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SOURCING BASED METHODS OF WAREHOUSE SERVICES DEVELOPMENT IN THE PETROCHEMICAL ENTERPRISES PROCUREMENT

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Abstract

Warehousing services are one of the most frequently outsourced (about 30% of the specialized operator services market in Russia), and therefore, choosing the form of warehouse services sourcing is of practical and scientific interest. The issue of methods of warehouse services development comes to choosing the form of sourcing that it's also relevant for a number of reasons. The form of sourcing can have a positive or negative impact on the performance of the sourcing company and services consumers. The form of sourcing should ensure a high level of efficiency of both the warehouse operator and its services consumers, as well as a high level of quality of the services provided. The choice of the sourcing form considered mostly as a problem of choosing from between two alternative variants: insourcing and outsourcing. However, there are much more forms of sourcing, and the problem comes up to a multiple choice session. The petrochemical complex enterprises procurement is due to the procurement is one of the most cost-prohibitive components of the company. The object of this study is the tire complex of PJSC "TATNEFT" the largest domestic producer of tires, the organization of which is a holding, and the unit providing warehouse services and procurement is a separate legal entity.

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Keywords: Warehouse services, warehouse services provider, petrochemical complex, sourcing, insourcing, outsourcing.

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1. Introduction

Modern economic conditions development related to active service sector, a dynamic transition from a traditional to digital economic environment, the development of new formal services, both in the consumer and in the business segments. At the same time, the oil and petrochemical industries gains 30% of Russia's GDP in the industrial sector. The growth in industrial production in the first nine months of 2019 amounted to 2.6% (mining industry – 4%) compared to the same period of the last year (Starostina, 2019). High rates of production enterprises development in petrochemical complexes requires the effective organization of business processes, including for their main activities, but at the same time a significant share in the total costs is formed by warehouse business processes and procurement. The business process of warehousing, in fact, is associated with the provision of services to enterprises, as well as integrated storage services. Warehouse services are provided to enterprises in both procurement and sales activities. However, procurement has a significant impact on the enterprises efficiency. This determines the practical and scientific interest in the issue of warehouse services development method in the petrochemical enterprises procurement.

The potential for the development of warehouse services in the sphere of procurement, including the petrochemical complex, is to find ways to reduce costs and choose the best way to provide the necessary resources and services, i.e., the form and model of sourcing. Sourcing refers to the process of searching, selecting and using sources of material resources and services to the enterprise. Sourcing can be implemented in different forms, but most researchers both domestic and foreign agree on the choice between two alternative forms – insourcing and outsourcing, while the solution to this issue has a variable nature. In addition, most part of issues goes by only a cost-based approach or the level of importance estimate or the service quality level, but the aspect of determining the form of sourcing is much more complex and is a multi-criteria task. In other words, there is currently no general scientific approach to determining the optimal form of sourcing and improving the efficiency of enterprises. In summary it can be noted that the issue of development of warehouse services in the procurement of petrochemical enterprises on the basis of sourcing as a modern way to improve efficiency is relevant and requires further scientific study.

2. Problem Statement

With the market relations development and intensification in search of competitive advantages and efficiency of organizations increasing is carrying out the choice of sourcing strategy. In scientific works, various models and strategies of sourcing are considered, however, the generally accepted understanding of neither the essence of sourcing nor its types has not been formed, the very concept of sourcing is interpreted by scientists ambiguously. There is a wider understanding of sourcing: sourcing is a direction of activity that includes the following elements: a coherent strategy, optimized organization, supporting technology, changing the results (Gattorna, Ogulin, & Reynolds, 2003).

Stapran (2019) also interprets the concept of sourcing quite widely: sourcing is considered as an effective method of organizing business processes, implementing of strategic decisions related to organizational, financial, technical, technological and other aspects of firm management.

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In the issues on logistics and SCM (Stock & Lambert, 2001), the main attention is paid to strategic sourcing, which is considered as a set of processes on the basis of which decisions are made about strategic sources of supply (procurement), as a result the organization receives the necessary values.

Concurring with the view of specialists in the sphere of procurement we believe that sourcing should be understood as the process of searching, selecting and using sources of material resources for the enterprise. It seems that strategic and tactical (operational) sourcing should be distinguished in procurement. Strategic sourcing is related to decisions on sources of obtaining the necessary resources of a long-term strategic nature, affecting procurement strategies, corporate and other functional strategies of the organization in addition to procurement. Operational sourcing is the search for and attraction of sources for solving operational problems of procurement caused by changes in the current market conditions or the current enterprise's demand for material resources.

Nevertheless, it should be noted that at the moment there is an insufficient number of works containing the solution of questions of a choice of an optimum form of sourcing of warehouse services in purchasing of the production enterprises. This proves the need to study the decision-making process regarding the choice of the form of sourcing in modern conditions and confirms the relevance of the sourcing based methods of warehouse services development in the petrochemical enterprises procurement research.

3. Research Questions

This paper goal led to the formulation of following research questions:

1) Offer a methodology for the development of warehouse services in the procurement of petrochemical enterprises on the basis of sourcing;

2) Develop a model for determining the form of sourcing warehouse services of the enterprises procurement activities;

3) Form a system of indicators for evaluating the effectiveness of warehouse services sourcing in the petrochemical enterprises procurement.

4. Purpose of the Study

Modern economic conditions requires companies efficiency developing which is provided by a range of methods. Sourcing stands out among them by the reason of its strategic role for procurement process. An important decision is the highlighting the function to be outsourced.

The purpose of this study is to determine science-based provisions, as well as practical recommendations aimed at the development of warehouse services in the procurement activities of enterprises of the petrochemical complex based on sourcing.

5. Research Methods

The methodological basis of the research is based on using the system approach to the considered issues and the following methods: analysis and synthesis, expert evaluation method, economic and

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mathematical modelling. The authors also implemented matrix methods, statistical methods. The set of methods used in the study confirms the objectivity and validity of the conclusions obtained in the work.

6. Findings

The problem of choosing a sourcing form (or changing the current form) is a strategically important decision, as it affects the company's performance in the long term. Most research in the field of sourcing is reduced to making decisions on the choice of two alternatives: insourcing and outsourcing (Anderson, & Parker, 2002; Boothby, 1998). However, there are many more forms of sourcing which was confirmed by the analysis of theoretical provisions, and possible forms of sourcing in the procurement activities of petrochemical enterprises were also identified (Cohen & Young, 2005; Sharda & Chatterjee, 2011; Marciniak, 2015).

In this regard the sequence of actions for choosing the warehouse services sourcing form in the petrochemical enterprises procurement is a complex process consisting of several stages. Representation of the decision-making process for choosing the sourcing form as a cyclical process based on the determination that the current form of sourcing in a market economy is continual. The change of sourcing forms requires costs, and therefore, should be economically viable.

Thus sourcing based methods of warehouse services development in the petrochemical enterprises procurement includes the goals, objectives, methodical base and principles under which it is necessary to choose the warehouse services sourcing form of the petrochemical enterprises procurement.

As targets of the methodological approach to selecting warehouse services sourcing form of the petrochemical enterprises procurement, the following can be identified: determining the need to change (select) the form of warehouse service sourcing, increasing the economic efficiency of the enterprises that consume warehouse services and the warehouse operator, and achieving a high level of warehouse services quality.

In accordance with the marked goals, it is necessary to define the range of tasks:

1. Analysis of consumer companies and warehouse operators market position;

2. Determining the quality and efficiency of the function performed by the company and the operator;

3. Assessment of the possibility of changing warehouse service sourcing form.

Based on the range of tasks of the proposed method, it is possible to determine the principles according to which the selection of the warehouse services sourcing form of the petrochemical enterprises procurement should be carried out:

1. The principle of consistency under which taking into account the features of the holdings in the petrochemical complex;

2. The principle of scientific validity which involves the use of a scientific approach in the decision-making process of the sourcing form choice;

3. Flexibility principle which means that the decision can and should be reviewed at certain intervals;

4. Cost-effectiveness principle under which a new form of sourcing should have a positive economic effect on the activities of the entire holding;

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5. The principle of compliance of the sourcing form with corporate goals.

Along with the principles, it is necessary to define a set of methods according to which the decision on choosing the form of sourcing will be made:

1. Expert method;
2. Methods for multi-criteria evaluation of alternatives;
3. The method of system analysis;
4. Matrix method.

Having defined the main structural elements of the method for selecting the warehouse services sourcing form of the petrochemical enterprises procurement it is necessary to present the stages of its implementation (Figure 01).

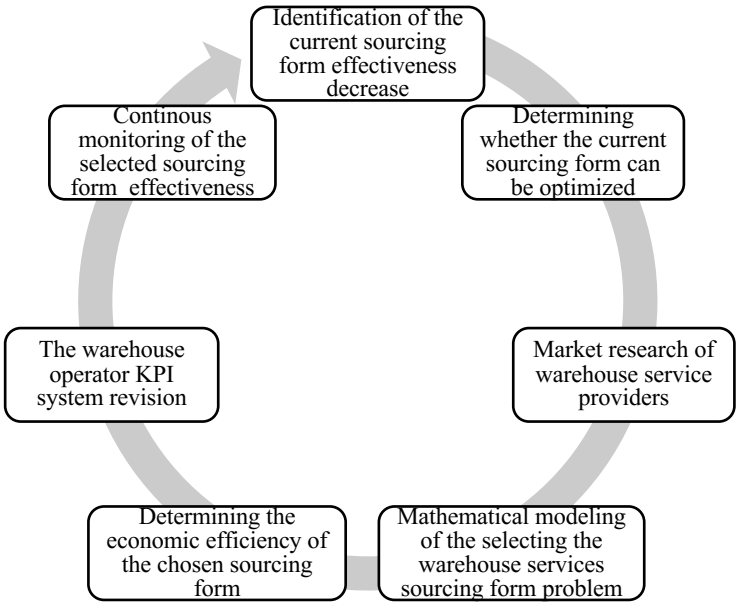

Figure 01. The main stages of the selecting the warehouse services sourcing form of the petrochemical enterprises procurement

The criteria for determining the warehouse services sourcing form decrease in the efficiency could be objective factors such as:

1. Reducing the profitability of the business (if the captive outsourcing – the warehouse operator profitability);
2. Increasing the volume of stocks of raw materials and goods at a higher rate than the volume of trade;
3. Slowing down of raw materials and goods stocks turnover (reducing the value of the turnover coefficient, increasing the duration of the turnover);
4. Decrease in customer satisfaction with the quality of warehouse operator services;
5. The resources supply disruption, etc.

If there is a decrease in efficiency for at least one of these indicators, it is necessary to start the procedure for considering the possibility of inefficiently organized sourcing.

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It should be noted that if a third-party operator is selected, it is necessary to determine the performance indicators of its activities to determine the quality of its services, and it is also necessary to develop relationships with the warehouse service operator (SRM principles is concerned).

In long-term partnerships, which include services outsourcing, it is necessary to achieve high performance of both companies to have high satisfaction from the contract implementation. The analysis of the parties ' satisfaction can be performed using a matrix for evaluating the relationship between contractors, adapted for the consumer and the operator of warehouse services (Figure 02).

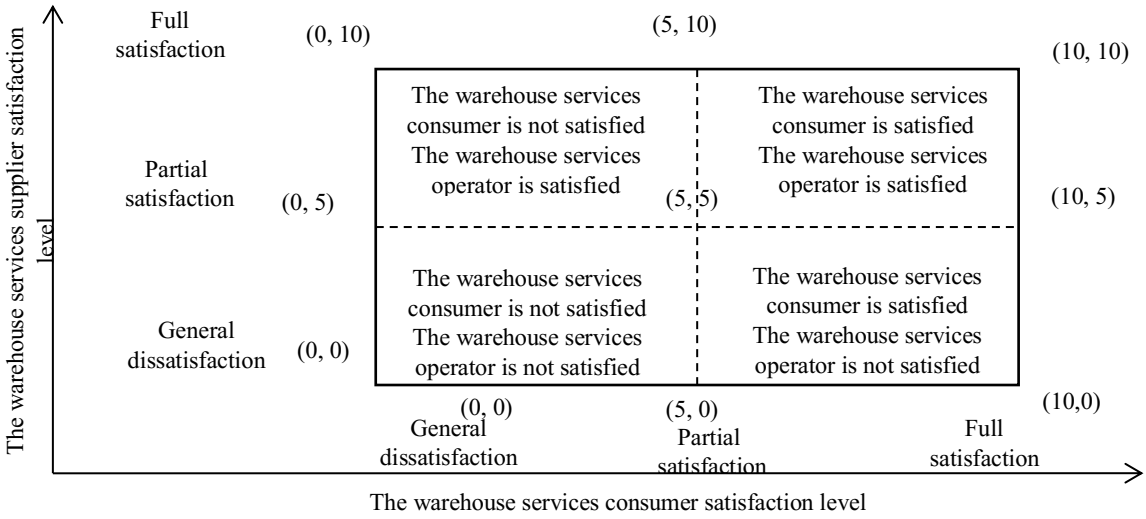

Figure 02. Matrix for the relationship between the consumer and the warehouse service operator evaluating

In our opinion, a key aspect in achieving customer and warehouse service operator satisfaction is the availability of a KPI system that helps to identify any deviations from the specified level of warehouse service efficiency in a timely manner and is one of the main parts of the method released by authors.

Current KPI systems must correspond to the chosen form of sourcing. A conceptual model for the KPI systems synthesis for warehouse services sourcing in the petrochemical enterprises procurement is presented at Figure 03.

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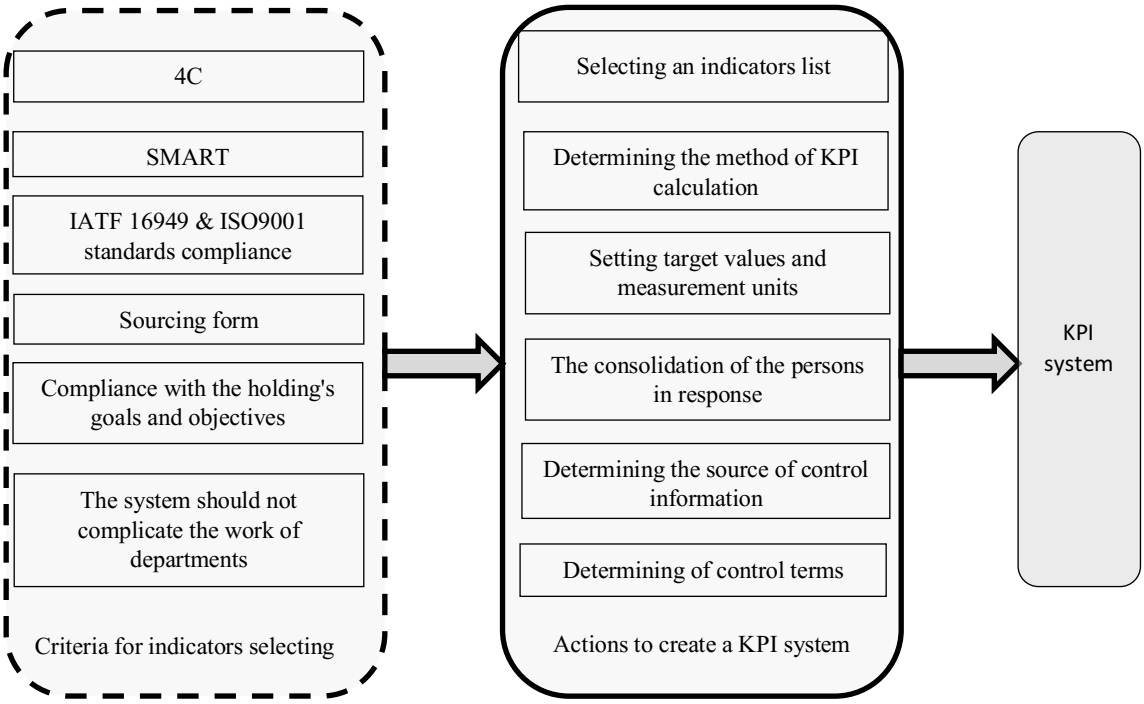

Figure 03. Conceptual model of KPI systems synthesis for sourcing warehouse services for warehouse services sourcing in the petrochemical enterprises procurement

Compliance with the sourcing form is one of the main criteria for the KPI system synthesis, due to the fact that the market warehouse services operator have been carefully selected in the preparatory phase, as a result, to assess the effectiveness of his work does not need to select a variety of criteria, enough for 3-5 key performance indicators reflecting the main parameters of the operator.

A possible KPI list of the market warehouse services operator (outsourcer) and the method of KPI calculation are presented in Table 01.

Table 01. The market warehouse services operator (outsourcer) KPI list

Indicator	Method of KPI calculation	Target KPI value
1. Timeliness of the warehouse operator services, %	$K_{Time} = \frac{\sum_{i=1}^{n} Q_{Time}}{\sum_{i=1}^{n} Q_{Total}} * 100\%$ Q_{Time} – volume of each provided service type within the specified time frame; Q_{Total} – total volume of provided services; n – number of provided service types	100%
2. Completeness of the warehouse operator services, %	$K_{Compl} = \frac{\sum_{i=1}^{n} Q_{Compl}}{\sum_{i=1}^{n} Q_{Plan}} * 100\%$ Q_{Compl} – volume of each type services actually provided; Q_{Plan} – planned volume of each type services provided (volume of services under the contract); n – number of provided service types	100%
3. The customer satisfaction level with the warehouse operator services	$SL = \frac{\sum_{i=1}^{n}(SL_{iactual} - SL_{iexpect})}{n}$ $SL_{iactual}$ – actual satisfaction level with the service; $SL_{iexpect}$ – expected satisfaction level with the service;	≥ 0

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quality	n – number of criteria.	
4. Cost-effective provision of services by the warehouse operator	$K_{effective} = \frac{\sum_{i=1}^{n} C_{actual}}{\sum_{i=1}^{n} C_{planned}} * 100\%$, где C_{actual} – actual costs for each service type; $C_{planned}$ – planned costs for each service type (the amount of planned funding); n – number of provided service types	≤ 100%

An integral indicator can also be calculated and the Harrington E .scale can be used to interpret its values (Liubushin & Brikach, 2014) (Table 02).

Table 02. E. Harrington scale intervals value

Interval value	Integral indicator of the warehouse services operator efficiency evaluation level
0,8 – 1,0	Very high level
0,63 – 0,8	High level
0,37 – 0,63	Average level
0,2 – 0,37	Low level
0,0 – 0,2	Very low level

The released sourcing based method of warehouse services development in the petrochemical enterprises procurement would help to increase the transparency of the warehouse operator's business processes, manageability, and more rapid elimination of emerging problems and bottlenecks. So, taking into account the analysis carried out in the current research, it was revealed that inefficient use of PJSC "TATNEFT" tires producer warehouse space (about 30% of the total area (about 30 thousand. square meters) is used inefficiently, there is a slowdown in inventory turnover, due to non-fulfillment of the production plan (mismatch of the plans of the holding's production enterprises and procurement plans due to the fault of production).

Therefore, it is possible to evaluate the effect of the proposed KPI system implementation:

1. The release of working capital from stock could provide up to 2 billion rubles;

2. The rationalization of the warehouse space use and the possible lease of part of the space – about 157 million rubles.

Thus, it can be noted that the introduction of a KPI system that meets all the requirements and modern approaches to enterprise performance management has an economic effect and increases the efficiency of warehouse operators.

7. Conclusion

Development of a methodological approach to choosing the warehouse services sourcing form in the in the petrochemical enterprises procurement based on sourcing approved by the current issue, it was found that the choice of the sourcing form affects the efficiency of the warehouse operator and by changing the current form, it is possible to significantly increase profitability. Recognizing the fact that the forms of sourcing are cyclical, an algorithm was developed that includes successive stages, allowing to make a decision including on the basis of objectification of decision-making using a mathematical model.

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It is obvious that there is a need for a differentiated approach to the formation of a KPI system for different forms of sourcing. Thus, in the case of outsourcing or any form combining with it, it is advisable to assess the effectiveness of the relationship with the outsourcer, it is not necessary to include the large number of indicators in order to simplify the control system. This system is aimed at assessing the economic impact of outsourcing warehouse services and providing a high quality services.

In order to develop a KPI system for the warehouse services sourcing forms provided by the company's own division, the indicators used in the practice of the internal outsourcing of the tire complex of PJSC “Tatneft’ were considered. The KPI system for this form of sourcing should reflect indicators that allow to evaluate the efficiency, effectiveness and productivity of the warehouse operator. At the same time, it is necessary to coordinate with the current system of standardization in the holding, if there is one. As a result of the implementation of the proposed KPI system, an economic effect associated with the release of financial resources in total up to 2.2 billion rubles can be achieved. The development of modern forms of business services sourcing has an impact on the activities of enterprises at the micro-and macro-levels, since along with increasing the efficiency of an individual enterprise, markets for sourcing services are being formed throughout the country. At the same time, there is an increase in requirements for the efficiency of business processes and the services quality. The analysis of existing forms of warehouse service sourcing in the purchasing activity of petrochemical enterprises, carried out in the dissertation research, allowed to develop and justify a method for determining the optimal form of sourcing of these services, as well as improving the efficiency of services provided based on creating a comprehensive KPI system.

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