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The Influence of the Competence Component of Intellectual Capital and Financial Efficiency on the Capitalization of Russian Manufacturing Companies

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ABSTRACT

The **object** of the study is Russian industrial companies whose shares are traded on the Moscow Exchange. The study's **subject** is financial and financial connections in the field of using intellectual capital's competence component as an important factor in business growth. The **relevance of the study** is important for the increasing role of intellectual capital and its components as a determining factor in business growth, as well as the need to identify new determinants that influence company capitalization. In the context of overcoming the consequences of sanctions, intellectualization and digitalization of the economy, the problem of the study of the dependency of the capitalization of Russian companies on the state of the components of intellectual capital is significantly updated. The **purpose of the study** is to assess and model the impact of the competence component of intellectual capital and financial efficiency on the capitalization of Russian manufacturing companies. **Methods** of comparative and statistical analysis, calculation of financial and economic indicators, correlation and regression analysis, and the Farrar-Glauber test were used. According to correlation analysis, the capitalization of Russian public companies in the production sector is influenced by an internal factor such as patent activity. The constructed multifactor linear regression model allows for the conclusion that a 1% increase in the number of patents raises the company's market capitalization by 1.23% while all other factors remain constant. It is **concluded** that in the Russian market the importance of material assets as a factor in business growth significantly prevails over the influence of the competence component of intellectual capital. Recommendations are given, the implementation of which in the practice of Russian manufacturing companies will maximize their capitalization by taking into account the financial and economic advantages from the use of the competence component of intellectual capital.

Keywords: capitalization; Russian industrial companies; factors affecting capitalization; intellectual capital; intangible assets; return on assets; patent activity; financial efficiency

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INTRODUCTION

The relevance of the study of the influence of the competent component of intellectual capital on the financial and economic indicators of the activities of Russian industrial companies is due to a number of socio-economic and political trends.

First, the transition from a "material" economy to a digital one based on an intelligent component requires a corresponding transformation of business processes. Companies that invest in the formation and development of organizational competencies get a competitive advantage. Competence is increasingly important in the development of both intellectual capital and business as a whole.

Second, innovation diffusion and supply of high-tech products have declined sharply in the sanctions area due to the breakdown of partnerships and disturbance of logistics. This greatly restricts economic development and requires a reorientation from the use of foreign intelligent products and technology to other sources. There is an increasing need to develop and implement one's own innovations. Competitive development of the Russian economy's industrial sector will be possible only if the competence component of intellectual capital is effectively developed and used.

Intellectual capital (IC) presupposes a specific asset capable of creating value. Traditionally, the structure of the IC is divided into three components: organizational, structural and human capital [1]. Economic transformations resulted in a modification in the structure of intellectual capital. As structural elements, it is advisable to identify three groups of capitalizable components of intellectual capital: competence, digital and convergent. The competence component is the driver of the development of others, allowing them to change business models and facilitating the search for innovative solutions.

M. A. Eskindarov examined intellectual capital through a view of the characteristics that form human capacities [2]. In the digital economy, there is an increase in the involvement of the intellectual and innovative component in financial and economic circulation. New forms of human capital are being formed, which allows us to talk about the need to allocate the competence component within the IC. If human capital is only partially separated from the individual, competitiveness is organizational competence, which is one of the defining assets of the company. Competence capital is intangible knowledge resources that are transformed into unique, innovative assets.

The purpose of the study is to evaluate and model the impact of the competitiveness component of intellectual capital and financial effectiveness on the capitalization of Russian industrial companies.

The scientific hypothesis of the study is as follows: competency capital as a component of intellectual capital has a positive impact on the capitalization of industrial companies.

LITERATURE REVIEW

The role of IC in improving the sustainability of modern companies and its impact on financial and economic results is reflected in the scientific literature on both a theoretical and practical basis. In particular, according to N. Bontis, W. C. Keow and S. Richardson, there is a difference between the company's balance sheet and market value, which can be explained by the profile of intellectual capital [3]. The authors of the evaluation of 107 Malaysian companies argued that there is a close relationship between IC and the results of the company, regardless of industry affiliation. In turn, J. Xu and J. Li, having examined the role of IC components in high-tech and low-tech industrial companies (respective 116 and 380 observation objects), concluded that there was a positive correlation between IC and financial indicators in both sectors. [4].

Companies have three components of IC: tangible (physical), financial and intangible

(intellectual). Despite the fact that intellectual capital is intangible and difficult to measure, it is in the modern economy that it becomes a key factor for sustainable growth and value formation of companies. Issues of the influence of IC on the market value and financial performance of companies are discussed in the papers [5–9]. According to A. Riahi-Belkaoui, if the market is efficient, investors will value companies with highly developed intellectual capital more [10].

It is important to note that research in the scientific literature has been provided that allows us to discuss the detrimental influence of IC on the financial results of company activities. Thus, an analysis of 96 Greek companies listed on the Athens Stock Exchange (ASE), from four different sectors of the economy observed over a three-year period, revealed a statistically significant link only between human capital efficiency and financial indicators [11]. F. Sardo and Z. Serrasqueiro's study of the impact of IC on the financial performance of Malaysia's 41st construction company revealed a positive impact on the performance of capital-only companies [12]. In the paper by P. Puntilla [13], there is no significant influence of IC on the performance of companies [13].

Special attention in the scientific literature is given to the management of the knowledge component [14, 15]. Competent capital is becoming increasingly important in a modern knowledge-based economy. According to K. Wiig, the purpose of knowledge management is to maximize its effectiveness and profit from it by constantly updating knowledge [9]. Individual and collective knowledge is an important factor in business growth in the modern economy. As noted by C. Diebolt and R. Hippe, the long-term impact of the knowledge component on present innovation and economic development must be considered [16]. After analyzing more than 5 000 French industrial companies, E. Kremp and J. Mairesse empirically established that when the intensity of knowledge management increases by 1%, the tendency to innovate increases by 4% and productivity increases by 3% [17].

The most notable of the papers by Russian authors should be the studies of T. Andreeva and T. Garanina, A. A. Bykova and M. A. Molodchik, E. R. Baiburina, M. A. Fedotova and O. V. Loseva, N. R. Kelchevskaya, S. S. Rustam [18–21].

One of the first studies in the national scientific literature devoted to the question of the analysis of the impact of IC on the results of companies was the paper of T. A. Garanina, in which the impact on the market value of the shares of Russian companies of tangible assets and three components of intellectual capital is justified on the data of the Russian market [22].

The positive relationship between profits and returns from IC is established in the study of A. A. Bykova and M. A. Molodchik on the basis of a sample of 115 companies in the Perm region [23]. The conclusion about the significant influence of IC on the growth of fast-growing companies and the lack of significant dependence for slow-growing companies is supported in the paper by S. S. Rustam [24].

In general, it is necessary to note that, despite the presence of individual papers in the domestic scientific literature devoted to issues of empirical justification of the influence of IC on the results of activity and cost of Russian companies, the issues of interrelationship with individual components of IC did not receive proper development. This is what determines the relevance and necessity of study in this field.

MATERIALS AND METHODS

The theoretical basis of the study were the papers of Russian and foreign scientists devoted to the evaluation of the value of the business [24–26], the intellectual capital of companies [22, 23, 27–29], as well as the paper revealing the influence of intangible components on the cost of business, including corporate

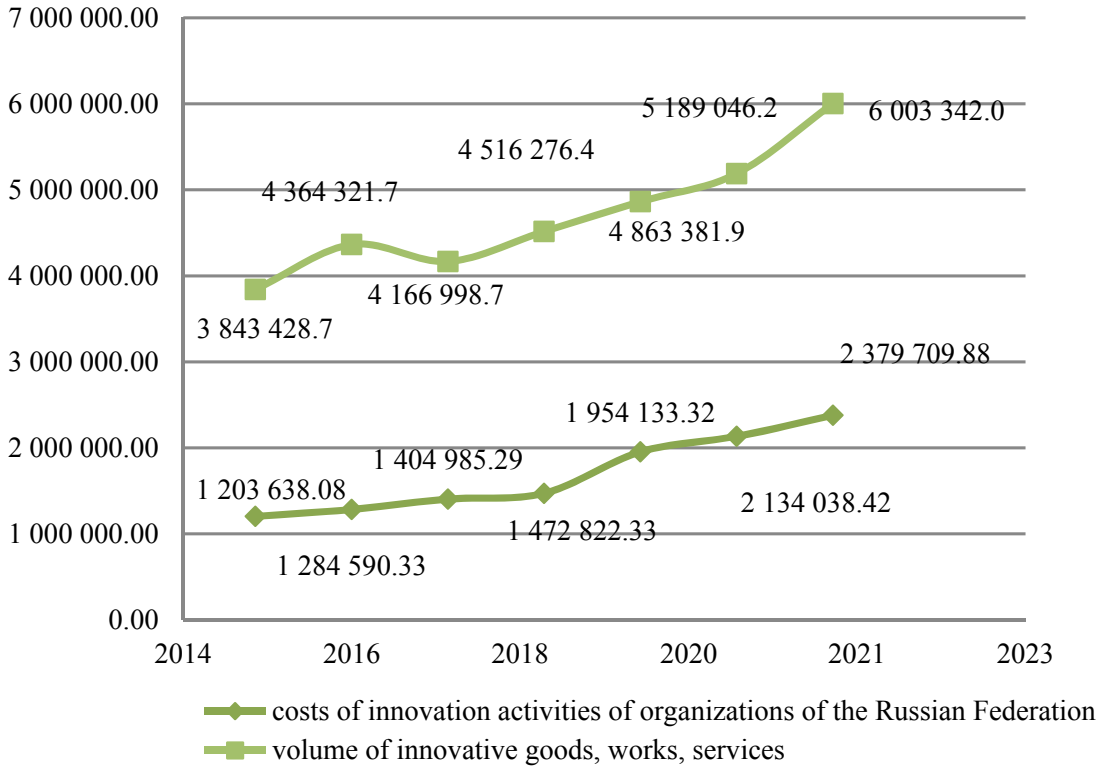

Fig. 1. **Dynamics of Indicators of Innovative Activity of Russian Companies, Mln Rubles**

Source: Rosstat data, gks.ru.

governance [30, 31], value of intangible assets [32], R&D costs [33], network capital [34], competences and dynamic abilities [35].

The information base of the study consisted of regulatory and legal documents, data from official statistics, and materials from internal company reports. In conducting the study, data from the information and analytical database of SPARK and the financial portal Smart-Lab were used.

Statistical and comparative analytic methodologies were used to conduct research on financial and economic indicators of company activities [36–38].

The multi-factor correlation-regression analysis was used to identify the indicators that have the largest influence on capitalization, as well as to determine the type of dependency between the variables to be investigated [38, 39].

The company's competence capital is reflected in the results of intellectual activity, including inventions and useful models. The increasing role of innovation as a key factor of sustainable business development allows to view patent activity as an indicator of the state of the complementary component in the IC. The number of inventions and utility models (patents) is one of the significant manifestations of the competence component. Since the results of intellectual activity, according to FSBU 14/2022 "Intangible Assets"[1] are reflected exclusively in cost value due to the absence of an active market for most intangible assets (IAs), this indicator will also be considered as a result of the competence component.

RESULTS OF THE STUDY

Intellectual Capital of Russian Companies

Costs of innovative activities in the period 2015–2021 overall in the Russian Federation

[1] Order of the Ministry of Finance of Russia from 30.05.2022 No. 86n "On approval of the Federal Standard of Accounting of FSB 14/2022 "Intangible Assets". URL: http://publication.pravo.gov.ru/ Document/View/0001202206280008?ysclid=lpwcowkldl36860099 (accessed on 28.09.2923).

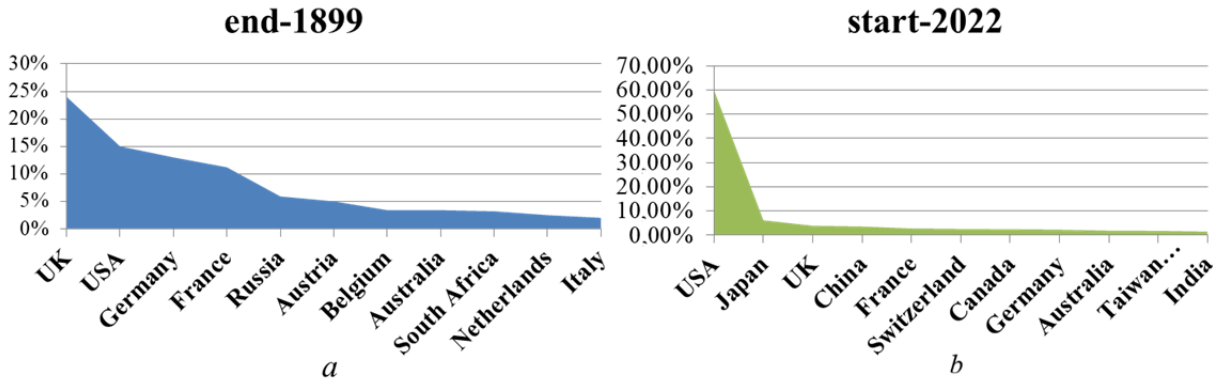

Fig. 2. **Relative Sizes of World Stock Markets, End-1899 (*a*) Versus Start-2022 (*b*)**

Source: Compiled by the author based on data from Credit Suisse Global Investment Returns Yearbook 2022 Summary Edition. URL: https://www.credit-suisse.com/media/assets/corporate/docs/about-us/research/publications/credit-suisse-global-investment-returns-yearbook-2022-summary-edition.pdf (accessed on 05.11.2023).

had a trend of growth (197.71%), as well as the indicator of the volume of shipped innovative goods, works and services (156.2%) (*Fig. 1*). But the level of innovation activity of Russian companies is not characterized by a sustained positive trend.

As a negative trend characterizing the unsatisfactory level of development of the competence component of intellectual capital, it is worth noting the decrease of the share of Russian companies in the capitalization of the world market. According to a review published annually by the Swiss investment bank Credit Suisse, if in 1899 the share of Russian companies in the world market capitalization was 5.9% (5th place in the value of companies), then in 2022 they fell only into the category "other"[2] (*Fig. 2*).

The innovation activity of Russian companies, which is characterized primarily by competency capital, is significantly inferior to the indicators of the leading countries across the entire spectrum of economies. In the Global Knowledge Index (GKI), determined annually since 2017, Russia's position in the ranking has fallen to 52nd place, which is comparable to countries such as Romania, Malaysia, Egypt, Oman, Chile, Uruguay, Greece, Bahrain, Saudi Arabia, Costa Rica (*Table 1*).[3]

The analysis of the competence component of IC of Russian companies allows to speak of insufficient level of its development. For this reason, the capitalization of Russian companies is significantly lower than that of foreign companies. The management of Russian companies does not consider IC and its components as a factor that allows to increase market value.

Correlation and Regression Analysis of the Impact of Competent Capital on the Capitalization of Russian Industrial Companies

We will examine the impact of the identified indicators (patent activity and IA) on the capitalization of Russian industrial companies, as well as develop a dependency regression model. The data were collected for 24 companies leading in patentability, but their composition was adjusted to build a balanced model. Only those companies were included in the sample for which observations

[2] Credit Suisse Global Investment Returns Yearbook 2022 Summary Edition. URL: https://www.credit-suisse.com/media/assets/corporate/docs/about-us/research/publications/credit-suisse-global-investment-returns-yearbook-2022-summary-edition.pdf (accessed on 28.09.2923).

[3] Global Knowledge Index (GKI). URL: https://ru.knoema.com/aomssce/global-knowledge-index (accessed on 03.04.2023).

Table 1

Position of Individual Countries in the Global Knowledge Index (GKI) in 2020–2022

Country	Country rank in 2022	Value of the Global Knowledge Index				
		2018	2019	2020	2021	2022
USA	1	68.5	69.7	71.1	69.9	68.4
Switzerland	2	72.7	73.2	73.6	71.9	68.3
Sweden	3	68.6	69.1	70.6	70.0	67.0
Finland	4	68.8	69.7	70.8	69.7	66.9
Ireland	20	65.7	69.4	66.1	63.7	61.1
Singapore	12	67.9	69.2	69.2	68.0	63.3
Denmark	7	65.3	67.6	68.3	68.5	66.0
UK	9	66.5	67.5	68.1	68.9	63.9
Norway	8	64.7	65.3	66.1	68.1	64.2
Iceland	14	64.4	64.7	65.2	67.0	62.9
UAE	25	61.9	63.7	66.1	63.1	58.9
Luxembourg	6	68.3	69.1	69.5	67.3	66.1
Germany	11	64.4	64.6	66.2	66.6	63.6
China	–	54.0	53.7	57.4	59.2	–
Russia	52	51.7	46.0	45.0	51.7	48.1

Source: Compiled by the author based on data from the Global Knowledge Index (GKI).

were obtained at each given time for all the indicators analysed. Fuel and energy complex companies were also excluded from the sample.

Despite the fact that metallurgy is traditionally classified as low-tech, leading companies in the industry are showing sufficient innovation activity. Public companies representing medium- and high-tech industries (aerospace, general mechanical engineering, chemical industry) have a low share of the total MOEX capitalization.

In the first phase of the study, the patent activity, the absolute value and the share of NMA in the non-current assets of the companies under investigation were analysed.

The largest number of patent leaders in the sample included in the metallurgy and chemical industries (*Fig. 3*).

A comparative analysis of the absolute value of IA and their share in non-current assets has led to the conclusion that among the PJSCs operating in the field of production, the leaders in absolute size of the IA are "Nizhnekamskshina" and "Alrosa". Analysis of the indicator of the size and share of IA, by which you can "see" intellectual capital in traditional financial reporting, allowed to conclude, first, the existence of problems with the reflection of the intangible

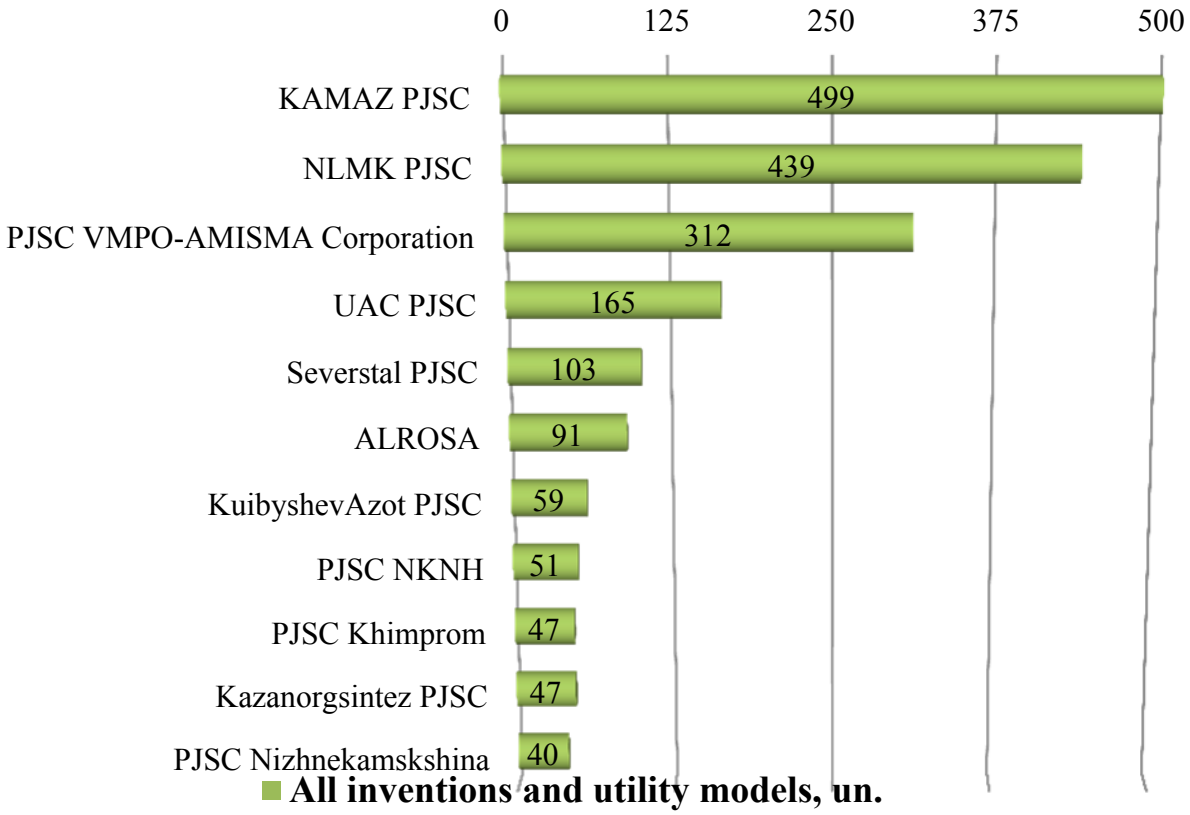

Fig. 3. **Indicators of Patent Activity of Russian Manufacturing Companies**

Source: Compiled by the author based on data from the Spark reference and analytical system.

component in the reporting and, secondly, the underestimation of Russian companies the role of IC as a source of value creation.

Analysis of the correlation between the time series of the number of patents and capitalization as a resulting indicator revealed a high degree between variables (correlation factor of 0.76). There is a close correlation between the IA balance sheet value and corporate capitalization, as the correlations are in the range 0.5-0.7 (r = 0.66).

The capitalization of companies is also influenced by factors related to material and financial capital. To clarify the contribution to the capitalization of Russian industrial companies of the competence component and its correlation with the influence of material capital, build a multi-factor model of regression. As variables characterizing the impact of physical and financial capital on capitalization, we will analyze the return on assets and EBITDA. For the valuation of intellectual capital, most often we use Tobin's ratio (q), which will also be considered an influence variable.

A multi-factor correlation study was used to identify the financial and economic elements that have the greatest influence on company market capitalization (*Table 2*).

From the evaluation of the results obtained, it can be concluded that of all the factors studied, the value indicator IA has the closest relationship with the resulting indicator (market capitalization) (R = 0.66), return on assets (R = 0.93), EBITDA profitability (R = 0.98). A marked correlation is observed with patent activity (R = 0.76). The relationship between capitalization and the Tobin's ratio (q) is weak or moderate (R < 0.5), respectively, and this variable may be excluded from further consideration.

In the matrix, there are pairs of correlation ratios between independent variables greater than 0.7, indicating the presence

Table 2

Values of the Correlation Coefficient (R) Based on the Results of Multivariate Correlation Analysis

Indicator	IA	ROA	EBITDA margin	Patent activity	Tobin's ratio (q)	Capitalization
IA	1					
ROA	0.77	1				
EBITDA margin	0.68	0.89	1			
Patent activity	0.46	0.51	0.79	1		
Tobin's ratio (q)	–0.1	–0.01	0.44	0.60	1	
Capitalization	0.66	0.93	0.98	0.76	0.32	1

Source: Compiled by the author.

of multicollinearity. The determinant of the inter-factor matrix of R correlations (det[R] = 0.0001), found using the MDETERM function, is close to zero. We can make an assumption of the general multicollinearity of the entire set of explanatory variables. The Farrar-Glauber multicollinearity test was carried out. The observed value of Farrar-Glauber (FG) was 53.25. The actual value is compared to the table value (18.3) of the χ^2 criterion with a degree of freedom (10) and a level of significance $\alpha = 0.05$. The observed value is greater than the table, respectively, in the array of explanatory variables, which presents multicollinearity.

Since the analysis of the matrix of multicollinearity correlation pairs showed that EBITDA profitability is most strongly interrelated with the rest of the explanatory variables, let us exclude it from further analysis.

Build a three-factor model of their influence by taking into account the factors most closely connected with capitalization — the value of intangible assets, return on assets, and patent activity. The results of the regression analysis are presented in the *Table 3*.

Table 3 shows that the three-factor equation has statistically significant ratios for two factors: return on assets and patent activity. These factors are statistically significant. Variable (X_1) profit per share and free member are insignificant (p- value > 0.05). Excluding the variable X_1 from the analysis, we get the following model:

$$Y = 23.65 \times X_2 + 1.23 \times X_3,$$

where Y — capitalization of the company; X_2 — return on assets; X_3 — patent activity.

The determination factor for the two-factor model is approximately 97%, indicating that the quality of the model has improved, and that the change in the resulting feature by 97% is due to changes in the explanatory variables (return on assets and patent activity).

CONCLUSION

As a result of the hypothesis's example, specific conclusions can be drawn: market

Table 3

Fragment of the Three-Factor Regression Analysis Protocol

Variable	Coefficient	Standard error	t-statistic	P-value
Y- cross	79.0506929	100.9913629	–3.01066036	0.0948841
Variable X_1	1.920973225	0.538378486	1.710642697	0.22927588
Variable X_2	23.64728178	4.16381638	6.887258988	0.0204377
Variable X_3	1.23065141	1.354525812	0.806215223	0.04784121

Source: Compiled by the author.

capitalization is acceptable as a comprehensive indication of investment attractiveness impacted by an intellectual capital component such as patent activity. Nevertheless, in the Russian market, the influence of tangible assets' fundamental value on the company's capitalization exceeds the importance of the ICT competence component.

The model obtained makes it possible to conclude that patent activity leads to capitalization growth and correlates strongly with other financial indicators of the company's activity.

For this sample of Russian companies, the presence of a close correlation between market capitalization and the number of patents may not be evident. The results for the investigated data set of companies allow for a development of recommendations on the management of intellectual capital components in order to improve capitalization:

- intellectual capital components should be considered as variables in improving market capitalization and sustaining long-term viability;
- patent activity is an internal non-financial factor for increasing market capitalization;
- necessary to assess existing patents in terms of their value-added impact and to disclose relevant information;
- require not only to include the development of intellectual capital components, including patent and publishing activity, the number of hours of training, the availability of digital duplicates, the involvement in digital and networking interactions, etc., but also to ensure that relevant reporting is developed;
- formulate a portfolio of objects based on individual components of intellectual capital and assess the potential benefits from them based on the needs of the company, consumers, and the market as a whole.

Following the recommendations based on the study's conclusions will contribute to the long-term development of Russian industrial companies and improve their market capitalization.

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