

## Research and Evaluation of the Consumer Market Potential in the Agglomeration Economy

Anna V. Shpengler<sup>1</sup>, Nadezhda K. Savelyeva<sup>1</sup>, Vitaliy V. Rychkin<sup>2</sup>, Alexander V. Gololobov<sup>2</sup>

<sup>1</sup> Vyatka State University, Kirov, Russia

<sup>2</sup> Belgorod State National Research University, Belgorod, Russia

### Author Note

Anna V. Shpengler

Vyatka State University, 36 Moskovskaya str., Kirov, 610000, Russia

e-mail: av\_shpengler@vyatsu.ru

Correspondence concerning this article should be addressed to

Nadezhda K. Savelyeva ORCID: 0000-0002-9497-6172

Vyatka State University, 36 Moskovskaya str., Kirov, 610000, Russia

e-mail: nk\_savelyeva@vyatsu.ru

Vitaliy V. Rychkin ORCID: 0009-0004-1508-4857

Belgorod State National Research University, 85, Pobedy Str., Belgorod, 308015, Russia

e-mail: freetrack777@gmail.ru

Alexander V. Gololobov ORCID: 0009-0003-7701-2691

Belgorod State National Research University, 85, Pobedy Str., Belgorod, 308015, Russia

e-mail: alek-gololobov@yandex.ru

**Abstract:** The study focuses on the main directions of developing the consumer market of the urban agglomeration, their interrelation, and their mutual influence on the region's sustainable development. In the conditions of agglomeration changes occurring on the territory of the federal subject, the disproportions of development between municipalities are increasing, which can have a multidirectional impact on economic development and the achievement of strategic goals. The socio-economic development of agglomerations is characterized by a special level of development of individual consumer market segments and a system of indicators that make it possible to form a real picture of the socio-economic development and well-being of the territory. The authors investigate the development parameters of the Republic of Karelia consumer market and the Petrozavodsk urban agglomeration. The relevance of the conducted research is determined by the significant role of consumer market segments in the development of economic sectors of the agglomeration territory and the subject.

**Keywords:** agglomeration, consumer market, territorial development, correlation matrix, factor analysis, factor load, sustainable development

**JEL codes:** C1, D11, O18, O20, R10, R11

The formation of conditions for the sustainable development of urban agglomerations is a priority strategic task of the spatial policy of the Russian Federation (Antonov & Makhrova,

2019; Voroshilova, 2021; Zwanka & Buff, 2021). Considering urban agglomeration as an element of management, it is important to identify priorities for its development and analyze factors having the most impact on the achievement of strategic goals of territorial development (Fang & Yu, 2017; Rigby & Brown, 2015). The importance of the consumer market for the economy of a developing agglomeration lies primarily in a certain influence of its stability level on the development of the territory (Bufetova, 2009; Gaasland et al., 2020; Lappo et al., 2007; Shmidt et al., 2016; Voroshilova, 2021).

The research aims to conduct economic diagnostics of the development parameters of the consumer market of the federal subject to identify imbalances in the market of its constituent municipalities and agglomerated territory. The research object is the Republic of Karelia, on the territory of which the Petrozavodsk urban agglomeration is formed (Shpengler et al., 2023; Savelyeva, 2023). The information base includes the works of Russian and foreign scientists, as well as statistical data from the Federal State Statistics Service of the Russian Federation (Rosstat) (Rosstat Regional Office of Republic of Karelia, 2022). The scientific novelty lies in applying an integrated approach to assessing the consumer market of the region and the urban agglomeration and identifying key indicators of its development.

### **Methodology**

The role of the consumer market in the socio-economic development of the territory is determined by the fact that it:

- Promotes the economic development of the country, region, agglomeration, and municipalities, being a source of tax revenues to budgets of all levels;
- Creates additional jobs, demand for labor, which is especially important for developing agglomerations;
- Meets the needs of the local population in goods and services in accordance with their requests and solvency;
- Determines quantitative and qualitative characteristics of supply and demand and stabilizes prices for goods and services;
- Creates opportunities to participate in interregional and international trade and economic relations for the agglomeration territory;
- Helps increase the level of a multiplicative effect for various sectors of the economy, an example of which is the growth of consumer lending for the banking sector (Gu et al., 2021; Trivedi & Sama, 2020; Zhukova & Plotnikov, 2013; Zwanka & Buff, 2021).

The structure of the region's consumer market consists of three main segments that closely interact with each other and affect the region's socio-economic development:

1. Retail market;
2. Catering market;
3. Household services market.

The level of development of the consumer market on the territory of the federal subject is usually not homogeneous and depends on many factors, including the degree of agglomeration of the territory (Antonov & Makhrova, 2019; Lavrinenko et al., 2019; Rastvortseva, 2017).

The importance of the consumer market for the economy of Russian regions lies in the fact that, in many respects, the dynamics of their development depend on its stability because the entire reproduction process at all stages of economic activity is based on the functioning of individual economic entities, the closing link of which is the consumer market as an institutional system that controls the sale of goods and services necessary to satisfy consumer demand fully (Gu, S. et al., Demchenko, 2021).

The study of the territorial features of forming and developing the consumer market of municipalities is an urgent direction of regional socio-economic policy. Monitoring of the main indicators is carried out continually.

The analysis of scientific research on the development of the consumer market allowed the authors to identify various methods and tools. According to E. I. Demchenko (2021), the most common are methods and tools are system analysis, statistical methods (balance, index, etc.), methods of sociological research, factorial, regression, and correlation analyses, and expert methods based on a subjective prediction of the development of the object under expert study. Several scientists base the analysis of the dynamics of the consumer market development of the territory on the study of its internal contradictions, the elimination of which leads to an increase in its development potential (Galiakhmetov & Kutuyashova, 2004). To diagnose its condition, the author identifies three areas of analysis. The main indicators reflecting the development of the consumer market are as follows:

- The analysis of the structure of the consumer goods market;
- The assessment of the consumer market development;
- The analysis of the goods and services market infrastructure, including the analysis of consumer market entities.

Based on the considered assessment methods, it is proposed to study the level of differentiation in the development of the regional consumer market based on the analysis of the following parameters:

- X1 – retail turnover per 1000 people, thousands of rubles/1000 persons;
- X2 – retail facilities per 1000 people, units/1000 persons;
- X3 – average monthly salary of employees of organizations (trade), thousand rubles/1000 persons;
- X4 – the percentage of wages in trade enterprises in wages by the economy of the municipality as a whole, %
- X5 – fixed investments in trade and catering, thousand rubles/1000 persons;
- X6 – volume of paid services per 1000 people, thousand rubles/1000 persons;

The methodology was tested in the municipalities of the Republic of Karelia, as well as in the Petrozavodsk urban agglomeration.

## Results

The steps of the proposed approach to the analysis of the consumer market are as follows:

1. In the first stage, relative indicators of the consumer market development are calculated per 1000 people of the population in the context of municipalities of the region;
2. In the second stage, indicators are classified by the matrix method using indicators characterizing the development of the consumer market of municipalities in the region;
3. In the third stage, the correlation dependence between the studied parameters (X1–X6) is investigated;
4. In the fourth stage, factor loads are analyzed for each indicator, and the variance and eigenvalues of the factors are determined;
5. In the fifth stage, the number of factor groups for the spatial analysis model is determined;
6. In the sixth stage, the parameters are distributed into groups of factors, and their generalized names are formed;
7. In the seventh stage, a spatial graphical interpretation of the municipalities' development is carried out according to the level of development of the consumer market and relative to each other.
8. In the eighth stage, the spatial model of the analysis of the consumer market development is interpreted, and the level of differentiation is assessed.

During the first stage, based on the data of municipalities of the Territorial Statistics Service for the Republic of Karelia, calculations were made of relative indicators of consumer market development in the context of municipalities for 2021.

**Table 1**

Values of indicators for the development of the consumer market of municipalities of the Republic of Karelia

Municipality	Retail turnover per 1000 population, thousands of rubles/1000 persons	Retail facilities per 1000 persons, units/1000 persons	Average monthly salary of employees of organizations (trade), thousands of rubles/1000 persons	Average monthly salary of employees of organizations (trade), thousands of rubles/1000 persons	Average monthly salary of employees of organizations (trade), thousands of rubles/1000 persons	Average monthly salary of employees of organizations (trade), thousands of rubles/1000 persons
	X1	X2	X3	X4	X5	X6
Petrozavodsk City District	205	15	45	77	495	12799
Kostomuksha City District	141	11	52	67	42	462
Belomorsky Municipality	147	18	36	62	25	358

Kalevalsky Municipality	75	18	40	82	199	96
Kemsky Municipality	121	21	36	53	5	261
Kondopozhsky Municipality	119	16	35	75	11	2689
Lakhdenpokhsky Municipality	130	19	34	76	2	259
Loukhsky Municipality	101	16	40	73	4	304
Medvezhyegorsky Municipality	110	23	32	63	33	496
Muesersky Municipality	70	25	29	73	199	99
Olonetsky Municipality	100	20	33	76	9	391
Pitkyarantsky Municipality	128	24	45	84	46	337
Prionezhsky Municipality	99	9	33	61	3	398
Pryazhinsky Municipality	66	12	73	131	5	202
Pudoshsky Municipality	83	24	33	73	4	215
Segezhsy Municipality	130	21	38	71	82	410
Sortavalsky Municipality	157	30	36	78	46	687
Suoyarvsky Municipality	68	16	43	93	16	224

Source: Compiled by the authors based on (Rastvortseva, 2017)

During the second stage, indicators are classified by the matrix method using indicators characterizing the development of the consumer market of municipalities in the region.

The third stage presents the results of the calculations of the correlation matrix by the main socio-economic indicators of the development of the consumer market of municipalities of the Republic of Karelia. If the values of the parameters' calculations are close to 1, it indicates the links between parameters. For example, the correlation of the parameters X1/X5 equal 0.618, X4/X3 – 0.864, X1/X6 – 0.763, and X5/X6 – 0.902 respectively.

The results of constructing the correlation matrix shows that there is a relationship between parameters X1 (retail trade turnover per 1,000 population) and X5 (fixed investment in trade and catering), X4 (percentage of wages in trade enterprises in wages by economy of municipality as a whole) and X3 (Average monthly salary of employees of organizations

(trade)), X1 (retail trade turnover per 1000 population) and X6 (volume of paid services per 1000 people), X5 (fixed investment in trade and catering) and X6 (volume of paid services per 1000 people).

The fourth stage analyzes factor loads for each indicator and determination of variance indicators and eigenvalues of factors. Factor analysis was carried out for 18 municipalities of the Republic of Karelia on six main variables. The results of factor analysis of the full set of variables are presented in Table 2.

**Table 2**  
 Factor analysis

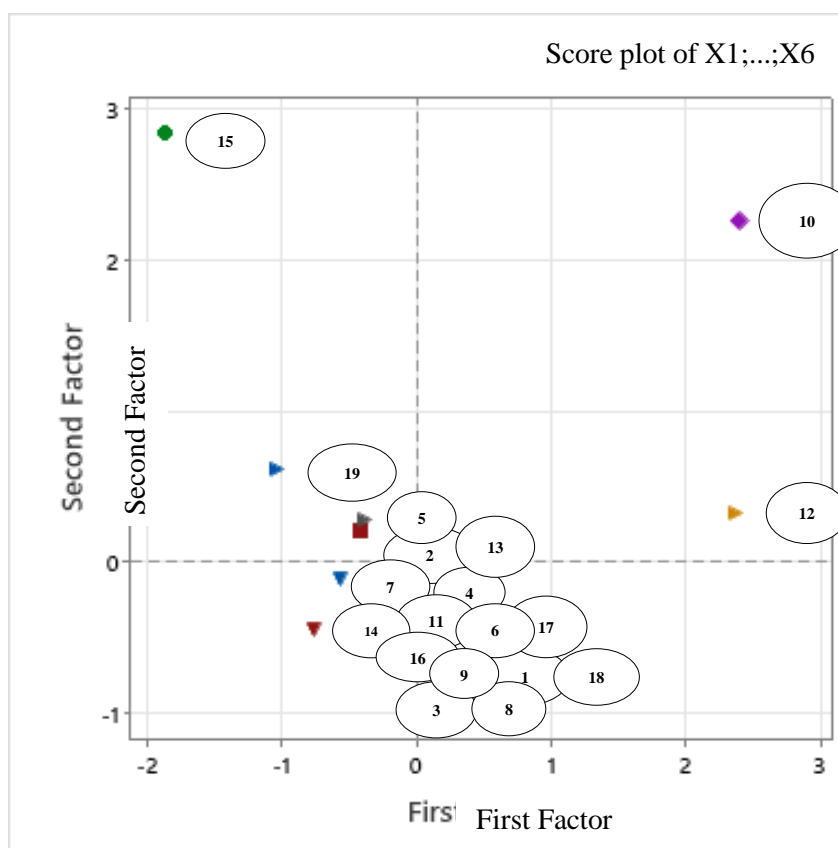
<b>Variable</b>	<b>Factor1</b>	<b>Factor2</b>	<b>Factor3</b>	<b>Factor4</b>	<b>Factor5</b>	<b>Factor6</b>
X1	0.709	-0.520	-0.221	-0.416	0.012	-0.068
X2	0.086	-0.560	0.821	-0.049	-0.023	0.035
X3	0.734	0.615	0.078	-0.220	-0.155	0.072
X4	0.668	0.614	0.387	0.029	0.140	-0.083
X5	0.876	-0.261	-0.059	0.371	-0.144	-0.058
X6	0.927	-0.232	-0.193	0.126	0.150	0.106
Variance	3.1213	1.4611	0.9194	0.3782	0.0875	0.0325
Variance explained by each factor, %	52.0	24.4	15.3	6.3	1.5	0.5
<b>Standardized coefficients of factor values</b>						
<b>Variable</b>	<b>Factor1</b>		<b>Factor2</b>		<b>Communality</b>	
X1	0.709		-0.520		0.774	
X2	0.086		-0.560		0.322	
X3	0.734		0.615		0.916	
X4	0.668		0.614		0.823	
X5	0.876		-0.261		0.835	
X6	0.927		-0.232		0.913	
Variance	3.1213		1.4611		4.5824	
% Var	0.520		0.244		0.764	
<b>Factor loads</b>						
<b>Variable</b>	<b>Factor1</b>			<b>Factor2</b>		
X1	0.227			<b>-0.356</b>		
X2	0.028			<b>-0.384</b>		
X3	0.235			<b>0.421</b>		
X4	0.214			<b>0.420</b>		
X5	<b>0.281</b>			-0.179		
X6	<b>0.297</b>			-0.159		

Source: Compiled by the authors

During the fifth stage, the number of factor groups for the spatial analysis model is determined. The obtained results of factor analysis of the complete set of variables indicate the possibility of the prospective formation of two groups of factors, which account for 52.0% and 24.4% of the explained variance, respectively (Table 2).

During the sixth stage, the parameters are distributed by factor groups, and the names of map axes for spatial analysis are formed.

The seventh stage conducts a spatial graphical interpretation of the development of municipalities according to the level of development of the consumer market relative to each other (Figure 1).



**Figure 1**

Graphical interpretation of the spatial analysis of the development of the consumer market of municipalities of the Republic of Karelia

C1			
1	Belomorsky Municipality	11	Olonetsky Municipality
2	Kalevalsky Municipality	12	Petrozavodsk City District
3	Kemsky Municipality	13	Pitkyarantsky Municipality
4	Kondopozhsky Municipality	14	Prionezhsky Municipality

5	Kostomuksha City District	15	Pryazhinsky Municipality
6	Lakhdenpokhsky Municipality	16	Pudoshsky Municipality
7	Loukhsky Municipality	17	Segezhsy Municipality
8	Medvezhyegorsky Municipality	18	Sortavalsky Municipality
9	Muesersky Municipality	19	Suoyarvsky Municipality
10	Municipality Max		

Source: Compiled by the authors

## Conclusion

The spatial analysis of the development of the consumer market of the municipalities of the Republic of Karelia proved the feasibility of the selected parameters. They affect the level of development of the urban agglomeration as a whole. As the results showed, factor analysis revealed the interaction of various groups of factors with the provision of the territory by trade and catering enterprises, the investment attractiveness of the market, and the prospects for employment within its segments. Factor analysis makes it possible to identify the main indicators in the development of the consumer market of the territory. To assess the level of its development in particular municipalities and conclude that it is necessary to make individual management decisions related to the increased level of support in any territories. It is worth noting that the advantage of this spatial analysis method is its simplicity and accessibility in use.

The practical significance of this analysis lies in the possibility of considering its results when making decisions by regional authorities regarding business support measures in relation to specific territories of municipalities, as well as in the comprehensive assessment and development of strategies for the socio-economic development of territories of municipalities. Annual monitoring will provide an opportunity to track dynamic changes in the position of municipalities on the spatial map.

The concept of forming an urban agglomeration provides for the construction of a competitive consumer market and ensures an improved quality of life on its territory, which should eventually lead to a positive demographic increase in the population of the urban agglomeration. Consequently, through the development of the agglomeration consumer market, the social and economic attractiveness of the territory will be formed for the population and small and medium-sized businesses in the region.

## References

- [1] Antonov, E. V., & Makhrova, A. G. (2019). Largest urban agglomerations and super-agglomerations in Russia. *Izvestiya Rossiiskoi akademii nauk. Seriya geograficheskaya*, 4, 31-45. DOI: 10.31857/S2587-55662019431-45
- [2] Bufetova, A. N. (2009). Uneven spatial development: Regional centers and regional periphery. *Region: Economics and Sociology*, 4, 55-68.
- [3] Demchenko, I. E. (2021). Level assessment of consumer market development of the economy of the Northwestern Federal District. *Territorial Development Issues*, 9(3). DOI: 10.15838/tdi.2021.3.58.5

- [4] Fang, C., & Yu, D. (2017). Urban agglomeration: An evolving concept of an emerging phenomenon. *Landscape and Urban Planning*, 162, 126-136. DOI: 10.1016/j.landurbplan.2017.02.014
- [5] Gaasland, I., Straume, H. M., & Vårdal, E. (2020). Agglomeration and trade performance – Evidence from the Norwegian salmon aquaculture industry. *Aquaculture Economics & Management*, 24(2), 181-193.
- [6] Galiakhmetov, R. A., & Kutuyashova, E. V. (2004). *Development of the regional consumer market*. Izhevsk, Russia: Izhevsk State Technical University named after M.T. Kalashnikov.
- [7] Grinchel, B. M., & Antonova, A. A. (2012). Measuring the dynamics of agglomeration processes in the regional economy. *Economic and Social Changes: Facts, Trends, Forecast*, 5(23), 79-90.
- [8] Gu, S., Ślusarczyk, B., Hajizada, S., Kovalyova, I., & Sakhbieva, A. (2021). Impact of the COVID-19 pandemic on online consumer purchasing behavior. *Journal of Theoretical and Applied Electronic Commerce Research*, 16(6), 2263-2281. DOI: 10.3390/jtaer16060125
- [9] Lappo, G. M., Polyanskiy, P. M., & Selivanova, T. I. (2007). Agglomerations of Russia in the XXI century. *Bulletin of the Irkutsk Region Regional Development Fund*, 1, 45-52.
- [10] Lavrinenko, P. A., Mikhailova, T. N., Romashina, A. A., & Chistyakov, P. A. (2019). Agglomeration effect as a tool of regional development. *Studies on Russian Economic Development*, 30, 268-274.
- [11] Rastvortseva, S. (2017). Agglomeration economics in regions: The case in the Russian industry. *Regional Science Inquiry*, 9(2), 45-54.
- [12] Rigby, D. L., & Brown, W. M. (2015). Who benefits from agglomeration? *Regional Studies*, 49(1), 28-43. DOI: 10.1080/00343404.2012.753141
- [13] Rosstat Regional Office of Republic of Karelia. (2022). *Official website*. Retrieved from <https://krl.gks.ru> (Accessed 10 June 2023)
- [14] Savelyeva, N. K., Sozinova, A. A., Makarova, T. V., Spengler, A. V., & Barmina, E. A. (2023). Normative and legal problems of regulating the agglomeration creation and activity at the regional level. *Economics, Entrepreneurship and Law*, 13(3), 733-746. DOI: 10.18334/epp.13.3.117394
- [15] Shmidt, A. V., Antonyuk, V. S., & Francini, A. (2016). Urban agglomerations in the regional development: theoretical, methodological and applied aspects. *R-Economy*, 2(3), 363-373. DOI: 10.15826/recon.2016.2.3.033
- [16] Shpengler, A. V., Smetanina, A. I., Kolesova, Yu. A., Barmina, E. A., Saveleva, N. K., & Sozinova, A. A. (2023). Developing the Volga Federal District urban agglomerations: A comparative analysis. *Journal of Creative Economy*, 17(3), 901-920. DOI: 10.18334/ce.17.3.117387
- [17] Trivedi, J., & Sama, R. (2020). The effect of influencer marketing on consumers' brand admiration and online purchase intentions: An emerging market perspective. *Journal of Internet Commerce*, 19(1), 103-124. DOI: 10.1080/15332861.2019.1700741
- [18] Voroshilova, N. V. (2021). Development of urban agglomerations in the European North of Russia. *Federalism*, 4(104), 54-74. DOI: 10.21686/2073-1051-2021-4-54-74
- [19] Zhukova, E. A., & Plotnikov, V. A. (2013). Consumer's market and its importance to the regional economy. *Scientific notes of the St. Petersburg University of Management Technologies and Economics*, 2(42), 7-14.
- [20] Zwanka, R. J., & Buff, C. (2021). COVID-19 generation: A conceptual framework of the consumer behavioral shifts to be caused by the COVID-19 pandemic. *Journal of International Consumer Marketing*, 33(1), 58-67. DOI: 10.1080/08961530.2020.1771646