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# Dataset Analysis of the Risks for Russian IT Companies Amid the COVID-19 Crisis

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**Abstract:** The motivation for this research was to strive towards specifying the risks for businesses under the conditions of the COVID-19 pandemic and crisis in the IT sector in Russia. This paper is aimed at performing a dataset analysis of the risks for Russian IT companies amid the COVID-19 crisis. The sample contains the top 100 largest IT companies in Russia in 2020 and covers the data on these companies for 2019–2020. The influence of the COVID-19 crisis pandemic on the risks for IT companies in Russia is assessed with the help of the authors' methodological approach to the dataset analytics of companies' risks with the use of the method of trend analysis, analysis of variance and the hierarchical synthesis concept by T. Saaty. A specific feature of the authors' methodological approach is its taking into account of the pre-crisis level of risks for companies. Due to this, the authors' methodological approach allows for the most precise and correct determination of the scale and character of the influence of the COVID-19 pandemic and crisis on the risks for companies. The role of human resources in the management of risks for IT companies under the conditions of the COVID-19 pandemic and crisis in Russia is determined with the help of regression analysis; the regularity of the change in revenue, and the position of the company in the ranking (its competitiveness) in terms of the growth of the number of employees, are described mathematically. The key conclusions are that the influence of the COVID-19 pandemic and crisis on the risks for IT companies in Russia in 2020 was weak, and human resources played an important role in risk management. The theoretical significance of the paper lies in its rethinking of human resources management of Russian IT companies from the position of risk amid the COVID-19 crisis. The practical significance of the authors' conclusions lies in the discovery of the high risk resilience of Russian IT companies to the pandemic and the formation of their risk profile amid the COVID-19 crisis, in which the main, though low, risk is the risk of reduction in competitiveness, whilst the risk of reduction in revenue is minimal.

**Keywords:** business risks; 2020 pandemic; COVID-19 crisis; dataset analysis; IT companies of Russia; risk management



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## 1. Introduction

Risks for business grew significantly in 2020 against the background of the COVID-19 pandemic and crisis. The crisis had unequal effects on the economy, which were very differentiated by sectoral markets. Thus, the spheres that suffered the most include tourism, whose activities were limited due to the ban on mass events, termination of the work of restaurants, and restriction of transport communications (Ninh 2023; Zhang et al. 2022a), as well as the beauty industry, including beauty salons and gyms, whose activities were paralysed by the pandemic restrictions (Moreno Ramírez et al. 2022).

Contrary to these, the sphere of education successfully adapted to the conditions of the pandemic, having transferred to the remote form of teaching (Tanhan et al. 2023). Though this is connected with certain organisational and technical complexities and additional costs, remote education allowed educational organisations to retain jobs and the pre-pandemic volume of provision of educational services (Facente et al. 2022).

Against this background, a vivid contrast is the sector of online trade, whose development accelerated amid the COVID-19 crisis (Pratap et al. 2023). Many companies from various sectors performed a transition to online trade, to support business activities under the conditions of lockdowns (Chen and Bashir 2022). The vivid beneficiaries of the pandemic were private organisations of healthcare and pharmaceutical companies, including developers of vaccines (Mishra et al. 2023).

Special attention should be paid to the experience of the IT sector—as a driver of high-tech sectors that belong to the digital economy. In the conditions of the Fourth Industrial Revolution there is tough global digital competition and, during the decade of science and technologies in the Russian Federation (2022–2031), an announcement by the Decree of the President of the Russian Federation (dated 25 April 2022, No. 231 (Ministry of Education and Science of the Russian Federation 2023)), the IT sector acquired a strategically important value.

In the above-mentioned tourist or beauty industries, an increase in risks is only connected with business losses, loss of market positions, and a reduction in personnel (loss of valuable personnel by a loss of business and the growth of unemployment in the economy). The specific feature of the IT sector is that, unlike most of the other sectors viewed as examples here, the risks for business in the IT industry may lead to particularly critical consequences for the economy as a whole. Thus, risks in the IT sector pose a threat not only to IT companies but to the whole economic system. The negative consequences for the economy may be connected with the loss of technological sovereignty and leadership, which threatens national economic security and contradicts the strategic priorities of Russia.

In the existing literature, the experience of only certain IT companies in the selected territories was studied. This does not allow for the general characterisation of the influence of the COVID-19 pandemic and crisis on the IT sector and leaves the experience of this sphere in Russia poorly studied. This literature gap is to be filled by this paper. The paper's contribution to the literature lies in its specifying of the features of business under the conditions of the COVID-19 pandemic and crisis in the IT sector in Russia. A clear and narrow sectoral and geographical focus allows the most precise measuring of risks, given the specifics of the Russian IT sector.

The paper's originality is due to its development and application of a new methodological approach to dataset analytics of risks for companies. A specific feature of the authors' methodological approach is the consideration of the pre-pandemic (pre-crisis) level of risks for companies. Due to this, the authors' methodological approach allows for the most precise and correct determination of the scale and character of the influence of the COVID-19 pandemic and crisis on the risks for companies. This is the essential difference between the new methodological approach and the existing approaches, in which risks for companies are studied in narrow timeframes of the year 2020, without consideration of previous experience, which could lead to distorted assessments and the incorrect treatment of data.

This paper is aimed at the dataset analysis of the risks for Russian IT companies amid the COVID-19 crisis. This goal is achieved with the help of two research tasks. The first task is connected with the assessment of the influence of the COVID-19 pandemic and crisis on the risks for IT companies in Russia. The second task consists in determining the role of human resources in the management of risks for IT companies under the conditions of the COVID-19 pandemic and crisis in Russia.

## 2. Risks for Russian IT Companies Amid the COVID-19 Crisis: Literature Review and Gap Analysis

This paper is based on the scientific provisions of the theory of economic crises, according to which economic crises worsen the business climate and increase business risks. This theory is based on Keynes (1936) and Krugman (1979), and on the ideas of N.D. Kondratiev on the cyclical development of the economy (Barnett 1998).

The fundamental basis of this paper is the theory of business risks, according to which two key risks, that grew under the conditions of the COVID-19 pandemic and crisis, are distinguished. The first one is the risk of reduction in revenue. Reduction in revenue is a serious threat to business, for it may lead to losses, insolvency, and bankruptcy (Berzon et al. 2022; Vagin et al. 2022). Under the conditions of the COVID-19 pandemic and crisis, the lockdown set restrictions on the production and sales activities of the business and reduced the volume of effective demand due to the reduction in the level of revenue in society, which, in sum, increased the risk of reduction in business revenue (Inshakova et al. 2021).

The second risk is the risk of reduction in competitiveness. The loss of competitive advantages is usually accompanied by the ousting of business from the market (Kharlanov et al. 2022). Under the conditions of the COVID-19 pandemic and crisis, the opportunities to implement innovations were limited due to the deficit of investments in the development of business, which raises the risk of reduction in competitiveness of business (Kolchin et al. 2023; Litvinova 2022). The aggregate increase in the risks for business on the whole, in the macro-economic scale under the conditions of the COVID-19 pandemic and crisis, was reflected by Kyung and Whitney (2020).

The existing literature notes the significant growth of risks for IT companies under the conditions of the COVID-19 pandemic and crisis because of the reduction in financing of R&D (Błaszczyk et al. 2022; El Khoury et al. 2022) and the decrease in demand for IT products (Sudershanaa et al. 2021). It is also noted that a logical result of an increase in business risks, under the conditions of the COVID-19 pandemic and crisis, is the monopolisation of the IT sector (Abbas Zaher et al. 2021; Bajaba et al. 2021; Eid et al. 2023; McLean et al. 2021; Shehzad et al. 2020; Su et al. 2022), since, in the high-risk business environment, only the largest, most competitive, and most flexible IT companies with the large financial strength could survive (Chen et al. 2022; Desai et al. 2023).

Published works (Cherry et al. 2023; Villegas et al. 2023) point to the evolution of business risks, which, in particular, were reflected in credit rankings during the COVID-19 pandemic. Multiple published works by Hadef et al. (2022); Ouerfelli et al. (2022); Yuan and Pang (2022) and Zhang et al. (2022b) note that, during the COVID-19 crisis, especially at the early stage of the pandemic, revenues and competitiveness of businesses were largely predetermined by the situation in healthcare (Zhang et al. 2021b), lockdowns that were imposed to fight the viral threat (Zhang et al. 2021a) and the related socio-psychological situation in the society—ranging from emotional depression and social drama to euphoria, from the registration of first vaccines and the start of mass vaccination from the new coronavirus infection (Lu 2020).

The evolution of business risks was reflected in credit rankings (Ahelegbey et al. 2023). Thus, Chodnicka-Jaworska (2023) noted the strong influence of COVID-19 on credit rankings of European banks. Gholipour and Vizvári (2022) pointed to the clear reaction of the credit ranking agencies to COVID-19, manifested in the preparation of rankings in view of the epidemiological situation. Tran et al. (2021) substantiated a close connection between sovereign credit rankings and the incidence rate of the new coronavirus infection during the COVID-19 pandemic.

However, it is not clear from the existing literature to what extent the level of business risks for IT companies was predetermined by the direct effect of the COVID-19 pandemic and crisis. It seems that each economic system had its unique status quo. This being said, the risks and risk management of IT companies in Russia under the conditions of the COVID-19 pandemic and crisis are presented in a small number of sources, which include

Gurkov and Shchetinin (2022), and, thus, are poorly studied. The discovered literature gap led to the following research issue.

$RQ_1$: What influence did the COVID-19 pandemic and crisis have on the risks for IT companies in Russia?

In the extant literature (Kellner et al. 2023), one of the tools of risk management of business is human resources management. Floros et al. (2023) and Osuna and Pérez (2022) noted in their works that many companies from various sectors of the economy had to cut personnel, which allowed them to minimise losses and retain market positions, i.e., to manage the risk of reduction in revenue and the risk of reduction in competitiveness.

At the same time, the extant literature points to the contradictory influence of human resources on the risks for IT companies. On the one hand, Ali and Barda (2022); Rajashekar and Jain (2023) and Stalin et al. (2019) point to the critical value of having the best personnel for conquering and retaining the unique competitive advantages of IT companies, which determine their market positions and revenues. On the other hand, Sudershanaa et al. (2021) and Sydorenko et al. (2022) point to the wide opportunities for automatization of the activities of IT companies, and, as a result, the need to optimise personnel, i.e., reduce personnel.

The existing scientific proofs, as presented in the literature, belong to the period of instability, while, under the conditions of a crisis, the role of human resources in the activity of IT companies can change. Completely opposite variants are possible. One variant involves a reduction in the significance of human resources against the background of a crisis and the preference for reduction in personnel to retain the break-even situation of IT companies, i.e., reduction in the risk burden for companies (Chawla et al. 2023). Another variant, on the contrary, is connected with assigning human resources a key role in the reduction in risks for IT companies amid an economic crisis (Błaszczyk et al. 2022; Chen et al. 2023; Li et al. 2021; Pai et al. 2022; Petermann and Zacher 2022; Skhvediani et al. 2022; Tomer et al. 2021; Zhang et al. 2023).

It is also necessary to note the importance of considering the specific features of an economic system, for automatization among modern countries is unequal, which causes large differences in the significance of human resources. This is manifested most vividly in the IT sector, where knowledge-driven jobs dominate, and creative and innovative activity and digital competencies pose high value. Insufficient elaboration on the practical experience of human resources management in Russian IT companies, as well as the uncertainty of the influence of these companies' human resources management amid the COVID-19 crisis, constitutes a gap in the literature. This gap leads to the following research question.

$RQ_2$: What is the role of human resources in the management of risks for IT companies under the conditions of the COVID-19 pandemic and crisis in Russia?

To search for answers to the posed RQs, we compiled a dataset and developed and applied the authors' methodological approach to the dataset analytics of the development of Russian IT companies amid the COVID-19 crisis.

## 3. Methodology

### *3.1. Dataset of the Development of IT Companies in Russia Amid the COVID-19 Crisis*

The information and empirical basis of the research in this paper is the rating "TAdviser100: Largest IT companies in Russia 2020" (TAdviser 2023b) and the rating "TAdviser100: Largest IT companies in Russia 2019" (TAdviser 2023a). Based on the materials of these sources, the authors' dataset of the development of IT companies in Russia amid the COVID-19 crisis was formed.

Most attention, during the formation of the dataset, was paid to the risks for IT companies. For the most complete information support for risks, the dataset includes pre-pandemic (pre-crisis) data for 2019, and the data under the conditions of the COVID-19 pandemic and crisis in 2020. The indicators, which are included in the dataset, allow for

quantitative measuring of the risk of reduction in revenue and the risk of reduction in competitiveness of Russian IT companies.

One of the equipotential criteria for the selection of data to be included in the dataset is the data integrity and sufficient range of the list of indicators for their suitability for the study of the effects of the COVID-19 crisis on the high-technology sector. Another criterion is associated with the relevance of data as of 2020 to enable the direct study of the effects of the COVID-19 pandemic rather than the regular dynamics of the development of IT companies in Russia. Another criterion is the need for the presence of data-in-motion to compare the values for 2019 with the values for 2020 and to study the causal relationship between the COVID-19 crisis and pandemic and the impact on the high-technology sector.

The rating "TAdviser100: Largest IT companies in Russia 2020" (TAdviser 2023b) served as a source of data on the performance indicators of Russian IT companies in 2020, while the rating "TAdviser100: Largest IT companies in Russia 2019" (TAdviser 2023a) served as a source of data on the performance indicators of Russian IT companies in 2019.

The dataset is given in the Supplementary Materials (Table S1) and is a Microsoft Excel spreadsheet which reflects the following performance indicators of the top 100 Russian IT companies in 2019–2020:

- 2020 rating position;
- 2019 rating position;
- Company;
- Revenue according to the 2020 rating, million rubles inc. VAT;
- Revenue according to the 2019 rating, million rubles inc. VAT;
- Number of employees in the 2020 rating;
- Number of employees in the 2019 rating;
- Business profile of the company;
- Key industries in which the company specializes;
- Major customers of the company;
- Confirmation of revenue ("-"—no confirmation; "+"—revenue confirmed).

The data sample from the dataset on the top 10 Russian IT companies in 2020 is shown in Table 1.

**Table 1.** Excerpt from the dataset on the performance indicators of the top 10 IT companies in Russia in 2020.

| 2020 Rating Position | 2019 Rating Position | Company | Revenue According to the 2020 Rating, Million Rubles Inc. VAT | Revenue According to the 2019 Rating, Million Rubles Inc. VAT | The Number of Employees in the 2020 Rating | The Number of Employees in the 2019 Rating | Business Profile of the Company | Key Industries in which the Company Specializes | Major Customers of the Company | Confirmation of Revenue ("-"—No Confirmation; "+"—Revenue Confirmed) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | Rostec | 253,400 | 266,600 | N/A | N/A | N/A | N/A | N/A | - |
| 2 | 2 | National Computer Corporation | 215,674 | 207,948 | 4371 | 3965 | Production, integration, digital services, development, implementation, distribution | Public sector, extractive and processing industry, telecommunication industry | N/A | - |

**Table 1.** *Cont.*

| 2020 Rating Position | 2019 Rating Position | Company | Revenue According to the 2020 Rating, Million Rubles Inc. VAT | Revenue According to the 2019 Rating, Million Rubles Inc. VAT | The Number of Employees in the 2020 Rating | The Number of Employees in the 2019 Rating | Business Profile of the Company | Key Industries in which the Company Specializes | Major Customers of the Company | Confirmation of Revenue ("-"—No Confirmation; "+"—Revenue Confirmed) |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 3 | Lanit | 173,767 | 164,241 | 8630 | 8540 | Systems integration, distribution, consulting, engineering systems, IT outsourcing, service, education, innovations and start-ups | N/A | N/A | - |
| 4 | 4 | Softline | 108,834 | 94,820 | 4700 | 4500 | Digital transformation, cyber-security, managed services, cloud services, in-house development | Financial sector, insurance sector, retail sector, public sector | N/A | - |
| 5 | - | Marvel Distribution | 97,517 | 85,603 | 1070 | N/A | Software distribution, hardware distribution, hardware production | N/A | N/A | + |
| 6 | - | X-Holding | 82,230 | 33,760 | 4821 | N/A | Information security, data storage systems, Big Data, blockchain, Artificial Intelligence, Machine Learning. Experts in cryptography and quantum technologies | Telecommunications, IT | MegaFon, Rostelecom, Mail.ru | - |
| 7 | 5 | 1S | 54,300 | 51,400 | N/A | N/A | N/A | N/A | N/A | - |
| 8 | 8 | Rostelecom | 49,799 | 36,902 | N/A | N/A | N/A | N/A | N/A | - |
| 9 | 11 | Gazprom Avtomatizatsiya | 46,408 | 34,153 | N/A | N/A | N/A | N/A | N/A | - |
| 10 | 10 | iTeco | 36,340 | 34,570 | 3285 | 3008 | IT infrastructure, software development, DPCs, AI, blockchain, start-ups, BIM, WAAS (Workplace-as-a-Service) | Financial sector, telecommunications, construction | N/A | - |

Source: calculated and compiled by the authors.

As can be seen from Table 1, the dataset contains detailed information which makes it possible, not only to quantitatively describe the performance of the largest IT companies in Russia, but also to take into account their qualitative peculiarities and become familiar with the specific nature of their activity.

The advantage of the created dataset, compared to alternative sources of statistics on the activities of IT companies and, in particular, compared to the primary sources of data (TAdviser 2023a, 2023b), is that the dataset has combined the data on the indicators of the top 100 IT companies of Russia in 2019 and 2020 into a common data array in tabular form; this has made possible the study of the dynamics of these indicators. "Raw" indicators for 2019 and 2020 are contained in various ratings with different orders of IT companies, as well as with different names of the same companies (in Russian or English, since most companies are international and are only headquartered in Russia).

### *3.2. The Methodological Approach to Dataset Analytics of Risks for Companies Amid the COVID-19 Crisis*

This research aims to solve two tasks. The first task is to assess the influence of the COVID-19 pandemic and crisis on the risks for IT companies in Russia. To solve this task, the initial data in the dataset were processed with the use of the authors' methodological

approach to dataset analytics of the development of Russian IT companies amid the COVID-19 crisis. The approach is based on the existing methodological developments in the sphere of dataset analysis (Popkova and Sergi 2021; Sozinova and Popkova 2023). The developed approach involves analytics of the materials of the rating "TAdviser100: Largest IT companies in Russia 2020" (TAdviser 2023b) and the rating "TAdviser100: Largest IT companies in Russia 2019" (TAdviser 2023a) according to the following algorithm (Figure 1).

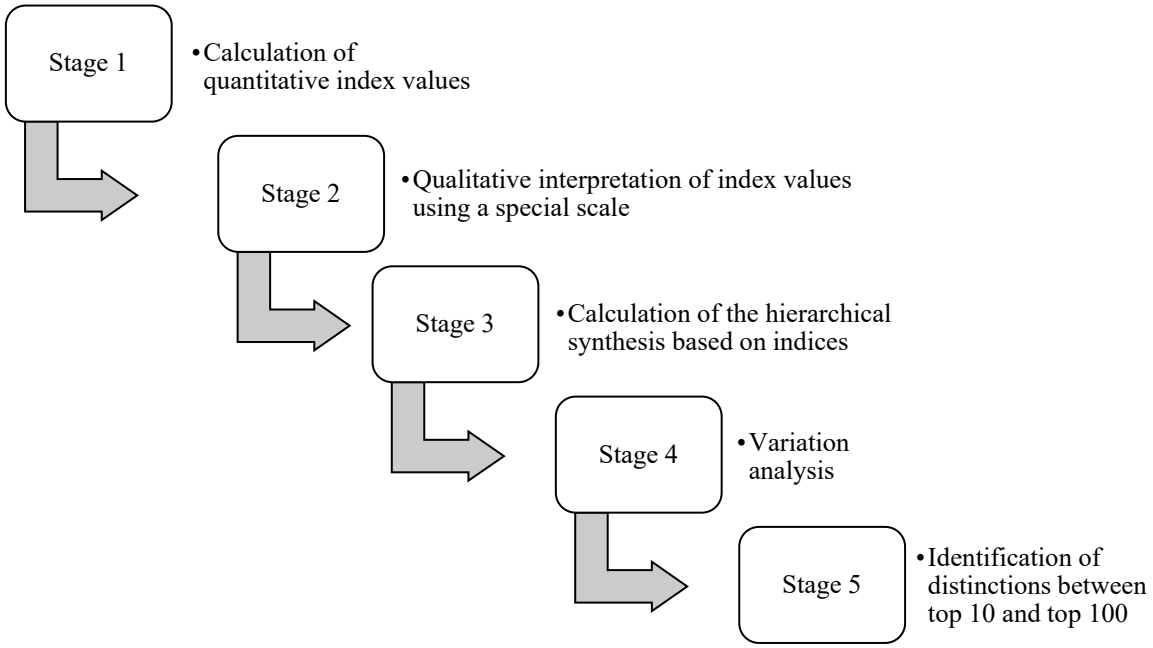


**Figure 1.** Algorithm of the analysis of data on the development of Russian IT companies amid the COVID-19 crisis in accordance with the proprietary methodological approach. Source: developed and compiled by the authors.

As shown in Figure 1, quantitative index values are calculated at Stage 1 of the proposed algorithm:

- Revenue change index (RCI): RCI = R2020 × 100%/R2019-100, where R means revenue;
- Index of change in the number of employees (CNE): CNE = NE2020 × 100%/NE2019-100, where NE is the number of employees;
- Rating position change index (RPC): RPC = RP2020 × 100%/RP2019-100, where RP means rating position.

The second stage features the qualitative treatment of the values of indices with the use of a special scale. As a result of additional analysis of the dynamics of the change in the indicators of the top 100 IT companies in Russia in 2019 compared to 2018, we revealed that the revenue change index in 2019 equalled 31.8%, the index of change in the number of employees was 10.4%, and the rating position change index was −2.94%. Based on this, we compiled a scale for the qualitative interpretation of indices (Table 2).

**Table 2.** Scale for the qualitative interpretation of indices.

| Index | Normal Dynamics, the Industry Is Stable | The Dynamics Are Slightly above Normal, and the Impact of the Crisis on the Industry Is Moderate | The Dynamics Are Significantly above Normal, and the Impact of the Crisis on the Industry Is Strong |
|---|---|---|---|
| Revenue change index, % | from −31.8 to 31.8 | from −50 to −31.8 or from 31.8 to 50 | lower than −50 or higher than 50 |
| Index of change in the number of employees, % | from −10.4 to 10.4 | from −30 to −10.4 or from 10.4 to 30 | lower than −30 or higher than 30 |
| Rating position change index | from −2.94 to 2.94 | from −10 to −2.94 or from 2.94 to 10 | lower than −10 or higher than 10 |
| Hierarchical synthesis | from −15.0 to 15.0 | from −30 to −15 or from 15 to 30 | lower than −30 or higher than 30 |

Source: developed and compiled by the authors.

At Stage 3, the hierarchical synthesis is calculated based on indices drawing on the hierarchic procedure of T. Saaty (Li et al. 2020; Saaty 1978). Since the reduction in revenue is a key sign of the industry crisis in general, the highest weight coefficient (0.5) has been assigned to the revenue change index. Moreover, rating position change is a fairly significant sign of the industry crisis in general; hence, a weight coefficient of 0.3 has been assigned to the index of change in the number of employees. Change in the number of employees is, rather, a sign of the crisis of individual enterprises; hence, the lowest weight coefficient (0.2) has been assigned to the rating position change index.

At Stage 4, the variation analysis is carried out. This allows the determination of the level of homogeneity of the sample and characterisation of the level of risk. At this stage, we also determine the share of IT companies for which revenue reduced in 2020 compared to 2019—this allows the determination of the dissemination of the practical implementation of the risk of reduction in revenue. Similarly, we determine the share of IT companies whose position in the ranking reduced (they went down in the rating) in 2020 compared to 2019—this allows the determination of the dissemination of the practical implementation of the risk of reduction in competitiveness.

At Stage 5, distinctions are identified between results obtained for the top 10 and top 100 IT companies. This allows the determination of the tendency and prospect for the monopolization of the IT sphere in the period of post-crisis recovery. The practical value of the proposed approach lies in it providing the scientific and methodological basis to detect the consequences of the COVID-19 crisis for high technologies. The developed and calculated indices allow for the quantitative measuring of the impact of the COVID-19 crisis on the risks for IT companies. The usefulness of the dataset lies in the fact that it contains not only the raw data in a convenient form but also the data that has been processed using the authors' special methodological approach to the analysis of data on the development of risks for Russian IT companies amid the COVID-19 crisis.

The advantage of the newly developed methodological approach to the dataset analysis of the development of Russian IT companies amid the COVID-19 crisis, and the dataset based on it, is a combination of quantitative and qualitative analysis. The scale proposed by the authors for the qualitative interpretation of the values of calculated indices allows for the making of a distinction between the normal dynamics of the development of high-tech industry and the impact of the COVID-19 crisis by drawing on the experience of the dynamics of 2018–2019. This makes it possible to identify not only the nature but also the power of the impact of the COVID-19 crisis on the IT industry in Russia, as well as to avoid data distortion and misinterpretation, guaranteeing high accuracy and reliability of results and the conclusions drawn from them.

The empirical value of the developed methodological approach to the dataset analysis of the development of Russian IT companies amid the COVID-19 crisis is that this approach

provides different degrees of detail of the data in the dataset at the level of the top 10 IT companies and at the level of the top 100 IT companies. The presence of indices with different detail eliminates the risk of identifying particular trends (through variation analysis) and ensures the identification of trends that are common to the entire IT industry. As a result, this approach also goes beyond the statement of established risky trends and opens up opportunities to predict the long-term effects of the COVID-19 crisis on the IT industry, drawing on changes in market concentration.

The uniqueness of the newly developed methodological approach to the dataset analysis of the development of Russian IT companies amid the COVID-19 crisis is that this approach, and the dataset based on it, take into account the different significance of trends in the activity of IT companies for the industry. Drawing on the hierarchical procedure of T. Saaty, the trends have been ranked according to the level of significance. And the hierarchical synthesis (the overall index) takes into account the weight coefficients of the indicators, thus showing us the true inwardness of the COVID-19 crisis and its impact on the IT industry, with emphasis on key trends that are clearly and consistently indicative of the crisis and its influence on risks.

The second task involved determining the role of human resources in the management of risks for IT companies under the conditions of the COVID-19 pandemic and crisis in Russia. To solve this task, we selected the method of regression analysis, for it allows for high-precision factor analysis. Since regression analysis is impossible in case of a deficit of data, we selected companies—from the top 100 Russian IT companies—with the full set of data (without gaps in the statistics). As a result, we formed an additional sample with 61 companies, which is given in Table A1.

Regression analysis based on the full sample of 100 companies is impossible due to the gaps in the data. That is why companies with incomplete data (absence of data on certain indicators) were excluded. In this way, a sample of 61 companies was obtained. The processing of data from Table A1 (the data were obtained by the authors based on the materials of TAdviser 2023a) takes place according to the following research model:

$$\begin{cases} \text{RCI} = \delta_{\text{RCI}} + \varsigma_{\text{RCI}}\text{CNE}; \\ \text{RPC} = \delta_{\text{RPC}} + \varsigma_{\text{RPC}}\text{CNE}, \end{cases} \quad (1)$$

where RCI—revenue change index;
CNE—index of change in the number of employees;
RPC—rating position change index.

In the case of positive values of the coefficients of regression of $\varsigma_{\text{RCI}}$ and $\varsigma_{\text{RPC}}$, human resources play an important role for risk management: preservation of the number of employees facilitates the decrease in the risk of reduction in revenue and the risk of reduction in competitiveness. Accordingly, in the case of negative values of the coefficients of regression of $\varsigma_{\text{RCI}}$ and $\varsigma_{\text{RPC}}$, human resources are insignificant for risk management: a decrease in the risk of reduction in revenue and the risk of reduction in competitiveness is facilitated by downsizing. The reliability of regression equations is checked with the help of the F-test and *t*-test.

## 4. Results

### *4.1. Influence of the COVID-19 Crisis Pandemic and Crisis on the Risks for IT Companies in Russia*

To solve the first research task, which is connected with the assessment of the influence of the COVID-19 pandemic and crisis on the risks for IT companies in Russia, the data from Table S1 were processed with the help of the authors' methodological approach. At the first stage of the algorithm of dataset analysis, using the authors' methodological approach, we calculated the quantitative values of the revenue change index (RCI), the index of change in the number of employees (CNE) and the rating position change index (RPC). The values of the indices for the whole sample are given in Table S1. The obtained values of indices for the top 10 Russian IT companies are shown in Table 3.

**Table 3.** Indices for the top 10 Russian IT companies in 2020.

| 2020 Rating Position | Company | Indices | | |
|---|---|---|---|---|
| | | Revenue Change Index, % (RCI) | Index of Change in the Number of Employees, % (CNE) | Rating Position Change Index, % (RPC) |
| 1 | Rostec | −4.95 | N/A | 0 |
| 2 | National Computer Corporation | 3.72 | 10.24 | 0 |
| 3 | Lanit | 5.8 | 1.05 | 0 |
| 4 | Softline | 14.78 | 4.44 | 0 |
| 5 | Marvel Distribution | 13.92 | N/A | N/A |
| 6 | X-Holding | 143.57 | N/A | N/A |
| 7 | 1S | 5.64 | N/A | 40 |
| 8 | Rostelecom | 34.95 | N/A | 0 |
| 9 | Gazprom Avtomatizatsiya | 35.88 | N/A | −18.18 |
| 10 | iTeco | 5.12 | 9.21 | 0 |

Source: calculated and compiled by the authors.

At the second stage, we used the scale (Table 2) to perform a qualitative interpretation of the indices' values. The averaged index values for the top 10 and the top 100 Russian IT companies in 2020 are shown in Table 4 (top 10 companies) and Table 5 (top 100 companies).

**Table 4.** Averaged index values for the top 10 Russian IT companies in 2020.

| Indicator | Revenue Change Index, % | Index of Change in the Number of Employees, % | Rating Position Change Index, % | Hierarchical Synthesis |
|---|---|---|---|---|
| Arithmetic mean for the top 10 | 25.84 | 6.24 | 2.73 | - |
| Weighted value | 12.92 | 1.25 | 0.82 | 14.99 |
| Standard deviation | 43.44 | 4.28 | 16.35 | - |
| Coefficient of variation, % | 168.1 | 68.67 | 599.41 | - |

Source: calculated and compiled by the authors.

**Table 5.** Averaged index values for the top 100 Russian IT companies in 2020.

| Indicator | Revenue Change Index, % | Index of Change in the Number of Employees, % | Rating Position Change Index, % | Hierarchical Synthesis |
|---|---|---|---|---|
| Arithmetic mean for the top 100 | 22.58 | 9.82 | 1.95 | - |
| Weighted value | 11.29 | 1.96 | 0.58 | 13.84 |
| Standard deviation | 34.8 | 18.88 | 16.46 | - |
| Coefficient of variation, % | 154.15 | 192.32 | 846.07 | - |

Source: calculated and compiled by the authors.

According to Table 4, all values of the revenue change index (25.84 < 31.8), the index of change in the number of employees (6.24 < 10.4) and the rating position change index (2.73 < 2.94) for the top 10 Russian IT companies in 2020 are normal and are indicative of stability in the high-tech industry.

According to Table 5, all values of the revenue change index (22.58 < 31.8), the index of change in the number of employees (9.82 < 10.4) and the rating position change index (1.95 < 2.94) for the top 100 Russian IT companies in 2020 are normal and are indicative of stability in the high-tech industry.

The results obtained point to the fact that there was no marked slowdown in the Russian high-tech industry in 2020 under the influence of the COVID-19 crisis (as exemplified by revenue). Most IT companies demonstrated a high level of corporate social responsibility—they declared themselves as responsible employers and elected to reject mass downsizing. In addition, there were no significant rearrangements in the positions of IT companies, so the overall situation is stable.

At Stage 3, the hierarchical synthesis was calculated based on indices drawing on the hierarchic procedure of T. Saaty. The hierarchical synthesis for the top 10 IT companies in Russia in 2020 was calculated in the following way: 22.84 × 0.5 + 6.24 × 0.2 + 2.73 × 0.3 = 12.92 + 1.25 + 0.82 = 14.99. This value is on the fringe of the norm, though it demonstrates the stability of the situation in the IT sector. The hierarchical synthesis for the top 100 IT companies in Russia in 2020 was calculated in the following way: 22.58 × 0.5 + 9.82 × 0.2 + 1.95 × 0.3 = 11.29 + 1.96 + 0.58 = 13.84. This value is close to the norm, though it shows the stability of the situation in the IT sector. On the whole, this is a sign of a tense situation in the IT sector in Russia amid the COVID-19 crisis.

At Stage 4, the variation analysis was carried out. All coefficients of variation in Tables 4 and 5 are very high (over 30%). This is indicative of the fact that the impact of the COVID-19 crisis on Russian IT companies in 2020 is highly differentiated. And although the overall situation is stable, individual IT companies may go through a crisis.

The revenue change index has negative values with 11% of companies and positive values with 86% of companies; there were no data for 3% of companies. Therefore, the risk of reduction in revenue was realised in practice with 11% of Russian IT companies or more in 2020.

The rating position change index had positive values with 34% of companies and negative values with 26% of companies; there were no data for 40% of companies. Therefore, the risk of reduction in competitiveness was realised in practice with 34% of Russian IT companies or more in 2020. The index of change in the number of employees has negative values with 12% of companies and positive values with 48% of companies; there were no data for 40% of companies. Therefore, 12% of Russian IT companies or more in 2020 reduced their staff, which could potentially have led to the loss of valuable personnel.

At Stage 5, distinctions were identified between the results obtained for the top 10 and top 100 IT companies. The analysis of distinctions has shown that the impact of the COVID-19 crisis on the top 10 IT companies (14.99) is more expressed than its impact on the top 100 IT companies (13.84). Hence, the COVID-19 crisis did not contribute to the monopolization of the high-tech industry; quite the opposite, it caused a reduction in market concentration and encourages competition. Hence, in the long term, the impact of the COVID-19 crisis on the IT industry in Russia may turn out to be positive if the current trends are maintained.

### *4.2. The Role of Human Resources in the Management of Risks for IT Companies under the Conditions of the COVID-19 Pandemic and Crisis in Russia*

To solve the second research task, which was determining the role of human resources in the management of risks for IT companies under the conditions of the COVID-19 pandemic and crisis in Russia, we performed a regression analysis of data from Table A1. This allowed the specification of the research model and the receiving of the following system of equations of the paired linear regression:

$$\begin{cases} \text{RCI} = 14.8654 + 0.4407\text{CNE}; \\ \text{RPC} = 5.4364 - 0.2872\text{CNE}, \end{cases} \quad (2)$$

The system of Equation (2) shows that an increase in the value of the index of change in the number of employees by 1% leads to a logical increase in the revenue change index by 0.4407% and a decrease in the rating position change index by 0.2872%. To perform tests of the reliability of the regression equations, let us use the regression statistics and perform an analysis of variance (Tables 6 and 7).

**Table 6.** Regression statistics and analysis of variance for RCI.

| **Regression Statistics** | | | | | | |
|---|---|---|---|---|---|---|
| Multiple R | 0.3983 | | | | | |
| R-square | 0.1586 | | | | | |
| Adjusted R-square | 0.1444 | | | | | |
| Standard error | 19.33 | | | | | |
| Observations | 61 | | | | | |
| | Analysis of variance | | | | | |
| | df | SS | MS | F | Significance F | |
| Regression | 1 | 4156.0263 | 4156.0263 | 11.1228 | 0.0015 | |
| Residual | 59 | 22,045.3657 | 373.6503 | | | |
| Total | 60 | 26,201.3920 | | | | |
| | Coefficients | Standard error | t-Stat | *p*-Value | Lower 95% | Upper 95% |
| Constant | 14.8654 | 2.7945 | 5.3196 | 0.000002 | 9.2736 | 20.4571 |
| CNE | 0.4407 | 0.1321 | 3.3351 | 0.0015 | 0.1763 | 0.7052 |

Source: calculated and compiled by the authors.

**Table 7.** Regression statistics and analysis of variance for RPC.

| **Regression Statistics** | | | | | | |
|---|---|---|---|---|---|---|
| Multiple R | 0.3487 | | | | | |
| R-square | 0.1216 | | | | | |
| Adjusted R-square | 0.1067 | | | | | |
| Standard error | 14.6999 | | | | | |
| Observations | 61 | | | | | |
| | Analysis of variance | | | | | |
| | df | SS | MS | F | Significance F | |
| Regression | 1 | 1764.3141 | 1764.3141 | 8.1648 | 0.0059 | |
| Residual | 59 | 12,749.2112 | 216.0883 | | | |
| Total | 60 | 14,513.5253 | | | | |
| | Coefficients | Standard error | t-Stat | *p*-Value | Lower 95% | Upper 95% |
| Constant | 5.4364 | 2.1251 | 2.5582 | 0.0131 | 1.1841 | 9.6888 |
| CNE | −0.2872 | 0.1005 | −2.8574 | 0.0059 | −0.4882 | −0.0861 |

Source: calculated and compiled by the authors.

Regression statistics from Table 6 showed that the revenue change index was by 39.83% (Multiple R = 0.3983; R2 = 0.1586), determined by the influence of the index of change in the number of employees. At the significance of F equalling 0.0015, the level of significance was $\alpha = 0.01$. The equation for RCI passed the F-test (11.1228 > 7.0850) and the *t*-test (3.3351 > 2.660) at the level of significance of 0.01.

The regression statistics from Table 7 showed that the rating position change index was by 34.87% (Multiple R = 0.3487; R2 = 0.1216), determined by the influence of the index of change in the number of employees. At the significance of F that equals 0.0015, the level of significance was $\alpha = 0.01$. At this level, the equation for RCI passed the F-test (8.1648 > 7.0850) and the *t*-test ($|-2.8571| > 2.660$).

Thus, the positive values of the regression coefficients of $\varsigma_{RCI}$ and $\varsigma_{RPC}$, received in the system of regression Equation (2), prove that human resources are important for risk management; the preservation of the number of employees (retaining valuable staff) facilitates a decrease in the risk of reduction in revenue and the risk of reduction in competitiveness of Russian IT companies under the conditions of the COVID-19 pandemic and crisis.

## 5. Discussion

This paper's contribution to the literature is that it develops the scientific provisions of the theory of economic crises, rethinking the influence of the COVID-19 crisis on business risks using the example of Russian IT companies, thus substantiating the specifics of this crisis.

This paper contributes to the theory of business risks by specifying the features of the change in risks and disclosing the essence of risk management of Russian IT companies under the conditions of the COVID-19 pandemic and crisis. The received results provided answers to both RQs, which are compared to the existing literature in Table 8.

**Table 8.** Comparison of the obtained answers to RQs with the literature.

| | | |
|---|---|---|
| $RQ_1$: What effect did the COVID-19 pandemic and crisis have on the risks for IT companies in Russia? | | |
| Existing literature | Provisions of the literature | Strong negative influence: reduction in financing, reduction in demand, monopolisation of the IT sphere |
| | Literature sources | Błaszczyk et al. (2022); Chen et al. (2022); Desai et al. (2023); El Khoury et al. (2022); Sudershanaa et al. (2021) |
| Results of this paper | Qualitative answer | Moderate influence that is very differentiated among IT companies, preservation of a "healthy" competitive environment in the sector |
| | Quantitative measuring of the results | – The risk of reduction in revenue was realised with 11% of IT companies or more; among the top 100 companies, the average growth of revenue is 22.58%, variation—154.15%;<br>– The risk of reduction in competitiveness was realised with 34% of Russian IT companies or more; among the top 100 companies, the position in the rating deteriorated by 0.58% on average; variation equals 846.07%.<br>– Hierarchical synthesis: 14.99 with the top 10 IT companies and 13.84 with the top 100 IT companies. |
| $RQ_2$: What is the role of human resources in the management of risks for IT companies under the conditions of the COVID-19 pandemic and crisis in Russia? | | |
| Existing literature | Provisions of the literature | Contradictory influence: critical value of the best personnel with wider opportunities for automatization (downsizing) |
| | Literature sources | Ali and Barda (2022); Błaszczyk et al. (2022); Chawla et al. (2023); Rajashekar and Jain (2023); Skhvediani et al. (2022); Stalin et al. (2019); Sudershanaa et al. (2021); Sydorenko et al. (2022) |
| Results of this paper | Qualitative answer | Positive influence: the necessity to retain staff for the management of risks for IT companies |
| | Quantitative measuring of the results | Correlation of the number of employees:<br>– With revenue of IT companies: 39.83%;<br>– With competitiveness of IT companies: 34.87%. |

Source: Authors.

As shown in Table 8, unlike Błaszczyk et al. (2022); Chen et al. (2022); Desai et al. (2023); El Khoury et al. (2022) and Sudershanaa et al. (2021), the influence of the COVID-19 pandemic and crisis on the risks for IT companies in Russia in 2020 was not strong and negative, but moderate and strongly differentiated among IT companies. This is shown by the obtained quantitative results. Thus, the risk of reduction in revenue was realised

with 11% of IT companies or more; among the top 100 companies, the average growth of revenue was 22.58% and variation—154.15%.

The risk of reduction in competitiveness was realised with 34% of Russian IT companies or more; among the top 100 companies, the position in the rating deteriorated by 0.58% on average, with variation equalling 846.07%. The hierarchical synthesis equals 14.99 for the top 10 IT companies and 13.84 for the top 100 IT companies. Therefore, despite the generally known reduction in financing and decrease in demand, the monopolisation of the IT sector did not take place—a "healthy" competitive environment in the Russian IT sector was preserved.

Unlike Chawla et al. (2023); Sudershanaa et al. (2021) and Sydorenko et al. (2022), we proved that, despite the wide capabilities of automatization under the conditions of stability in the market environment, it is inaccessible or inexpedient for Russian IT companies under the conditions of the COVID-19 pandemic and crisis. This is why these companies should not reduce personnel.

Confirming the views of Ali and Barda (2022); Błaszczyk et al. (2022); Rajashekar and Jain (2023); Skhvediani et al. (2022) and Stalin et al. (2019), we substantiated the positive influence and important role of human resources in the management of risks for IT companies under the conditions of the COVID-19 pandemic and crisis in Russia. This is demonstrated by the obtained quantitative results. Thus, the correlation between the number of employees and the revenue of IT companies was 39.83%, and with the competitiveness of IT companies—34.87%. Therefore, it is necessary to preserve the full staff for the management of risks for IT companies.

This conclusion strengthened the evidence base of such sources as Chen et al. (2023); Li et al. (2021); Pai et al. (2022); Petermann and Zacher (2022); Tomer et al. (2021) and Zhang et al. (2023).

The theoretical significance of the paper's results lies in the fact that the phenomenon of the gap, which took place in Russian IT companies under the conditions of the COVID-19 crisis, was revealed and scientifically substantiated (for the first time). The essence of this gap phenomenon is that the COVID-19 crisis influenced the top 10 IT companies and the top 100 IT companies differently. This phenomenon reflects the regularity of the change in risks for IT companies amid the COVID-19 crisis in the course of an increase in their market share. This regularity consists in the following: an increase in the market share leads to an increase in risks for IT companies amid the COVID-19 crisis.

The difference in the research conducted with previous studies is that the improved authors' methodology, applied in this paper, allows for the in-depth study and clarification of the specifics of the influence of the COVID-19 crisis on IT companies with different market shares. The existing literature (Abbas Zaher et al. 2021; Bajaba et al. 2021; Eid et al. 2023; McLean et al. 2021; Shehzad et al. 2020; Su et al. 2022), based on the experience of previous economic crises, in particular, the 2008 world financial crisis, assumes that the COVID-19 crisis should have led to the monopolisation of the IT sphere.

Contrary to this, economic and mathematical modelling based on reliable statistics revealed the opposite effect. Instead of an increase in market concentration, it reduced—i.e., the COVID-19 crisis ensured the de-monopolisation of the IT sphere in Russia, in particular creating favourable conditions for the creation and development of IT start-ups. Due to this, the paper substantiated the uniqueness of the COVID-19 crisis in its fundamental difference from previous economic crises, which is connected with the favourable influence on market competition in the IT sector.

## 6. Conclusions

This paper filled the discovered gaps in the literature and answered both RQs; both tasks were solved and the goal was achieved. Firstly, the performed dataset analysis of the influence of the COVID-19 pandemic and crisis on the risks for IT companies in Russia showed that this influence in 2020 was weak (this is the answer to $RQ_1$). Meanwhile, before the pandemic—in 2019 compared to 2018—the revenue change index among the

top 100 Russian IT companies was 31.8%, under the conditions of the COVID-19 pandemic and crisis it was even lower, equalling 22.58%. This shows that the crisis did not cause the growth of the risk of reduction in revenue—this risk even decreased. This risk was realised in practice only with 11% of IT companies, whose revenue reduced in 2020 compared to 2019.

However, the rating position change index before the pandemic—in 2019 compared to 2018—equalled −2.94%, but under the conditions of the COVID-19 pandemic and crisis it grew up to 1.95%. This shows that the crisis facilitated the increase in the risk of reduction in competitiveness of Russian IT companies. This risk was realised in practice with 34% of Russian IT companies, whose competitiveness reduced in 2020 compared to 2019. The hierarchical synthesis is similar with the top 10 IT companies (14.99) and with the top 100 IT companies (13.84)—therefore, monopolisation did not take place, and a highly-competitive market environment was retained.

Secondly, the compiled econometric model proved the important positive role of human resources in the management of risks for IT companies under the conditions of the COVID-19 pandemic and crisis in Russia (the answer to $RQ_2$). The correlation of the number of employees with the revenue of IT companies equalled 39.83%, and with the competitiveness of IT companies—34.87%. Based on this, it is recommended to retain the full personnel for the management of risks for IT companies in Russia.

The theoretical significance of this paper is due to rethinking of human resources management of Russian IT companies from the position of risk amid the COVID-19 crisis. The developed authors' methodological approach to the dataset analytics of companies' risks amid the COVID-19 crisis allowed—with high precision and reliability—the quantitative measuring of the direct influence of the pandemic and crisis on the risks for IT companies in Russia in 2020.

The practical significance of the authors' conclusions is that they discovered the high-risk resilience of Russian IT companies to the pandemic and formed their risk profile amid the COVID-19 crisis, in which the main risk, though it is still a low risk, is the risk of reduction in competitiveness, and the risk of reduction in revenue is minimal. The systematisation of the experience of the COVID-19 pandemic and crisis and its presentation in the form of an econometric model will allow the reducing of the uncertainty and the raising of the effectiveness of risk management of Russian IT companies under the conditions of future epidemics, pandemics and economic crises.

The Russian experience is of particular use in developing countries, which may have similar issues associated with the development of high-tech industries amid the COVID-19 pandemic, though the focus on Russia's experience and the impossibility to apply it to other countries are a limitation of the research performed. To overcome this limitation, future scientific works should study the experience of other developing countries, in particular, BRICS and the EAEU, and take into account the specifics of change in the risks and risk management of IT companies under the conditions of the COVID-19 pandemic and crisis.

**Supplementary Materials:** The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/risks11070127/s1.

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**Institutional Review Board Statement:** Although the dataset contains the COVID-19 incidence data, these data have been derived from publicly available sources and do not represent any personal data. The dataset contains aggregated (consolidated, generalized) data for the entire world. Private data falling within regulatory or ethical limitations may never be used in the dataset.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Data will be available on request.

**Conflicts of Interest:** The authors declare no conflict of interest.

## Appendix A

**Table A1.** Indices of IT companies in Russia with the full set of data.

| No. | Company | Revenue Change Index, % | Index of Change in the Number of Employees, % | Rating Position Change Index, % |
|---|---|---|---|---|
| 1. | National Computer Corporation | 3.72 | 10.24 | 0 |
| 2. | Lanit | 5.8 | 1.05 | 0 |
| 3. | Softline | 14.78 | 4.44 | 0 |
| 4. | iTeco | 5.12 | 9.21 | 0 |
| 5. | SAP CIS | 0.11 | −1.79 | 22.22 |
| 6. | RRC Group | 43.45 | −12.5 | −14.29 |
| 7. | JET Infosystems | 24.98 | 4.84 | 0 |
| 8. | Krok | 1.15 | 9.87 | 16.67 |
| 9. | Tegrus | 17.42 | 3.5 | −5.26 |
| 10. | Envision Group | 27.64 | −7.08 | −9.52 |
| 11. | GK Fors | 28.61 | −11.76 | −13.04 |
| 12. | ICL | 21.86 | 15.69 | −4.17 |
| 13. | Satel | 40.02 | 31.5 | −7.69 |
| 14. | X-Com | 23.01 | 2.89 | 0 |
| 15. | AMT Group | 11.76 | −8.73 | −6.9 |
| 16. | OTP | 7.28 | 26.67 | −6.67 |
| 17. | Inline Group | 19.45 | 4.38 | −6.25 |
| 18. | SysSoft | 20.62 | 33.76 | −6.06 |
| 19. | Kod Bezopasnosti | 60.87 | 2.86 | −45 |
| 20. | Informzashchita | 15.97 | −48.4 | 21.43 |
| 21. | Tamax Group | 86.65 | 2.9 | −32.69 |
| 22. | SMART technologies | 36.48 | 53.75 | −14.29 |
| 23. | InfoTeKS | 17.24 | 12.89 | −17.78 |
| 24. | Itransition | 3.08 | 10.98 | 5.56 |
| 25. | NAG | 14.66 | 14.71 | 2.63 |
| 26. | GK Korus Consulting | 26.83 | 11.76 | −6.98 |
| 27. | Borlas Group | −4.99 | −4.52 | 20.59 |
| 28. | Philax | 29.67 | 44.17 | −8.51 |
| 29. | Ramek-BC | 2.01 | −11.07 | 18.92 |
| 30. | DCLogic | 6.8 | −10.26 | 12.5 |
| 31. | GK Programmny Product | 7.69 | 17.89 | 4.55 |
| 32. | TerraLink | 1.49 | 32.65 | 20.51 |
| 33. | RDTEC | 28.24 | 16.2 | −4 |
| 34. | GlowByte | 24.55 | 15.11 | 0 |

**Table A1.** *Cont.*

| No. | Company | Revenue Change Index, % | Index of Change in the Number of Employees, % | Rating Position Change Index, % |
|---|---|---|---|---|
| 35. | Unitec | 60.78 | 41.67 | −13.79 |
| 36. | iCore | 25.76 | 9.02 | 0 |
| 37. | BARS Group | 30.35 | 25.77 | −1.89 |
| 38. | UTSB | 18.5 | 34.02 | 1.85 |
| 39. | Mango Telecom | 20.69 | 14.5 | 1.79 |
| 40. | GK Impuls Telecom | −6.04 | 13.33 | 12.73 |
| 41. | Sonet | 30.89 | 0 | −4.48 |
| 42. | TeleSvyaz | 12.33 | −36.05 | 8.06 |
| 43. | BIA Technologies | 2.68 | 2.11 | 10.94 |
| 44. | Ventra IT | 10.69 | −6.26 | 4.35 |
| 45. | Sinto | −45.01 | −22.22 | 58.7 |
| 46. | Informatsionnyye Tekhnologii Budushchego | 78.29 | 53.51 | −22.68 |
| 47. | Novardis | 60.75 | 31.88 | −10.59 |
| 48. | First Line Software | 22.79 | 22.55 | 6.85 |
| 49. | NTC Protey | −5.54 | 0.33 | 19.7 |
| 50. | HiTec | 22.69 | 23.81 | 6.67 |
| 51. | Neoflex | 28.21 | 6.68 | 3.8 |
| 52. | GK Angara | 34.71 | 42.06 | 1.22 |
| 53. | Askon | 7.09 | 6.32 | 17.57 |
| 54. | Galex | −1.77 | 1.79 | 23.94 |
| 55. | Satell.IT | 8.32 | 2.28 | 16.88 |
| 56. | Sinimex | 31.88 | 11.01 | 5.81 |
| 57. | ITPS | 10.04 | 2.83 | 17.95 |
| 58. | Activ-soft | 7.29 | 4.23 | 17.5 |
| 59. | EOS | 17.8 | 2.26 | 0 |
| 60. | Oberon | 4.65 | 13.33 | 20.99 |
| 61. | Kompyutery I Seti | 7.92 | 20.39 | 19.28 |

Equipment for all Russian IT-companies included in this table was obtained from such a Russian manufacturer—Skolkovo Center, Moscow, Russia. Source: calculated and compiled by the authors.

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