

Purchasing digitalisation as a leading means for achieving effectiveness

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Abstract Being a prerequisite for the further development of the procurement system, digitalization completely changes the purchasing function and affects its effectiveness through various factors, the main of which are quality and savings, risk minimization, and speed increase. In short, all of the above allows to achieve leading position and prominent standing.

Moreover, through using digital technologies it is possible to identify those places in the supply chain where failures are associated with the factors highlighted in this study, eliminate them, and in the future predict in advance and minimize the occurrence of a repeated situation. In addition, the use of technology leads to the necessity of a new efficiency system with new key performance indicators. In the future, collecting information on key indicators allows to build an econometric model for evaluating the effectiveness of the procurement system as a whole, taking into account the use of digital technologies, which will be relevant for state and municipal procurement bodies.

1 Introduction

The federal contract system in the field of public procurement of the Russian Federation has been functioning since the beginning of 2014. The aim of the changes is to comprehensively improve the domestic public procurement system, increase competitiveness, ensure budgetary savings and increase the efficiency and effectiveness of the procurement system. To achieve this goal and to meet modern conditions, various innovations are used.

Certain results have already been achieved: creation of a regulatory framework, a unified information system, a catalogue of goods, works and services in electronic format and electronic trading platforms. The basis of a well-functioning system of state and municipal procurement is the effectiveness of using budget funds. That is why the Decree of the Government of the Russian Federation dated January 31, 2019 No. 117-r approved the Concept for increasing the budget expenditures efficiency in 2019-2024 (Government of the Russian Federation 2019).

Like any investment project involving financial inflows and outflows in the form of cash digitalization requires an assessment of effectiveness. The task is to determine the influence of the elements of the digital economy on the effectiveness of the procurement system for state and municipal needs. This study has theoretical and practical significance, namely the following:

- The study will help to more clearly understand the effectiveness of procurement and the factors influencing it, as well as complement the already published work of researchers to form a complete picture of procurement digitalization;
- The implementation of the described research results will bring the procurement system to a qualitatively new level and will contribute to the construction of an effective digital procurement system that is globally competitive.

2 Literature review and methodological approach

In the majority of developed countries, the efficiency as savings from the use of digital technologies is estimated at 10-25% (Kramin et al. 2017). Moreover, savings are viewed as a result of the basic principles management (Raymond 2008):

1. Quality-price ratio, that is, maximizing value based on a certain amount of funds. Sometimes, in addition to the price, other elements of the procurement system may be considered, for example, staff qualifications or performance indicators when concluding contracts with suppliers of previous years.
2. Ethical behaviour meaning correct behaviour of public servants and compliance with anti-corruption principles.
3. Ensuring a competitive tender in order to eliminate fraud and favouritism, contributing to the establishment of low prices, high quality and competition of suppliers.
4. Transparency of public procurement to minimize corruption and provide guarantees for investors in a fair assessment of contracts.
5. Strict accountability at both national and international levels.

In the 1990s, the practice of benchmarking the procurement process for the private sector has begun to be actively applied in other countries, and it involved the study of best practices to identify performance indicators and the likelihood of success for disseminating them to other market participants (Solovieva 2018). However, public sector procurement is different from private procurement, so performance indicators will be different for the two areas. Patrucco et al. (2016) identified areas for benchmarking state and municipal procurements containing performance criteria:

1. Budget savings;
2. Organizational efficiency that presupposes the ability of the organization to achieve its goals with a favourable ratio of results and costs;
3. Process efficiency – the ratio of costs and time spent on the process;
4. Product quality;
5. Sustainability and innovativeness of the region due to the implementation of procurement functions.

In Russia, performance evaluation is based on budget savings (see Table 1 that follows).

Table 1. Budget savings in agreements for the period of 2014-2018.

Year	2014	2015	2016	2017	2018
Savings, bln rubles	340,04	409,89	517,91	429,74	343,59

Source: Own results based on Zakupki (2019)

The Higher School of Economics Experts in their annual study of the procurement system in the Russian Federation identify the following criteria, in addition to savings, that affect the efficiency and effectiveness of procurement (see Procurement system in Russia 2018):

1. The volume of purchases for state and municipal needs in the framework of the Federal Law “On the contract system in the field of procurement of goods and services to ensure state and municipal needs” dated 04.04.2013 No. 44-Federal Law;
2. The volume of purchases under the Federal Law “On the Procurement of Goods, Work, Services by Certain Types of Legal Entities” dated July 18, 2011 No. 223-Federal Law (Federal law 2013);

3. The level of competition, expressed as the average number of applications submitted per lot in the framework of No. 44-Federal Law and within the framework of No. 223-Federal Law (Federal law 2011);
4. The quality of preparation of schedules, expressed in the number of their adjustments;
5. The proportion of terminated contracts;
6. Volume of failed purchases;
7. Results of public discussion.

As for econometric approaches to assessing the effectiveness of the procurement system for state and municipal needs, such studies are not widespread in Russia due to the lack of statistical data. Nevertheless, a number of researchers (Yakovlev et al. 2012; Yakovlev et al. 2013) determined the influence of individual factors on the functioning and effectiveness of the procurement system, however, these studies were carried out within the framework of the previously existing procurement system and without taking into account digital technologies. Foreign researchers advanced further (Kacandolli-Gjonbala et al. 2018), studying the influence of various factors on the effectiveness of the procurement system using an econometric approach, since the process of digitalisation and digitalization of procurement began much earlier than in the Russian Federation (Bakulina and Sergunina 2018).

Our research is based on quality analysis of the latest trends in using digital technologies for procurement system for state, municipal and corporate needs. In the information selecting, processing and systematizing processes methods of comparison, classification, quantitative and qualitative indicators, and table presentation of data were used.

Evaluation of the effectiveness of procurement is determined after a certain, predetermined time period as the difference between the forecast (potential) and actual (real) value of the purchase. The potential cost is predicted before the implementation of the procurement function, taking into account the cost of ownership of the products and the costs of organizing and implementing the procurement. The actual purchase price should include, in addition to the costs of organizing and conducting, the costs associated with the execution of the contract concluded during the procurement and the application of the result for which the procurement was carried out. If the task is not solved within the specified period with the expected quality, the purchase will not be considered effective.

3 Conducting research and results

Taking into account the understanding of the procurement effectiveness, the basis of the procurement function is to ensure its quality. Undoubtedly, the approaches mentioned in the Literature Review take place, since they reflect the traditional understanding of procurement. However, in order to maximize the use of digital functions, it is necessary to determine where current quality management methods are no longer suitable due to changing conditions. By improving the quality of the procurement system, revenues are simultaneously increasing, and innovations are more stimulated.

Digital technologies take procurement quality to a new level by increasing accuracy, minimizing risks, ensuring savings, and improving speed. These elements, along with quality, determine cost and influence procurement efficiency. It follows that the main groups of key performance indicators (KPIs) include quality, the resulting savings and the delivery of purchased goods.

An important step in quality management is the definition of an element in the supply chain where a failure occurs or may occur in order to further eliminate a repeated failure. Foreign enterprises and companies use such quality improvement systems as the "8D Method" (or 8 disciplines of problem solving), which combines 8 steps to identify the cause of the problem and eliminate it (Kogan and Lyutikova 2010), or "Five "Why's" which, in addition to establishing causal relationships and finding problems, allows you to mobilize company resources and minimize costs (KPMS 2019). These methods can be used not only in private, but also in state and municipal institutions, respectively, it is likely that similar methods will be used both for procurement within private companies and for the procurement system for state and municipal needs.

However, such methods operate on the basis of past experience, that is, resources and means to improve quality are directed to those elements of the supply chain where failures occurred. However, the modern world is volatile, and quality degradation can occur in another business process. Therefore, this approach to quality management is impractical due to its complexity.

In this case, the effectiveness of the procurement system will be affected by digital technologies that collect, analyse information, and can already predict where the next failure will occur - the so-called predictive analytics (Government of the Russian Federation 2018).

Knowing where disruptions in the supply chain can occur, and also where, in which elements quality is important, can improve the efficiency of the entire procurement system. For this, the matrix approach of strategic management is used (see Figure 1).

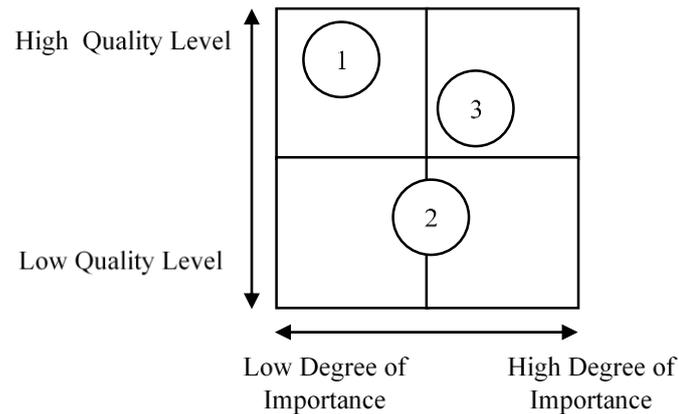


Fig. 1. Matrix of quality control
Source: Own results

According to the presented matrix (Fig. 1), it is necessary to evaluate any product on the basis of parameters: strategic importance and the level of quality, which can be determined both by standards and consumer expectations. If purchases are made within the framework of the state system, interstate standards (Government Standards), industry standards, regulations, building codes and others and others are used. In this case, digital instruments also play a role. For example, the current catalogue of goods, works, and services allows one to achieve a uniform description of the subject of procurement in accordance with all standards and regulations. When purchasing in a private business, the quality level can be regulated in accordance with the consumer expectations. For example, in a coffee shop, a coffee variety is considered a strategically important element, and therefore the product quality is appropriate (point 3 in the figure). However, with the help of digital technologies, the procurement team conducted research and found out that the diversity and quality of milk was more important for visitors, although they were given the least importance in terms of quality. Thus, the procurement department wasted money on the purchase of the best coffee, which is much more expensive than the best milk. In order to outperform competitors, the procurement department must review its strategy and focus on improving the quality of milk to increase the efficiency of procurement in general. Consumer expectations play a role in the state system, as procurement functions are carried out and should be carried out based on the needs of the customer.

Based on the understanding of where quality is important, new KPIs may arise, which digital technologies allow to identify. For example, it was revealed that the quality of the goods deteriorated during truck transportation, therefore, it is necessary to introduce new requirements for truck cleaning after the transportation of other goods and verify that these requirements are met using the newly introduced KPI. At the same time, when replenishing the database with information about new emerging failures and relevant requirements and new KPIs, updated information should be immediately entered into the catalogue, so that in the future both customers and manufacturers know what problems and where may occur, and tried to ensure the effectiveness of procurement function, thus increasing the efficiency of the entire national procurement system.

4 Conclusions

Thus, the effectiveness of the procurement system is expressed through quality, as well as other criteria arising from it. Among these criteria one might distinguish saving, minimizing risks, and, last but not least, improving terms. The existing research and development allow us to define a list of criteria for evaluating effectiveness, which, of course, need to be taken into account, analysed, and evaluated.

However, with the advent of digital technologies, the procurement system changes completely, including their impact on efficiency – using certain digital technologies, it is possible to increase the accuracy and transparency of procurements, reduce risks, improve quality by quickly collecting, analysing and processing information and other advantages.

In addition, one would probably agree that identifying bottlenecks in the supply chain and the procurement system as a whole digital technologies determine the new key performance indicators. In the future, having received a sufficient array of statistics from these data, it would be possible to develop an econometric model for evaluating the procurement system effectiveness taking into account digital technologies which would undoubtedly have a significant contribution to the practical activities of organizations, enterprises, state as well as municipal bodies.

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