


DOI: 10.26794/2587-5671-2021-25-4-48-63

UDC 33.336.6(045)

JEL G32, O16

# Impact of the Value of Intangible Assets on the Capitalization of Food Retailers for their Sustainable Growth

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## ABSTRACT

The **objective of the research** in the article is the food retail companies that occupy leading positions in the Russian and foreign markets. The **subject of the study** is financial and economic relations in the field of the use of intangible assets (IA) as a significant factor in increasing the capitalization of food retailers and their sustainable development. The **relevance** of the problem is due, on the one hand, to the significant contribution of trade to the country's GDP, on the other hand, to the need to find new drivers for the sustainable development of food retailers in the context of overcoming the negative consequences of the pandemic and the digital economy. The **purpose** of the study is to assess the impact of the value of intangible assets on the capitalization of food retailers. The authors applied the **methods** of comparative analysis, calculation of financial and economic indicators, correlation, and regression analysis of statistical data processing. The authors used Student's t-test and Fisher's f-test to confirm the quality of the constructed model. The study shows that Russian food retailers, as compared to foreign ones, occupy a smaller market share in the domestic economy and have a smaller share of intangible assets in the non-current assets of companies (except for X5 Retail Group). On the Russian food market, a trend has been revealed towards an increase in the production of goods under private labels and a decrease in the presence of foreign retailers, as well as an increase in the share of online trading that requires the use of intellectual property, including digital intangible assets, and leads to an increase in cash flows. Based on multivariate correlation analysis, it was found that the capitalization of trading companies in the food sector is most affected by the value of intangible assets and return on them. The constructed model of linear two-factor regression allows the authors to **conclude** that with an increase in the value of intangible assets by 1%, the market capitalization of a company increases by 10% with a constant return on assets. The article provides recommendations for Russian food retailers on the formation and use of a portfolio of intangible assets for value-based business management, which will contribute to their sustainable development.

**Keywords:** the value of intangible assets; return on assets; capitalization of food retailers; digital economy; sustainable development

**For citation:** Loseva O.V., Fedotova M.A., Bogatyreva V.V. Impact of the value of intangible assets on the capitalization of food retailers for their sustainable growth. *Finance: Theory and Practice*. 2021;25(4):48-63. DOI: 10.26794/2587-5671-2021-25-4-48-63

## INTRODUCTION

The relevance of the research on the impact of intangible assets on the capitalization of food retailers is due to a number of currently existing socio-economic trends and factors.

Firstly, it should be noted that the share of retail and wholesale trade in Russia's GDP, according to Rosstat, has remained significant over the past three years and amounts to about 11–12%,<sup>1</sup> trade in the structure of domestic GDP ranks 8th, which indicates the importance of this industry for the country's economy.

In 2012–2019 the largest contribution (up to 48%) to the total volume of retail trade was made by food and grocery retailers (*Fig. 1*).

Secondly, in the structure of sales of food and grocery retailers, a special place is occupied by the so-called private label products. These products are manufactured either under the brand of a retail chain or under another brand that is sold exclusively in that retail chain. Due to the lower advertising and marketing costs, private label products have a lower cost compared to well-known brands. In addition to control over pricing, retailers also gain control over product quality, which is an important aspect of a retail chain's appeal.<sup>2</sup>

*Fig. 2* shows that Russian retailers have been actively expanding the range of their own brands: for the period 2011–2018 the share of such products increased from 2% to 8%. Thus, the importance of intangible assets, including the goodwill of food and grocery retailers, is increasing as a factor influencing the investment attractiveness and, as a consequence, the capitalization of trading companies.

This is also evidenced by another trend that has emerged in connection with the digitalization of the economy, and more

recently the difficult epidemiological situation caused by the coronavirus disease — the growth of online sales of fast-moving consumer goods (FMCG), including food and grocery retail trade (*Fig. 3*).

At the end of 2019, the turnover of the online food sales market showed a rapid growth of 67% and amounted to 45 billion rubles.<sup>3</sup> Consumers are changing their habits: actively ordering products online, comparing prices in an online store before buying, using smartphones to analyze special offers, and using social media as a feedback form for retailers. Online sales of FMCG are expected to reach 2.2 trillion rubles (7.0% of the retail market) by 2029.<sup>4</sup>

*Table 1* shows the largest online food and grocery stores according to the InfoLine rating for May 2020, that is, during the first wave of coronavirus in Russia (*Table 1*).

According to the table, X5 Retail Group is in the lead, but the recently launched Sbermarket is actively promoting its online services.

Today, large retailers not only show interest in the online format, but also actively open online supermarkets, for example, perekrestok.ru, auchan.ru, av.ru, shop.lenta.com, okeydostavka.ru, vkusvill.ru, delivery.metro-cc.ru.<sup>5</sup> The online trading format requires the registration of their own domain names, the development of websites, special software applications, and digital content, which, in turn, also increases the share of digital intangible assets of trading companies.

Thus, it is due to intangible assets that companies can create a unique product that is in high demand not only due to its quality but also to the positive reputation of the brand, as well as the information and digital

<sup>1</sup> Russia in numbers, 2020. URL: [https://gks.ru/bgd/regl/b20\\_11/Main.htm](https://gks.ru/bgd/regl/b20_11/Main.htm) (accessed on 11.03.2021).

<sup>2</sup> Russian food retail: Time to buy food stocks. Sova Capital. URL: <https://research.sovacapital.com/> (accessed on 10.04.2020).

<sup>3</sup> Russian Food Retailers. UBS Global Research. URL: <https://www.ubs.com/ru/en.html> (accessed on 10.04.2020).

<sup>4</sup> E-commerce in FMCG in 2019: InfoLine Review. 21.02.2020. Information portal "e-pepper". URL: <https://e-pepper.ru/news/onlayn-rynok-fmcg-v-2019-godu-obzor-infoline.html> (accessed on 11.02.2021).

<sup>5</sup> Russia Consumer & Retail Report. Includes 5-year forecasts to 2023. Fitch Solutions. URL: <https://www.fitchsolutions.com> (accessed on 11.02.2021).

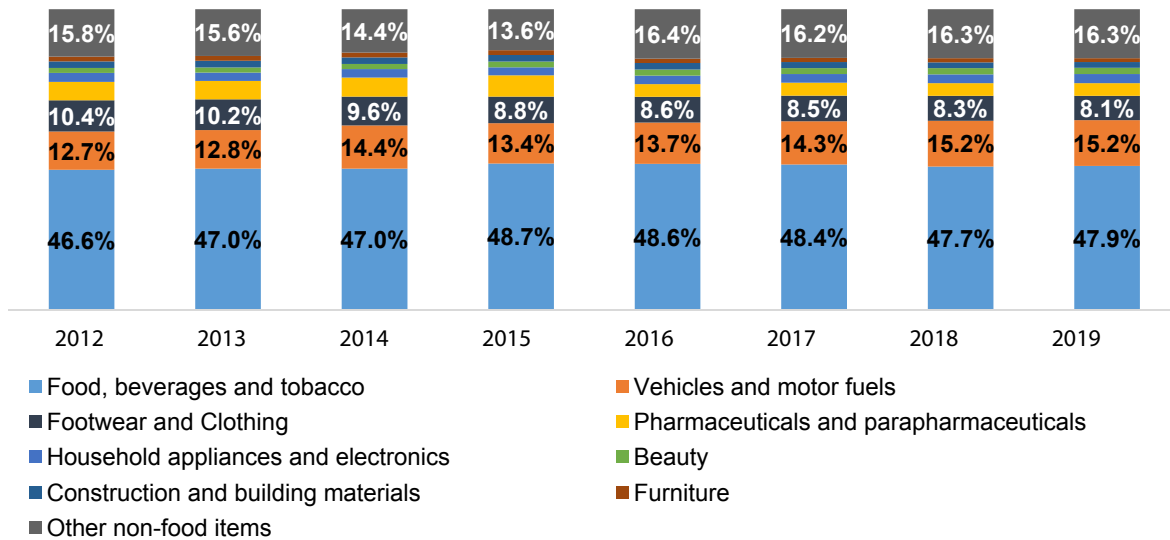


Fig. 1. Structure of retail sales in Russia, 2012–2019, %

Source: Rosstat data, gks.ru.

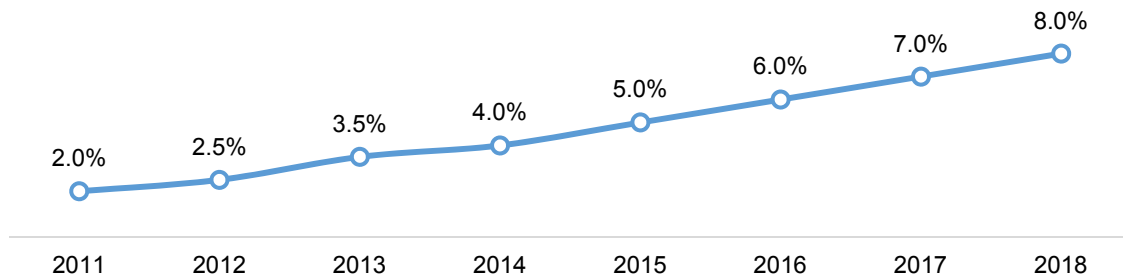


Fig. 2. Share of sales of private label products in the retail market of Russia, 2011–2018, %

Source: compiled by the authors based on materials from the InfoLine information agency. URL: <http://infoline.spb.ru> (accessed on 11.03.2021).

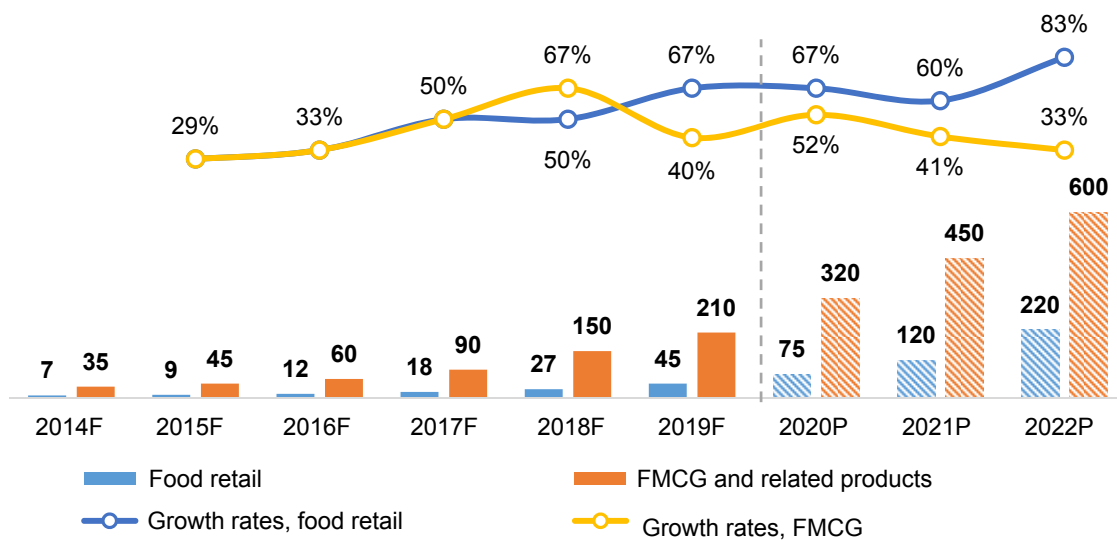


Fig. 3. Dynamics of the online FMCG retail market, 2014–2022, RUB billion

Source: compiled by the authors based on materials from the InfoLine information agency. URL: <http://infoline.spb.ru> (accessed on 11.03.2021).

Table 1

## TOP online grocery retailers in Russia

Retailers	Turnover, RUB billion (VAT incl.)	Orders, thousand	Average purchase value, RUB (VAT incl.)
X5 Retail Group: Perekrestok.ru	2.37 1.7 0.673	714 350 364	3319 4813 1849
SberMarket	2.028	505	4015
Utkonos	1.9	295	6450
Ozon.ru	1.6	1400	1140
Vkusvill	1.25	604	2070
Yandex.Lavka	1.2	1200	1000
iGoods	1.1	241	4565
Wildberries	0.997	-	-
Samokat	0.95	1400	680

Source: *Forbes* magazine website. URL: <https://www.forbes.ru/biznes/404047-situaciya-vse-bolshe-pohodit-na-gonku-vooruzheniy-kak-servisy-x5-i-sberbanka?photo=3> (accessed on 11.03.2021).

innovations used in the process of selling food products. Therefore, every food and grocery retailer striving to grow in the market and increase its capitalization should focus on these assets.

The study aims to substantiate the importance of intangible assets as a factor in the growth of food retailers' business based on assessing the impact of intangible assets on their capitalization.

To achieve this aim, we set the following tasks:

- to analyze the macroeconomic indicators affecting the turnover of retail companies;
- to conduct a comparative statistical analysis of domestic and foreign food retailers in terms of structure, share of intangible assets in non-current assets;
- to conduct a correlation and regression analysis of the impact of intangible assets on the capitalization of the studied food retailers of the Russian and foreign markets;
- to give recommendations to Russian food and grocery retailers on intangible

asset management in order to increase the capitalization of companies in the digital economy.

## MATERIALS AND RESEARCH METHODS

The information base of the study was the work of domestic and foreign scientists engaged in the development of the concept of company value management, the valuation of intangible assets, regulatory documents and standards in the field of valuation, official statistics, and official websites of food retailers<sup>6</sup> and information and analytical database Bloomberg.<sup>7</sup>

<sup>6</sup> "Dixie Group" official website. URL: <https://dixy.ru/> (accessed on 25.03.2020). "Magnit" official website. URL: <https://magnit-info.ru/> (accessed on 25.03.2020). "Okey Group" official website. URL: <https://www.okmarket.ru/> (accessed on 25.03.2020). "Lenta Ltd" official website. URL: <https://lenta.com/> (accessed on 25.03.2020). "Walmart Inc" official website. URL: <https://www.walmart.com/home> (accessed on 25.03.2020). "X5 Retail Group" official website. URL: <https://www.x5.ru/> (accessed on 25.03.2020).

<sup>7</sup> Bloomberg information and analytical system. URL: <http://www.bloomberg.com> (accessed on 20.03.2020).

The theoretical basis of the study was the value-oriented management models [1], in which intangible assets play a significant role, in particular: G. Ahonen's "intangible value chain" [2] for the company to receive additional income from the use of intangible assets and, as a result, positive market value added (MVA); "value creation mix" by R. Normann and R. Ramirez [3], where intangible assets, as well as intangible competencies and hidden abilities to create innovations, are considered as strategic assets of the company [4]; models of the impact of off-balance sheet intangible assets (customer loyalty [5], company image [6], research results [7]) on the efficiency of commercial activities, etc. Particular attention was paid to the work of researchers on the composition of intangible assets [8] and the search for growth drivers for retail companies [9, 10].

Since the market capitalization is used as an indicator characterizing the value of a company, which is largely influenced by external factors, the methods of macroeconomic [11, 12] and statistical analysis [13, 14] were used. To study the influence of internal factors associated with the activities of the companies themselves, the methods of analysis of economic indicators [15–17], obtained from the data of financial and management reporting, were used.

Finally, the study of the relationship between intangible assets and the capitalization of grocery retailers was carried out using multivariate correlation-regression analysis [18, 19], which makes it possible to measure the tightness of the relationship between variables and determine which of the factors has the greatest influence on the effective indicator, as well as to establish the form of dependence and build a model regression to predict the capitalization of companies for given values of factor variables [20].

## RESEARCH RESULTS

### Analysis of macroeconomic factors affecting the turnover of Russian food retailers

The consumer price index (CPI) should be considered as macroeconomic factors that directly affect the financial performance of food retailers.

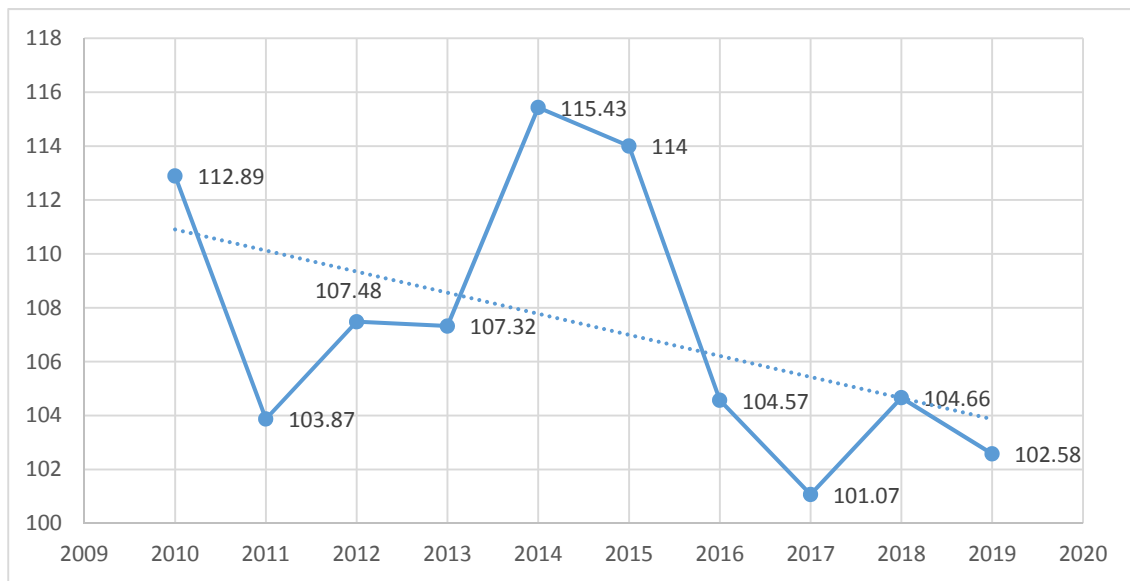
The consumer price index for food products characterizes the average change in prices for a certain period for products included in the consumer basket. *Fig. 4* shows the dynamics of this index for the period 2010–2019.

The graph shows a downward trend in the index during relatively prosperous periods of economic development and spikes in values during crisis events (after the economic crisis of 2008, in 2014–2015 due to the introduction of anti-Russian sanctions, in 2018 due to the strengthening of macroeconomic instability in the world). In December 2020, the CPI value for food was 104.21% compared to December 2019, which is associated with another unfavorable factor — the downturn of the Russian economy due to the pandemic.

In addition to product inflation, the volume of sales in this segment can also be affected by the level of real household incomes. For the analysis, the indicator of real disposable household income was selected, which characterizes income adjusted for the rate of inflation, excluding mandatory payments. *Fig. 5* shows the dynamics of real disposable cash income in Russia for the period 2014–2019, expressed in terms of growth rates compared to the previous year.

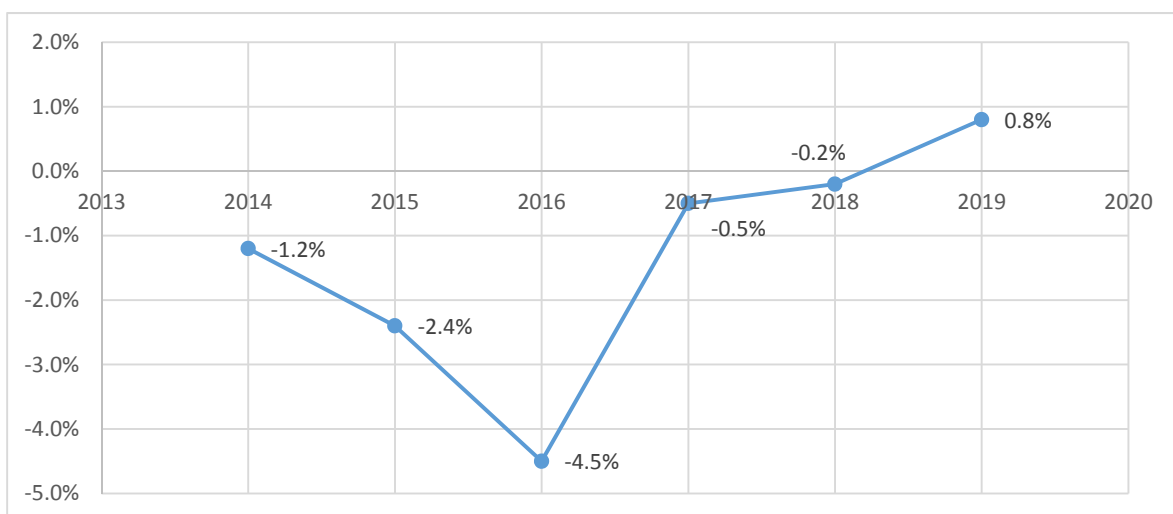
The graph shows a downward trend in real disposable household incomes after the emergence of crisis phenomena in the economy, in connection with which one should expect a decrease in this indicator in 2020 compared to the previous year against the background of negative economic consequences during the pandemic.

The relationship between the indicators of food inflation, the rate of change in real disposable household income, and the



**Fig. 4. CPI for food products in 2010–2019**

Source: compiled by the authors based on the Rosstat data. URL: <https://www.gks.ru/folder/13397?print=1> (accessed on 04.05.2021).



**Fig. 5. Dynamics of the growth rate of real disposable income in Russia compared to the previous year**

Source: compiled by the authors based on the Rosstat data.

turnover of food retail trade is shown in the graph (Fig. 6).

Based on the graphs presented, it can be concluded that the change in the growth rates of food retail turnover and the growth rates of real disposable income (RDI) practically coincide. The dependence of trade turnover and the consumer price index is observed in the period up to 2017, then a decrease in food inflation does not lead to the same slowdown in the growth rate of retail trade.

Based on the results of the analysis of macroeconomic factors, we can conclude that the volume of the retail food market is closely related to the level of real disposable income of households, but, regardless of the economic situation, the food market does not so clearly “fall” due to the social significance of the goods provided. In this regard, the capitalization of food retailers will largely be influenced by internal factors that determine the competitiveness of companies in modern



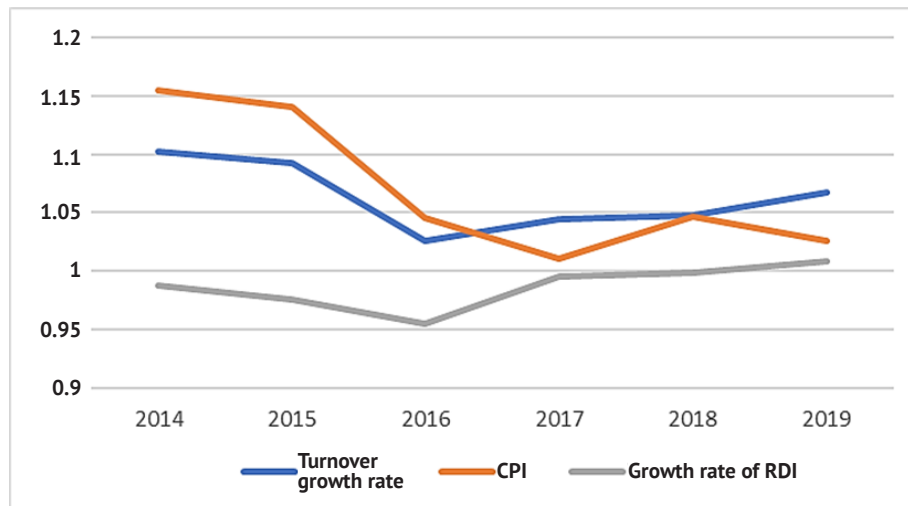


Fig. 6. Growth rates of the main macroeconomic indicators in the food retail market

Source: compiled by the authors based on the Rosstat data.

economic realities, primarily intangible assets and financial indicators.

#### Comparative analysis of domestic and foreign food retailers by structure and share of intangible assets in their non-current assets

Initially, we will identify the largest Russian and foreign food retailers as key players in the food market. According to Deloitte, among the 250 TOP retailers in the Global Powers of Retailing rating<sup>8</sup> at the end of 2019, Russian retail chains such as X5 Retail Group ranked 42nd with revenue of \$ 24.4 billion, Magnit – 51st with revenue of \$ 19.4 billion, Lenta Ltd – on the 159th place with revenue of \$ 6.6 billion, Dixy Group – on the 215th place with \$ 4.7 billion. The Russian food retailer O’Key Group, which was not included in the rating of Deloitte, but occupies a significant position in the domestic food market, was also selected for the analysis.

The listed companies are among the five leaders of the Russian food market. They account for 28.8% of the entire food market in Russia. In some foreign countries, the indicator characterizing the market share of the largest retailers is much higher, for

example, in the USA – 46%, in France – 54%, in Poland – 56%, in the UK – 61%, in the Czech Republic – 71%, in Germany – 74%.

Foreign food retailers holding leading positions in the aforementioned revenue ranking include Target (USA) – 11th; Aeon (Japan) – 13th place; Tesco (Great Britain) – 1st place; Carrefour (France) – 7th place; Kroger Co. (USA) – 5th place, Walmart (USA) – 1st place.

In the selected retail chains for the purpose of comparative analysis, the study considered the absolute value of intangible assets reflected on the balance sheet of the organization; the share of intangible assets in non-current assets (*Tables 2, 3*); composition and structure of intangible assets.

As of 2019, the absolute value of intangible assets prevails among the industry leader X5 Retail Group and amounts to more than 126 billion rubles, which is more than 2.5 times the sum of all intangible assets of other represented Russian retailers. It should be noted that the value of intangible assets for many domestic companies is growing, but the share of intangible assets in non-current assets of almost all retailers, except for X5 Retail Group, remains quite stable. At the same time, Dixy is the leader with a 31% share of intangible assets, which significantly

<sup>8</sup> Global Powers of Retailing. Deloitte. 2020. URL: <https://www2.deloitte.com/uk/en/pages/consumer-business/articles/global-powers-of-retailing.html> (accessed on 05.05.2020).

Table 2

**Analysis of the size and share of IA in non-current assets of the largest Russian food retailers**

Absolute value of intangible assets (RUB million)							
	2013	2014	2015	2016	2017	2018	2019
X5	78 878.7	80 302.0	90 414.0	96 749.0	108 718.0	112 574.0	126 265.0
Magnit	2 118.4	2 352.5	2 765.7	2 791.1	3 635.5	28 556.5	30 794.0
Lenta	623.2	870.5	1 092.3	1 890.2	1 816.7	1 905.9	2 271.0
Dixy	20 543.1	20 553.5	21 273.4	21 441.2	14 907.5	15 024.1	16 321.3
O'key	550.0	539.4	1 293.7	893.1	961.1	1 294.2	1 105.8
Share of intangible assets in non-current assets, %							
	2013	2014	2015	2016	2017	2018	2019
X5	35	33	31	28	27	14	14
Magnit	1	1	1	1	1	4	4
Lenta	1	1	1	1	1	1	1
Dixy	36	35	33	33	28	31	20
O'key	1	1	2	1	2	2	2

Source: compiled by the authors based on the Bloomberg information and analytical database.

Table 3

**Analysis of the size and share of IA in the non-current assets of the largest foreign retail companies**

Absolute value of intangible assets (RUB million)							
	2013	2014	2015	2016	2017	2018	2019
Target	11 388	21 163	20 988	15 522	39 977	45 755	43 778
Aeon	67 957	80 934	155 880	200 391	153 961	155 485	178 104
Tesco	202 362	224 324	359 881	303 830	197 748	209 573	534 880
Carrefour	410 219	672 626	753 496	639 643	646 497	750 079	656 819
Kroger Co	99 716	214 503	285 145	250 751	226 950	284 413	264 327
Walmart Inc	685 745	1 268 500	1 260 400	1 024 100	1 026 700	2 043 900	1 983 000
Share of intangible assets in non-current assets, %							
	2013	2014	2015	2016	2017	2018	2019
Target	1.0	1.1	1.1	1.0	2.6	2.4	2.3
Aeon	7.3	7.2	8.3	8.0	7.7	7.4	7.4
Tesco	11.6	10.2	11.6	9.8	8.9	8.5	17.2
Carrefour	36	34	34	33	37	33	30
Kroger Co	13.9	14.2	15.7	16.0	15.4	15.9	12.1
Walmart Inc	13.6	12.9	12.0	12.1	12.6	19.8	17.8

Source: compiled by the authors based on the Bloomberg information and analytical database.



exceeds the share of intangible assets even among foreign food retailers. Apparently, Magnit, Lenta, and O'Key companies do not pay enough attention to the development of their intangible assets.

Particular attention should be paid to the composition and structure of intangible assets of the companies under study in order to analyze which intangible assets prevail on the balance sheet of Russian food retailers.

The structure of Lenta's intangible assets is not shown in *Fig. 7*, since in 2019 only software is present in the company's intangible assets.

In terms of the variety of intangible assets, Magnit leads with such intangible assets as goodwill (91%), software (4.94%), lease rights (2.85%), licenses (0.5%), trademarks (0.1%). It should be noted that goodwill is reflected in the balance sheets of only three companies under study – X5 Retail Group, Magnit and Dixy Group, while it accounts for more than 80% of all available intangible assets of the companies. It is also worth paying attention to the availability of software, which is becoming more important in the era of digitalization. According to this indicator, X5 Retail Group is in the lead, with software accounting for 92% of all intangible assets.

Among foreign retailers, the undisputed leader in the absolute value of intangible assets throughout the entire study period is the American company Walmart, which also ranks first in the Global Powers of Retailing 2020 report. In 2019, the value of the intangible assets of this grocery retailer is approximately 1,983 billion rubles, which is more than 157 times higher than the indicator of the main player in the Russian food retail market – X5 Retail Group. This difference is explained both by the greater amount of goodwill and by the fact that foreign companies, unlike Russian ones, try to reflect all intangible assets on their balance sheets, which increases their investment attractiveness and capitalization.

At the same time, the share of intangible assets in non-current assets of foreign

retailers generally exceeds this indicator for Russian companies (with the exception of Target). Only the shares of intangible assets in non-current assets of X5 Retail Group and Dixy Group are comparable to them.

Based on the comparative analysis of food retailers in the domestic and foreign markets in terms of intangible assets, we can conclude that the largest Russian retailers, with the exception of X5 Retail Group, are inferior to foreign ones in absolute value, intangible assets are recorded on the balance sheets of organizations. Also, the share of intangible assets in the structure of assets of domestic companies is on average lower than that of foreign companies.

#### **Correlation-regression analysis of the impact of intangible assets on the capitalization of the studied food retailers of the Russian and foreign markets**

The analysis was carried out in several stages:

- 1) determining the linear correlation coefficient between capitalization and the book value of intangible assets for the studied Russian and foreign food retailers;
- 2) conducting a comparative analysis of the financial and economic indicators of Russian and foreign food retailers to form a general homogeneous sample for correlation and regression analysis;
- 3) carrying out a multivariate correlation analysis to collect, in addition to intangible assets, other most significant factors affecting the change in the effective indicator;
- 4) building a multivariate regression model and assessing its quality.

**Stage 1.** Determination of the linear correlation coefficient between capitalization and the book value of intangible assets.

The values of the linear correlation coefficient between the book value of intangible assets and the capitalization of Russian and foreign food retailers are shown in *Fig. 7*.

Based on the results obtained, the relationship between the capitalization

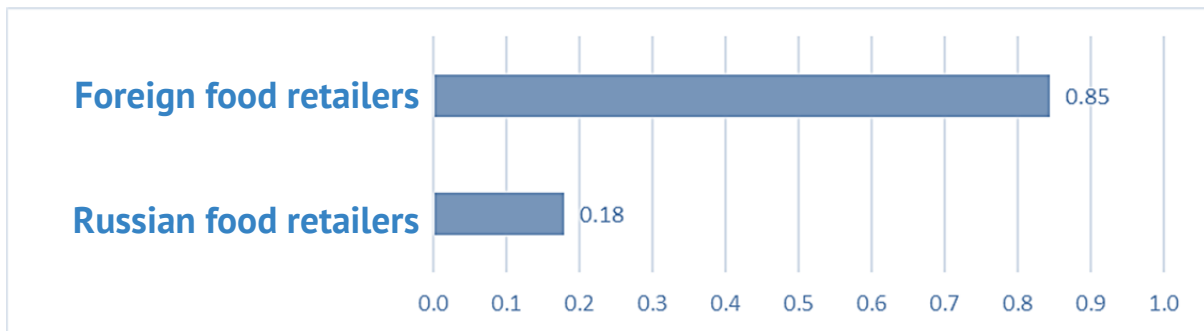


Fig. 7. Correlation coefficients between the value of IA and the capitalization of companies

Source: compiled by the authors on the basis of calculations using the MS Excel Data Analysis.

Table 4

#### Financial and economic indicators of Russian food retailers, 2019

Indicator	X5 Retail Group	Magnit	Lenta	Dixy	Okey	Average value
Capitalization growth rate, %	125	96	85	109	87	100.4
Share of intangible assets, %	12	3	1	20	2	7.3
Asset turnover	1.67	1.49	1.38	3.78	1.83	2.03
Return on assets, %	9	5	6	6	4	6
Leverage	8.67	4.57	3.75	8.29	3.78	5.81
Tobin's Q	1.43	1.15	1.03	1.21	1.03	1.17
Current liquidity	0.49	2.32	0.95	0.47	0.91	1.03

Source: compiled by the authors based on the Bloomberg information and analytical database.

indicator and intangible assets for Russian companies can be called weak, since the correlation coefficient is less than 0.3. For foreign companies, on the contrary, the relationship between these indicators is close, since the correlation coefficient ranges from 0.7 to 0.9. In this regard, we can conclude that intangible assets do not have such a strong impact on capitalization in the Russian food retail market as in the external market. This can be explained by factors such as high volatility of the stock market in the food retail sector, underestimation of Russian companies in general, incomplete reflection in the

balance sheet of intangible assets of companies, and also by the fact that the strategic benchmark of the companies under study is aimed more at increasing revenue than maximizing market value.

**Stage 2.** Conducting a comparative analysis of the financial and economic indicators of Russian and foreign food retailers (Tables 4, 5), which may also affect the change in their capitalization.

Comparing the average values of the two tables, we can conclude that the greatest differences relate to two characteristics: the growth rate of capitalization and the share of intangible assets in foreign companies is

Table 5

## Financial and economic indicators of foreign food retailers, 2019

Indicator	Target	Aeon	Tesco	Carrefour	Kroger Co	Walmart Inc	Average value
Capitalization growth rate, %	148	146	141	90	92	114	122
Share of intangible assets, %	1.6	3.0	12.8	19	9	13	10
Asset turnover	1.9	0.8	1.4	1.5	3.2	2.3	1.8
Return on assets, %	11	2	4	4	6	9	6
Leverage	3.6	8.7	3.7	5.1	5.1	3.1	4.9
Tobin's Q	2.0	1.1	1.1	1.0	1.4	2.1	1.5
Current liquidity	0.89	0.99	0.61	0.82	0.76	0.80	0.81

Source: compiled by the authors based on the Bloomberg information and analytical database. URL: <http://www.bloomberg.com> (accessed on 20.03.2021).

Table 6

## Values of the correlation coefficient (R) based on the results of multivariate correlation analysis

	Market capitalization	IA	ROA	Assets turnover	ROE	Leverage
Market capitalization	1.00					
Intangible assets value	0.88	1.00				
Return on assets	0.50	0.31	1.00			
Asset turnover	0.25	0.18	0.79	1.00		
Return on equity	0.12	-0.02	0.60	0.76	1.00	
Leverage	-0.37	-0.24	-0.25	-0.06	-0.08	1.00
Current liquidity	0.22	0.18	-0.29	-0.23	-0.25	-0.14

Source: compiled by the authors using the MS Excel Data Analysis.

significantly higher than similar indicators for Russian companies.

In addition, Russian companies have significant volatility in their indicators relative to the average. Thus, the values of indicators of X5 Retail Group are close to or exceed the average values (excluding current liquidity). At

the same time, the rate of capitalization growth for this retailer is the highest. For the rest of the companies, most of the indicators take values below average or there are some “outliers”, in particular, the share of intangible assets in Dixy Group significantly exceeds the average values, as does the current liquidity of Magnit.

Standard Error	2.5443477					
Observations	42					
ANOVA						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	2	1174.973922	587.4869612	90.74972392	2.13459E-15	
Residual	39	252.4745035	6.473705218			
Total	41	1427.448426				
Coefficients						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-3.440875938	0.864611698	-3.979677752	0.000290999	-5.18971817	-1.692033707
HMA	10.01635645	0.871083993	11.49872634	4.24709E-14	8.25442277	11.77829013
return on assets	38.29922012	12.44661832	3.077078379	0.003813248	13.12355826	63.47488198

Fig. 8. Regression analysis data of the relationship between the value of IA, return on assets, and capitalization of the companies under study

Source: compiled by the authors using the MS Excel Data Analysis.

Table 7

### Evaluation of the quality of the constructed regression model

Parameters	<i>t</i> -test	<i>t</i> -tab.	Comparison	Significance of coef.	<i>P</i> -value	$\alpha$	Comparison	Significance of coef.
b0	-3.980	2.708	-3.980 > <i>t</i> tab.	Significant	0.0003	0.05	0.0003 < $\alpha$	Significant
b1 (IA)	11.499	2.708	11.499 > <i>t</i> tab	Significant	4.25E - 14	0.05	4.25E - 14 < $\alpha$	Significant
b4 (ROA)	3.077	2.708	3.077 > <i>t</i> tab.	Significant	0.0038	0.05	0.0038 < $\alpha$	Significant
Parameter	<i>F</i> -test	<i>F</i> tab.	Comparison	Equation significance	Significance <i>F</i>	$\alpha$	Comparison	Equation significance
Regression equation	90.750	5.194	90.75 > <i>t</i> tab.	Significant	2.13E - 15	0.05	2.13E - 15 < $\alpha$	Significant

Source: compiled by the authors based on regression analysis data.

Most foreign companies do not show strong volatility of their indicators relative to the average. The only exception is Target, which has the largest negative deviation of the share of intangible assets from the average, so it is advisable to exclude its data from further analysis. The leader is Walmart Inc, whose performance is either above or close to the average (excluding leverage). Thus, the sample for correlation-regression analysis includes five foreign companies (except for Target) and one Russian company — X5 Retail Group, which is on a par with foreign companies in many competitiveness indicators, including

the absolute value of intangible assets, their share in non-current assets, return on assets, Tobin's Q ratio. In addition, having calculated for a given company separately the correlation coefficient between the indicators of the company's market capitalization and the value of intangible assets, we obtained a value of 0.86 (86%), which indicates a close relationship between these indicators.

**Stage 3.** Conducting multivariate correlation analysis.

This analysis allows us to select from the set of considered financial and economic internal factors those that have the greatest

impact on market capitalization. *Table 6* shows the results of the analysis.

Based on the results obtained, it can be concluded that of all the factors studied, the closest relationship with the effective indicator (market capitalization) is for intangible assets ( $R = 0.88$ ), and there is also a noticeable relationship with the return on assets ratio ( $R = 0.5$ ). The relationship between capitalization and other factors is weak or moderate ( $R < 0.5$ ), therefore, these factors can be excluded from further consideration.

**Stage 4.** Building a multivariate regression model.

A linear model was chosen for the analysis. Considering the value of intangible assets and the return on assets selected at the stage of multivariate correlation analysis, we will construct a two-factor model of their influence on changes in market capitalization.

The results of the regression analysis are shown in *Fig. 11*.

Thus, the resulting model will be:

$$f(x) = -3,44 + 10,02x_1 + 38,30x_2, \quad (1)$$

where  $f(x)$  — market capitalization of the company;

$x_1$  — value of intangible assets;

$x_2$  — return on asset.

The coefficient of determination for the two-factor model is about 82%, which indicates the high quality of the model and the fact that changes in the effective indicator by 82% are due to changes in the factors of the model (the value of intangible assets and return on assets).

To assess the quality of the model, we will run the Fisher  $F$ -test and the Student's  $t$ -test for each of the coefficients at the 5% significance level and for the model itself (*Table 7*).

Based on *Table 7*, we can conclude that all found regression coefficients are significant, and the equation itself is applicable not only for the sample but also for the general

population of retailers. Consequently, the constructed regression model is adequate.

## CONCLUSIONS

Overcoming the consequences of the pandemic for the Russian economy involves the implementation of measures aimed, inter alia, at maintaining the quality of life of the population. In this regard, providing citizens with vital food products at reasonable prices requires the uninterrupted and efficient operation of food retailers, with GDP contribution of 12–14%. At the same time, for the companies themselves, the achievement of efficiency in conditions of an objective increase in prices is associated with the search for internal development drivers, which should certainly include the development of a new format of online trading and other digital marketing tools, which requires an increase in the share of intangible assets in non-current assets and improving the quality of their management.

As for the food retail sector in Russia, it is also worth noting that the market share of the leaders of this sector in aggregate is less than the share of the largest retail chains in foreign developed countries. At the same time, the market share of the largest Russian retailers is growing every year due to a decrease in sales through traditional distribution channels, as well as a decrease in the market share of foreign retailers in Russia with a simultaneous increase in the recognition of domestic trademarks and brands. This indicates future prospects for the development of Russian retail chains and the need to search for additional competitive advantages, which, based on the experience of world leaders, can become intangible assets.

The influence of intangible assets, as well as the return on assets, on the capitalization of food retailers and, as a consequence, on their investment attractiveness, is justified by the use of multivariate correlation-regression analysis based on data mainly related to foreign retail chains. The sample included

data from only one Russian company — X5 Retail Group, comparable to foreign peers in terms of key competitiveness indicators, including the size and share of intangible assets in non-current assets. The resulting model (Fig. 1) allows us to conclude that with an increase in the value of intangible assets by 1%, the market capitalization of a company can grow by 10% with constant profitability, and with an increase in the profitability of assets, including intangible assets, by 1% the market capitalization can grow by 38% at a constant value of intangible assets. The quality of the constructed model is confirmed using Student's *t*-statistics and Fisher's *F*-test.

For most Russian food retailers, a close correlation between market capitalization and intangible assets is not obvious. However, the previous conclusions provide a basis for the development of generalized recommendations for Russian food and grocery retailers to manage their intangible assets to increase capitalization and investment attractiveness. In particular, companies should:

- 1) adopt the concept of value-based management aimed at increasing the market value of a business and increasing its capitalization as a basic development strategy;
- 2) consider intangible assets as the main factor in increasing market capitalization;
- 3) in the absence of intangible assets on the company's balance sheet, take measures

to identify them and reflect them in the accounting records;

4) introduce new digital technologies and innovations, including those related to e-commerce, in the main areas of the retailer's activities;

4) evaluate the existing intangible assets of the company for obsolescence and impairment, as well as analyze the effectiveness of their use and the possibility of commercialization;

5) form a portfolio of intangible assets based on the needs of the company, consumers and the food retail market as a whole;

6) determine the volume of investments in potential intangible assets, prioritize the most effective of them, contributing to an increase in the innovative and technological development of the retailer;

7) make a forecast of potential economic benefits, ensuring the growth of the value and capitalization of the company when using the created portfolio of intangible assets, make the necessary adjustments to it;

8) evaluate the effectiveness of the resulting portfolio of intangible assets.

Compliance with these recommendations by Russian food retail representatives, based on the experience of world leaders and the findings of the study, will help to increase the market capitalization and investment attractiveness of Russian food retailers, as well as their sustainable development.

## ACKNOWLEDGEMENTS

The article is based on the results of budgetary-supported research according to the state task carried out by the Financial University. Financial University, Moscow, Russia.

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*The article was submitted on 14.03.2021; revised on 28.03.2021 and accepted for publication on 27.04.2021.*

*The authors read and approved the final version of the manuscript.*