Analysis of the Efficiency of the Use of Assets of the Electronic Industry in Russia

Filatov Evgeniy Aleksandrovich[a] and Guseva Maria Mikhailovna[b]
Department of Regional Economic and Social Problems, A. E. Favorsky Irkutsk Institute of Chemistry of the Siberian Branch of the Russian Academy of Sciences, Favorsky str. 1, Irkutsk, Russian Federation
johnru3000@rambler.ru, mguseva2021@oresp.irk.ru

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Abstract: **Relevance.** Attracting investments is a necessary condition for the development of any industry. In recent years, the electronic industry has become an industry of paramount importance in the face of increased sanctions. Its connection with the military-industrial complex, sub-branches of mechanical engineering and other fields of activity determines its importance, the need for development and support at the state level. However, in addition to the planned budget funds, private investments are no less important for it. Currently, among the largest producers in the industry, there are relatively new companies created exclusively at the expense of private investors, including foreign ones. Due to the increasing role of this industry and more active state support, the relevance of its analysis increases. The most important indicator of economic efficiency is the return on assets, which shows the return on invested capital. **Goal.** The author's 3-factor models of the profitability of current and non-current assets allow us to determine which factors caused the change in profitability. The object of the study is the electronic industry of Russia. **Methods.** The article describes 10 methods of factor analysis by Filatov E.A., which make it possible to make an accessible and relatively simple conclusion about changes in the financial position of the object of study, as well as to assess the degree of influence of factors on changes in the studied indicator. This article consolidates knowledge in the field of the theory of economic analysis, the acquisition of skills in applying methods of modeling factor systems, assessing the impact of quantitative and qualitative factors on indicators characterizing the results of financial and economic activities and their effectiveness. **Results.** The methods of factor analysis presented in the article developed by Filatov E.A. in comparison with the most common traditional methods can reduce the complexity by several iterations by entering the author's comparative coefficients. In addition, the author's methods of deterministic factor analysis complement the process of cognition of the functioning of economic systems, revealing the existing economic patterns and objectively existing cause-and-effect relationships between the phenomena of economic life. **Conclusions**. This publication analyzes the return on assets in general for manufacturers of computers, electronic and optical products of the Russian Federation. This type of activity is the most profitable compared to other manufacturing industries. In recent years, the indicators of return on assets, for the real industry as a whole, have been unstable. Their variation may be the result of changes in the profit received and/or the total value of assets, which in turn also depend on a variety of external and internal factors.

1 INTRODUCTION

A special position among all industries is occupied by high-tech industries, in particular the production of electronic and optical products. In recent years, the number of studies and publications describing the development of its producers in a variety of aspects has increased: import substitution, expansion of cooperative ties, features of technology and organization of production, the current state and trends in production development (Basmanova and Medushevskaya, 2016; Brykin and Kolegov, 2013; Evstigneev, 2005; Khromykh, 2016; Kolegov,

[a] https://orcid.org/0000-0001-8090-6926
[b] https://orcid.org/0009-0006-1048-2885

Vlasov and Korotkov, 2016; Turtsevich, Guminskiy and Peretz, 2012; Vermel, 2010; Veselova, 2015). According to many researchers, a comprehensive analysis of return on assets is also relevant and in demand. It shows how various macroeconomic processes affect the final financial results of the production of electronic products, in particular the impact of the restructuring of logistics links, which by 2020 was already observed on a national scale. In recent years, such a study has not been conducted at the level of a large manufacturing sector using a significant sample of manufacturers.

This publication analyzes the final reporting indicators of the «production of computers, electronic and optical products» for 2020 and 2021, which can be considered a new stage in its development due to a significant increase in state support. Sustainable production growth is planned for 2026-2030, ensuring its leading positions in promising markets and global technological leadership. From 2020 to 2023, the budget of the Russian Federation for its development includes about 235 billion rubles. This figure looks more modest than the corresponding budgets announced by some technology leaders, but it is a record for Russia for the entire period after the collapse of the USSR (Kovalevskiy, 2021). In addition, a significant difference in this period is the presence of covid restrictions (due to the pandemic of coronavirus infection COVID-19), which were introduced for all enterprises in the country from the second quarter of 2020. In 2021, they were already less stringent and manufacturers began to recover. A comparison of 2020 and 2021 shows the financial condition of manufacturers after the 2020 crisis.

The return on assets indicator depends on the efficiency of production activities and asset management, which are divided into two main groups (according to their role in the production process): non-current and negotiable (Dilworth, 1992; Dilworth, 1993). Due to various external factors, the growth of current assets in the production of computers, electronic and optical products significantly exceeded the growth of non-current assets. Perhaps, along with this, his «return» (the impact on profit growth) grew. A smaller increase in the value of non-current assets (compared with current assets) can be explained by the 2012 decree «On Long-term State Economic Policy», on the basis of which programs were created to identify and dispose of non-core assets. After the restructuring, it became possible to obtain a more accurate value of return on assets, taking into account the value of the property that is directly needed for the production of products.

In this study, a factor analysis of changes in the return on non-current and current assets in the industry under study was carried out. To accomplish this task, the authors have developed two three-factor models.

The results of the analysis may be relevant for government agencies, first of all, to understand how global challenges have affected the state of this group of producers. In addition, the new state concept for the development of the industry (from 2020) assumes a comprehensive solution of tasks in nine key areas, one of which is «economic efficiency». The results of the study can be taken into account when developing measures for its implementation. At the regional level, it is also possible to look for ways to improve the financial condition of producers working in their territory.

This study contains the following sections: literature review, methodology, result and discussion, conclusion.

2 LITERATURE REVIEW

Return on assets analysis is a fairly simple and popular research method. In the scientific literature, various approaches can be found to various variations of this research method, in particular using factor analysis. In this case, the object of research may be the application of models and their methodology (Safonov, 2020; Zykova, 2020), analysis within the enterprise or application to the industry. In relation to an individual enterprise, it is important from the point of view of investors. The industry approach shows how efficiently assets are used, how optimal the industry structure is and, of course, depends on the complexity and duration of the production cycle. In addition, it may reflect the impact of various macroeconomic processes and the effectiveness of public policy. Examples of use in industries: a study of the profitability of high-tech industries, a study of the profitability of assets of enterprises in the wine industry (Cheremisinova, Krichevets and Pliner, 2019; Spitsyn, 2019). According to the authors, there are currently relatively few examples of industry analysis. Earlier, the authors analyzed the profitability of assets of manufacturers of computers, electronic and optical products located in the territory of one region of the country based on this model (Filatov and Guseva, 2023).

The production of computers, electronic and optical products belongs to medium-sized mechanical engineering and unites a wide range of manufacturers of products of various purposes. It is a part of the

information technology industry that provides a hardware platform for processing information and implementing further digitalization processes. In the Russian Federation, the above-mentioned productions were merged into a single group in 2017. This is the production of both ready-to-use products and electronic components intended for further assembly. The finished products include computers, products of communication, irradiation and electrotherapeutic equipment, consumer electronics, control and measuring, navigation, optical devices, as well as information carriers and consumer electronics. The above-mentioned products may have different technical solutions and, accordingly, a very high or rather low cost. In general, the production of computers, electronic and optical products is a high-tech activity, up to 2/3 of its products are the most sophisticated high-tech equipment. Studies of production processes have shown that it has a higher level of complexity compared to other industries (Kurchenkov and Cherednichenko, 2007; Trofimov et al., 2014).

The specifics of the production of computers, electronic and optical products in Russia are the assembly of products from imported components. To date, their share in various products remains quite high. In addition to extensive logistics links, obtaining government orders is of great importance for industry manufacturers (Komarov, 2013; Kovalevskiy, 2021; Kulikova, 2017; Nikishina, 2014; Nikolaev, 2015; Nizovkina, 2015; Rakhlis et al., 2016). The industry is dominated by large enterprises, which account for the bulk of revenue and profits. The share of the small sector is up to 10% (in terms of staff). The central Federal District remains the most developed territory – the locomotive of the industry's development, which is distinguished by a developed infrastructure and scientific potential. The main part of production is concentrated in the European part of Russia, more than half of which are in the Central Federal District.

After 2014, this industry sector, like many others, came under the influence of sanctions. As a result, the restructuring of production relations began, as many foreign suppliers of components and software completely or partially suspended their activities in Russia. Among them are large companies that are technology platforms. These are, for example, AMD, Intel, IBM, Oracle, SAP, Cisco Systems, Microsoft and others. Against the background of the annual strengthening of sanctions, the logistics links of manufacturers in this sector were being restructured to alternative suppliers. In 2019, the main suppliers of equipment and components for Russian manufacturers were the countries of Southeast Asia: China ($210.8 million), Taiwan ($73.4 million), Malaysia ($80.9 million). According to experts, the sanctions restrictions imposed by Western countries have not yet affected the production of civilian electronic products, and manufacturers belonging to the military-industrial complex have already shifted to domestic suppliers. It can be noted that all Russian manufacturers, regardless of size and form of ownership, have suffered from sanctions. Of course, large enterprises with financial resources had advantages in increasing the cost of components. In addition, they could still maintain production using stocks (Larin, Sokolov and Khrustalev, 2022). Even the giants of production, which have foreign owners in the authorized capital, were on the verge of bankruptcy.

2020 and 2021 are of particular importance due to the beginning of the implementation in the state of new approaches to the development of industries subject to import substitution. These measures should ensure an increase in the share of electronic products produced in the domestic market by increasing the production volumes of existing Russian enterprises. At the beginning of 2020, according to forecasts of the leading manufacturers of the industry, a forced decrease in production activity could be expected against the background of a decrease in supply and demand from customers (Larin, Sokolov and Khrustalev, 2022).

One of the reasons for the growth of the Russian electronics industry is the increased use of IT solutions in the public sector. For example, the total revenue of the 50 largest suppliers (manufacturers of this industry) to the public sector increased by almost 30% by the end of 2020. By the end of 2021, the implementation of a number of major projects in the industry is celebrated. These are, for example, the launch of mass production of 360 thousand tablets for the population census (such devices have never been produced in Russia before), more than 33 thousand personal computers for health authorities in the regions, the purchase by the Pension Fund of the Russian Federation of more than 10 thousand domestic automated workplaces. However, against the background of production growth, profitability indicators are decreasing.

The year 2021 can be characterized as a period of recovery after the crisis, in which some enterprises had an increase in production under import substitution programs, while others were on the verge of bankruptcy or had already been liquidated. On the eve of 2020, this production sector is experiencing an unstable financial condition, an increase in the value of assets, and an increase in the ratio of non-current and current assets.

3 METHODOLOGY

10 methods of factor deterministic analysis developed by Filatov E.A. are aimed at qualitative improvement of the methodology of this type of analysis to calculate the influence of any number of factors used in the initial model for analysis. Filatov's methods allow us to assess the influence of factors on performance indicators, while factors, unlike other methods, may not be ranked by significance and nature of influence.

This section of the article presents the author's developed functional models of return on assets, which make it possible to find the root causes of changes in this profitability more comprehensively than other models.

3.1 Analysis of Return On Current Assets of the Electronic Industry of the Russian Federation

For factor analysis of the author's 3-factor model of return on current assets, four indicators were used: revenue, net profit, value of current assets, value of non-current assets.

Further, based on the methods of deterministic (functional) factor analysis developed by Filatov E.A. (Filatov, 2021a; Filatov, 2021b), we will assess the degree of influence of three factors on the change in the return on current assets of the electronic industry enterprises of the Russian Federation.

The initial data for an alternative factor analysis of the return on current assets of the electronic industry enterprises of the Russian Federation are presented in Table 1 based on the data of «BIR-Analyst» (AEI (Agency of economic information) «Prime» (2022, June 1) Retrieved from https//bir.1prime.ru). For the analysis, the accounting data of more than 6.5 thousand Russian enterprises that have the main activity «production of computer equipment, electronic and optical products» were used. Their share of revenue is more than 90% of the total number of enterprises in the above-mentioned type of activity.

Table 1: Initial data for factor analysis of the return on current assets of enterprises of the electronic industry of the Russian Federation.

№	Indicators	No. factor's	2020 (0)*	2021 (I)**	Deviation (Δ)***
1	***NR*** – Net Revenue, thousand rubles		12465 30705	12742 90306	27759601
2	***NP*** – Net Profit, thousand rubles		96471 773	67532 072	-28939701
3	***CA*** – Current Assets, thousand rubles		12935 62734	13283 01266	34738532
4	***NA*** – Non-Current Assets, thousand rubles		44962 1914	48261 6377	32994463
5	**RC** – Return On Current Assets (2/3) = 6 * 7 * 8		0.0745 78	0.0508 41	**-0.023737**
6	**ROS** – Return On Sales (2/1)	H_1	0.0773 92	0.0529 96	-0.024396
7	**TONA** – Turnover Of Non-current Assets (1/4)	H_2	2.7723 98	2.6403 79	-0.132018
8	**RNCA** – Ratio of Non-current and Current Assets (4/3)	H_3	0.3475 84	0.3633 34	0.015749

where: * **0** – past (basic) period (year), taken as reference base; ** **I** – reported (current) period (year); *** **Δ** – change for the period, calculated as the difference between the fact and the plan (**I – 0**).

The initial formula derived by the authors for factor analysis of the return on current assets will have the following form (formula 1):

$$RC = \frac{NP}{NR} * \frac{NR}{NA} * \frac{NA}{CA} = ROS * TONA * RNCA = H_1 * H_2 * H_3 = \prod_{n=1}^{3} H_n \quad (1)$$

The author's model of return on current assets consists of 3 factors:

F₁ – **ROS** – Return On Sales – this is a financial indicator used to calculate the share of net profit in the total income received by the enterprise. This indicator is used to assess the operational efficiency of companies (Harper, 1989; Higgins, 1989).

F₂ – **TONA** – Turnover Of Non-current Assets – This is the ratio of sales revenue (***NR***) to the value of non-current assets (***NA***). This indicator is an important indicator of the efficiency of non-current assets of the enterprise (Baker, Lembke and King, 1989).

F₃ – **RNCA** – the Ratio of Non-current and Current Assets is calculated as the ratio of the value of non-current assets (***NA***) to the value of current assets (***CA***) and characterizes the overall structure of the assets of the enterprise. The ratio of immobilized and mobile assets shows how many non-current assets of the enterprise account for current assets.

The resulting indicator – **RC** – the Return On Current Assets is calculated as the ratio of net profit

(***NP***) to the value of current assets (***CA***). This indicator characterizes the efficiency of the company's current assets.

Based on the data in Table 1, it can be seen that:

- the return on sales of enterprises of the electronic industry of the Russian Federation in 2020 was 7.74%, then in 2021 it was 5.30%, a decrease of -2.44% over the study period;

- the turnover of non-current assets of the electronic industry enterprises of the Russian Federation in 2020 was 277.24%, then in 2021 it was 264.04%, a decrease of -13.20% over the study period;

- the ratio of non-current and current assets of the electronic industry enterprises of the Russian Federation in 2020 was 34.76%, then in 2021 it was 36.33%, an increase of 1.57% over the study period.

The resulting indicator of the author's model of the return on current assets of the electronic industry enterprises of the Russian Federation in 2020 was 7.46%, then in 2021 it was 5.09%, a decrease of **-2.37%** over the study period.

The cumulative deviation of the resulting indicator (Δ***RC***) is determined by the formula 2:

$$\Delta RC = \sum_{n=1}^{3} RC\ (H_n) = \Delta RC\ (H_1) + \Delta RC\ (H_2) + \Delta RC\ (H_3) \quad (2)$$

Further, to calculate the influence of factors on the change in the return on current assets of enterprises of the electronic industry of the Russian Federation, we apply methods of deterministic factor analysis developed by Filatov E. A.

Auxiliary data on the author's comparative coefficients for factor analysis are presented in Tables 2, 3.

Table 2: Multiple comparative coefficients by one factor.

Comparison of factors	Designation of comparative coefficients	Value	The product of coefficients (value)
$H_{1(I)} / H_{1(0)}$	K_1	0.684770	1.00
$H_{1(0)} / H_{1(I)}$	K_2	1.460345	
$H_{2(I)} / H_{2(0)}$	K_3	0.952381	1.00
$H_{2(0)} / H_{2(I)}$	K_4	1.050000	
$H_{3(I)} / H_{3(0)}$	K_5	1.045311	1.00
$H_{3(0)} / H_{3(I)}$	K_6	0.956653	

Table 3: Multiplicative comparative coefficients for two factors.

Comparison of factors	The designation of comparative coefficient	Factor factors	Value
$(H_{1(I)} * H_{2(I)}) / (H_{1(0)} * H_{2(0)})$	M_1	$K_1 * K_3$	0.652162
$(H_{2(0)} * H_{3(0)}) / (H_{2(I)} * H_{3(I)})$	M_2	$K_4 * K_6$	1.004486

10 methods of Filatov E.A. are presented in Table 4, in which the result is equal to the product of the main part of the formula and the corresponding correction coefficients.

Table 4: Methods of alternative factor analysis using comparative coefficients.

No. of methods	No. of formulae	Formulas/calculations	
		The main part of the formula	Adjustment factors
1.1	1.1	$\Delta RC\ (H_1) = RC_0 * (K_1) - RC_0$	–
	1.2	$\Delta RC\ (H_2) = (RC_0 * (K_3) - RC_0)$*	K_1
	1.3	$\Delta RC\ (H_3) = (RC_0 * (K_5) - RC_0)$*	$(K_1 * K_3)$ or M_1
1.2	2.1	$\Delta RC\ (H_1) = (RC_1 - RC_1 * (K_2))$*	$(K_6 * K_4)$ or M_2
	2.2	$\Delta RC\ (H_2) = (RC_1 - RC_1 * (K_4))$*	K_6
	2.3	$\Delta RC\ (H_3) = RC_1 - RC_1 * (K_6)$	–
2.1	3.1	$\Delta RC\ (H_1) = (\Delta H_1 / H_{1(0)}) * RC_0$	–
	3.2	$\Delta RC\ (H_2) = (\Delta H_2 / H_{2(0)}) * RC_0)$*	K_1
	3.3	$\Delta RC\ (H_3) = ((\Delta H_3 / H_{3(0)}) * RC_0)$*	$(K_1 * K_3)$ or M_1
2.2	4.1	$\Delta RC\ (H_1) = ((\Delta H_1/H_{1(I)}) * RC_1)$*	$(K_6 * K_4)$ or M_2
	4.2	$\Delta RC\ (H_2) = ((\Delta H_2/H_{2(I)}) * RC_1)$*	K_6
	4.3	$\Delta RC\ (H_3) = ((\Delta H_3/H_{3(I)}) * RC_1$	–
3.1	5.1	$\Delta RC\ (H_1) = (RC_1 * K_4 * K_6) - RC_0$	–
	5.2	$\Delta RC\ (H_2) = ((RC_1 * K_2 * K_6) - RC_0)$*	K_1
	5.3	$\Delta RC\ (H_3) = ((RC_1 * K_2 * K_4) - RC_0)$*	$(K_1 * K_3)$ or M_1
3.2	6.1	$\Delta RC\ (H_1) = (RC_1 - (RC_0 * K_3 * K_5))$*	$(K_6 * K_4)$ or M_2
	6.2	$\Delta RC\ (H_2) = (RC_1 - (RC_0 * K_1 * K_5))$*	K_6
	6.3	$\Delta RC\ (H_3) = RC_1 - (RC_0 * K_1 * K_3)$	–
4.1	7.1	$\Delta RC\ (H_1) = \Delta RC - (RC_1 - (RC_0 * K_1)$	–
	7.2	$\Delta RC\ (H_2) = \Delta RC - (RC_1 - (RC_0 * K_3))$*	K_1
	7.3	$\Delta RC\ (H_3) = \Delta RC - (RC_1 - (RC_0 * K_5))$*	$(K_1 * K_3)$ or M_1
4.2	8.1	$\Delta RC\ (H_1) = \Delta RC - ((RC_1 * K_2) - RC_0)$*	$(K_6 * K_4)$ or M_2
	8.2	$\Delta RC\ (H_2) = \Delta RC - ((RC_1 * K_4) - RC_0)$*	K_6
	8.3	$\Delta RC\ (H_3) = \Delta RC - ((RC_1 * K_6) - RC_0)$	–
5.1	9.1	$\Delta RC\ (H_1) = \Delta RC - (RC_1 - (RC_1 * K_4 * K_6))$	–
	9.2	$\Delta RC\ (H_2) = \Delta RC - (RC_1 - (RC_1 * K_2 * K_6))$	K_1
	9.3	$\Delta RC\ (H_3) = \Delta RC - (RC_1 - (RC_1 * K_2 * K_4))$*	$(K_1 * K_3)$ or M_1
5.2	10.1	$\Delta RC\ (H_1) = \Delta RC - (RC_0 * K_5 * K_3) - RC_0)$*	$(K_6 * K_4)$ or M_2
	10.2	$\Delta RC\ (H_2) = \Delta RC - ((RC_0 * K_5 * K_1) - RC_0)$*	K_6
	10.3	$\Delta RC\ (H_3) = \Delta RC - ((RC_0 * K_3 * K_1) - RC_0)$	–

3.2 Analysis of return on non-current assets of the electronic industry of the Russian Federation

For factor analysis of the author's 3-factor model of return on non-current assets, four indicators were used: revenue, net profit, value of current assets, value of non-current assets.

Further, based on the methods of deterministic (functional) factor analysis developed by Filatov E.A. (Filatov, 2021a; Filatov, 2021b), we will assess the degree of influence of three factors on the change in the return on non-current assets of the electronic industry enterprises of the Russian Federation.

The initial data for an alternative factor analysis of the return on non-current assets of the electronic industry enterprises of the Russian Federation are presented in Table 5 based on the data of «BIR-Analyst» (AEI (Agency of economic information) «Prime» (2022, June 1) Retrieved from https//bir.1prime.ru).

Table 5: Initial data for factor analysis of the return on non-current assets of enterprises of the electronic industry of the Russian Federation.

No.	Indicators	No. factor's	2020 (0)*	2021 (I)**	Deviation (Δ)***
1	***NR*** – Net Revenue, thousand rubles		1246530705	1274290306	27759601
2	***NP*** – Net Profit, thousand rubles		96471773	67532072	-28939701
3	***CA*** – Current Assets, thousand rubles		1293562734	1328301266	34738532
4	***NA*** – Non-Current Assets, thousand rubles		449621914	482616377	32994463
5	**RN** – Return On Non-current Assets (2/4) = 6 * 7 * 8		0.214562	0.139929	**-0.074633**
6	**ROS** – Return On Sales (2/1)	H_1	0.077392	0.052996	-0.024396
7	**TOCA** – Turnover Of Current Assets (1/3)	H_2	0.963641	0.959338	-0.004303
8	**RCNA** – Ratio of Current and Non-current Assets (3/4)	H_3	2.877001	2.752292	-0.124709

where: * **0** – past (basic) period (year), taken as reference base; ** **I** – reported (current) period (year); *** **Δ** – change for the period, calculated as the difference between the fact and the plan (**I – 0**).

The initial formula derived by the authors for factor analysis of the return on non-current assets will have the following form (formula 3):

$$RN = \frac{NP}{NR} * \frac{NR}{CA} * \frac{CA}{NA} = ROS * TOCA * RCNA = H_1 * H_2 * H_3 = \prod_{n=1}^{3} H_n \quad (3)$$

The author's model of return on non-current assets consists of 3 factors:

H_1 – **ROS** – The Return On Sales is calculated as the ratio of net profit (***NP***) per unit of revenue from sales (revenue) (***NR***). This indicator shows the percentage of the share of profit from all revenue. This indicator characterizes the efficiency of the main (operational) activity of the enterprise (Jennings, 2002).

H_2 – **TOCA** – Turnover Of Current Assets is the ratio of sales revenue (***NR***) to the value of current assets (***CA***). This indicator is an important indicator of the efficiency of the company's current assets.

H_3 – **RCNA** – the Ratio of Current and Non-current Assets is calculated as the ratio of the value of current assets (***CA***) to the value of non-current assets (***NA***) and characterizes the overall structure of the assets of the enterprise. The ratio of mobile and immobilized funds shows how many current assets of the enterprise account for non-current assets.

The resulting indicator – **RN** – the Return On Non-current Assets is calculated as the ratio of net profit (***NP***) to the value of non-current assets (***NA***). This indicator characterizes the efficiency of non-current assets of the enterprise.

Based on the data in Table 5, it can be seen that:

- the return on sales of enterprises of the electronic industry of the Russian Federation in 2020 was 7.74%, then in 2021 it was 5.30%, a decrease of -2.44% over the study period;

- the turnover of current assets of the electronic industry enterprises of the Russian Federation in 2020 was 96.36%, then in 2021 it was 95.93%, a decrease of -0.43% over the study period;

- the ratio of current and non-current assets of the electronic industry enterprises of the Russian Federation in 2020 was 287.70%, then in 2021 it was 275.23%, a decrease of -12.47% over the study period.

The resulting indicator of the author's model of return on non-current assets of the electronic industry enterprises of the Russian Federation in 2020 was 21.46%, then in 2021 it was 14.00%, a decrease of **-7.46%** over the study period.

The cumulative deviation of the resulting indicator (**Δ*RN***) is determined by the formula 4:

$$\Delta RN = \sum_{n=1}^{3} RN\,(H_n) = \Delta RN\,(H_1) + \Delta RN\,(H_2) + \Delta RN\,(H_3) \quad (4)$$

Further, to calculate the influence of factors on the change in the return on current assets of enterprises of the electronic industry of the Russian Federation, we apply methods of deterministic factor analysis developed by Filatov E. A.

Auxiliary data on the author's comparative coefficients for factor analysis are presented in Tables 6, 7.

Table 6: Multiple comparative coefficients by one factor.

Comparison of factors	Designation of comparative coefficients	Value	The product of coefficients (value)
$H_{1(I)} / H_{1(0)}$	K_1	0.684770	1.00
$H_{1(0)} / H_{1(I)}$	K_2	1.460345	
$H_{2(I)} / H_{2(0)}$	K_3	0.995534	1.00
$H_{2(0)} / H_{2(I)}$	K_4	1.004486	
$H_{3(I)} / H_{3(0)}$	K_5	0.956653	1.00
$H_{3(0)} / H_{3(I)}$	K_6	1.045311	

Table 7: Multiplicative comparative coefficients for two factors.

Comparison of factors	The designation of comparative coefficient	Factor factors	Value
$(H_{1(I)} * H_{2(I)}) / (H_{1(0)} * H_{2(0)})$	M_1	$K_1 * K_3$	0.681712
$(H_{2(0)} * H_{3(0)}) / (H_{2(I)} * H_{3(I)})$	M_2	$K_4 * K_6$	1.050000

10 methods of Filatov E.A. are presented in Table 8, in which the result is equal to the product of the main part of the formula and the corresponding correction coefficients.

Table 8: Methods of alternative factor analysis using comparative coefficients.

No. of methods	No. of formulae	Formulas/calculations	
		The main part of the formula	Adjustment factors
1.1	1.1	$\Delta RN\,(H_1) = RN_0 * (K_1) - RN_0$	–
	1.2	$\Delta RN\,(H_2) = (RN_0 * (K_3) - RN_0)*$	K_1
	1.3	$\Delta RN\,(H_3) = (RN_0 * (K_5) - RN_0)*$	$(K_1 * K_3)$ or M_1
1.2	2.1	$\Delta RN\,(H_1) = (RN_I - RN_I * (K_2))*$	$(K_6 * K_4)$ or M_2
	2.2	$\Delta RN\,(H_2) = (RN_I - RN_I * (K_4))*$	K_6
	2.3	$\Delta RN\,(H_3) = RN_I - RN_I * (K_6)$	–
2.1	3.1	$\Delta RN\,(H_1) = (\Delta H_1 / H_{1(0)}) * RN_0$	–
	3.2	$\Delta RN\,(H_2) = (\Delta H_2 / H_{2(0)}) * RN_0)*$	K_1
	3.3	$\Delta RN\,(H_3) = ((\Delta H_3 / H_{3(0)}) * RN_0)*$	$(K_1 * K_3)$ or M_1
2.2	4.1	$\Delta RN\,(H_1) = ((\Delta H_1/H_{1(I)}) * RN_I)*$	$(K_6 * K_4)$ or M_2
	4.2	$\Delta RN\,(H_2) = ((\Delta H_2/H_{2(I)}) * RN_I)*$	K_6
	4.3	$\Delta RN\,(H_3) = ((\Delta H_3/H_{3(I)}) * RN_I$	–
3.1	5.1	$\Delta RN\,(H_1) = (RN_I*K_4*K_6) - RN_0$	–
	5.2	$\Delta RN\,(H_2) = ((RN_I*K_2*K_6) - RN_0)*$	K_1
	5.3	$\Delta RN\,(H_3) = ((RN_I*K_2*K_4) - RN_0)*$	$(K_1 * K_3)$ or M_1
3.2	6.1	$\Delta RN\,(H_1) = (RN_I - (RN_0*K_3*K_5))*$	$(K_6 * K_4)$ or M_2
	6.2	$\Delta RN\,(H_2) = (RN_I - (RN_0*K_1*K_5))*$	K_6
	6.3	$\Delta RN\,(H_3) = RN_I - (RN_0*K_1*K_3)$	–
4.1	7.1	$\Delta RN\,(H_1) = \Delta RN - (RN_I - (RN_0*K_1)$	–
	7.2	$\Delta RN\,(H_2) = \Delta RN - (RN_I - (RN_0*K_3))*$	K_1
	7.3	$\Delta RN\,(H_3) = \Delta RN - (RN_I - (RN_0*K_5))*$	$(K_1 * K_3)$ or M_1
4.2	8.1	$\Delta RN\,(H_1) = \Delta RN - ((RN_I*K_2) - RN_0)*$	$(K_6 * K_4)$ or M_2
	8.2	$\Delta RN\,(H_2) = \Delta RN - ((RN_I*K_4) - RN_0)*$	K_6
	8.3	$\Delta RN\,(H_3) = \Delta RN - ((RN_I*K_6) - RN_0)$	–
5.1	9.1	$\Delta RN\,(H_1) = \Delta RN - (RN_I - (RN_I*K_4*K_6))$	–
	9.2	$\Delta RN\,(H_2) = \Delta RN - (RN_I - (RN_I*K_2*K_6))$	K_1
	9.3	$\Delta RN\,(H_3) = \Delta RN - (RN_I - (RN_I*K_2*K_4))*$	$(K_1 * K_3)$ or M_1
5.2	10.1	$\Delta RN\,(H_1) = \Delta RN - (RN_0*K_5*K_3) - RN_0)*$	$(K_6 * K_4)$ or M_2
	10.2	$\Delta RN\,(H_2) = \Delta RN - ((RN_0*K_5*K_1) - RN_0)*$	K_6
	10.3	$\Delta RN\,(H_3) = \Delta RN - ((RN_0*K_3*K_1) - RN_0)$	–

4 RESULTS

4.1 Results for analysis of return on current assets of the electronic industry of the Russian Federation

The results for analysis of return on current assets of the electronic industry of the Russian Federation of 10 methods of Filatov E.A. is presented in Table 9.

Table 9: The results of the author's methods of factor analysis.

No. of methods	**No. of formulae**	**The main part of the formula**	**Adjustment factors**		**Result**
	1	$\Delta RC\,(H_1) = -0.023509$	–		-0.023509
	2	$\Delta RC\,(H_2) = -0.003551$	0.684770	K_1	-0.002432

1.1, 2.1, 3.1, 4.1, 5.1	3	ΔRC (H_3) = 0.003379	0.652162	$K_1 * K_3$	0.002204
	Total	**-0.023681**			**-0.023737**
1.2, 2.2, 3.2, 4.2, 5.2	1	ΔRC (H_1) = -0.023404	1.004486	$K_6 * K_4$	-0.023509
	2	ΔRC (H_2) = -0.002542	0.956653	K_6	-0.002432
	3	ΔRC (H_3) = 0.002204	–		0.002204
	Total	**-0.023743**			**-0.023737**

As can be seen from the final result of Tables 1 and 9, the purpose of the analysis has been achieved – the determination of the influence of factors has been disclosed without deviations.

The final change in the return on current assets of the electronic industry enterprises of the Russian Federation was positively influenced by:

- an increase in the ratio of non-current and current assets by 1.57% caused an increase in the studied indicator of **0.22%**.

The final change in the return on current assets of the electronic industry enterprises of the Russian Federation had a negative impact:

- a decrease in the return on sales by -2.44%, caused a decrease in the studied indicator by **-2.35%**;
- a decrease in the turnover of non-current assets by -13.20% caused a decrease in the studied indicator of **-0.24%**.

The combined influence of three factors led to a decrease in the return on current assets of the electronic industry enterprises of the Russian Federation by **-2.37%**.

Over the five years under study (from 2017 to 2021), the return on current assets of the Russian electronics industry was not stable and had various variations:

- the minimum in 2018 is about 4.3%;
- the maximum in 2020 is about 7.5%.

4.2 Results for analysis of return on non-current assets of the electronic industry of the Russian Federation

The results for analysis of return on non-current assets of the electronic industry of the Russian Federation of 10 methods of Filatov E.A. is presented in Table 10.

Table 10: The results of the author's methods of factor analysis.

No. of methods	No. of formulae	The main part of the formula	Adjustment factors		Result
1.1, 2.1, 3.1, 4.1, 5.1	1	ΔRN (H_1) = -0.067636	–		-0.067636
	2	ΔRN (H_2) = -0.000958	0.684770	K_1	-0.000656
	3	ΔRN (H_3) = 0.009301	0.681712	$K_1 * K_3$	-0.006340
	Total	**-0.077895**			**-0.074633**
1.2, 2.2, 3.2, 4.2, 5.2	1	ΔRN (H_1) = -0.064416	1.050000	$K_6 * K_4$	-0.067636
	2	ΔRN (H_2) = -0.000628	1.045311	K_6	-0.000656
	3	ΔRN (H_3) = -0.006340	–		-0.006340
	Total	**-0.071384**			**-0.074633**

As can be seen from the final result of Tables 5 and 10, the purpose of the analysis has been achieved – the determination of the influence of factors has been disclosed without deviations.

The final change in the return on non-current assets of the electronic industry enterprises of the Russian Federation had a negative impact:

- a decrease in the return on sales by -2.44%, caused a decrease in the studied indicator by **-6.76%**;
- a decrease in the turnover of current assets by -0.43%, caused a decrease in the studied indicator by **-0.07%**;
- a decrease in the ratio of current and non-current assets by -12.47% caused a decrease in the studied indicator by **-0.63%**.

The combined influence of three factors led to a decrease in the return on non-current assets of the electronic industry enterprises of the Russian Federation by **-7.46%**.

Over the five years under study (from 2017 to 2021), the return on non-current assets of the Russian electronics industry was not stable and had various variations:

- the minimum in 2018 is about 9.8%;
- the maximum in 2020 is about 21.5%.

5 DISCUSSION

The average absolute indicators of the electronic industry of the Russian Federation for the period under study (2020-2021), with the exception of net profit, increased:

- net profit by -30.00% (-28939.701 million rubles);
- revenue by +2.23% (+27759.601 million rubles);
- total assets by +3.89% (+67732.995 million rubles);
- current assets by +2.69% (+34738.532 million rubles);
- non-current assets by +7.34% (+32994.463 million rubles).

According to Rosstat, inflation in the Russian Federation as a whole for 2021 amounted to 8.39%, that is, the increase in income for the electronic industry was lower than the inflation rate.

The structure of assets of enterprises of the electronic industry of the Russian Federation during the study period changed slightly less than by %:

- the share of current assets decreased by -0.86%;
- the share of non-current assets increased by +0.86%.

Profitability, in contrast to absolute indicators, is a relative indicator, which makes it possible to compare companies and industries of different activities and different sizes. The return on assets in its own way is the economic efficiency of the entire company's property as a whole.

In 2021, compared with 2020, the efficiency of the electronic industry of the Russian Federation decreased by an average of 1.5 times. This is due to a decrease in net profit with a slight increase in resources (Awad, 1988; Cash, McFarlan and McKenney, 1988; Courtney and Paradice, 1988; Meigs and Meigs, 1993; Smith, 1989; Spiller and May, 1990).

6 CONCLUSION

The final results of the two calculation methods are presented in Table 11, calculated on the basis of the author's models of return on assets (formulas 1 and 3).

Table 11: The final results of the author's models of return on assets.

The factor influencing the change in return on assets, %	Deviation of return, %	
	current assets	non-current assets
Decrease in return on sales by -2.44	-2.35	-6.76
Reduction asset turnover: - current assets by -0.43 - non-current by -13.20	-0.24	-0.07
Reduction of the ratio of current and non-current assets by -12.47 (calculation of return on non-current assets)		-0.63
Increase in the ratio of non-current and current assets by +1.57 (calculation of return on current assets)	+0.22	
Total deviation	**-2.37**	**-7.46**

The difference in financial results for the electronics industry between 2020 and 2021 shows a decrease in profit (by -30%) against the background of revenue growth, current and non-current assets (+2,23%, +2,69%, +7,34%), what was reflected in the decrease in the return on assets from 5.53% to 3.73%. At the same time, the return on non–current assets decreases by -7.46%, current assets - by -2.37%. Factor analysis showed that the main impact on the decline in the above indicators was a decrease in return on sales (Table 11). Less significant was the decrease in the turnover of assets (especially non-current ones), an increase in their value and a slight change in the ratio.

In 2020 and 2021, two poles of positive and negative impact on production can be distinguished:

1. state support measures (government orders, investments, introduction of new forms of business organization, tax incentives, bans on imported components and expansion of the sales market);
2. sanctions, inflationary processes (price increases), pandemic (temporary production stoppages, loss of specialists), the growth of the US dollar.

Currently, several large enterprises are directly under sanctions, while other manufacturers are experiencing difficulties from the ban on the purchase of components and equipment for production. Assessing the impact on the state of producers, we can say that the processes in the second group had the greatest impact on the final financial indicators for the period under study. They affected the growth of costs and assets, which led to a decrease in profits. Moreover, both small and medium-sized and large enterprises are affected, which by the end of 2021 have achieved a significant decrease in profits or a negative financial result. For example, the reduction in net profit of the largest manufacturer Samsung Electronics Rus Kaluga LLC from 2020 to 2021 is 791.8 million rubles. In the Central Federal District, there is also a decrease in return on assets from 3.61 to 1.23 due to a significant decrease in net profit (almost three times). The most developed region was also affected by sanctions, inflation and the pandemic.

Net profit. The reduction in return on sales from an average value (the range of average profitability values is from 5% to 20%) in 2020 to a low one (the range of low values is up to 5%) in 2021 can be primarily explained by the losses of the largest manufacturers (who fall into the top 50 in this type of activity). According to the federal districts, the level of profitability has a large variation. At the same time, many of them, especially those far from the center, have negative values.

Current assets. The increase in the value of working capital occurred due to the growth of «stocks» and «accounts receivable». The increase in the cost of materials and components, as well as an increase in inventories against the background of the introduction of new bans on their purchase, the restructuring of logistics, taking into account the reorientation to other suppliers, affected the total cost of «stocks» necessary for production. The main reasons for the growth of accounts receivable are higher interest rates on loans and high inflation, with many companies postponing payments for purchased

goods at a later date. In addition to the increase in accounts receivable from 2020 to 2021, for the studied production group, there is an increase in overdue (accounts receivable) by 21% (as of October 2021), while its overall increase compared to the average for 2017 to 2019 is almost twofold (Rosstat of the Russian Federation). An increase in the cost of working capital allows you to work in new conditions, increases the stability of production activities, but does not ensure efficiency, at which there is an increase in profit (for the analyzed period).

Non-current assets. Considering the increase in the value of non-current assets, it can be noted that their value (in addition to revaluation) increased due to an increase (several times) in the cost item «research and development results», which is a positive fact. However, time must pass from research to the start of production (especially mass production), and perhaps more than one year. For example, large manufacturers in the field of production of computing and communication equipment note that there is import substitution in some positions, but there is no mass production yet. Because of this, the situation of enterprises remains quite difficult, even despite solving problems by changing suppliers (Kovalevskiy, 2022). In addition, despite significant investments, there is still no increase in fixed assets in the group of fixed assets «machinery and equipment» due to the creation of new value (commissioning, modernization, repair) (Rosstat of the Russian Federation). Which is extremely important for this type of production.

The preservation of the ratio of revenue and property (in terms of value and structure) indicates that there have been no significant changes in the production under study as a whole during the period under review. The departure of some large and significant manufacturers of the industry, which is expected to happen in 2022 (which has not yet been observed in 2021), should already affect the level of production, the property of producers and, accordingly, the profitability of assets in the short term. State support for manufacturers has ensured an increase in production, but sufficient conditions for improving efficiency in general have not yet been observed across the entire group of manufacturers of «computers, electronic and optical products».

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