

# Methodology of System Management of the Supply Chain Based on the Leasing Process

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**Abstract** - The development of leasing relations is based on the adequate methodological basis for assessing the effectiveness of the leasing process. The purpose of our research is to describe the methodology for assessing and managing the leasing process taking into account the interests of the lessee and the factors of the external and internal environment. In our research, leasing process is represented as an element of supply chain management. The main methods that we used in our research were the method of modeling cash flows of the enterprise - recipient and the method of discounting the cash flows generated with the participation of an industrial enterprise in the leasing process, the methodology for modeling the supply chain of an industrial enterprise. The proposed methodology is a universal tool for assessing and managing the leasing process, which includes the strengths of advanced methods for assessing the effectiveness of a leasing scheme for financing productive investments accumulated in scientific works of experts in the field of leasing and logistics. The proposed structure of strategic features based on a set of methods for assessing leasing activities, leasing potential and leasing climate allows an industrial enterprise to develop management strategies for the leasing process based on the performance. The methodology of assessment and management has practical value for a wide range of organizations that are considering the possibility of technological re-equipment of industrial production in the context of platform business networks, as well as the improvement of supply chain management.

**Key words**- leasing, leasing process, leasing process management system, leasing activity, leasing climate, leasing potential, supply chain management.

## 1. Introduction

Modern scientific literature has accumulated a lot of experience in procurement chain management, which includes a number of methods. In the English-language literature, the following specialists have dedicated their studies to this subject: Simatupang, T. M. and Sridharan, R. [1], De Angelis, R., Howard, M., and Miemczyk, J. [2]. Ref. [3] reviewed the experience of the Blockchain method in the construction industry. Many specialists [4] consider leasing as a method of centralized management of the civil machinery park. Separate studies [5] are devoted to the methods of measuring the efficiency of logistics and supply chain. Kolinska K., Cudzilo M., Altintas O., Keuschen Th., Saur A., and Klumpp M. devoted their studies [6] to general problems of supply chain formation and to the methods of comparing logistics efficiency. Jeremy Shapiro [7] classifies the supply chain management method (SCM method) into two forms: transactional and analytical methods of supply chain management. The hierarchical classification of supply chain management models allows a deeper understanding of the application of certain models [8]. However, in the methodological aspect of supply chain management, there is a gap in the use of leasing when building efficient logistics chains. From the perspective of organizational theory, supply chains are a special form of a network organization. They consist of loosely coupled, independent actors with equal rights. Their organizational structure is adapted dynamically according to the tasks to be

performed and the aims of the network organization as a whole [9]. A supply chain may be regarded as a single (virtual) entity by its customers. The term virtual firm, however, is used for a network of firms collaborating only in the short term, sometimes only for fulfilling a single customer order [10]. It should be noted that an instrumental perspective still dominates research on sustainable supply chain management (SSCM) [11]. There is increasing criticism of the instrumental perspective adopted in SSCM [12]. An instrumental perspective can be characterized by either having a win-win focus (business-case lens) and the idea that sustainability should improve, or at least not diminish, the economics dimension, or by thinking in terms of trade-offs, that is, a choice between options, with firms normally choosing business over sustainability goals [13]. To manage the leasing process effectively, methodological grounds based on the accumulated theoretical and methodological experience are needed. The proposed methodology for the strategic management of the leasing process (LPSM) is based on the works of specialists in systems analysis [14] and on the leasing efficiency methods. Most foreign methodologies to assess the leasing process are based on calculations of the amount of leasing payments for lessees and comparison of leasing with alternative financing schemes based on a payment schedule. For example, these methodologies are proposed by ref. [15] and [16]. Another group of Western researchers [17, 18] considered organizations from the point of view of their attractiveness for participation in a leasing transaction. A separate group of researchers [19-21] considered the effectiveness of leasing transactions through the lease capitalization change as a result of the leasing process and the impact of operating leasing. Many Russian methodological approaches to assessing the effectiveness of leasing financing schemes come down to the analysis of cash flows, based on the lessee's industry specifics. Economic sanctions that lead to intensive industrial import substitution require some leasing changes in technological re-equipment of industrial enterprises and the implementation of large-scale industrial projects [22]. In recent years, the study of platform business models described by ref. [23] has become more popular. These models create value by exchange between several independent groups, for example, between consumers and producers. This

methodological solution goes in line with our study. Despite the substantial methodological and fundamental contribution to economics, there is a lack of a systematic approach and the possibility of regenerating the management strategy of the leasing process based on operational data in a platform business model. This fact is the purpose of our research.

## 2. Methods

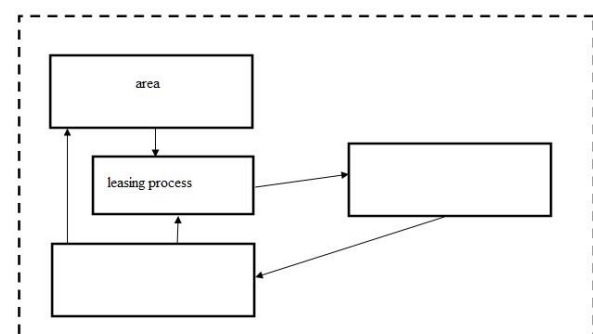
When studying the problems of managing leasing efficiency, a wide range of methods were used, including the methods of leasing potential and leasing climate, economic and mathematical modeling, strategic analysis, design methods, as well as synthesis of special theories: development modeling, management of cash flows and supply chains.

## 3. Results

In our research, we identified a gap in the methodological support of supply chain management with the use of leasing, which may reduce logistics costs, as well as increase delivery speed and the company's capitalization. We present the results of developing a methodology for the leasing process management based on the formation of a management system and the assessment methods.

The study of the leasing process management as a system should affect three areas (Fig. 1):

- functional (the management system of the leasing process efficiency implements basic management functions: planning, analysis, accounting);



**Figure 1.** Areas of "responsibility" for managing leasing efficiency

- Intentional (planning of tactical decisions: regeneration of strategic plans, reengineering of business processes, etc.). The basic functions of the

leasing process management in the cost management system are the preparation and development of an investment decision; implementation of the investment decision; evaluation and summary of its results. Specific functions of cost management should be noted. They include: customer relationship management, customer service management, demand and supply management, product management, etc. These procedures are implemented through management functions. At the stage of making investment decisions this is done with the help of the following elements: forecasting, modeling and programming; at the implementation stage – through organization and motivation; at the control stage – through accounting and analysis. The functional sphere should also include derivative management functions applicable to the leasing management system, such as anti-crisis, innovation, etc. The intentional environment of the leasing process management refers to the long-term management actions aimed at the qualitative development of the management object. According to G. B. Kleiner, this sphere belongs to objective reality and ontology while the functional sphere is classified as the sphere of subjective intentions, plans and ideology [14]. [14] And [24] singled out a separate enterprise management system, which is applicable for the leasing process management system of an industrial enterprise - the sphere of expectations (the expectation sphere). When an industrial enterprise becomes a lease participant, it is supposed to meet a wide a range of expectations of the leasing system entities, including those presented in Table 1. The management system of the leasing process containing these expectations converts them into quantitative indicators that are transformed in the management goals.

**Table1.** Cross-expectations of an industrial enterprise and leasing system entities

Expectation entity	Expectation	Expectations of the industrial enterprise - lessee
Leasing company (lessor)	Demand for lease services Flow of leasing funds	Lease funding of investment projects Flexible payment schedule Low residual value
Credit establishment – bank	Demand for credit services Timely payment	Availability of credit costs Reduction of

	from borrowers	leasing rates
Producer (seller) of the leasing subject	Demand for the produced products Timely payment from consumers	High quality of the leasing subject Low material and energy consumption of the leasing subject Price affordability of the leasing subject
Insurance company	Demand for insurance services	Flexible insurance terms Price affordability of insurance services
State budget	Taxes and fees from leasing system entities sent to budgets of different levels	Tax preferences for the lessee Maintenance of favorable leasing climate

The list of leasing entities makes it clear that the leasing process is of multifunctional nature and the functions of each specific leasing process belong to the macro-, meso- and microeconomic level. None of the expectations presented in Table 1 can be met without proper leasing process management. It is possible to draw the following conclusion regarding the structure of the leasing process management system. In the process of interaction with each other, the leasing system entities form certain possibilities for each specific leasing process. Psychological and behavioral features and socio-economic interests of the lessee make the leasing process management system evaluate information on the external environment, features and interests of the leasing system entities. This assessment creates a system of expected response of the leasing system entity to any actions of the lease management system. So, in the leasing system functioning, the leasing entities act as key structuring constraints: targets, set by the interests of owners and management. The leasing entities form their own interests in the leasing process management system and their expectations affect management decisions based on forecasting the reaction of the leasing system entities. As a result of the historical evolution of economic theory, the systemic paradigm now dominates. It is the logical basis for the relatively recent synergetic paradigm, the object of which is the system that includes interacting components and transformational potential [25]. Ref. [25] points out at a close interaction of components with the socio-economic

space that form economic synergy as the newest interdisciplinary direction [25, 26]. Based on the analysis of a number of scientific approaches, we believe that to perform the relevant tasks and to give the most complete description of the leasing management system (LMS), a different approach to defining the system should be presented. It should be based on the internal and external description of the system, which provides an introduction of the concept of system-containing space and the identification of the system-forming feature. G.B. Kleiner considered a system-containing space as a full and extensive sphere of objects or phenomena, which have their own fundamental possibilities for identifying their parts [14]. Based on the Kleiner's approach and the research conducted by Zubkova O.V. on its basis, we defined the system-forming feature as the method of constructing a system-containing space [24]. Fig. 2 shows the system-containing space, built on the specified system-forming features.

The system-forming features are  $x$ ,  $y$  and  $z$ :

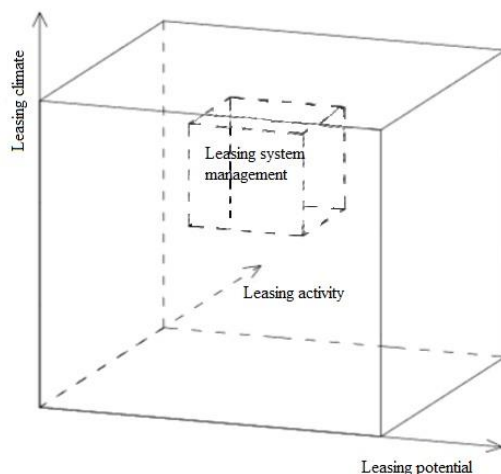
$$y = 1, 2, \dots, p;$$

$$x = 1, 2, \dots, r;$$

$$z = 1, 2, \dots, q.$$

Thus, the system is an integral part of the system-forming space that is resistant to external and internal influences. It is singled out with the help of several system-forming features.

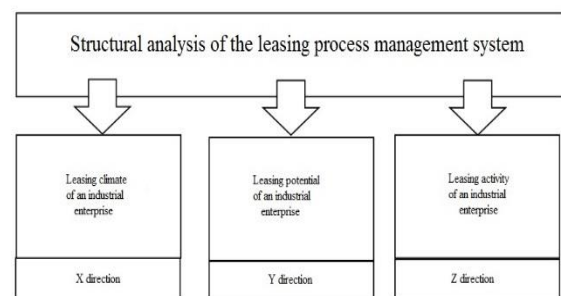
The concept of structure, as well as the concept of a system, refers to the basic concepts of systems analysis.



**Figure 2.** System-forming space of the leasing system management based on the three system-forming features

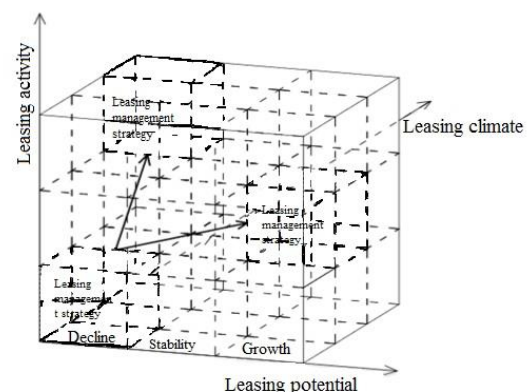
The proposed by G. B. Kleiner concept considers the concept of the system structure to be secondary

and explores it in combination with the system itself, that is, as the structure of the leasing management system. In the applied and theoretical systems analysis of the leasing process, the result of structuring a system is the concept of its structure. At the same time, we understand a combination of elements and connections between them as the structuring of the management system, indicating a transition from understanding the management system of the leasing process as a specific part of the external space to understanding it as an association of internal elements and their connections. The management system structuring has an individual way of division and depends on the purpose of the study. On the basis of the above-mentioned information Fig. 3 presents the methods of structural analysis of the leasing system elements.



**Figure 3.** Structural analysis of the leasing system elements

To construct an economic-mathematical model of the object of our research (leasing process management system) we created a “map” which distinguishes different management models (Fig. 4).



**Figure 4.** “Map” of the economic-mathematical model of the leasing management system

The identification of 27 strategies for managing the leasing process throughout its life on the basis of operational indicators allows the industrial

enterprise to achieve its strategic objectives in the context of platform business models. The use of the platform mechanism contributes to the long-term and fast development of industrial enterprises, which is a very important point [26]. When creating the “map” of the leasing process management system, it is necessary to take into account:

- 1) the vision of managing the leasing process as an economic object;
- 2) figurative and conceptual and categorical apparatus;
- 3) the concept of the leasing process management;
- 4) system description of the leasing process management;
- 5) initial management theory principles, formulated with the help of the conceptual and categorical apparatus;
- 6) methods of arguing, checking or substantiating certain provisions on the basis of initial principles and / or empirical data;
- 7) methods to interpret the provisions and conclusions of the description of the leasing process management system;
- 8) final conclusions regarding the leasing process management system;
- 9) the systematic approach to managing the effectiveness of the leasing process.

Taking into account the location of each specific management system on the “map”, we can talk about the functioning of the system in the context of: 1) increasing efficiency; 2) stability; 3) declining efficiency.

The systematic approach to managing the leasing process is observed in leasing contracts that take place within the framework of the financial and economic activities of industrial enterprises in the Russian Federation. The methodology for managing the leasing process can be understood as a generalized (logical) model of the leasing process management, including a system description of management, i.e. its representation in the form of a system, as well as the basic principles adopted in this concept. Therefore, the management system of the leasing process is defined as the nature, essence, behavior and development of all the management subsystems of the leasing process or a set of such subsystems.

#### 4. Discussion

The proposed methodology for managing the leasing process is based on our research [22] and

the works of Russian [8, 27, 28] and English specialists [2, 5, 6, 29, 30] that helped to choose the direction of our research and solve the accumulated methodological and management tasks.

#### 5. Conclusion

The proposed methodology for managing the leasing process eliminates the shortcomings of the methods used in practice and the methods described in the scientific and specialized literature. It takes the methodological basis for the assessment of the supply chain efficiency with the use of leasing investment forms to a new level. The advantages of the proposed methodological approach are the following: complete account of the potential lessee’s specifics; the account of various financing forms to replenish the main assets of an industrial enterprise; account of the parameters of an industrial enterprise – the supply chain elements, such as: financial and economic activity of the enterprise and its results; the condition and availability of relevant infrastructure for participation in the supply chain; accumulated leasing potential represented by the accumulated discounted income in the leasing process; leasing activity indicators, showing the dynamic and structural specifics of the potential leasing process; visibility and ease of interpretation of the obtained quantitative results. The analysis showed the possibility of using a dynamic assessment of the leasing effectiveness [31]. In our opinion, the proposed methodology is universal and may be suitable for assessing the effectiveness of the leasing process in the supply chain system.

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#### References

- [1] Simatupang, T. M., Sridharan, R., “A critical analysis of supply chain issues in construction heavy equipment”, *International Journal of Construction Management*, Vol. 16, No. 4, pp. 326-338, 2016.
- [2] De Angelis, R., Howard, M., Miemczyk, J., “Supply chain management and the circular economy: towards the circular supply chain”, *Production Planning & Control*, Vol. 29, No. 6, pp. 425-437, 2018.

- [3] Wang, J., Wu, P., Wang, X., Shou, W., "The outlook of blockchain technology for construction engineering management", *Frontiers of engineering management*, Vol. 4, No. 1, pp. 67-75, 2017.
- [4] Kunz, N., Van Wassenhove, L. N., McConnell, R., Hov, K., "Centralized vehicle leasing in humanitarian fleet management: the UNHCR case", *Journal of Humanitarian Logistics and Supply Chain Management*, Vol. 5, No. 3, pp. 387-404, 2015.
- [5] Blass, V., Corbett, C. J., "Same supply chain, different models: Integrating perspectives from life cycle assessment and supply chain management", *Journal of Industrial Ecology*, Vol. 22, No. 1, pp. 18-30, 2018.
- [6] Kolinska, K., Cudzilo, M., "Comparison of logistics indicators as a way of improving efficiency of supply chains", *Research in Logistics & Production*, Vol. 4, No. 1, pp. 21-32, 2014.
- [7] Shapiro, J., *Supply chain modeling*. SP: Peter, pp. 720, 2006.
- [8] Bochkarev, A.A., *Supply chain planning and modeling: Educational manual*, M.: Alfa Press, pp. 192, 2008.
- [9] Sydow, J., *Strategische Netzwerke: Evolution und Organisation (1st ed., 6th reprint ed.)*, Wiesbaden: Gabler, 2005.
- [10] Stadler, H., "Supply chain management: An overview", In *Supply chain management and advanced planning*. Springer, Berlin, Heidelberg, pp. 3-28, 2014.
- [11] Xiao, C., Wilhelm, M., van der Vaart, T., van Donk, D. P., "Inside the Buying Firm: Exploring Responses to Paradoxical Tensions in Sustainable Supply Chain Management", *Journal of Supply Chain Management*, 2019.
- [12] Matthews, L., Power, D., Touboulic, A., Marques, L. "Building bridges: Toward alternative theory of sustainable supply chain management", *Journal of Supply Chain Management*, Vol. 52, pp. 82-94, 2016.
- [13] Slawinski, N., Bansal, P., "Short on time: Intertemporal tensions in business sustainability", *Organization Science*, Vol. 26, pp. 531-549, 2015.
- [14] Kleiner, G.B., *Enterprise strategy*, M.: "Business", pp. 144, 2008.
- [15] Brealey, R.A., Myers, S.C., *Principles of corporate finance*, McGraw-Hill, Inc., 2008.
- [16] Contino, R.M., *The complete equipment – leasing handbook: a deal makers guide with forms, checklists, and worksheets*, New York, AMACOM, pp. 480, 2012.
- [17] Beattie, V., Goodacre, A., Thomson, S. J., "International lease-accounting reform and economic consequences: The views of UK users and preparers", *The International Journal of Accounting*, Vol. 41, No. 1, pp. 75-103, 2006.
- [18] Bedford, R., *The importance of company and Asset Characteristics in the Use of Leasing Finance in the United Kingdom: An Investigations*. Finance, Glasgow, University of Strathclyde, 2012.
- [19] Dogan, F. G., "Non-cancellable Operating Leases and Operating Leverage", *European Financial Management*, Vol. 22, No. 4, pp. 576-612, 2016.
- [20] Fülbier, R., Silva, J., Pferdehirt, M., *Impact of lease capitalization on financial ratios of listed German companies*, Working paper, WHU – Otto Beisheim School of Management, 2006.
- [21] Bourjade, S., Huc, R., Muller-Vibes, C., "Leasing and profitability: Empirical evidence from the airline industry", *Transportation Research Part A: Policy and Practice*, Vol. 97, pp. 30-46, 2017.
- [22] Bayev, I., Evplova, E., Gnatyshina, E., Gordeeva, D., Ivanova, O., Korneev, D., Ryabchuk, P., "Import Substitution through Leasing Operations in Emerging Markets: changing development paradigm", *Revista ESPACIOS*, Vol. 39, pp. 11-30, 2018.
- [23] Gawer, A., Cusumano, M.A., *Platform leadership: How Intel, Microsoft, and Cisco Drive industry innovation*, Boston: Harvard Business Review Press, 2002.
- [24] Zubkova, O.V., Khodorovsky, M.Y., *Management problems of industrial enterprises: monograph*, Chelyabinsk: Myakotin I.V., pp. 412, 2012.
- [25] Rybachuk, M.A., "Dialectics of the interaction of general scientific and disciplinary paradigms (through the example of natural sciences and economics)", *Journal of Economic Theory*, Vol. 1, pp. 114-122, 2016.
- [26] Muhammad K. *The Effects of Electronic Human Resource Management on Financial Institutes*. *Journal of Humanities Insights*. 02(01):01-5, 2018.
- [27] Meskon, M., Albert, M., Khedouri, F., *Principles of Management: translated from English*, M.: Business, pp. 54, 1997.
- [28] Lukinsky, V.S., *Models and methods of the logistics theory: Manual. 2nd ed.*, SP: Peter, pp. 448, 2008.
- [29] Orekhova, S.V., *Formation of a sustainable development methodology for a metallurgical enterprise based on the resource approach: PhD in Economics*, Ekaterinburg, pp. 229, 2018.
- [30] Altintas, O., Keuschen, Th., Saur, A., Klumpp, M., "Analytical Hierarchy Process for Location Problems in Logistics", In: *Grubbström, R.W./Hinterhuber, H.H. (eds.): 16th International Working Seminar on*

*Production Economics, Conference Proceedings, Innsbruck 01.-05.03.2010, Innsbruck (Eigenverlag), Vol. 3, pp. 1-12, 2010*

- [31] Twarog, J., *Measuring and indicators of logistics. Publishing House of Institute of Logistics and Warehousing, Poznan, 2005.*