Supply Chain Management of Industrial Enterprise Based on the Participation in Network Architecture Holdings (Case Study: SPV)

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Abstract— The modern industry of the Russian Federation is experiencing an acute shortage of long-term investment resources for technological re-equipment programs aimed at import substitution. The purpose of the study is to identify topical issues of the supply chain management at an industrial enterprise that has become an SPV in a business network. The study is mainly based on the methodology for modeling supply chain management of the recipient enterprise and the method of discounting its cash flows generated with the participation of the industrial enterprise in the leasing process. The proposed concept of systematic management of the leasing process based on business networks allows investors to focalize investment resources on the basis of a set of management methods in order to accelerate the launch of industrial production and increase capitalization. The proposed systematic supply chain management concept is of practical value for a wide range of organizations considering the possibility of using tools for technological re-equipment of industrial production in the context of platform-based business networks. Implementation of the supply chain in SPV is showed at creation of a continuous innovations flow, reduction of technological development costs and unfirming system for development.

Keywords— enterprise industries, supply chain management, leasing process, SPV, investment rate.

1. Introduction

Progressive industrial enterprise development involves the study of the enterprise development as an economic system that implements supply chain management and various goals that require methodological and managerial support. The economic system is focused on manufacturing process management to achieve the objectives, that is, the subject of economic development management is the relationship between the subjects of the system, and the purpose of the system in a market condition is the generated economic effect.

The economic effect of an industrial enterprise is directly related to the level of investment in its fixed assets and the compliance with market requirements. Investment activity of the enterprise as a sensitive mechanism is affected by a number of internal factors, as well as by the micro and macro environment of the business entity. The progressive escalation of economic and political tension in the world is caused by the diametrically opposed positions taken by Russia and Western countries towards the incorporation of the Crimean Peninsula into the Russian Federation in 2014, the conflict in Donbass (Ukraine), as well as the anti-terrorist operation in the Middle East, increase the relevance of intensifying economic growth in the context of economic sanctions. In this context, the long-term national development strategy was the transformation of the domestic economy into a high-tech economy; given the increasing external economic threats, this process requires much more consolidated managerial efforts at all levels - from the federal level to industrial enterprise supply chain management. The obvious dependence of the industrial sector of the economy on global prices in the context of the preserved economic focus on raw materials does not allow the Russian Federation to rely on permanent industrial growth. In the light of this, modernization of domestic industrial production, primarily high value added manufacturing, requires the attention of business
owners and state authorities. Therefore, it is necessary to reorder the innovative behavior priorities in the manufacturing sector; the investment projects aimed at deep processing and focused on import substitution should be at the top. For this reason, the central problem of the industrial production development in the structural industry of the Russian Federation is the investment activity promotion as the basis of economic growth and effective import substitution. The need for state support for import substitution and the growth of real investment in order to reduce dependence on imports has been repeatedly stated by high-level officials. Thus, President V. V. Putin highlighted the role of technical re-equipment of the industrial sector and revaluation of fixed assets to return domestic consumers to Russian manufacturers [1]. The Chairman of the Russian Government in 2015 emphasized the great possibilities of domestic production to replace imported goods [2]. Heavy reliance on imported engineering tools (89%) metallurgical and oil and gas equipment (75 and 70%, respectively) is of particular concern [3]. These issues triggered a methodological search for an adequate concept of achieving industrial growth.

In modern science, there is a lot of research on the issues of the theory and methodology of business networks. Thus, the studies by [4-9] are aimed at studying the origin and benefits of the business model, as well as its present and future prospects. Thus, the Asian experts [10] conducted research on the influence of social factors on the development of a business network; [11] considered business network as an object of systematic management. The global scientific community is also particularly interested in the studies devoted to the applied problems of the network business model implementation: the use of business networks in e-commerce considered by [12] and [13]; the research on communications by [14] and the study on the consistency rate by [15]; the growth factor of the activity efficiency examined by [16], [2], [17], [18], [19], [20]. Thus, the tendency of the global scientific community to use business networks for the solution of applied problems can be traced. However, the analysis of the studies by domestic and foreign experts revealed a methodological and theoretical gap in research aimed at solving problems in the systematic management of the leasing process in a networked business when implementing large-scale investment projects.

1.2 Problem Statement

To effectively implement strategic objectives, the lessee enterprise should apply supply chain management techniques and be conscious of a change in the institutional environment in order to timely switch to another leasing process management strategy. On the other hand, it is important to have a methodological basis for assessing the adequacy of the institutional environment and the immediate external environment to meet the goals of the project when implementing large-scale investment projects that require capital injections from several leasing companies. Thus, the purpose of our study is to identify topical issues of the systematic management of the leasing process of an industrial enterprise in a business network and to offer possible solutions. The research goal was achieved through assessing the importance of implementing large-scale import substitution investment programs based on lease financing and developing a concept for managing the leasing process of an industrial enterprise in a business network.

2. Methods

One of the up-to-date approaches to business operations is integrated supply chain or logistics chain management. The Supply Chain Management (SCM) concept, which was initially formed in the disciplinary sphere of logistics, currently represents a separate field of knowledge. The SCM concept is based on the fact that the manufacturing enterprise is not a formation independent of the environment but a part of a system chaining “sources of raw materials – production – shipment to the end user”. When studying supply chain management problems, a wide range of methods should be applied, including methods for assessing the profitability and turnover of enterprise resources, economic and mathematical modeling, strategic analysis, planning and design analysis, as well as methods synthesized from the methodologies of special theories, namely development modeling, cash flow and supply chain management. The present study is primarily based on the analysis of the cash flows of an industrial enterprise and their modeling in the context of the volatile external and institutional environment. The research relies on the statistical information for the period from 2003 to 2019, periodic financial statements of industrial enterprises and management information on leasing contracts. These methods will significantly improve the assessment quality and help future managers to develop the guidelines for managerial decision-making in the lease financing of investment projects.
3. Results

Engineering is a structural sector that produces fixed assets, vehicles, durable goods, weapon and military technology; it closely correlates with all sectors of the economy ensuring sustainable development and stable operation. The level of the engineering industry development has a significant impact on labor productivity, material and energy intensity. Dynamic progress in engineering contributes to economic security and the country's defensive potential; it is a source of positive innovative activity and the growth of the life quality.

Physical and moral depreciation of fixed assets is a systemic barrier to effective import substitution in the engineering industry. Over the past 10 years, the rate of fixed assets depreciation in the economy as a whole increased from 43.0% in 2003 to 46.8% in 2019. The renewal of fixed assets, as evidenced by the coefficients of renewal and retirement, is observed in the non-productive sphere. Thus, the coefficient of total renewal increased from 1.8 in 2000 to 4.6 in 2019; in the manufacturing industry, this indicator increased from 5.0 in 2004 to 5.7 in 2019; the overall retirement rate decreased from 1.1 in 2004 to 0.7 in 2019; the retirement rate is of the same value in manufacturing [21].

The dynamics of investment in fixed assets in Russia is closely correlated with the dynamics of manufacturing production, which indicates an upcoming decline in industrial production due to a reduction in investment.

Given the shortage of own investment resources and the low availability of “long-term” resources, various methods and tools for long-term investment should be applied in order to stimulate technical re-equipment and increase independence from imports.

Leasing as an investment activity is commonly used in developed market economies; therefore, it can become one of the basic instruments for attracting long-term investments in the industrial sector of the Russian economy. Obviously, leasing is not the solution to all the problems accumulated over decades; it should not always be used when making investments. However, this scheme can bring tangible results provided there efficient state regulation.

According to the Expert Agency research [23], the value of the leased equipment in 2019 amounted to 742 billion rubles, which is 96.4% of the level of 2018. The potential of lease financing is rather high at this stage of its evolution. Thus, the share of leasing volume in the GDP of Russia increased by 0.3 percentage points in 2019 and amounted to 1.2%. The value of lease contracts for the analyzed period amounted to 38.6%. However, the positive growth rate of leasing does not indicate its quality in strategic terms. The modern Russian leasing market is characterized by a large share of lease contracts for the purchase of vehicles (air, land, sea and rail transport). These assets are usually purchased by the largest commodity firms that use the equipment to transport either raw materials and soil or passengers. According to the Expert Agency [23], 75.7% of the total leased assets in the country were vehicles, and the share of machinery and metallurgical equipment in 2016 was only 2.4% (compared to 2.9% in 2015). Certain tax restrictions introduced by the state decreased the efficiency of this investment tool. Thus, it can be concluded that despite great potential, leasing is not used as a tool for mass technical re-equipment of Russian industrial enterprises producing highly processed and knowledge-intensive products, such as machines, robotics equipment, engineering tools, etc.
In the context of ongoing economic sanctions and a lack of long-term investment resources for financing import substitution technology projects, the spectrum of potential investors is being reduced to large export corporations and state funds. The features of such projects are their payback time and high capital intensity. Investments in the industrial production of new types of equipment require a methodological basis for the systematic management of the leasing process: from the manufacturer of the leased asset to the state budget, for which there is a tax levy. Early research on the effectiveness of leasing from the perspective of its participants [24] indicates the concentration of the leasing effect in the non-industrial sector (credit institutions and leasing companies); this worsens the climate for import substitution which is determined by modern conditions.

Thus, it is impossible to replace foreign imports with domestic production, significantly increase efficiency and ensure long-term competitiveness at the macro and micro levels if there is no paradigm shift in the management of the effective technical re-equipment of industrial enterprises from subsidizing and providing financial assistance that is credited to offshore accounts and has dubious effectiveness to targeted funding based on lease contracts. The practice of allocating funds to the enterprise for technical re-equipment should be abandoned; alternatively, the enterprise should be provided with leased assets ready for operation (Figure 1).

![Figure 1. Change of the import substitution concept in industrial enterprises based on lease contracts](image)

Effective and sustainable technical re-equipment of an industrial enterprise based on lease contracts requires a change in scientific and methodological approaches to management, improvement of methodology, and application of new progressive methods and techniques. In Russia, the problems of the Fourth Industrial Revolution and the urgent need for industrial import substitution are directly related to the issues of new industrialization. It is important to know that the speed and depth of technological changes shape the need for structural changes at the micro-level. At industrial enterprises, this is primarily associated with the introduction of additive and cloud technologies, new principles of metalworking manufacturing, the widespread use of robotics in production.

This problem can be successfully solved through project finance that involves lease-based platform business models.

The structure of platform business models as an economic mechanism has not been fully defined. One of the most prominent studies is the research by [6] who investigated nine elements: cost structure and composition, key resources, activities and partnerships, distribution channels, consumer segmentation, cash flows, value proposition, and customer relationships. The typologies by [1][15] significantly correlate with the objectives of our study; according to the authors, the key values are market segmentation, product creation chain structure, position in the value chain, cost structure, economic effect, and a competitive strategy. In Russia, the research on the specifics of doing business through the lens of the “business model” has been recently introduced; it is a research mainstream in the field of enterprise economic management.

Based on the objectives of the study, experts interpret the business model as: 1) the structure of products and information flows, including a description of various actors, their roles, potential benefits and sources of income [13]; 2) a set of variables to create a competitive advantage [5]; 3) the reflection of a business (key elements of the company and inter-element relationships), which determines the formation of economic rents by the enterprise [25]; 4) the history of the company operation [4]; 5) the representation of the logic of the company [6] and strategic choices for creating and capturing value [8]; 6) the nature and system of the interaction between the focal company and customers [26] or contractors [20]; 7) the process of creating, delivering and converting value [9] that involves certain structural transactions [10,12] and the presence of certain competencies of the organization for ensuring the exchange and interaction in this process [17, 18]; 8) a set of tools for the study of the economic activity logic and the assessment of current strategic performance to implement innovations [11, 14] and manage the asset complex [19]; 9) the diffusion of technical potential for the realization of economic values [2]; 10) the algorithmization of activities to achieve a strategic result [16].

Technical re-equipment in the structural sectors of the Russian economy requires large-scale investment
resources that have decreased in recent years. Nevertheless, bank lending is still the major source of financing for lease transactions; it amounted to more than 60.2% in 2019 [23], and the deposits provided by lessees increased from 11.5% in 2015 to 14.2% in 2019, which imposed an additional burden on the recipients. The experts [27] noted that in recent years, the share of large businesses involved in the leasing process has been decreasing (50.6% in 2015 compared to 44.8% in 2019). This confirms the relevance of business networks to the lease financing of the technological re-equipment of the industry.

The effectiveness of lease financing based on project finance of large-scale technology programs of industrial enterprises is improved through the use of business networks consisting of a number of leasing companies, credit organizations, and lessee enterprises.

The development of lease finance of industrial investments in Russia involves the practice of project finance: “turnkey leasing” or “leasing in package” [28]; thus, fully equipped warehouse complexes with the required hardware and software became the subject of the lease.

A leasing process based on project finance consists of several phases, including a long-term investment stage for the acquisition, creation, delivery, and standardization [29] of the asset; the main way of servicing debt obligations and the source of debt repayment are future earning in the form of lease payments. Thus, the ultimate goal of project finance is the creation of a new production based on lease financing and consisting of an asset complex, or deep modernization of existing industrial production, which involves a significant increase in cost, productivity, etc. In addition, the scale of the project is comparable with the scale of the lessee enterprise or exceeds it.

The composition of the business network participating in project finance of the leasing process is determined by its complexity, structure, and the system for contract formation. A lessor (one or more) as part of a business network can act as a project initiator, lender or stakeholder. An SPV (special purpose vehicle) of the leasing process can take the role of a lessee, investor, or lessor (lessors). The products produced on leased equipment are sent to customers, and the income obtained is directed to pay off the debt, to develop the project and, as a result, becomes the project driver.

The effective use of lease finance in large-scale technological re-equipment projects requires a methodological basis for the systematic management of the leasing process at an industrial enterprise. The fundamental basis of the management system should be a methodology for assessing external factors and the conditions of the institutional environment that provides the management of an industrial enterprise with certain strategies for managing the leasing process.

Systematic management is focused on the identification of internal and external environment factors that affect the economy of an industrial enterprise in the course of the leasing process. In this regard, there is a need for the development of a methodological justification for the formation of a strategy for managing the leasing process on the basis of performance indicators, which include the indicators of current financial and economic activities, the state of infrastructure and environmental factors (the macro- and micro-environmental factors).

The implementation of large-scale investment projects within the framework of business networks should imply a qualitative assessment of the strategy for managing the leasing process in terms of its compliance to the given criteria for the strategic development of the enterprise. In our opinion, this criterion is the speed of the leasing process.

Thus, the well-known principle that time is money is supplemented by the assertion that speed saves time [30], which has been justified in the economic science and practice by the effect of capital turnover or business activity on the outcome. The faster the pre-investment and investment stages of the leasing process are organized, the faster the lessee begins to use the leased equipment in the production process and generate revenue. Thus, this contributes to higher financial results in the reporting period.

Among the factors affecting the speed (turnover) of the implementation of investment decisions, we can distinguish two options for achieving the goal of a large-scale investment project aimed at creating a highly-processed finished product at an industrial enterprise:

- the infrastructure and production programs are financed based on the investment capital of the leasing company; this generates an increase in capitalization partially aimed at providing new investment solutions;
- the network model of leasing companies on the basis of balanced company interests forms investment capital aimed at financing the infrastructure and production programs of the SPV project selected from a number of potential lessees on the basis of the methodological management of the leasing process.

Traditional interaction between the lessee and the leasing
company in the framework of the leasing process (Figure 1) is reduced to the fact that an industrial enterprise has to implement a number of consecutive projects and direct their net present value to the implementation of subsequent programs in order to introduce large-scale investment solutions for technological re-equipment. An increase in production output or a decrease in the current costs of an industrial enterprise as the goal of the project results in an increase in the turnover of its resources; in turn, this saves time and generates inverse capital. In the context of the urgent need to kick-start industrial production to replace imported goods, the current practice of financing investment decisions of enterprises based on lease contracts is faced with two obstacles: a leasing company lacks investment capital to finance the project alone or it takes the enterprise a lot of time to enter the market due to the lack of the investment capital for the quick implementation of the project.

3.1 Supply chain management of SPV

The concept of supply chain management based on business networks (Figure 2) is based on an increase in the turnover rate of the SPV, which has passed the acceptability assessment taking into account external and institutional environment factors of an industrial enterprise and meeting the goals of the stakeholders.

Supply chain management has three main processes:

Information Management: Today, the role and position of information is obvious to everyone. Proper circulation and accurate transfer of information make processes more efficient and effective and easier to manage. In the supply chain, the issue of coordination in activities is very important. Coordinated and appropriate information management between partners will have an increasing impact on decisions and speed, accuracy, quality and other aspects.

Logistics Management: This section covers all physical activities from the raw material preparation stage to the final product, including transportation, warehousing, production schedule, and so on.

Relationship Management: This section is one of the most important topics in the supply chain and has a tremendous impact on all areas in the supply chain and its level of performance. Many of the initial failures in the supply chain are due to poor transmission of expectations and the outcome of behaviors that occur between the parties involved in the chain. In the development of any integrated supply chain, the development of trust and confidence among partners and the establishment of reliability for them are critical and important elements for success.

Investment projects that require enormous resources are developed by a group of leasing companies that form an aggregate capital fund \( \sum \frac{K_\ell}{k} \) for SPV financing on an all-inclusive basis. The selection of a potential lessee (lessees) involves the assessment of the conditions for the possible progress of the leasing process in the context of its institutional environment taking into account the factors of financial and economic performance, the availability and state of infrastructure. An important task will also be the assessment of external factors of the micro- and macro-environment factors.

Reduced pre-investment and investment cycles due to the participation of the SPV in a business network ready to finance a large-scale industrial project predetermine an early return-on-investment and generation of the net present effect.

Figure 2: supply chain process in SPV

Figure 3. The concept of supply chain management process of an industrial enterprise in a business network
In order to ensure sustainable company growth and increase competitiveness, the accumulated financial resources are directed to financing the planned programs. The focus of investment resources on certain projects should be determined by the methodological basis of the systematic management of the leasing process.

4. Conclusions

It justifies the importance to include partnering enterprises taking part in creation of intellectual and tangible assets in the logistic chain of the industrial enterprise. In a methodological, scientific and practical aspect, the implementation of the systematic management of the leasing process of an industrial enterprise in a business network will require:

- the development of a methodology for supply chain managing based on the identification of strategic space and the selection of strategic features;
- the research on the classification of strategies for supply chain managing *within* the strategic space;
- the identification, description and resolution of systemic contradictions that arise in the course of the leasing process in order to develop a strategy for managing the leasing process that meets strategic goals.

The practical development of the concept of supply chain managing of an industrial enterprise in a business network meets the requirements of the modern Russian environment and the needs of the structural industry for the implementation of the import substitution policies.

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