterion was calculated on the basis of the assessments of two other experts.

Source: compiled by the author.

occurring in the country or region in the next 10 years, based on the experts' assessment on a 5-point scale (Table 2).

The weight-adjusted score was calculated as follows:

(Influence of the factor (arithmetic mean of the experts' ratings) / sum of the influence of the factors) × average assessment of the probability of the occurrence of the factor.

For example, the calculation for the factor 'Increasing influence of state medicine on the market of medical services in the Russian Federation' is as follows: (0.75 / 54.73) × 2 = 0.027.

2. Research findings and their discussion

Based on the results of Tables 1 and 2, in order to visualise the influence of external factors on the activities of the organisation, it is necessary to arrange the factors in descending order of their importance for the activities of the state outpatient organisation from more to less important. Table 3 gives a clear idea of the factors that can have a greater or lesser impact on the work of a governmental outpatient organisation.

On the basis of Table 3, the main directions for the development of a state outpatient medical organisation were formulated.

Developing effective control over the movement of medicines

Two experts considered this position to be a positive and significant factor in the development of outpatient care in Russia. The author also assessed this factor on the basis of the scientific literature studied (for example, [Burdastova, 2020; Volnukhin, Siburina, 2021], etc.). The provision of drugs is one of the most expensive and difficult to manage expenses. One of the mechanisms for efficient spending of funds on drugs is the inclusion of a clinical pharmacologist in the staff of a polyclinic. His role as a physician is to help the clinician to select treatment regimens competently, combining medications and taking into account the prescriptions of all the specialists involved in the patient's care. In this case, the problem of polypharmacy is solved and the effective use of medicines is realised. The problem of polypharmacy, i.e. the simultaneous prescription of a large number of medications, is relevant to the work of a state outpatient facility, since it often works with elderly and old people. In an effort to 'cure' chronic diseases, a general practitioner prescribes medication for each nasal condition, but this causes both therapeutic and economic harm to the elderly. Therapeutic harms consist of the total number of drug side effects, which significantly affect the quality of life of an elderly patient. According to data collected under the 'Care' programme, among Moscow residents aged 65 and older who sought outpatient care and had three or more geriatric syndromes according to self-assessment, 95.5% of patients received drug therapy, including 1 to 12 (average 4.6 ± 2.5) drugs. Three or more medications were taken by 78.7%, five or more by 50.7% and seven or more by 22.2% of patients [Tkacheva et al., 2015]. According to [Sizova et al., 2015], an analysis of 402 outpatient medical records of comorbid patients with arterial hypertension observed at the state budgetary health institution 'City Polyclinic No. 2' in Moscow from 2010 to 2013 showed that the average number of drug prescriptions per patient was 9.5 (from 5 to 14 drugs). The high prevalence of polypharmacy in the elderly population is still due to the inadequate qualifications and lack of time of general practitioners in polyclinics.

Strengthening the influence of private medicine on the medical services market in the Russian Federation

This factor is considered by experts and the author to have a significant impact on the work of the clinic. However, an analysis of medical literature revealed a number of limiting factors for increasing the influence of private medicine in the Russian Federation. There is a tendency for private medical organisations to provide the most marginal types of medical services. This creates a conflict of interest between public and private health care. From an economic point of view, a number of medical services are objectively ineffective, but of high ethical importance to the state and the population. The development of private medicine in itself certainly has a number of positive aspects for the development of national healthcare, but the regulatory mechanism should remain with the state. Improving the legal system in relation to the state and private partners, as well as involving private medical organisations in the provision of socially significant types of medical care (outpatient care, medical rehabilitation, palliative care, etc.) will provide a significant incentive to increase the duration and quality of life of patients and the quality of types of medical care.

Improving legislation on public-private partnerships in the health sector

Achieving a balance of influence between private and public health care in the Russian Federation is possible thanks to the active development of public-private partnership mechanisms. Most private medical organisations try to occupy the most profitable types of medical services and are reluctant to enter the compulsory health insurance system because of the unfavourable compulsory health insurance rates for the private partner. In our country, two branches of healthcare are developing in parallel, and private medical organisations are often not involved in the implementation of national healthcare projects. Today, Russian healthcare needs private investment. It should also be noted that a significant restriction on the development of the private sector in medicine could lead to an increase in government spending on health care, which, according to the author, could lead to an increase in inflation due to an increase

in social spending. In order to develop the private health care system and the health care system as a whole, the state must create conditions in which companies actively participate in the provision of the most popular medical services to the population within the framework of the compulsory health insurance system, playing the role of a complementary partner rather than a substitute.

Development of outpatient psychiatric services in a polyclinic setting

Key to understanding the burden of mental illness from an economic perspective are the terms DALY and YLD. DALY (Disability Adjusted Life Year) is an indicator of the total burden of disease, expressed as the number of years lost due to illness, disability or early death; YLD (Years Lived With Disability) are years lost due to illness during life. As noted above, mental illnesses rarely lead to early death, so in terms of DALYs, depression and anxiety disorder rank 13th and 24th, respectively, across all ages. However, in terms of YLDs, depression and anxiety disorders rank 2nd and 8th, respectively [Murray et al., 2019]. Depression and anxiety disorders are the most common illnesses robbing people of years of working life. This means that special emphasis must be placed on the early detection and effective treatment of such diseases. Patients seeking psychiatric help in specialised centres represent only a small proportion of the actual cases of the disease. The majority of patients are those who do not seek help at all or who seek help in outpatient clinics for various somatic complaints. The high prevalence of this type of pathology among the working age population and the long periods of inpatient treatment in multidisciplinary hospitals lead to significant economic damage, which is expressed in an increase in lost production and a decrease in the overall GDP [Skripov, 2018].

Improving methods of material incentives for clinic staff

The salaries of the employees of the Federal Health Service are determined by the Director, taking into account the complexity and volume of the work performed. The amount of remuneration is regulated by law and directly depends on the salary. Incentive payments are governed by the local internal rules of the institution, depend on the intensity, quality and length of service and are defined in the employment contract. Thus, the salary system in a separate medical organisation directly depends on the decisions of the manager. In this case, the chief physician's task is to organise work on the creation of an effective remuneration system and to explain the mechanisms for the formation of employees' salaries.

Improving methods of non-monetary incentives for clinic staff

On the basis of expert assessments, the following factors were identified as having a significant impact on the work of the state outpatient clinic:

- improving the level of technical equipment of clinics;
- improving the work environment for clinic staff;
- developing corporate culture in a polyclinic environment.

The level of technological equipment in a medical facility and the improvement of the work environment are the most important factors in increasing staff efficiency and have a direct impact on staff loyalty. The greater their loyalty and the more favourable the psychological climate in the organisation, the more effective and safer the treatment. The development of a corporate culture in the organisation will help to increase the sense of belonging to the organisation, strengthen working relationships and become a competitive factor for each individual clinic.

Digitalisation of the health care system in the Russian Federation

A formalised bureaucratic approach to the organisation of a doctor's work (filling in medical documentation, issuing certificates, prescribing discounted drugs, collecting paperwork for processing benefits, disability, etc.) exists in many organisations and deprives them of the opportunity to be creative. As a direct consequence, specialists with deep professional knowledge and high creative potential are leaving the medical organisation and being replaced by medical workers of medium and low qualification [Volnukhin, Siburina, 2021]. The development of healthcare digitalisation and artificial intelligence will give an impetus to the development of the state outpatient clinic.

Increasing the role of the nurse in a polyclinic setting

The issue of increasing the value of nurses as employees is being addressed in many developed countries. The main thesis of the change of the peculiarities of the work of medical institutions and the formation of the paradigm of the effective joint work of a doctor and a nurse is the understanding that a nurse is a qualified employee and it is not worth wasting the potential of a qualified employee on unskilled and uncharacteristic work (filling in documentation, transferring documents, performing the work of junior medical staff and much more).

Protecting the rights of health workers in the outpatient sector

Today, medical workers are one of the most vulnerable groups in the workforce. This creates tension among employees and contributes to rapid burnout and subsequent resignation. Working to provide legal protection for medical staff will lead to greater confidence and a sense of support.

Establishment of a mentoring system and career development

A mentoring system is needed to help new employees feel more at home in the clinic and to help them quickly learn the basics of business ethics. When talking about

career opportunities, it is necessary to highlight the specifics of the development of doctors and nurses as employees of a state medical organisation. Based on the classic understanding of the career ladder model, the pinnacle of development for a practicing physician is the position of chief physician, and for a nurse, the position of chief nurse. This model may seem acceptable to many workers, but in a global sense, this situation needs to be corrected.

Doctors and nurses must be able to develop within their specialty and receive material and non-material incentives to do so. It is necessary to strive for a situation in which a practising doctor or nurse with extensive experience and qualifications, with significant indicators of the performance of his/her duties, has a higher salary and more comfortable working conditions than the head of department or even the head of branch. In medical institutions, the administrative branch should run parallel to the medical branch, without contradicting it. It is important to remember that in a medical organisation the main thing is the relationship between a medical worker and a patient, and all other mechanisms should facilitate the implementation of this relationship and create the most favourable conditions for it.

Management work

In the healthcare system of the Russian Federation, the head of a medical organisation is the chief physician. Often, as studies show, the head physician in Russia almost always has a medical education and almost never a management, economic and legal education [Burdastova, 2020]. Many developed countries have recognised the need for a qualified manager instead of the head of a medical institution [Yarasheva et al., 2020].

Organisation of geriatric services in a polyclinic setting

The proportion of the population over working age in the Russian Federation is almost 24%, with health indicators deteriorating with age. About 80% of older people have multiple chronic diseases. For example, 87.6% of Moscow residents over 60 years of age who underwent a medical examination in the five months of 2015 were classified as health group III, i.e. those requiring medical observation or specialised, including high-tech, medical care, as well as those requiring additional examination [Bykovskaya et al., 2019]. The increase in the proportion of the elderly population is an inevitable process in the modern world of developing medical technologies, and the global task and challenge for the healthcare systems of many countries in such conditions is to increase the average life expectancy of the population and, no less importantly, its quality.

Conclusion

The present study shows the degree of influence of factors on the activities of a state outpatient medical institution. The obtained data allowed to formulate the main directions of development of state medical institutions in the Russian Federation, which can be practically used in formation of a strategy for development of state outpatient organisations.

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Compliance-risks in the operation of IT products

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Abstract
The article discusses compliance risks that can arise during the operation of IT products in the market and cause unacceptable damage to IT organisations. To achieve this goal, the author of this article conducted a study of civil, administrative and criminal judicial practice, where one of the parties was an IT company (OKVED 62), including disputes related to the infringement of exclusive rights to IT products. Based on the research conducted, 12 compliance risks were identified, of which 6 were civil, 1 was administrative and 5 were criminal. An analysis of judicial practice has shown that the withdrawal, distribution and operation of IT products on the market without taking into account these requirements exposes IT companies to civil, administrative and/or criminal liability. In addition, as part of the work carried out, the dynamics of criminal offences in the field of computer information was analysed, where it was found that in the period 2022-2023. The increase in offences related to unauthorised access to electronic devices rose from 9,308 to 36,788 crimes (an increase of 74.6%). The results of the study highlited the urgent need for IT stakeholdes to develop effective and efficient preventive measures to influence identified compliance risks. For example, the development of measures related to the review of requirements for documentary support of IT projects, the form and content of IT products, and ways of protecting computer information.
Keywords: IT-subject, IT-product, IT-project, risk, compliance-risk, compliance-consequence.

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运营 IT 产品的合规风险

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简介
文章讨论了IT产品在市场运作过程中可能出现的合规风险，这些风险会对IT 产品造成不可接受的损害。为了实现这一目标，本文作者对民事、行政和刑事法院的实践进行了研究，其中一方当事人是信息技术主体（全俄罗斯经济活动分类手册62），包括研究与侵犯信息技术产品专有权有关的纠纷。根据所进行的研究，确定了 12 项合规风险，即 6 项民事风险、1 项行政风险和 5 项刑事风险。对司法实践的分析表明，在不考虑这些要求的情况下在市场上生产、销售和运营信息技术产品，会使信息技术主体面临民事、行政和/或刑事责任的威胁。此外，正在进行的工作分析了计算机信息领域刑事犯罪的趋势，发现在 2022 年至 2023 年期间，与未经授权访问电子设备有关的犯罪案件从 9 308 起增加到 36 788 起（增加了 74.6%）。研究结果表明，信息技术主体迫切需要制定切实有效的预防措施，以应对已发现的合规风险：例如，制定与核实信息技术项目文件支持要求、信息技术产品的形式和内容以及保护计算机信息的方法有关的措施。
关键词: IT 实体、IT 产品、IT 项目、风险、合规风险、合规后果。

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Introduction

An analysis of the business activities of 495 IT enterprises in the Tomsk Oblast (OKVED 62) showed that during the creation of IT products within IT projects about 170 universal risks can occur [Nikolaenko, Sidorov, 2023]. An in-depth study of the nature of these risks allowed us to divide them into four groups: commercial risks (3%), project risks (33%), external environmental risks (37%) and compliance risks (27%)[1]. In addition, it was found that the occurrence of one compliance risk causes material damage to IT organisations in the average amount of 277,000 roubles. If two compliance risks occur during the implementation of an IT project, the damage increases to 554,000 roubles, if three - to 831,000 roubles, etc.

In this article, universal risks are understood as probable events that are relevant to IT projects regardless of their size, complexity, duration, types, approaches to creating IT products and number of participants [Paladino et al., 2009; Chapman, 2011; Aven, 2012; Brandas et al., 2012; Lee et al., 2013; De Baker et al., 2014; Mishra et al., 2014; Wieczorek-Kosmala, 2014; Beer et al., 2015; Luckmann, 2015]. Compliance risks are understood as probable events associated with the violation of current legislation, requirements of national standards and codes of conduct, which have legal consequences [Nikolaenko, 2024a].

The time for updating 170 risks in the study was limited to the following phases of the IT project lifecycle: requirements generation; development of the automated system concept; development of the technical specifications (hereafter referred to as TS); development of the draft design; development of the technical design; development of the working documentatio[2,3]. Compliance risks for the 'commissioning' and 'maintenance' phases were not identified due to the stated objectives of the study. However, it is important to note that information about the risks that may materialise during these phases and lead to compliance consequences is very important for IT organisations that plan to introduce, distribute and operate IT products on the market.

To confirm this, we can cite examples where the subject of the dispute was the exclusive rights to the created IT products. For example, in case No. A83-6393/2023[4] 1C LLC asked the court for compensation for infringement of exclusive rights in the amount of 268,000 roubles. In Case No. A81-11865/2022[5] 1C LLC and 1C-Soft LLC demanded payment of 4.7 million roubles from Partner JSC. In Case No. A50-4247/2023[6] 1C LLC claimed compensation in the amount of 684,000 roubles for the illegal use of IT products. In case No. A36-7440/2022[7] 1C LLC asked the court to protect the exclusive rights to IT products owned by 1C LLC and to recover 50,000 roubles from the infringer. Similar claims are registered in cases No. A35-7078/2022[8] and No. A08-16/2022[9]. In case No. A29-10372/2022[10] 1C LLC applied to the court for compensation for the illegal use of IT products in the amount of 342,000 roubles. In case No. A14-13243/2022[11] 1C LLC and 1C-Soft LLC claimed compensation from SpetsTekh-Stroy LLC for the illegal use of IT products in the amount of 2.4 million roubles.

An analysis of judicial practice also shows that there are frequent cases where the infringement of exclusive rights is converted into criminal liability. A clear example is case No. 1-209/2022[12], where the defendant copied a file of an IT product onto a USB drive without the proper permission of the copyright holder, 1C-Soft LLC, and performed numerous illegal installations, thereby obtaining commercial benefits. By his criminal actions, the defendant violated the constitutional right of the copyright holder to protect intellectual property, as provided for in Article 44, Part 1 of the Constitution of the Russian Federation[13], and caused damage to him in the amount of 4.2 million roubles.

Based on the above, it can be concluded that the purpose of this article is to identify compliance risks that may arise during the operation of IT products on the market It is important to note that in accordance with the provisions of Article 17 of the Federal Law 'On Information, Information Technologies and Protection of Information' No. 149-FZ[14] (hereinafter referred to as the 'Law'), offences in the sphere of information technologies are subject to disciplinary, civil, administrative and/or criminal liability. In order to achieve this objective, a study was made of the judicial practice in cases where the subject of the dispute was the infringement of rights to IT products or where one

[1] Nikolaenko V. (2023). Impeccable risk management: a textbook. Tomsk, TUSUR publishing house.
[2] GOST R 59793-2021 (2020). Information technology. Standards for automated systems. Automated systems. Stages of creation. Moscow, Standardinform.
[3] GOST R 57102-2016/ISO/IEC TR 24748-2:2011 (2016). Information technology. Systems and software engineering. Life cycle management. Part 2. Guide to the use of ISO/IEC 15288. Moscow, Standartinform.
[4] Decision of the Arbitration Court of the Republic of Crimea in Case No. A83-6393/2023 of 18.09.2023. https://clck.ru/36cnZT.
[5] Decision of the Arbitration Court of the Yamalo-Nenets Autonomous Okrug in Case No. A81-11865/2022 dated 13.08.2023. https://clck.ru/36cpoK.
[6] Decision of the Arbitration Court of Perm Krai in case No. A50-4247/2023 dated July 27, 2023. https://clck.ru/36cpzX.
[7] Decision of the Arbitration Court of the Lipetsk Region in case No. A36-7440/2022 dated 13.06.2023. https://clck.ru/36cq88.
[8] Decision of the Arbitration Court of the Kursk Region in case No. A35-7078/2022 dated 13.03.2023. https://clck.ru/36d5KQ.
[9] Decision of the Arbitration Court of the the Belgorod Region in case No. A08-16/2022 dated 07.11.2002. https://clck.ru/36d7n5.
[10] Decision of the Arbitration Court of the Kursk Region in case No. A29-10372/2022 dated 30.12.2002. https://clck.ru/36d5W7.
[11] Decision of the Arbitration Court of the Voronezh Region in case No. A14-13243/2022 dated 07.11.2022. https://clck.ru/36d7f5.
[12] Judgment of the Proletarsky District Court of Saransk, Republic of Mordovia, in case No. 1-209/2022, dated 09.07.2002. https://clck.ru/36eUWo.
[13] Constitution of the Russian Federation. https://clck.ru/MsKLk.
[14] The Federal Law 'On Information, Information Technologies and Protection of Information' No. 149-FZ of 27 July 2006. https://clck.ru/ggWjK.

of the parties was an IT company (OKVED 62).

1. Civil law risks

An analysis of arbitration court practice has shown that during the operation of IT products, as a rule, two types of risk events occur: risks related to the quality of the IT results of the work performed (rendered IT services, delivered IT goods) and risks related to the exclusive rights to the results of intellectual activity (hereinafter - RIA). According to Article 1261 of the Civil Code of the Russian Federation[15] An IT product is a RID [Kuznetsova et al., 2022]. Let us look at the content of these compliance risks in more detail.

The risk of discovering defects when using the results of the work performed (services rendered, goods delivered). The legislator understands a deficiency of work (service, product) as any non-compliance with mandatory requirements of laws, national standards, contract terms, etc. [Gayazov, 2022]. [Gayazov, 2022]. For example, if an IT product does not meet the stated requirements, it will be considered low quality, which can have negative compliance consequences for both the contractor (performer, supplier) and the customer. In particular, if it is established that the elimination of the defects will require significant costs or the nature of the defects is such that the defects will be discovered repeatedly, the customer (buyer) has the right to demand a refund of the previously paid amount [Mikhailenko, Kovaleva, 2021]. It is worth noting that the work [Nikolaenko, 2024b] notes that an IT product is a complex legal object consisting of two parts - an IT service and/or RIA (computer programs).

An illustrative example of the identification of defects during the operation of an IT product is Case No. A45-15497/2020[16], where a contract was concluded between Era LLC (the contractor) and Smartmedia LLC (the client), under which the contractor was obliged to perform and the client was obliged to pay for work on the creation of the Boom Boom mobile application on the Android and iOS platforms. During the "support" of the created IT product, the client identified a large number of software defects and requested the contractor to redo the work. The contractor refused to comply. In order to determine the nature of the defects, the court ordered an expert examination, which concluded that the result of the work performed partially complied with the terms of the contract, was of poor quality, and required the removal of the identified defects. As a result, the court decided to recover 133.7 thousand roubles from Era LLC.

Risk of copyright infringement. If individuals produce, distribute and operate IT products without the permission of copyright holders, these programmes are considered unlicensed (counterfeit) [Kopylov, 2019]. The use of such IT products is prohibited and may result in civil or administrative liability for legal entities and criminal liability for natural persons.

The consequences in the event of a risk of copyright infringement may be a ban on the use of the RIA by the copyright holder with subsequent recovery of damages (compensation) [Kotovshchikov, 2017]. In addition to the civil law consequences for the person who has infringed intellectual property rights, more serious compliance consequences may be imposed if, for example, the person has imported, sold or rented out counterfeit works in order to make a profit, or has provided false information about the copyright holders on copies of the works. If the fact of committing such an act is established, the subject will be brought to administrative responsibility in accordance with Article 7.12 of the Code of Administrative Offences of the Russian Federation[17].

An example is case 5-1637/2021[18], where the offender illegally exploited copyrighted items in business activities, namely the use of counterfeit IT products for Sony PlayStation 4 Pro consoles. The court found the offender guilty and sentenced him to an administrative fine of 15,000 roubles without confiscation of property.

It is important to note that the severity of the offence is increased if the subject appropriates authorship (plagiarism) and causes material damage to the author or copyright holder. In this case, the person may be held criminally liable in accordance with Article 146 of the Criminal Code of the Russian Federation[19]. For example, in case No. 1-108/2020[20] the defendant violated the exclusive rights of the copyright holder, 1C LLC, and caused property damage in the amount of 545.4 thousand roubles.

The risk that the copyright holder will prohibit the use of the RIA. According to Article 1252 of the Civil Code of the Russian Federation, if a subject violates the rights to intellectual property, the copyright holder has the possibility to stop illegal actions in the form of a direct prohibition. An example of the occurrence of such a risk is Case No. A53-23110/22[21], , in which Sistema-1 LLC asked the court to prohibit RSTU, the Federal State Budgetary Educational Institution of Higher Education, from illegally using the IT product LabWagon. After studying the case materials, the court dismissed the claims, concluding that an employee of

[15] Civil Code of the Russian Federation (CC RF). Commentary on the latest amendments (2019). Moscow, ABAK.
[16] Decision of the Arbitration Court of the Novosibirsk Region in case No. A45-15497/2020 dated 03.24.2022. https://clck.ru/36d7VV.
[17] Code of Administrative Offences of the Russian Federation (CAO RF) https://clck.ru/MsKtY.
[18] Decision of the Stavropol Industrial District Court No. 5-1637/2021 of 03.06.2021. https://clck.ru/36eUaL.
[19] Criminal Code of the Russian Federation (CC RF) of 13.06.1996. No. 63-FZ. https://clck.ru/ggWjK.
[20] Judgment of the Shpakovsky District Court of Stavropol Territory in case No. 1-108/2020 dated 24 September 2020. //sudact.ru/regular/doc/Tg3F5jz1VEox/.
[21] Decision of the Arbitration Court of the Rostov Region in case No. A53-23110/22 dated 07.06.2023. https://clck.ru/36cr8y .

Sistema-1 LLC was the author of LabWagon, but not the copyright holder. The court found that this employee created the disputed IT product as part of a work assignment when he was in an employment relationship with RSTU, the Federal State Budgetary Educational Institution of Higher Education.

The risk that the copyright holder will recover damages (compensation) for infringement of intellectual property rights. In addition to a direct prohibition to suppress actions that violate intellectual property rights, the copyright holder is given the opportunity to recover damages from the subject in the form of compensation for losses or payment of compensation in the range of 10 thousand to 5 million roubles [Shorokhov, 2020].

An illustrative example of the materialisation of the risk in question is Case No. A50-17729/2022[22], in which the copyright holder, 1C LLC, having established the fact of illegal use of its IT product, applied to the court for compensation from the individual entrepreneur Yazykova G.L. in the amount of 400,000 roubles.

It is worth noting that, in practice, cases of violation of the terms of license agreements are also common. For example, in case No. A67-8506/2018[23] SAB LLC asked the court to recover from NP Baikal-Tender a debt under the licence agreement in the amount of 3.5 million roubles.

The risk that the exclusive right to the intellectual property may not be recognised for the author. Failure to comply with the rules for the creation of intellectual property, for example, within the framework of labour relations between an employer and an employee, can lead to a negative scenario if the employer cannot prove that he is the copyright holder [Zaidova, 2021]. According to Article 1295 of the Civil Code of the Russian Federation, the exclusive right to a work for hire created by an employee within the framework of established work duties belongs to the employer.

An example of the materialisation of the risk in question is Case No. A40-90889/21-134-529[24], in which VIST Group JSC asked the court to prohibit the use of the ALTAN IT product. In support of its claims, VIST Group JSC referred to the fact that the IT product was developed by its former employees as part of their official duties. After reviewing the case materials, the court refused to grant the claims, stating that in order to establish the fact that the exclusive rights to the ALTAN programme belong to VIST Group JSC, it is necessary to confirm the fact that the employees were given a service contract. The court concluded that the IT product created was not a work for hire, and therefore JSC VIST Group was not the copyright holder of the ALTAN programme.

Risk of creating unwanted derivative works. According to Article 1270 of the Civil Code of the Russian Federation, the processing (modification) of IT products may lead to the creation of a derivative work, which is an independent object of copyright [Beskodarova, 2020]. This circumstance may lead to unwanted disputes. An example of such a conflict is Case No. A56-38522/2020[25], where Nmarket.PRO Rus LLC (the plaintiff) asked the court to jointly and severally recover damages in the amount of 2 million rubles from the owners of the website panpartner.ru. In support of its claims, the plaintiff argued that the software part of the search module website was its IT product. The court-appointed experts concluded that the total volume of the search engine module code was 2,669 lines, of which 589 lines (22%) were used by the site without modification and 1,522 lines (57%) were partially modified. Based on the experts' findings, the court concluded that the site's owners had illegally modified the search engine, thereby creating an unwanted derivative work.

2. Administrative risks

If an entity violates information security requirements during the creation and subsequent operation of IT products, for example, by using uncertified information systems, databases and other means of information security, the entity may be subject to administrative liability in accordance with Article 13.12 of the Code of Administrative Offences of the Russian Federation.

According to Article 21 of the Law No. 149-FZ, any information, including computer information, is subject to protection if its unlawful use may cause damage to its owner. This threat is eliminated through the use of protective measures: for example, IT units must obtain special licences that allow them to carry out information security activities.

A clear example of the occurrence of a risk associated with a violation of the requirements of the information protection rules is Case No. 5-300/2015[26]. The case documents show that during the inspection, InfoTelecom LLC failed to comply with the requirement to have qualified personnel on site. This fact was the basis for bringing the IT unit under administrative responsibility.

3. Criminal risks

According to the report on the state of criminality in 2022, 522.1 thousand crimes committed with the use of IT or in the field of computer information were registered in the Russian Federation - 26.5% of the total number of crimes. In 2023, 585.2 thousand such crimes

[22] Decision of the Perm Krai Arbitration Court in case No. A50-17729/2022 dated 28.12.2002. https://clck.ru/36d5id.
[23] Decision of the Arbitration Court of Tomsk Oblast in case No. A67-8506/2018 dated 15.11.2018. https://clck.ru/3957JU.
[24] Decision of the Moscow Arbitration Court No. A40-90889/21-134-529 dated 10/05/2023. https://clck.ru/36cmjw.
[25] Decision of the Arbitration Court of St Petersburg and Leningrad Region in Case No. A56-38522/2020 dated 14.04.2023. https://clck.ru/36d4mB.
[26] Order of the Sovietsky District Court of Bryansk in Case No. 5-300/2015 of 29.05.2015. https://clck.ru/36ZdQH.

were recorded - 34.3% of the total number of crimes[27]. An analysis of judicial practice has shown that the main criminal risks arising from the use of IT products relate to economic activity and computer information. Let us look at them in more detail.

The risk of theft of property by entering, deleting, blocking or modifying computer information, also known as fraud in the sphere of computer information (Article 159.6 of the Criminal Code of the Russian Federation). According to the Law No. 149-FZ, computer information is information stored in electronic devices and computer programs. This risk is characterised by the commission of an act connected with the input, deletion, blocking, modification of computer information for the purpose of stealing another person's property or acquiring the right to such property. According to the Russian Ministry of Internal Affairs, 334 cases of computer information fraud were registered in Russia in 2022, and 417 such crimes in 2023.

An example of illegal input of computer information is Case No. 1-422/2016[28], An example of illegal input of computer information is Case No. 1-422/2016, where the defendant, using the victims' mobile phones and SIM cards, repeatedly illegally withdrew funds from the victims' accounts by sending SMS messages.

Modification of computer information is the alteration of information in an electronic device or computer program. An example of illegal modification of computer information is case No. 1-26/2017[29], in which the defendant used the victim's mobile phone to make changes to the original state of bank card account data.

It is worth noting that computer information can be altered not only in electronic devices and computer programs, but also in databases. For example, in Case No. 1-30/2018[30] the defendant knowingly entered into the AIS-Tax database false information about the existing overpayment of VAT by a legal entity.

An example of another interference with the functioning of the means of storing, processing and transmitting computer information is presented in case No. 1-139/2016[31], where the defendant stole money through the personal account of the President-Service programme, using a login and password obtained by criminal means, by returning electronic travel documents at the ticket offices of the railway station.

Case No 1-48/2020 should be mentioned separately[32]. According to the case documents, the defendants and an unidentified person used illegally obtained login/password pairs to access the personal accounts of customers of the 'Kukuruza' multifunctional bonus payment card and carried out a number of operations to steal electronic money.

Risk of unauthorised access to computer information. Risk of unauthorised access to computer information. According to the Russian Ministry of Interior, 9,308 cases of unauthorised access to computer information were registered in Russia in 2022, and 36,788 such crimes were registered in 2023.

According to the Criminal Code of the Russian Federation, access to computer information by a person who does not have the right to receive and work with such information, in relation to which special protective measures have been taken to limit the circle of persons who have access to it, is recognised as illegal. If a subject performs illegal or unauthorised access, he/she may be criminally liable in accordance with Article 272 of the Criminal Code of the Russian Federation.

An example of unauthorised access to computer information is Case No. 1-190/2016[33]. According to the case documents, the defendant committed nine offences by installing counterfeit copies of IT products (Kompas-3D V16, CorelDRAW X6, Microsoft Windows 7 and Microsoft Office Professional Plus 2010) with the aim of selling and profiting from the sale of counterfeit copies of IT products. The total amount of material damage caused by the defendant to the copyright holders was 1.6 million roubles.

An example of the modification of computer information is case No. 1-257/2023[34], where the defendant, an office specialist, obtained unauthorised access through the 1C Retail programme and illegally issued SIM cards.

An example of the copying of computer information, i.e. the transfer of information to another medium while leaving the original information unchanged, is case no. 1-457/2022[35], where the defendant copied and transmitted the personal data of property owners in a chat room of an instant messaging service.

The risk of creating, using and distributing malicious computer programs. Malicious programs are computer viruses designed to cause the unauthorised destruction, blocking, alteration or copying of computer information. If a person uses and distributes malware, he or she may be prosecuted in accordance with Article 273 of the Criminal Code of the Russian Federation. According to the Ministry of Interior of the Russian Federation, in 2022, 200 cases of creation, use and distribution of

[27] Federal State Institution 'Central Information and Analysis Centre'. https://clck.ru/395A4r.
[28] Judgment of the Rudnichny District Court of Kemerovo, Kemerovo Oblast, Case No. 1-422/2016, dated 26 September 2016. https://clck.ru/395cv4.
[29] Judgment of the Bratsk City Court of the Irkutsk Region in Case No. 1-26/2017 of 22 September 2016. https://clck.ru/395d3Z.
[30] Judgment of the Leninsky District Court in Case No. 1-30/2018 of 11.04.2017. https://clck.ru/395dBV.
[31] Judgment of the Sinarsky District Court of Kamensk-Uralsky, Sverdlovsk Oblast, in Case No. 1-139/2016, dated 17 September 2016. https://clck.ru/395dKd.
[32] Judgment of the Kuibyshevsky District Court of Omsk in case No. 1-48/2020 dated 27.12.2019. https://clck.ru/395dPY.
[33] Judgement of the Severskiy City Court of the Tomsk Oblast in case No. 1-190/2016 dated 23.06.2016. https://clck.ru/36VDoX.
[34] Judgement of the Zlatoust City Court of the Chelyabinsk Region in the case No. 1-257/2023 of 11.04.2023. https://clck.ru/36UcMi.
[35] Judgement of the Kuznetsk district court of Penza Oblast in case No. 1-457/2022 dated 08.12.2022. https://clck.ru/36Ucs4.

malicious computer programs were registered in Russia (36.9% less than in 2021), in 2023 - 196 such crimes.

An example of the use of a computer virus to copy computer information is case number 1-226/2023[36], where the defendant used a virus to view video images from surveillance cameras and webcams on Internet users' personal computers and made unauthorised copies from those devices.

Case 1-355/2023 is an example of the neutralisation of protective equipment[37]. Neutralisation of security means is the negative impact on technical, cryptographic and other means with the aim of gaining unauthorised access to protected computer information. According to the complaint, the defendant illegally used the malicious program techsys.dll to neutralise the protection tools installed by the copyright holder.

The risk of violating the rules for operating means of storing, processing or transmitting computer information. According to the Criminal Code of the Russian Federation, liability for violating the rules of access and operation arises if the subject causes damage to the owner, the amount of which exceeds 1 million rubles. In this case, the subject may be held criminally liable in accordance with Article 274 of the Criminal Code of the Russian Federation.

A good example of the occurrence of the risk in question is Case No. 1-22/2021[38], where the defendants and an unidentified person developed plans to secretly steal money from ATMs in the Krasnoyarsk Territory and illegally entered the ATMs, violating the rules for their operation. To do this, they connected a laptop to the ATM and used malicious programs that caused the ATMs to continuously dispense all available cash. In total, the defendants made four connections and caused losses to the owners of 17.5 million roubles.

Risk of unlawful impact on the critical information infrastructure of the Russian Federation (hereinafter referred to as RF CII) According to Article 2 of the Federal Law 'On the Security of Critical Information Infrastructure of the Russian Federation' No. 187-FZ[39] (hereinafter referred to as Law 187-FZ), critical information infrastructure is the information systems of critical information infrastructure entities. A person who unlawfully interferes with critical information infrastructure may be criminally liable under Article 274.1 of the Criminal Code of the Russian Federation.

An example of risk materialisation is case 1-171/2023[40]. An examination of the case materials revealed that the defendants connected the mobile payment services to the subscriber numbers of PJSC VimpelCom, whose information infrastructure is an object of the critical information infrastructure of the Russian Federation. The illegal actions of the defendants violated the integrity and relevance of computer information. In order to localise the problem, PJSC VimpelCom was forced to suspend the MTopUp service on the territory of the Russian Federation.

Conclusion

As a result of the study, 12 compliance risks were identified - 6 civil, 1 administrative and 5 criminal. Separately, it is worth noting the dynamics of growth in offences committed using IT or in the field of computer information. In particular, in the period 2022-2023, the increase in offences related to unauthorised access to computer information and electronic devices rose from 9,308 to 36,788 cases, i.e. by 74.6%.

The results obtained indicate the need for IT entities to establish effective and efficient preventive measures to influence the identified compliance risks, such as compliance with and implementation of requirements for documentation support of IT projects, the form and content of IT products, and methods for protecting computer information. An analysis of legal practice has shown that the introduction, distribution and operation of IT products on the market without taking these requirements into account puts IT organisations at risk of undesirable compliance consequences.

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Transformation of business models through dynamic organisational capabilities

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Abstract

In this paper we look at the application of the theory and practice of dynamic capabilities of companies that adapt their current resources and competences. We review the Concept of Dynamic Capabilities that is developed by D.J. Teece, and discuss the context of the resource-based view and the Concept of Key Capabilities. In the article we highlight the three main components of dynamic capabilities: the sensory capabilities, the capacity to learn and strategic agility.

The main part of the work includes an illustrative case of *Netflix's* business transformation and the decline of *Blockbuster Video*. We take a closer look at the development of *Netflix* – its key business innovations in 'delivering' content to the customer and the collapse of *Blockbuster Video* – the reasons for its inability to sense the changing business environment.

The conclusions of the cases are discussed through the prism of the three components of dynamic capabilities. We highlight which of these enabled the company to transform, develop new key capabilities and build competitive advantage.

Keywords: dynamic abilities of the company, business model, resource approach, key competencies.

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通过组织动态能力业务模式的转变

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简介

文章论述了企业应用动态能力以调整其现有资源和能力的理论与实践。文章考虑了基于 D.J. Teece著作的动态能力概念，概述了基于资源方法和关键能力概念的动态能力背景。强调了动态能力的三个重要组成部分：感觉能力、学习能力和战略灵活性。文章的主要部分包括对 Netflix 公司业务转型和 Blockbuster Video 公司衰落的案例分析。文章分别讨论了 Netflix 在向客户 "提供 "内容业务方面的主要创新历程和Blockbuster Video的衰落，阐述了该公司忽视商业环境明显变化的原因。

我们从动态能力的三个组成部分的角度总结了这些案例的成果，指出哪些能力促成了业务转型、开发了新的核心竞争力并建立了竞争优势。

关键词: 公司的动态能力、业务模式、资源方法、关键能力。

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Modern companies are faced with the need to adapt to changing market conditions, which requires the transformation of traditional business models. Those that have failed to adapt have either lost their business altogether or are still struggling. By definition, dynamic capabilities enable an organisation to remain flexible and change both strategically and operationally. The key issue for companies is therefore to have the necessary resources and capabilities to maintain or even gain a competitive advantage at the time of the next market change. At its core, the concept of dynamic capabilities should answer the question of how a company can remain flexible and adapt to change.

The article uses the illustrative case of *Netflix* and Blockbuster Video from 2005 to 2015, primarily to qualitatively tell the story of how dynamic capabilities - their presence or absence - allow you to adapt and transform your business model in the digital era, which changes the conditions and environment of doing business. *Netflix* and *Blockbuster Video* are striking examples of companies with radically different strategies in the context of the digital revolution. The current state of these companies also reflects their ability to survive changes in the business environment.

Netflix's flexibility and willingness to innovate enabled it to take a leading position in the video rental market. Blockbuster, on the other hand, demonstrated a lack of willingness to change, resulting in a significant loss of market share. The company focused on traditional business methods and failed to move to digital platforms in time.

A key element of *Netflix's* success has been its use of user preference data to create personalised recommendations and develop its own content.

Blockbuster's reluctance to change and its conservative approach meant that it lost a significant proportion of its audience and was forced to close most of its stores. The company failed to take advantage of the opportunities offered by new technologies.

Netflix's success demonstrates the importance of dynamic capabilities and the willingness to transform in a rapidly changing market. Companies that can respond quickly to change and adopt new technologies are more likely to succeed. The key question is how to recognise that a company has dynamic capabilities and knows how to develop and apply them.

The concept of dynamic capabilities was popularised by D.J. Teece et al. in 1997 in their article 'Dynamic Capabilities and Strategic Management', which describes dynamic capabilities as the ability of a firm to integrate and exploit external and internal capabilities to conduct business in a rapidly changing environment [Teece et al., 1997]. Dynamic capabilities therefore enable new innovative forms of competitive advantage. The concept of dynamic capabilities originates from one of the classic and recognised approaches in the study of business strategy - the resource-based approach of R. Grant [Grant, 1991]. G. Hamel and K.K. Prahalad [Hamel, Prahalad, 1989; 1993] were also interested in the strategic analysis of companies and further developed the concept of the resource-based approach by introducing the concept of core competencies. Key competencies characterise a company in the marketplace and determine its place in the industry. A company's core competencies are the fundamental 'skills', business processes and business practices that are primarily associated with the company's success in the marketplace. The concept of dynamic capabilities does not abolish the basic resource approach and the concept of key competences - on the contrary, it becomes the next stage, defining those capabilities of the firm that allow the firm's key competences to be updated and adapted to the realities of a changing environment.

Dynamic capabilities are the ability of an organisation to identify and assess changes in the environment and then to adapt quickly and effectively to these changes using available resources and competencies. These capabilities include the ability to anticipate future challenges, develop and implement new strategies, and change existing business processes and structures to achieve sustainable competitive advantage.

Dynamic capabilities differ from static capabilities in that they involve continuous updating and improvement of the organisation's internal processes and external interactions. They help organisations not only to survive in uncertain times, but also to thrive by capturing new markets and creating unique offerings for customers.

Based on the existing literature, the author identified several key components of dynamic capabilities [Teece et al., 1997; Eisenhardt, Martin, 2000; Zollo, Winter, 2002]:

- sensory abilities:
  - the company's ability to gather and analyse information on changes in the environment (technological innovations, changes in consumer behaviour, changes in legislation, etc.),
  - effective use of monitoring and analysis systems to identify key trends and threats;
- learning abilities:
  - continuous improvement of knowledge and skills of employees through training and sharing of experience,
  - quick adaptation to new technologies and working methods;
- strategic flexibility:
  - the possibility of reviewing and adjusting the long-term strategy according to current conditions,
  - adaptive management of resources and priorities.

Let's look at the business practices of the two companies chosen for the case study: *Netflix* and Blockbuster Video, after which we can determine which components of dynamic capabilities *Netflix* used in practice and how *Blockbuster Video* ignored them.

Netflix originally started as a DVD rental by mail service, a business model that allowed customers to order films without having to visit a store. However, the company's management realised that the future belonged to digital technologies and streaming [Hastings, 2020]. The transition to the streaming format began in 2007 when *Netflix* launched its first online video streaming service. Initially, users could watch a limited selection of movies and TV shows, but the content library was gradually expanded. This was a risky move as it required significant investment in infrastructure and content licences, but it has proved extremely successful. With the rapid development of the internet and the rise of smartphones and tablets, *Netflix's* streaming platform has become incredibly popular. This article shows how this strategy has affected Netflix's financial and operational performance.

One of the key elements of *Netflix's* success has been its personalisation and recommendation algorithms. The company has begun to actively use data on user preferences to create customised offers. Each customer receives recommendations based on the movies and TV shows they have watched, ratings and other behavioural parameters [Hastings, 2020]. *Netflix's* algorithms are based on complex mathematical models and artificial intelligence. They analyse a huge amount of data to understand which genres, actors, directors and plots each individual user likes. This allows customers to receive the most relevant recommendations, increasing their satisfaction with the service and time spent on the platform. *Netflix* also uses A/B testing to improve the interface and functionality of its website and apps. This allows the company to continually improve the user experience and increase conversion to views, which drives revenue.

Creating original content was the next step in *Netflix's* evolution. The company realised that relying on third-party producers could limit its options, so it decided to start producing its own shows and films. The first major success was the series House of Cards, released in 2013. It received numerous awards and positive reviews from critics, confirming the correctness of the strategy chosen. After that, *Netflix* began investing heavily in the creation of original projects such as 'Stranger Things', 'The Crown' and many others.

Original content has allowed *Netflix* to differentiate itself from its competitors and attract new subscribers. It has also given the company full control of the rights to these projects, allowing it to monetise them in a variety of ways, including international sales and licensing.

Table
Financial performance of *Netflix* and *Blockbuster*, 2005–2015 (mln USD)

Годы	*Netflix*	*Blockbuster Video*
Revenue		
2005	682	5.720
2006	997	5.530
2007	1.205	5.150
2008	1.365	4.970
2009	1.670	4.050
2010	2.163	3.240
2011	3.205	2.820
2012	3.609	N/A
2013	4.374	N/A
2014	5.505	N/A
2015	6.779	N/A
Net profit		
2005	49	520
2006	67	50
2007	83	–37
2008	116	–101
2009	115	–518
2010	161	–128
2011	226	N/A
2012	–39	N/A
2013	112	N/A
2014	267	N/A
2015	123	N/A

Sources: Blockbuster Inc SEC Filing 10-K Annual reports, 2005-2011: https://last10k.com/sec-filings/bliaq/0001193125-10-058339.htm; Netflix Inc SEC Filing 10-K Annual report, 2005-2015: https://ir.netflix.net/financials/sec-filings/default.aspx.

The shift from DVD rental to streaming, the development of personalisation and the creation of original content have become key elements in the successful transformation of Netflix's business model.

Blockbuster Video, the leader in the video rental market in the 1990s and early 2000s, focused on the physical rental of videocassettes and DVDs through its network of stores. The company had a large number of stores across the United States and enjoyed great popularity among people who preferred to rent films rather than buy them.

Blockbuster stuck to its guns even when streaming came along and the internet became ubiquitous. The company relied on its proven business model, believing that a significant proportion of its customers preferred to go to a store, choose films in person and interact with staff.

Beyond its supposed understanding of the market, *Blockbuster Video* maintained its focus on physical rentals for other, more rational reasons. Physical rentals were highly profitable, largely due to late fees. Going digital would require significant investment in IT infrastructure, marketing and operating model changes.

Despite the obvious changes in media consumption, *Blockbuster* has been slow to embrace digital services. The company considered launching an online platform but delayed the process, fearing that the shift to online rentals would reduce sales in physical stores.

In addition, *Blockbuster* has traditionally specialised in retail sales and did not have the necessary skills and knowledge to quickly master digital technologies. Either way, the company tried to enter a new market when it became clear that the world was moving to digital platforms, but it was too late. *Blockbuster* tried to adapt by launching its Total Access online service in 2004, but it failed to seriously compete with *Netflix*. Total Access offered a hybrid model combining online viewing and physical rental, which proved inconvenient for many users.

High debt and declining physical rental revenues left the company in financial trouble, making it difficult to invest in new technology. Blockbuster's conservative approach eventually led to bankruptcy in 2011[1]. The company failed to adapt to market changes in a timely manner and lost its leadership to more agile and innovative competitors such as Netflix.

To get the full picture, let us turn to the actual financial indicators of the two companies, as shown in the table.

Until 2010, *Blockbuster's* revenues were significantly higher than *Netflix's*. But *Netflix* saw steady revenue growth each year; the gap narrowed each year until *Netflix* overtook its rival in 2010. Blockbuster experienced a sharp decline in sales in 2010 and stopped publishing financial statements after going bankrupt in 2011[2]. *Netflix* has been consistently profitable since 2005, unlike Blockbuster, which started making losses in 2007.

These data clearly show how *Netflix* was able to adapt effectively to new market conditions and strengthen its position, while Blockbuster was unable to cope with the challenges of the digital age and collapsed.

So we can see how dynamic *Netflix's* capabilities were and how stagnant Blockbuster Video's capabilities were. Returning to the theoretical basis, let's look at what the components of Netflix's dynamic capabilities were and how they manifested themselves.

The ability to clearly see the trend towards the digitalisation of society, which began in the mid to late 2010s, speaks to the company's sensory capabilities. *Netflix's* management was able to identify the gradual shift in consumer behaviour from 'physical' to 'digital' and began to rapidly develop IT capabilities. The company also kept abreast of the technological innovations of the time and understood that the spread of the internet to all segments of the population in developed countries, as well as the increasing availability of personal devices, was opening up a new way of consuming content.

According to the company's management, in particular *Netflix* co-founder and CEO R. Hastings, the company would not have been successful without the ability of almost all *Netflix* employees to learn. In his book 'No Rules Rules', Hastings states that a company's ability to learn as a whole depends on its ability to listen and take feedback from customers. All decisions are made on the basis of what is most convenient and beneficial for users. As mentioned earlier, the company is constantly experimenting, testing new things and getting feedback from customers. In this way, *Netflix* not only learns but also keeps its finger on the pulse of the market, which has allowed it to move to a new business model from the very beginning.

If we develop the idea of learning, we should note separately the most important competence of the company - working with customer data, which allows it to implement technological solutions that enable it to provide customers with appropriate content. This means that the company not only learns itself, but also trains its systems and algorithms. This is one of the company's key competencies.

The final important component of dynamic capabilities, as mentioned earlier, is strategic flexibility. This capability is clearly demonstrated by *Netflix's* decision to move to in-house content production. The company's overall flexibility, ability to identify market trends and organisational learning has enabled it to implement its own video content production processes, allowing it to become more strategically independent of

[1] Ash A. (2012). How Blockbuster went from dominating the video business to bankruptcy. Business Insider.
[2] A timeline: The Blockbuster life cycle (2012). https://www.forbes.com/2010/05/18/blockbuster-netflix-coinstar-markets-bankruptcy-coinstar_slide.html.

content providers. In this way, the company became not only a platform but also a production structure. It also opened up new revenue streams for the company.

Thus, the combination of key competencies in the form of working with customer data and creating original content based on the same data about customer preferences creates a strong competitive advantage. However, the author believes that all of this is built on a strong foundation of the company's dynamic capabilities.

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