Analysis of The Competition on The Service Sector Market in The Russian Federation: By the Example of Consulting Services

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Abstract: The analysis of the system of indicators measuring the efficiency of enterprises in the sector of consulting services provided in the article has allowed to define the factors that have the strongest influence on the market for consulting services, including economic, institutional, professional, and psychological factors. The interdependence of the price and a set of quality characteristics in the consulting market is shown in the article. The model built as a result of the study reveals that the guarantee of the comfort and performance characteristics of a consulting service is a significant part of its value, while a service provided without such guarantees can be times cheaper.

Index Terms: competitiveness, consulting, consulting services, management consulting, performance indicators of consulting enterprises, service sector.

I. INTRODUCTION

An important instrument for the study of the entity on the consulting services market is assessment of its competitiveness. A significant number of firms on the Russian services market hold unstable and weak market positions, teetering on the brink of survival during the period of economic destabilization and earning profits during the economic upswing due to the accelerated market growth pace.

II. METHODS

The following general scientific and special research methods were used in the study of a multilevel and multifactor environment, assessment of the competition nature, as well as in the forecast of the consulting services market development: method of scientific abstraction in the study of problems in analyzing the quality of consulting services; method of quantitative and qualitative analysis in the study of contradictions betweenthe goals and implications

of competition as a form of market relations organization; and

method of economic and mathematical modeling in the development of algorithms for the application of a system of indicators inthe study of the consulting services market. The model proposed in the article can be applied in the study of the competitive environment, assessment and forecasting of the competition development in the market. A mathematical method of generalizing the result – a geometric mean method – was used to build an integrated indicator for assessing the level of competition in the market. The methods of computer processing, analysis and display of information using Microsoft Excel and Statistica were also used in the analysis.

III. RESULTS

A consulting service is a unique product that takes the needs of each customerinto consideration anddepends on the knowledge, skills, and capabilities of the consultant. At the same time, there are no absolute substitute services on the consulting services market. Consultants have to study and analyze the situation, put forward hypotheses and suggest innovations, as well as convince their clients in the need for the suggested measures, and implement them. Consulting exists in all sectors of the economy: in the modern economy, consulting services are developed in the traditional financial [1] and industrial sectors of the economy, as well as in education [2, 3], agriculture [4], entertainment, social sectors [5] and others. It can be stated that consulting is actively developing in all areas and sectors of the modern Russian economy. The market boundaries are outlined by consulting services, which include consulting, recommendations, and practical assistance to business entities and state services with information exchange and public relations, development of accounting systems and programs, production costs, performance control procedures, advising and assisting private and public enterprises and services in planning, ensuring efficiency and control, providing management information, etc. Some indicators describing the market for consulting services are given in Table 1.

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Table 1: Calculation of cross elasticity

Indicators	Year		Absolute deviation	Relative deviation	Cross elasticity
	2015	2016			
Volume of demand for consulting services (Q(x)), bln rub.	126.0	132.3	6.3	5.0	-3.70
Average cost of audit services (P(y)), thous. rub.	879.1	867.3	-11.8	-1.35	

A. Analysis of the Interaction Among the Market Participants

There are the following barriers to entry into the consulting services market: capital investment, minor administrative barriers (there is a minor need for licenses and permits), and cost barriers, which are much higher for novice market participants. Overall, the entry into the Russian consulting services market is almost free, with some small restrictions. Calculation of the Herfindahl-Hirschman index (HHI), dispersion, and entropy [6] clearly indicates that the market has a low level of market concentration (Table 2). Slight dynamics of the index towards its growth does not influence the result but indicates a slight improvement in the market position for some business entities [7].

Table 2: Calculation of the Herfindahl-Hirschman index for the consulting services market of the Russian Federation

No.	Company	2014	2015	2016
1	Lanit	4.830	6.120	8.800
2	PwC	1.640	1.120	0.780
3	Croc	1.580	2.310	1.840
4	AT Consulting	1.350	0.190	0.110
5	Technoserv	1.150	0.720	0.540
6	KPMG	0.320	0.270	0.200
7	I-teco	0.320	0.340	0.280
8	Borlas group	0.300	0.250	0.170
9	IT	0.200	0.280	0.220
10	BDO Yunikon	0.190	0.280	0.230
11	Compulink	0.160	0.220	0.180
12	RSM Rus	0.120	0.110	0.090
13	2K	0.080	0.060	0.060
14	Intercom-audit	0.070	0.110	0.050
15	Development of	0.070	0.100	0.080
	Other	0.00090	0.00160	0.00160
	TOTAL	14.690	16.390	17.600

The calculation of the entropy index in the Russian market indicates that the level of competition in consulting slightly decreased in 2016 due to the strengthening of market positions and an increase in the share of market leaders. The range of logarithm variation for market shares can be applied to estimate the inequality by consulting organizations [8]. The greater the variation is, the higher the concentration of sellers of consulting services in the market is. The range of variation for shares increases during the period under study. This indicates an uneven distribution of the shares among the participants of the consulting market. Such dynamics of the indicator are due to the definition of leaders in the consulting services market in the Russian Federation. With due consideration for the results of the entropy calculation, it is noted that the increasing unevenness of distribution of market shares in the consulting services market had resulted in a slight decrease in competition in 2015, but the greatest negative impact on competition was observed in 2016. In other words, the competition on the market is tough, and the mutual dependence of market participants is either small or completely absent. It is obvious that no consulting firm has global advantages over others. The Herfindahl-Hirschman (HHI), Lerner (L), Gini (G), sales volume (IQ), Rosenbluth (IR), House (Hm), Hanna-Kay (HKI) indices, U-index, and a range of market share variation (σ) were used in the study. Let us calculate the aggregate indicator for assessing the competition development based on the above indicators [9]. It was taken into account that all the indicators under review were competition disincentives when the integrated indicator was calculated. An obvious advantage of the integrated indicator is that the influence of each individual index is reflected [10]. The analysis has revealed the following peculiarities of the consulting market in Russia: a service of each firm is not an absolute substitute for a service sold by other market participants; entry of firms into the consulting market is almost free, there are only minor restrictions; prospects for obtaining easy profits attract new participants with competing services to this market, reducing the profits of other market participants in the long term; there is no interdependence of firms in the market; each of the firms satisfies a relatively small share of the demand for a particular service; and no firms have decisive advantages over others. As such, the study has revealed that the Russian consulting market is a market with monopolistic competition [11].

B. Analysis of the Producers' Activity

The study of the consulting services market in Russia as a market for differentiated products based on the approach proposed by K. Lancaster is of great interest, where a product (service) is considered as a set of characteristics that allows to find how the selected factors influence the price (according to the Rosen model, this dependence is a result of interaction between supply and demand in the market, and thus describes the behavior of both sellers and consumers). The analysis of pricing and the degree of price influence on sales volumes is a must in the study of the competition development in the market, because it allows to determine to which extent sales volumes depend on the monopoly price. The authors believe that it is advisable to modify the models for the market under study with due consideration for the peculiarities of the consulting service. The "average cost of a consulting project" is taken as a resulting variable in the model that describes the relationship between a price and a set of characteristics.

The absence of multi collinearity among the factors chosen for the model was revealed during the analysis of the relationship between the variables of the models under study and their check for adequacy.It was also revealed that only three of the selected factors were significant: the average cost per unit of the consultant's work time (V), industry average output (LC),and staff qualification index (K_{slf}).It must be noted in the analysis of the regression results that the tabular value of the Student's criterion with the probability of p = 0.05 and degrees of freedom n-m-1 amounts to 2.3 [12], Table 3.

Table 3: Regression model results

	BETA	B	t	
Constant term		-7.56	-14.61	
V	1.24	0.001	4.82	2.30
LC	-1.10	-0.003	-4.79	
K_{slf}	0.69	4.62	2.81	

Following the comparison of the calculated t-statistics of the coefficients with the tabular value of the Student's criterion, it can be concluded that the following factors are statistically significant: the average cost per the work timeunit, industry average output, and the staff qualification index. As such, these three factors of the model are significant.Let us analyze the influence of each of the factors on the price. The elasticity factors (E) are calculated for each of the factors, based on the constructed model and using the following formula:

$$E = \alpha_i * \overline{x_i} / \overline{y},$$

where α_i isthe desired regression coefficients, $\overline{x_i}$ is the average value of the i-th characteristic of the product, and $\overline{y}$ is the average value of the resulting variable. The results of the calculations are provided in Table 4.

Table 4: Finding the influence of factors on the cost of a consulting project

α	lnPsr	Factors (average value)	Elasticity	
-7.65289				
0.000944		1,047	-0.1929	$lnP(V_{sr})$
-0.00026	-5.13	2,002.404	0.10284	$lnP(LC_{sr})$
4.851494		0.425833	-0.40308	$lnP(K\_slf_{sr})$

As can be seen from the table, a positive value is observed only for industry average output factor, while a negative elasticity value is observed for the other factors. A study of the model reflecting the relationship between the set of characteristics and the price of a consulting project using the least squares method indicated a close relationship between the dependent and independent variables ($R^2 = 0.98$) at a low mean square error (S = 0.12). This confirms that the selected factors adequately describe the pricing process in the market.

Using the appropriate calculations, it was found that the model met the Gauss-Markov terms and therefore could be used in practice as follows:

$$lnP = -7.56 + 0.0013V - 0.0003LC + 4.626K_{slf} + U_1.$$

Following the analysis of the ratio of price and sales volumes in the Russian consulting services market, let us estimate the model reflecting the interaction of sales volumes in the market and prices adjusted for quality.Suppose that the market is in equilibrium: then the model under study is as follows:

$$Q = \gamma_0 P_{t-1}{}^\gamma U_2,$$

where Q is the sales volumes in the consulting services market,U_2 is the error of the model, P_{t-1} is theprice for consulting project in t-1 period, and$\gamma_i$is the desired model coefficients.

Let us analyze the impact of prices on sales volumes of consulting services on the market adjusted by quality. Let us check the prerequisites for building a model in accordance with the Gauss-Markov theorem [13]

Table 5: Estimation results of the series remainder in the model under study

Years	Nat. logarithm of consulting services sales volume (lnQ)	$|U_2\_av|$ (average value of the series remainder in the model)	Number of turning points(left part of the inequality)	Resulting expression in the right part of the inequality
2007	7.688696			
2008	7.836574			
2009	8.004987			
2010	8.025001			
2011	8.179821	$7.8*10^{-8}$	5	4
2012	8.240476			
2013	8.986912			
2014	9.041036			
2015	9.223357			
2016	9.433208			

Analysis of the regression remainders is shown in Table 5, where the average value of the series remainder is $|U_{2_{av}}| = 7.8*10^{-8} = 7.8$, resulting in a zero expectation. The number of turning points exceeds the integer part of the expression in the right part of the inequality, so the series remainder has the randomness property. The results of building a regression model between the squares of the model remainders and the squares of the values of the independent explanatory variables in accordance with the White test [14] revealed that the calculated value of the Fisher criterion (F) was 4.34, while the table value $F_{0.05;2-1;13-2}$ was 4.84. As such, the tabular value of the Fisher criterion exceeds the calculated value, which means that there is no heteroscedasticity in the model under study. The absence of remainders in the autocorrelation model was established using the Durbin-Watson test [15].

As such, the model under study is as follows:

$$lnQ = 14.31 + 1.28lnP_{(t-1)} + 0.17U_{3(t-1)} + \mu.$$

The result of the study indicates that the pricing processes inthe Russian consulting services market can be described using the following model system:

$$\begin{cases} lnP = -7.56 + 0.0013V - 0.0003LC + 4.626K_{slf} + U_1; \\ lnQ = 14.31 + 1.28lnP_{(t-1)} + 0.17lnU_{3(t-1)} + \mu. \end{cases}$$

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C. Study of the Market Environment Shaping Factors

The next step is to identify factors that are decisive for the market environment shaping and development. The competition development in the consulting services market has been studied over the past decade. The following factors that mainly influence the development of competition can be defined: the volume of consulting services sold, total population, total employment,number of employedinthe consulting services sector, number of university graduates, amount of scientific research, volume of investment in the consulting services market, GDP,public income level, inflation rate, number of sellers in the market, etc.These studies revealed that some variables were multicollinear (linearly dependent), which means that they should be excluded from the system. Results of the analysis of the influence of these factors on competition performance are provided in Table 6.

Table 6: Key results of the evaluation of the models under study

Indicator	S	m^2	Independent variables excluded from the equation due to their insignificance	Most influential independent variables
HHI	0.42	0.96	B, J, W	Q, A, N, I, In
G	0.004	0.95	Q, J, W, I	A, B, N, In
IQ	0.36	0.96	Q, J	A, B, N, I, W, In
L	0.003	0.96	A, In	Q, B, J, N, I, W
σ	0.06	0.94	Q, J, I, W	A, B, N, In
mm^2	36	0.83	A, In, N	Q, B, J, I, W

Table 6 describes the results of the models' check for adequacy. The population size influences the market competition significantly. For example, when this factor grows by just 1 %, the Herfindahl-Hirschman index decreases by 27 %, the Gini index decreases by 21 %, and the dispersion index decreases by 66 % – in other words, the positive demographic dynamics promote competition development in the market. Based on this analysis, the amount of scientific research describes the Herfindahl-Hirschman index (this factor covers about 10 % of the information about the object of study), the index of change in output (29.2 %), and the Lerner index (about 2 %), whereas the growth of this factor leads to a slight decrease in the competition in the industry (when this factor grows by 1 %, the Herfindahl-Hirschman index increases by 2 %, respectively).Having analyzed the production volumes in the consulting services market and having reviewed the key indicators of competition in the market and relations among them, the authors believe that it is advisable to explore the relationship between the level of competition in the market and the volume of consulting services. The authors consider appropriate to use the classical Cobb-Douglas production function to do so [16]. The Herfindahl-Hirschman index, particle dispersion, Lerner index, and Gini index [17] are analyzed as indicators describing the level of the competition development in the study of the production function. The results of the correlation regression analysis of these dependences are provided in Table 6.This study revealed that the relationship between the resulting variable and the indicators was best described by the following function: $y = e^{ax}$. The data provided in Table 7 indicate the presence of indirect influence from the first three factors and the existence of a relationship between the dependent variable and the particle dispersion, which is very close to linear. The dispersion index and the Gini index are the most informative, while the Lerner index is the least useful in terms of assessing the impact of competition on production volumes in the consulting services market. As such, it can be concluded that the degree of relationship among all indicators in terms of production is above average.

Table 7: Comparison of the competition assessment results (based on indices) in the market for consulting services for production volumes

Indicator	R^2	S	Information value of the indicator	Probability of econometric problems (computed using ModelExpert software)
HHI	0.55	0.88	0.89	-----
L	0.54	0.94	0.69	0.01 %
G	0.71	0.81	16.9	-----
σ	0.84	0.61	29.8	-----

In order to take each of the selected indices into consideration in the study of the production function in the consulting services market, they are reduced to a single indicator. An aggregate indicator (ACI) for assessing the competition development in the market is used to do so. As such, use of the methods of econometric modeling described above has allowed to obtain the following model describing the influence of competition on production processes in the Russian consulting services market:

$lnQ^3 = 1936 + 0.62N + 0.13ACI + 077lnB^{\frac{1}{3}} - 0.32lnIn^{\frac{1}{3}} + U_{12}$,

where$U_{12}$is the model remainders. Check of the model for adequacy yielded the following results: a mean square error of the model was S = 46.49, and the coefficient of determination was 0.98. This indicates a close relationship between the variables under study and the presence of a significant influence of the factors on the resulting indicator. The proper selection of the model factors is confirmed by the absence of heteroscedasticity and first order autocorrelation, as well as by zero probability of econometric problems. The resulting dependence suggests that the aggregated concentration index provides about 30 % of information on production in consulting services, and when competition increases by 1 %, the value of the resulting variable increases by 19.1 %, which actually proves the hypothesis of the positive influence of competition on production in the consulting services in the Russian Federation.

IV. DISCUSSION

The role of consulting services among other services is assessed differently: they are assigned both to business professional services and information services. It is clear that the consulting product is a consulting service. K.K. Arabyan defines the consulting service as an intellectual product that remains with the clientafter the consultation completion [18].

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E.N. Bragina[19] lists a limited number of consumers among the features of consulting services (consulting services are usually used by the leading companies), along with geographical concentration of clients and consultants, active consumption of consulting services by state enterprises,a significant role of the brand and reputation of the consulting company, duration of the consulting service, lack of seasonal pattern of business activity, importance of confidentiality, high mobility of services, etc.The functions of consulting services are also important to understand. They include transformational, marketing, promotional, ethical, environmental, and other functions. M.V. Andriyanova develops consulting functions for providing consulting resources to economic entities and adds her own functions related to obtaining and storing information, transferring it through the marketfor consulting services, ensuring savings in transaction costs of consulting services market participants, and prescribed functions – in particular, optimization of business processes and improvement of their efficiency, introduction of innovations, and adjustment of the economic entities'behavior for the rational use of resources [20].The authors believe that indicators of the consulting services market attractiveness can be the following: market growth rates, price growth rates, state of competition, market entry barriers, legal restrictions, market segmentation, andincrease in the number of consulting companies [21].

V.CONCLUSION

The above analysis of the system of performance indicators for consulting enterprises allowed to define the factors that had the strongest influence on the market for consulting services, including economic, institutional, professional, and psychological factors.The model of competitive environment in the consulting industry developed during the study is based on three approaches to understanding competition. The developed algorithm for analyzing the market competitiveness based on the abovemodel includes an economic assessment of the activity environment using the aggregate index of competition development (ACI) and methods of regression analysis in three dimensions: analysis of sales volumes, analysis of pricing processes in the differentiated product market, and analysis of indicators of the competition development.The model built as a result of the study reveals that the guarantee of the comfort and performance characteristics of a consulting service is a significant part of its value, while a service provided without such guarantees can be times cheaper. The analysis also reveals that the nonprice competition in the consulting services market prevails over the price competition.The competition index has been developed, which, according to the developed model, is determined by the following factors: volume of production of consulting services, number of employed in the consulting services sector, and investment in fixed assets and GDP per person. All the above factors are inversely related to the resulting indicator. Small firms still have decisive influence on the development of competition and market processes in the consulting services market.

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