Municipal procurement in Ulyanovsk region: participation of small enterprises

Contratación Municipal en la región de Ulyanovsk: Participación de pequeñas empresas

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Received: 04/02/2019 • Approved: 23/06/2019 • Published 15/07/2019

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ABSTRACT:
The article gives the analysis of the level of participation of small enterprises and individual entrepreneurs in the contracts for municipalities of Ulyanovsk region. It gives the methodical approach and develops the functions of density of normal distribution characterizing six basic indicators of work for municipal purposes. The findings of this study and the tools used for assessing the extent of participation by small enterprises in procurement can be used when researching entrepreneurship, as well as to justify the contract system development programs.

Keywords: Municipal procurement; small enterprises; normal distribution function, contract system.

RESUMEN:
El artículo analiza el nivel de participación de las pequeñas empresas y los empresarios individuales en los contratos para los municipios de la región de Ulyanovsk. Da el enfoque metódico y desarrolla las funciones de densidad de distribución normal caracterizando seis indicadores básicos de trabajo para fines municipales. Los hallazgos de este estudio y las herramientas utilizadas para evaluar el grado de participación de las pequeñas empresas en las adquisiciones se pueden utilizar para investigar el espíritu empresarial, así como para justificar los programas de desarrollo de sistemas contractuales.

Palabras clave: Compras municipales; pequeñas empresas; función de distribución normal, sistema de contratación.

1. Introduction
One of the main ways to increase the efficiency of the Russian economy is development of small entrepreneurship. The urgency of this problem is preconditioned by the fact that the opportunities of further development of the raw material economy and related industries are almost exhausted at the present stage.

In recent years, facilitating the access of small businesses to municipal procurement
markets has been one of the important areas of competition development in the Russian economy. Municipal procurement is a strategic function of economic management because of the huge volume of resources consumed, as well as the important political objectives such purchases seek to achieve. One of the objectives of "Development strategy for small and medium sized enterprises in the Russian Federation for the period up to 2030" (Strategy of SME, 2016) is boosting the volume of goods, works and services purchased from small enterprises.

Small enterprises (SE) in Russia include both legal entities and self-employed entrepreneurs. The current criteria for classifying economic entities as small enterprises were established in Federal law No. 209-FZ dated 24.07.07 (Federal law, 2007). The main criterion is the number of employees, which for a small enterprise should not exceed one hundred people. The additional criteria are how much of an enterprise is owned by federal and municipal governments (maximum stake - 25%), as well as revenue from the sale of goods (works, services) and the carrying value of its assets. The maximum values of the last two criteria are set by the government and are adjusted annually if needed.

Municipal procurement is an essential element in supporting small businesses in Russia. How small enterprises were to participate in procurement regulated by Federal Law of April 5, 2013 № 44-FL «About the contract system in the sphere of procurement of goods, work and services for state and municipal needs» coming into force from January 1, 2014. In accordance with this law, Russia has established a contract system for the procurement of goods, works and services for state needs. The main issues addressed by the contract system is the development of competition, the saving of costs and the elimination of corruption. In addition, the contract system serves as an essential element of support for small businesses (Gonzalez and Antunez, 2016). For this purpose, it provides a set of procedures aimed at ensuring the participation of small enterprises in procurement and implementation of contracts for the supply of goods, works and services for the municipal needs.

Currently, in Russia there are over 5 million small enterprises, employing 15 million people (21% of the total number of jobs in the country). Small enterprises account for 17% of Russia's GDP. For comparison with other countries, it can be noted that the small business sector creates 45% of jobs and generates 33% of GDP in developing countries, and 62% and almost 64% in developed countries, respectively (International, 2010; European Commission SMEs access to public markets, 2016). These data show that small enterprises in Russia have not yet taken a worthy place in the economy, although they have the necessary potential.

An important direction of entrepreneurship systematic support at the regional and municipal levels is ensuring of their participation in contact system.

Experience gained in Russia and economically developed foreign countries today has shown the importance of the development of municipal contracts, as an effective tool of macroeconomic regulation and support of entrepreneurial activity. Municipal bodies or institutions are acting as customers on behalf of the municipality and authorized to make budgetary commitments. Municipal procurement should provide the necessary volume of purchases of high quality, orderly and prudent expenditure of budgetary funds, effectiveness of integration of different forms of enterprises and organizations for the implementation of contracts, publicity and transparency of procurement, stimulating the development of competition, reduction of corruption.

The aim of this research was to develop methods and to analyze regularities characterizing the achieved level of participation of SE in the municipal procurement.

1.1. Literature review

The issues related to the participation of small business in the procurement operations carried out by municipal institutions in different countries are given a lot of attention in various researches. The most interesting among such studies are as follows.

The research (Handler, 2015) is devoted to the study of procurement framework
development in the European Union. It is noted that apart from solving economic problems, in the course of such purchases one also pursues social, environmental and innovative goals. The article (Preuss, 2011) analyzes the participation of small enterprises in procurement in the UK. The author makes a conclusion that in industrialized countries the procurement accounts for a significant part of GDP. Therefore, for the development of small businesses in the regions it is extremely important to use this potential. The article (Thomassen et al., 2016) studies the access of small enterprises to procurement markets in the European Union, as the main element of an economy. Attention is drawn to two patterns: the average cost of contracts was going down and, furthermore, between the countries there was a significant difference in this regard.

In several studies out that subsidies, quotas and other special conditions for procurement are set for small enterprises based on the assumption that such enterprises are a relatively weaker category of participants in procurement contracts (Is open competition, 2017). The same issue is addressed in another paper (Technical Report, 2017). It deals with the preferential procurement policies for small enterprises. The article justifies the need for such preferences due to information, financial, regulatory and personnel barriers that arise in many countries in the procurement process, starting from the preparation phase and finishing with decision making and conflict resolution. The existence of barriers to the participation of small enterprises in public procurement in Nigeria is also discussed in the article (Akenroye and Aju, 2013). It proves that the main obstacles are the lack of clarity of information, the inability to prepare bidding documentation and the lack of knowledge about the necessary procedures.

The article (Kidalov and Snider, 2011) draws attention to the social aspects associated with the participation by small enterprises in the procurement operations of institutions in the United States and Europe, as well as to the importance of political support for ensuring the presence of such enterprises in public sector markets. The monograph (Bovis, 2007) shows that the success of small businesses in the bidding process increases with the division of a tender into smaller lots (i.e. increasing the number of lots), and, conversely, decreases with an increase in the size of lots. The article (Ortuzar et al., 2017) examines the experience of the largest electronic market in Chile, which, according to the authors, provides a transparent, universal, accessible and effective system of procurement for companies of all sizes, especially for micro and small enterprises.

The Russian studies focused on legal and organizational aspects of procurement (Galanov et al., 2010; Kichik, 2012; Mitkovskaya, 2014; Rakhmanova, 2018). Thus, in Russia, likewise in other countries, small businesses play a significant role in procurement. However, it is safe to say that there is a lack of empirical scientific works associated with the assessment of a role played by Russian small business in the implementation of such contracts. This makes our studies relevant, and their findings are dealt with herein.

2. Methodology

This article focuses on an analysis conducted with regard to the current level of participation by small enterprises in municipal procurement contracts. This analysis is essential, since it allows to justify the ways of further development of the procurement activities carried out by small enterprises and to monitor such operations, as well as to decide what changes are to be made in the contract system and in the organization of its functioning. The research was based on measuring the activities in the sphere of municipal purchases of totality of small enterprises in municipalities of Ulyanovsk region. The necessity of such approach is due to considerable differentiation of values of the indicators in different municipalities of region. The introduction of the contract system was carried out especially actively in recent years. This process was largely uneven. The level of participation of small entrepreneurial structures in municipal procurement system is determined by many of both objective and subjective factors. All this led to significant differentiation of indicators reflecting volumes of products, work and services by municipal purchases.

Certainly, the needs for municipal procurement are objective and reflect the situation in a particular municipality and its needs for certain goods, products and services. However, the
contracts to be concluded are subject both to legally established procedures and participation by enterprises in the preparation of bidding documentation, as well as the prices charged for the supply of goods, products and services specified in such documentation. As a rule, the placement of public orders is carried out through bidding in the form of tenders and auctions (including in electronic form), as well as by requesting quotations and proposals.

Small enterprises are known to be independent economic entities that carry out risky activities and decide on their own as to whether they need to participate in the performance of certain works, including those related to procurement. In these cases, after receiving information about such purchases, the head of a SE is to establish:

- whether the participation in procurement is of any interest to him or her;
- how he or she is satisfied with the starting (maximum) price of a contract;
- whether it makes sense to participate in the procurement, based on the submitted terms of reference and other documentation;
- what price is to be quoted in the bidding documentation to decide to participate in the procurement process.

The price reduction leads to a decrease in the expected profit, i.e. a decrease in the interest of small enterprises in the conclusion of a relevant contract.

The decision on whether a particular enterprise should participate in procurement is made taking into account the following criteria:

- availability of specialists and technologies to ensure timely and quality provision of works (goods, services);
- expected profit;
- additional financial resources required;
- experience with similar contracts;
- intensity of other works;
- expected schedule of the contract if concluded.

However, one desire for concluding contracts is not enough, because in the process of procurement an important role is played by the selection of those bidders who have offered the most favorable conditions for municipal authorities. It is obvious that at the tender stage only a part of small enterprises that have submitted bids are subsequently awarded with contracts. It should be taken into account that small enterprises compete with each other and with enterprises of other forms.

The organization of bidding in the form of tenders and auctions and the selection of their winners prevent these processes from being a foregone conclusion. The purpose of procurement based on the methodology adopted in Russia's rule - out the possibility of appointing suppliers in advance, i.e. not to allow the winners to be known before the end of the auction. As mentioned above, the purpose of procurement is to promote competition, ensure cost saving and avoid corruption. Thus, the list of suppliers may be made only after the tenders winners have been determined and the contracts for executing orders have been concluded. These arguments suggest that the processes of bidding are probabilistic and their specifications are set under the influence of various random factors. Economic and mathematical modeling was used to describe the current differentiation in the level of participation by small enterprises in the implementation of contracts. The probability density functions of a normal distribution were used as models. As shown by earlier studies, these functions are good at describing the relative performance of small business populations in Russian regions (Pinkovetskaya, 2015).

The main advantage of normal distribution density functions is that with their help it is possible to obtain unbiased estimates which characterize both average values of the performance of small enterprises and the intervals of change of indicators typical for municipalities. The comparability of indicators for different municipalities was ensured by the fact that the studies were based on relative indicators.
Author's algorithm of analysis of the regularities characterizing the achieved level of participation of SE in contracts for municipal purchases included the following steps:
- creation of information basis describing the number and cost of contracts for each municipality that were awarded to subjects of small entrepreneurship for municipal purposes;
- determination of the specific weight of the quantity and cost of contracts awarded to subjects of small entrepreneurship in the total number and cost of all contracts for each of the municipalities;
- determination of the quantity and cost of contracts awarded to subjects of small entrepreneurship for municipal needs per one SE in each of the municipalities;
- determination of average cost of a contract with subjects small entrepreneurship for municipal purposes in each of the municipalities;
- determination of the share of requests for which contracts with SE were signed in the total number of requests filed by subjects of small entrepreneurship;
- construction of density functions of the normal distribution, for all considered indicators;
- evaluation of the quality of functions constructed according to accepted criteria;
- analysis of the models and the definition of regularities that characterize participation of subjects of small entrepreneurship in municipal contracts;
- formation of proposals for the development of the contract system.

In development of models as information sets characterizing contracts with SE for municipal needs were used. Statistical materials for 21 municipality of the Ulyanovsk region were considered. We used the data for each of the municipalities for two years (2015 and 2016). The rationale of this approach is due to the following: at the beginning of the twenty first century the simultaneous consideration of temporal and spatial data has received wide development. Spatial data for number of years were called panel data. Panel data analysis methodology is given in the works (Baltagi, 2005; Baum, 2006). Since the panel data combine information about spatial characteristics of the considered objects and the dynamics of their changes for some time the developed models offer greater flexibility and thoroughness.

As the experience shows, a methodology based on the use of panel data, provides a number of significant advantages over construction of the similar models for one particular period (year):
- in the process of modeling a much larger number of observations is regarded;
- increased efficiency of the estimates is provided;
- shortcomings for both the spatial and temporal models are excluded.

Arrays of information for 2015 and 2016 located on the site of the Territorial Department of the Federal State Statistics Service of the Ulyanovsk region (Territorial, 2017) were used in developing of the models.

Table 1 shows a fragment of the initial data (for 6 municipalities of the region), characterizing the contracts concluded with SE for municipal needs.

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Number of contracts with SE, units</th>
<th>The cost of contracts with SE, million rubles</th>
<th>Number of applications filed by SE, units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bazarnosyzgansky municipal district</td>
<td>28</td>
<td>3019</td>
<td>60</td>
</tr>
<tr>
<td>Baryshsky municipal district</td>
<td>21</td>
<td>1892</td>
<td>61</td>
</tr>
</tbody>
</table>
3. Results
During the research we developed six functions of the normal distribution, reflecting existing in 2015-2016 regularities of SE participation in the procurement system for municipal needs in the regions of the country. Corresponding functions are given below.

<table>
<thead>
<tr>
<th>Municipal District</th>
<th>Value 1</th>
<th>Value 2</th>
<th>Value 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veshkaymsky municipal district</td>
<td>38</td>
<td>3319</td>
<td>75</td>
</tr>
<tr>
<td>Inzensky municipal district</td>
<td>12</td>
<td>2243</td>
<td>33</td>
</tr>
<tr>
<td>Karsunsky municipal district</td>
<td>89</td>
<td>7757</td>
<td>207</td>
</tr>
<tr>
<td>Kuzovatovsky municipal district</td>
<td>23</td>
<td>2671</td>
<td>51</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
The developed models allow to estimate for the municipalities averages values of the considered indicators and ranges of changing of these indicators that are typical for the majority municipalities of the Ulyanovsk region.

Logical and statistical analysis showed that all developed models well approximate the initial data on the whole range of their changes. Table 2 shows calculated values of the main statistics on three tests. A comparison conducted in respect of the calculated values

\[ y_1(x_1) = \frac{24}{0.98 \cdot \sqrt{2\pi}} \cdot e^{\frac{-(x_1 - 1.2)^2}{2 \cdot 0.96}} \]  

(1)

The second function shows the distribution of specific weight of the cost of contracts awarded to subjects of small entrepreneurship in the total cost of contracts awarded as the results of tender (lots) and requests of quotations \((x_2, \%)\)

\[ y_2(x_2) = \frac{73.33}{2.30 \cdot \sqrt{2\pi}} \cdot e^{\frac{-(x_2 - 3.67)^2}{2 \cdot 5.29}} \]  

(2)

The third function describes the distribution of the share of requests for which contracts were awarded with SE in the total number filed by subjects of small entrepreneurship requests \((x_3, \%)\).

\[ y_3(x_3) = \frac{285.71}{8.88 \cdot \sqrt{2\pi}} \cdot e^{\frac{-(x_3 - 44.42)^2}{2 \cdot 78.85}} \]  

(3)

The fourth function describes the distribution of the number of contracts initialed per one small enterprises located in the respective municipality \((x_4)\).

\[ y_4(x_4) = \frac{1}{0.05 \cdot \sqrt{2\pi}} \cdot e^{\frac{-(x_4 - 0.09)^2}{2 \cdot 0.0025}} \]  

(4)

The fifth function describes average cost of one contract with small enterprises for the needs of municipal governments \((x_5, \text{thousands rubles})\)

\[ y_5(x_5) = \frac{1900}{61.75 \cdot \sqrt{2\pi}} \cdot e^{\frac{-(x_5 - 132.89)^2}{2 \cdot 3.81 \cdot 10^3}} \]  

(5)

Sixth function reflects the cost of contracts awarded per one small enterprises, located in the municipality \((x_6, \text{thousands rubles})\)

\[ y_6(x_6) = \frac{100}{3.91 \cdot \sqrt{2\pi}} \cdot e^{\frac{-(x_6 - 8.87)^2}{2 \cdot 15.29}} \]  

(6)

The developed models allow to estimate for the municipalities averages values of the considered indicators and ranges of changing of these indicators that are typical for the majority municipalities of the Ulyanovsk region.

Logical and statistical analysis showed that all developed models well approximate the initial data on the whole range of their changes. Table 2 shows calculated values of the main statistics on three tests. A comparison conducted in respect of the calculated values
suggests that the statistics on Pearson test are less than the table value of 9.49. Similarly, the calculated values for Kolmogorov-Smirnov test are lower than the table value of 0.152 with the significance level of 0.05. The statistics on Shapiro-Wilk test exceed its table value of 0.93 with a high level of significance of 0.01. Thus, for all these tests the developed models (1-6) are of high quality and can be used to describe the patterns under review.

### Table 2
The calculated values of statistics on quality tests

<table>
<thead>
<tr>
<th>Number of functions</th>
<th>Kolmogorov-Smirnov</th>
<th>Pearson</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>0.06</td>
<td>0.77</td>
<td>0.97</td>
</tr>
<tr>
<td>(2)</td>
<td>0.08</td>
<td>1.04</td>
<td>0.96</td>
</tr>
<tr>
<td>(3)</td>
<td>0.07</td>
<td>0.43</td>
<td>0.94</td>
</tr>
<tr>
<td>(4)</td>
<td>0.09</td>
<td>0.64</td>
<td>0.93</td>
</tr>
<tr>
<td>(5)</td>
<td>0.08</td>
<td>2.08</td>
<td>0.95</td>
</tr>
<tr>
<td>(6)</td>
<td>0.04</td>
<td>0.72</td>
<td>0.98</td>
</tr>
</tbody>
</table>

All the developed functions are good at approximating the input data and are of high quality according to the accepted standards. Therefore, it may be concluded that it makes sense to use the normal distribution density functions in order to describe the patterns and analyze all the indicators considered herein.

### 3.1. Discussion

The developed models (1)-(6) allow us to establish a number of important regularities that reflect the level of SE participation in the municipality contracts in the Ulyanovsk region.

A peculiarity of density function of the normal distribution is that thereon average values and ranges of the considered indicators for the majority (68%) of the municipality can be determined without complex calculations. These intervals are calculated on the basis of values of standard deviations of indicators. In this case, for calculating the bounds of the interval to the average value of index the said deviation is respectively added and subtracted.

Average values and ranges of values of the number and value of contract per one small enterprise, specific weight of the number and cost of contract in the total number and total cost of contracts awarded as the results of tender (lots) and requests for quotations, and the average cost of one contract signed with subjects of small entrepreneurship by municipalities according to data for 2015-2016 are presented in Table 3. They are based on developed models (1)-(6).

### Table 3
Characteristics of the contracts signed with the SE for municipal needs

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Average values</th>
<th>Intervals of variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of contracts per 1 SE, units</td>
<td>0.09</td>
<td>0.04 – 0.13</td>
</tr>
<tr>
<td>Specific weight of contracts with the SE in the total number of</td>
<td>1.82</td>
<td>0.84 – 2.80</td>
</tr>
</tbody>
</table>
The data in table 3 show that an average of 9% of all the subjects of small entrepreneurship participate in the contract purchasing system for municipal purposes i.e., the level of participation of SE in these purchases is significant. In most municipalities, the indicator ranges from 4% to 13% SE, which indicates a high level of its differentiation. However, in the total number of contracts, the specific weight of contracts awarded to the SE is quite impressive. Almost 18% contracts performed by small enterprises. Differentiation of this indicator for municipalities is relatively small and does not exceed one third of the value of the indicator.

The amount of municipal procurement per one small enterprises functioning in municipalities is very insignificant. For most municipality, this indicator is in the range from 5 to 13 thousand rubles per year. Both the average price of contracts with small enterprises and their number have a significant differentiation by municipality in the Ulyanovsk region. This situation is typical not only for Ulyanovsk region. As a case in point we may mention Italy (Albano, 2015), where the tendency of firms to participate in procurement to some extent depends on their geographical location.

Specific weight of contracts with the SE in the total number of contracts is small and amounts to 1.8%.

The specific weight of the cost of contracts with the SE in the total cost of contracts is considerably (3 times) more than specific weight of the number of contracts. It speaks about a large difference in the cost of the contracts with the SE and contracts with other enterprises and organizations.

Average cost of one signed contract is 133 thousand rubles. We note that the volume of production of goods (services) per one worker of SE amounted to an average of 2 million rubles per year, that is more than ten times higher than even the upper limits of the range of change of average cost of a contract. This means that for most of enterprises that performed these contracts the relevant activity was episodic, that is, carried out for a limited period of time.

Specific interest is paid to the analysis of the proportion of requests for which contracts were signed with the SE in the total number of submitted requests by subjects of small entrepreneurship. The value of the indicator is almost 45%. And its differentiation among municipalities is relatively small. This may be due to two reasons: the high quality of submitted requests, or a small number of such requests.

Formed municipal procurement system in recent years has begun adapting to peculiarities of functioning of small entrepreneurship. In 2015, even for little municipalities was performed 34 contracts by the SE.

4. Conclusions and suggestion
In general, researches have led to the following conclusions:
- organizational and legal aspects of the federal law, which came into force in 2014 and
regulates the contracting framework, have ensured that more small enterprises have access to procurement;
- in describe the current level of participation of small enterprises in municipal procurement, one may use the normal distribution density functions as economic and mathematical models;
- the possibility of using the normal distribution density functions as economic and mathematical models to characterize the level of participation of subjects of small entrepreneurship in municipal procurement is shown;
- we have analyzed the distribution of six specific indicators describing participation of small enterprises in municipals contracts;
- all developed distribution density functions are good at approximating the empirical data and are of high quality according to the accepted standards;
- we have calculated average values of the indicators in question for all the municipality Ulyanovsk region, as well as their change intervals, which are typical for most municipality.

The developed models and the resulting regularities can be used for a wide range of tasks of monitoring the SE participation in procurement for municipal needs, projects of development and forecast of this trend in municipal governance system. The findings of this study are of a certain theoretical and applied significance, in particular, for justifying proposals for the development of support for small enterprises. The developed models and the resulting patterns can be used in resolving a wide range of issues related to the monitoring of participation by small enterprises in procurement contracts, as well as designing development and forecasting this area of municipal administration. Such information is important for entrepreneurs, as it enables them to assess the feasibility and consequences of participation in procurement.
Overall, the procurement framework which has been formed in Russia in recent years continues to adjust to the peculiarities of small business operations.

Suggestions for the development of municipal contract system see below:
- purchases from small entrepreneurship should not be less than 15% of total municipal order;
- can be establishment of mandatory requirement to the supplier of goods and services about involving subcontractors or collaborators from the SE in the execution of the contract;
- the SE participation in the contract system should to be based by the advance informing about the upcoming municipal purchases in the future;
- necessary statutory guarantee of inclusion of advance payments in contracts, without which the production of goods or services by SE seem difficult. The SE do not usually have significant working capital, and credit resources are very expensive;
- the requirements for submitted documents should be simplified, because small entrepreneurship usually have no highly qualified specialists in the area of municipal purchases and, thus, they have difficulty in preparing and submitting their requests for participation in contests;
- increasing transparency of the results of public procurement tenders;
- reducing the procurement participation costs for small businesses through the development of new information exchange technologies;
- ensuring absolute compliance with mandatory quotas for purchases from small enterprises;
- regular monitoring of the level of participation by small enterprises in procurement;
- providing small businesses with the necessary technological and organizational tools, as well as methodological developments to facilitate participation in procurement;
- creating registers of reliable small businesses that have a positive history of contract execution.
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Revista ESPACIOS. ISSN 0798 1015
Vol. 40 (Nº 24) Year 2019

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