

## EVALUATION OF COMPETITION FACTORS IN THE REGIONAL FOOD INDUSTRY MARKET

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### Abstract

The markets of food products in most countries have a distinct regional specificity. Traditionally, most of the consumed food products are produced by the enterprises of the region. The importance of forming a competitive environment in the food market is due to its decisive importance in improving the sustainability and quality of food supply, ensuring food security of the country and the region. The article proposes a method for assessing competition based on the behavioral interpretation of competition, which is implemented to assess the competitive factors in the Omsk regional food market. The evaluation of competition in the behavioral interpretation is determined by the evaluation of the perception of competition. The results of the questionnaire model implementation are obtained in the form of aggregated weighted estimates in the quantitative scale, reflecting the nature of the influence of supply and demand on the perception of competition by end-users; and also as a tree of clustering with the use of cluster analysis for allocation and grouping of factors of a competition in manufacturers perception.

**Key words:** competition factors, competition evaluation, regional food industry market

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### Introduction

Specificity of the regional markets of the food processing industry is such that it is advised to focus on the behavioral nature of competition to a greater extent than on the currently widespread structural and functional approaches to competition interpretation for making practical decisions. Therefore, if we take a functional approach as basis, the market system provides a natural mechanism for the functioning of enterprises, displacing outsiders from the market, which corresponds to the current situation in the food processing industry market of the Omsk region. This conclusion, among other things, is based on the lack of monopoly companies on the market that can distort its conditions. Analysis of the number of companies

in the region's food processing industry market and their dynamics, provision of state support to agricultural producers, the created infrastructure of state support, the presence of a city in the Omsk region indicates the presence of a sufficient number of market participants, which corresponds to the structural interpretation of the term "competition ". Thus, using these approaches, we fix the presence of competition on the market as it is formed, the competitive mechanism works, and the number of entities are sufficient, the market infrastructure operates in the Omsk region.

But in order to make decisions on the development of competition, the authorities need information about the specific perception of market conditions already formed by market participants, the assessment of the actions of infrastructure market organizations. The same information is required for companies to choose the methods of competition based on economic, managerial, marketing variables. To obtain data for decision-making for both companies and authorities allows the use of a behavioral approach to competition evaluation.

The purpose of this study is to implement a competitive evaluation method based on the behavioral interpretation of competition, and to assess the competition factors in the Omsk regional food processing industry market.

To implement these tasks, it is proposed to interpret the evaluation of competition through the model of competition perception by manufacturers and the model of consumers' perception of competition.

## **1 Theoretical bases of the research**

There are many models for assessing the competition factors in the markets. For example, often the analysis of factors is carried out based on the decomposition of the elements of M. Porter's model (Porter, 1989), which distinguishing the following groups (sources) of competition factors: rivalry among competing sellers in this market; competition from substitute goods; the potential threat of new competitors; economic opportunities (influence) of suppliers; economic opportunities (influence) of buyers. Another approach is to use methods of statistical analysis of market conditions. This approach is based not on modeling and analysis of the essence of market power, but on the evaluation of its consequences ("traces" (Weiss, 1979; Geroski, 2003): superprofits, inflated prices, changes in market structure, etc.). An alternative approach to the analysis of competition is the evaluation of the influence of market conditions on companies' behavior using dynamic game theory models. A number of studies are based on surveys of market participants (Borenstein & Shepard, 1993;

Dobson, 2001; Kokovikhin, 2018). Competitive assessments based on correlating the volumes of produced and consumed products and other approaches are also used.

The variety of approaches and models to the evaluation of competition is associated with the ambiguity of the interpretation of the very concept of "competition" (Bazhenov, 2017). Traditionally, the functional (Schumpeter, F.fon Hayek), behavioral (Smith, Marx) and structural (Ruby) approaches to this concept are considered. Their content is presented in Table 1.

**Tab. 1: Approaches to the interpretation of the concept of "competition" \***

Interpretation	Content	Ways of competing
Functional	Competition - a mechanism that provides opportunities to implement market's functions. The intensity of competition is manifested in the absence of companies' sustainable competitive advantages	Change management, strategic innovation
Behavioral	Competition - rivalry, providing the best results of activity on the market	Industrial-technological and marketing improvement
Structural	Presence on the market of a sufficient number of organizations-producers of buyers, infrastructure organizations. Characterized by the level and intensity of competition; composition of participants and their market shares	(Im-) possibility of influence on the price of individual market participants: the price is determined by the parameters of market equilibrium

\*The table was developed by the authors.

The state of competition is the subject of interest of various market participants: producers, consumers, the country, - because it largely predetermines their market / competitive behavior. However, if the final consumers are interested in the result of competition, manifested in a relative decrease in prices, widening the diversity and improving the quality of goods and services, producers and the state are interested in the way of competing, as well as the possibility of influencing the state and nature of competition. And this, in turn, actualizes interest in the evaluation of competition in the context of various interpretations. Because market actors pursue different, sometimes opposite, goals in the course of developing competition, they are interested in various aspects of competition. Consider them in Table 2.

**Tab. 2: Directions of use of competition assessments in the region by subjects\***

Consumers of Competition evaluation	The interpretation of the concept of "competition"		
	Functional	Behavioral	Structural
Region residents	-	Decision-making about purchasing on a "price / quality" parity	
Region Enterprises	Formation of innovative strategies and development strategies	Formation of competitive and marketing strategies	Formation of price strategies
Region authorities	Innovation support	Ensuring equal competition conditions	Antitrust regulations

\*The table was developed by the authors.

## 2 Methods of research

To measure the perception of competition by consumers in the regional food processing industry market, we use the base model previously proposed (Mamontov & Chernobaeva, 2017). The evaluation of competition perception is a linear combination of the influence of two groups of factors. These indicators, reflecting the impact on a generalized estimate of supply and demand, are in turn aggregated from elementary estimates of the components of these factors:

$$K = \alpha \cdot M + \beta \cdot C = \alpha \cdot \sum_{i=1}^3 \alpha_i \cdot M_i + \beta \cdot \sum_{j=1}^4 \beta_j \cdot C_j \quad (1)$$

Where K is the generalized assessment by consumers of the competition in the market;  $\alpha, \beta$  - weighting factors ( $\alpha + \beta = 1$ ) influence on the estimation of aggregated demand factors (C) and supply (M);

$M_i$  - estimations of components of influence of aggregated supply factors: M1 - an estimation of improvement of quality (expansion of properties) of the goods and services; M2 - evaluation of the expansion of choice; M3 - an estimation of perception of decrease in prices;  $\alpha_i$  are the corresponding weight coefficients.

$C_i$  - estimations of components of influence of the aggregated factors of demand: C1 - an estimation of invariance of the income of the consumer; C2 - assessment of consumer awareness; C3 - assessment of switching costs; C4 - assessment of change in demand

To measure the perception of competition by manufacturers, we use the factor analysis model (Soshnikova, Tamashevich, Uebe & Shefer, 1999), which allows us to reveal the latent characteristics of the phenomenon. They are established as a result of generalization of elementary features and act as integrated characteristics.

In our case, the elementary factors are those that influence the competition perceived by the producers. A list of these factors is given in the first column of the table (Table 3). Further, these factors, in accordance with the terminology adopted in the factor analysis, we will call elementary factors, initial signs or simply signs. The integrated characteristics, on the identification of which the factor analysis is directed, will later be called latent factors (identified factors) or simply factors.

To assess the perception of competition by consumers and producers in the regional market of food processing industry in Omsk, an online questionnaire was developed and posted on the multifunctional service Testograf.ru. The survey period is 09.2017 - 03.2018.

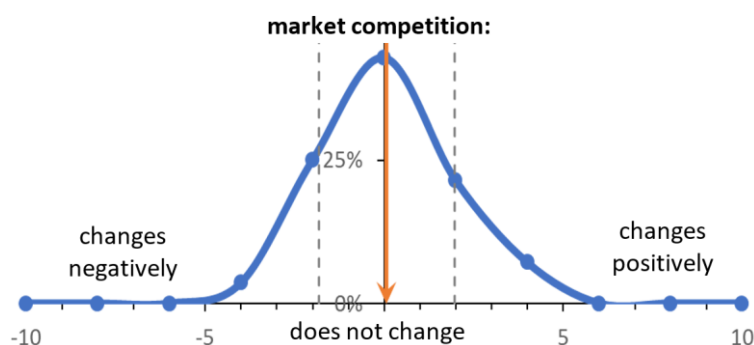
Questions in the questionnaire suggest to determine the degree of consent or disagreement of the respondent with the corresponding formulation of the measured variable. The degree of agreement was determined in a continuous scale. The weight of the measured variables is determined based on expert estimates.

To identify the characteristics of the perception of competition of representatives of various consumer groups and subgroups of producers, the questionnaire contains questions characterizing the respondent.

### 3 Results of the study

Figure 1 shows the distribution of the generalized assessment by consumers of the regional food processing industry market of the integral influence of competition factors. The vertical arrow, characterizing the average value of the distribution, indicates a value close to zero. Such a value of the generalized assessment of competition perception can be explained by two factors: a) the components of the factors of both demand (C) and supply (M) are such that, from the point of view of consumer perception, their influence on competition is insignificant; b) the influence of the components of the supply and demand factors mutually compensate each other.

**Fig. 1: Distribution of consumer generalized impact assessment of competition factors\***

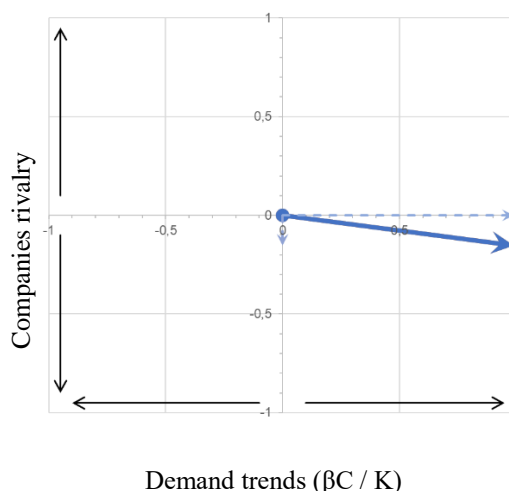


\*The figure was developed by the authors.

For the case of our market we are talking about the second situation. This is revealed by comparing the values of  $\beta_C / K$  and  $\alpha_M / K$  (Figure 2). Thus, from the point of view of end users, the influence of demand factors on the market is such that they perceive these factors as significantly improving competition. The perception of supply factors by the consumers, the competition of companies in the industry - how insignificantly worsen the competition.

Next are presented the results of an assessment of the perception of competition by producers of the regional food market, obtained by methods of factor and cluster analysis.

**Fig. 2: Weighted consumer appraisal \***



\* The figure was developed by the authors. The direction of the arrow in one of the quadrants of the matrix characterizes the influence of two factors (demand trends and the nature of companies rivalry) on the perception of the tendencies of competition development by end-users. The length of the arrow (maximum - one) characterizes the degree (level) of this influence.

**Tab. 3: Coefficients of the load of the identified factors (without rotation) \* and percentage of the explained variance (in %)\*\***

Initial signs	Two-factor variant of analysis		Three-factorial variant of analysis		
	Factor 1	Factor 2	Factor 1	Factor 2	Factor 3
(1) Downward price movements	-0,21	-0,23	0,31	0,06	-0,49
(2) Product-line expansion	<b>0,89</b>	-0,06	-0,67	0,58	0,06
(3) Quality improvement	-0,16	0,66	-0,27	-0,62	-0,12
(4) Reduction in expenditure	-0,33	0,13	0,19	-0,30	0,68
(5) Engineering and manufacturing innovations	0,08	0,13	-0,14	-0,05	0,52
(6) New products	0,60	0,47	<b>-0,76</b>	-0,01	-0,20
(7) Marketing innovations	0,12	<b>-0,80</b>	0,38	<b>0,71</b>	-0,20
(8) Segmentation	-0,13	<b>-0,85</b>	0,61	0,60	0,23
(9) New geographical markets	<b>0,76</b>	0,02	-0,62	0,45	0,39
(10) Exit from the market	<b>-0,77</b>	-0,41	<b>0,86</b>	-0,13	0,16
Percent of the explained variance	29	19	29	19	13

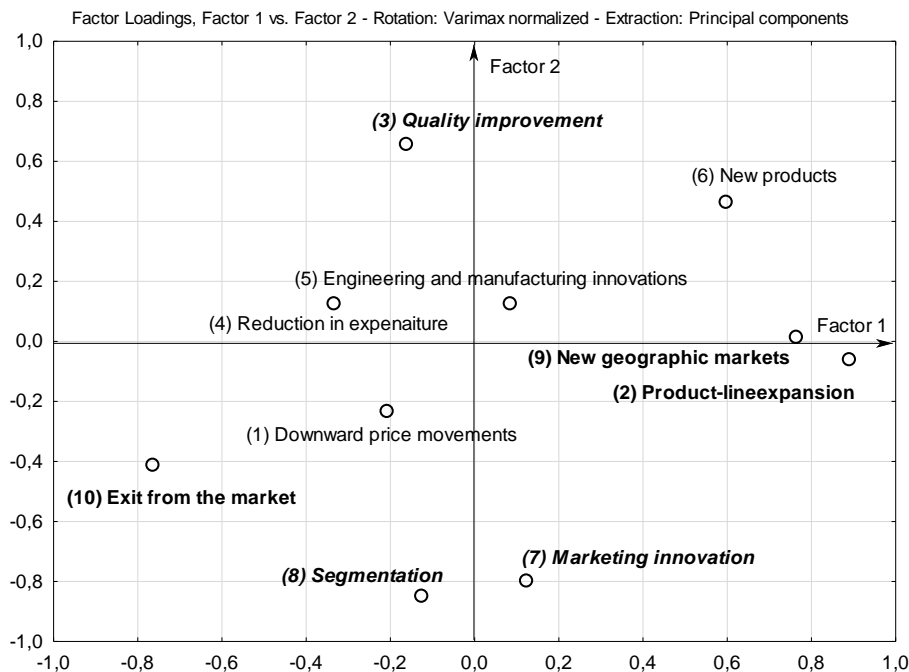
\* method of main components: italicized are values greater than 0.70 (Factor Loadings (Unrotated) - Extraction: Principal components - (Marked loadings are >, 700000))

\*\* The table was developed by the authors.

Proceeding from the values of loads of latent factors of the two-factor model (Table 3), it can be seen that Factor1, in fact, characterizes the company's willingness to compete by expansion / development (maximum positive values of loads of this factor – product-line expansion (0.89), orientation to new geographical markets (0.76) and the factor close to them

is a readiness for product innovations (0.6) .The positive values of these factors are in good agreement with the lowest absolute factor value of 0.77 (exit from the market) .Thus, the positive trend of the axis factor Factor 1 (Figure 3) can be interpreted as the orientation of the companies in the extensive expansion of the company's product offerings negative axis direction - a willingness to diversify and withdrawal from the market.

**Fig. 3: Initial characteristics in the space of identified factors\***



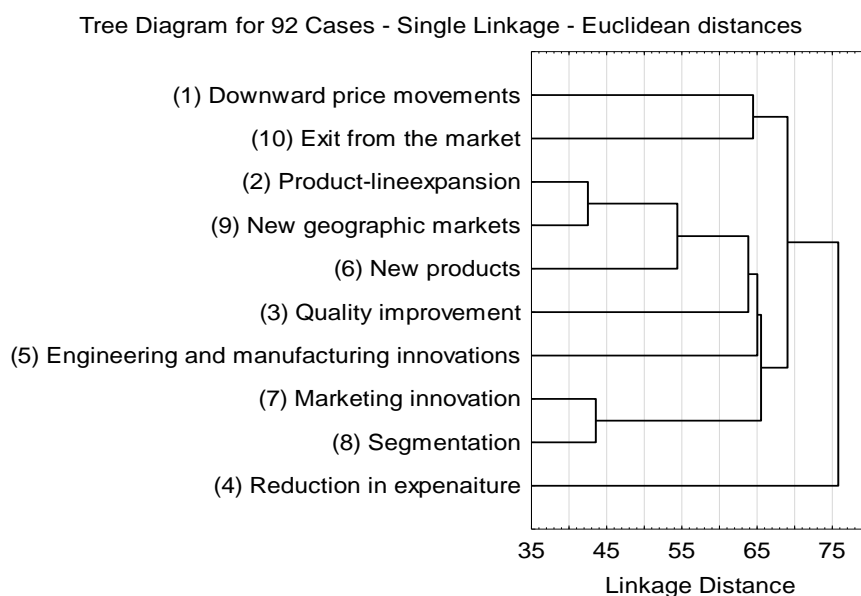
\*The figure was developed by the authors.

The Factor 2 factor axis can be interpreted as follows: positive direction - orientation to quality competitiveness. Note that the load of this attribute in the latent factor (0.66) is not very large, although it significantly exceeds the rest loads. The negative axis of this factor is a reflection of the marketing method of competing, including segmentation (-0.80 and -0.85, respectively).

Note that the model factors explain not more than half (48%) of the variance (Table 3), which indicates a significant variety of methods used by companies to compete.

The isolation of the third latent factor (Table 3) does not fundamentally change the structure of the factor loads of the first two factors (except for the direction of the axes, which is not important in this type of analysis) and allows us to identify a relatively weak factor - competing by reducing expenditure (load 0.68) with explained by this factor dispersion - 13% (Table 4).

**Fig. 4: Dendrogram of hierarchical classification of initial features\***



\*The figure was developed by the authors.

**Tab. 4: Methods of competition (average values of characteristics by age of enterprises)\***

Method of competition	For all groups	Age of enterprises		
		1 year or less	1-5 years	Over 5 years
(1) Downward price movement	0,2	-1,6	-0,1	1,1
(2) Product-line expansion	3,7	3,7	5,1	2,9
(3) Quality improvement	2,4	<b>-0,5</b>	<b>2,9</b>	<b>3,3</b>
(4) Reduction in expenditure	0,1	-0,5	1,2	-0,2
(5) Engineering and manufacturing innovations	1,2	1,4	1,5	1,0
(6) New products	2,7	-1,0	4,7	3,0
(7) Marketing innovations	2,9	3,6	3,9	2,0
(8) Segmentation	2,9	4,5	3,9	1,5
(9) New geographical markets	1,5	0,1	3,4	0,9
(10) Exit from the market	-2,3	1,0	-4,4	-2,4

\* The table was developed by the authors.

We should also note that price competition, as well as competition through engineering and manufacturing innovations, are not the priority ways of competition for the entire food processing industry as a whole.

The grouping of methods of competition is confirmed and more clearly portrayed as the result of a cluster analysis of the initial characteristics (4). From the resulting dendrogram it is clear that in the conditional scale of proximity (horizontal axis) the shortest distance (the closest proximity) has two groups of features: "product-line expansion" (2) and "new geographical markets" (9), as well as "marketing innovations" (7) and "segmentation" (8). The first group is also close to the sign of "new products"(6).



## Conclusion

The analysis allows us to distinguish two main ways of competing companies in the considered market: a) development of new geographical markets in combination with the expansion of the range and product-line in general; b) search and allocation of new target segments in conjunction with marketing improvement.

The results of both factor analysis and cluster analysis show that neither reduction in expenditure, nor engineering and manufacturing innovation, and in many ways quality improvement, are considered by companies as the main means of competition. At the same time, the company relies on exiting from the market, primarily with the need to reduce prices.

These results, in our opinion, indicate that, in terms of end users of food processing industry products, despite the favorable impact on the competition of demand factors, the influence of behavioral competition factors has a slight negative connotation (see Figure 3).

At the same time, comprehension of the need for competition by improving the quality of products grows with the age of the enterprise (table 5), which, in our opinion, indicates the long-term orientation of such companies, as well as their understanding of the deep needs of the end users.

As for the state, the main accents of market regulation are identified: a) quality control, especially of new enterprises, b) price control and their compliance with costs; c) support for engineering and manufacturing innovations.

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