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MODELING OF THE ORGANIZATIONAL AND ECONOMIC MECHANISM OF TECHNOLOGICAL EXCHANGE IN THE FORM OF LEASING

МОДЕЛЮВАННЯ ОРГАНІЗАЦІЙНО – ЕКОНОМІЧНОГО МЕХАНІЗМУ ТЕХНОЛОГІЧНОГО ОБМІНУ У ФОРМІ ЛІЗИНГУ

The article examines the importance of leasing in the context of the financial and economic crisis. The conditions have been studied and tools for the implementation of technological exchange processes in the form of leasing have been presented as a way to attract foreign investment and enhance the innovative activity of the lessee. The significance of planning the lessee's budgets on the basis of leasing contracts in providing innovative modernization of industrial enterprises has been revealed. An economic and mathematical model has been developed for managing the contractual activities of a lessee as the main participant in technological exchange in the form of leasing based on the principles of system dynamics. The proposed management model forms the basis of the organizational and economic mechanism of technological exchange, the functioning of the leasing business and the leasing services market. The practical application of the proposed technologies will allow the lessee of equipment to determine the most favorable conditions at the stage of concluding a lease contract, and on a global scale to ensure the development of the innovative component of economic processes.

***Key words**: leasing, innovative modernization of the economy, financial and banking system, lessee, contract activity, model, leasing efficiency, financial plan, budgeting.*

Необхідність інтеграції України у високо – технологічне середовище визначає необхідність інтенсивного формування конкурентоспроможної технічної бази на промислових підприємствах для випуску конкурентоспроможної продукції. Необхідна практично повна заміна існуючого обладнання та удосконалення технологічних процесів, що вимагає колосальних фінансових вливань. В умовах фінансово – економічної кризи, при нестачі фінансових коштів щодо оновлення матеріально – технічної бази підприємств, альтернативою могли б послужити позикові кошти. Але, комерційні банки не досить активно приймають участь у фінансуванні інноваційних проєктів, у зв'язку з можливістю виникнення ризику. Та й банківські кредити можуть стати непосильною ношею для багатьох підприємств. У зв'язку з цим, ринку потрібен альтернативний інструмент – лізинг, що є дуже перспективним напрямом, який стимулює розвиток промислових підприємств.

У статті розглянуто значення лізингу в умовах кризового розвитку національної економіки. Вивчено умови та інструменти здійснення процесів технологічного обміну в формі лізингу як способу залучення іноземних інвестицій та активізації інноваційної діяльності

лізингоодержувача. Розкрито значущість планування бюджетів лізингоодержувача на основі лізингових контрактів в забезпеченні інноваційної модернізації промислових підприємств.

Розроблено економіко-математичну модель управління контрактної діяльністю лізингоодержувача як основного учасника технологічного обміну в формі лізингу на основі принципів системної динаміки. Запропонована модель управління становить основу організаційно-економічного механізму технологічного обміну, функціонування лізингового бізнесу та ринку лізингових послуг.

Застосування на практиці запропонованих технологій щодо здійснення обміну в формі лізингу дозволить лізингоодержувачу на етапі укладання лізингового контракту визначати найбільш вигідні для нього умови, а в глобальному масштабі забезпечити розвиток інноваційної складової економічних процесів.

***Ключові слова**: лізинг, інноваційна модернізація економіки, фінансово-банківська система, лізингоодержувач, контрактна діяльність, модель, ефективність лізингу, фінансовий план, бюджетування.*

***JEL Classification:** O32; O33; C53*

Formulation of the problem. For the national economies of the countries of the world, the problem of attracting foreign investments is especially acute, which serve as a means of fixed assets modernizing and introducing the latest technologies. International leasing is one of these means, but its specificity lies in the fact that at the same time it is a mechanism for both investment and financing. This combination gives companies the opportunity to gain access to both the global financial market and the market for the latest technologies. In addition, in conditions of limited free capital of enterprises, there is a visible problem of lending and financing of domestic enterprises, which can be effectively solved on the basis of international leasing.

In the context of the crisis development of the national economy, the need to develop reliable mechanisms for attracting foreign investment is also becoming more acute, one of which can be international leasing. It seems important to develop an organizational and economic mechanism for technological exchange in the form of leasing.

Analysis of recent research and publications. A wide range of fundamental and applied economic research of recent times is devoted to leasing as an object of scientific research. These studies dealt with various aspects of the functioning of the leasing business and the leasing market. In particular, the following issues were considered: improvement of leasing instruments as a form of investment; formation and development of leasing companies; the role of leasing services in the innovative and industrial development of the economy, etc.

The studies of O.B. Alexandrova, V.D. Gazman, V.A.Goremykin, J. Alstrom, S. Amembala, E. Inikhoff, Lauritano M., Meidana A., Mozgrevoy O., Sebika D., Chanag S. Church M., Sharma G. et al. are the most significant in the field of using leasing instruments in the activities of business entities and in order to modernize the national economy.

Formulation of the article objectives. When analyzing individual studies on leasing problems, it should be noted that, as an integral mechanism of financial support for investment and innovation processes at various levels, it remains poorly developed. Further improvement of the models for harmonizing the interests of international leasing participants is required, while ensuring the innovative nature of interaction, which is embodied in the appropriate organizational and economic mechanism.

The purpose of this article is to develop recommendations for the formation of an organizational and economic mechanism for technological exchange in the form of leasing, its orientation towards ensuring economic activity in the context of harmonizing the interests of the state, financial and banking system, business and leasing companies.

Presentation of the main research material. The economic importance of leasing is recognized as one of the methods of supporting entrepreneurship by the state, tools for technical equipment and re-equipment of production, modernization of fixed assets of business entities, methods

of obtaining credit income and credit, grounds for financial monitoring, effective forms of private investment [1, 2, 3].

The newest original approaches which have not been used in our country before are needed for the innovative development of the economy, its modernization, a significant increase in foreign investment. At the same time, these approaches allow to increase the terms and funding levels, to reduce the cost of attracted credit resources. This is fully facilitated by the technology of leverage leasing, considered in foreign practice as one of the most complex forms of leasing financing for technological exchange, since it involves the coordination of the interests of many participants in the implementation of large investment projects. In all countries where this type of leasing has found application (USA, China, Canada, Australia, Japan, a number of EU countries), certain organizational and managerial, legal and economic features have developed; legislative and regulatory restrictions, including taxation, provision of preferences and benefits; specific features of the geography of transactions (international and domestic leasing); accounting rules and statistics, taking into account cyclicality and other factors [4, 5, 6].

As for technological exchange, it should be noted that it has a positive impact on the innovative modernization of the country's economy due to the increase in foreign investment and the efficiency of their use, tighter control over the targeted use of investments and gaining access to the world market of equipment and technological processes.

The mechanism for implementing an international leasing operation is shown in Fig. 1.

Business entities involved in the process of technological exchange through the implementation of an international leasing operation must make high demands on the management of their contract activities aimed at choosing a supplier of equipment or technology and determining the basic terms of the contract within their financial plan. In this regard, there arises an objective need to use effective models of technological exchange management, which allow at the stage of concluding a leasing contract to determine the most favorable conditions for a business entity [7, 8].

For an economic object carrying out technological exchange, the most urgent task is a clear and transparent planning of the income and expenditure parts of the financial plan. Since the financial and economic activity of an economic object is directly related to the contractual one, the most reliable and efficient planning method is the calculation of plans based on the concluded leasing contracts [9].

Since the most important issue when concluding a leasing contract is the price of equipment (technologies) supply, it is important for the lessee to determine its limit value, below which the conclusion of a leasing contract becomes economically inexp{edient.

As the maximum permissible price{ set for equipment (technology) supplied against a lease contract, its cost can be taken, determined on the base of the costs of its production (development) in the budgeting system of an economic object [7, 10].

Let us give a formal description of planning the lessee's budgets based on leasing contracts and determining the cost price using budgeting models.

Let B is the set of financial plans of the lessee:

$$B = \{b_i\}, i = \overline{1, N^B}, \quad (1)$$

where N^B is the cardinality of the set,

b_i - i-th element of the set. The structure of the i-th financial plan:

$$b_i = \{b_{in}, b_{ib}, b_{ie}\}, \quad (2)$$

where b_{in} is the name of the i-th financial plan;

b_{ib} - a start date of the i-th financial plan;

b_{ie} - an expiration date of the i-th financial plan.

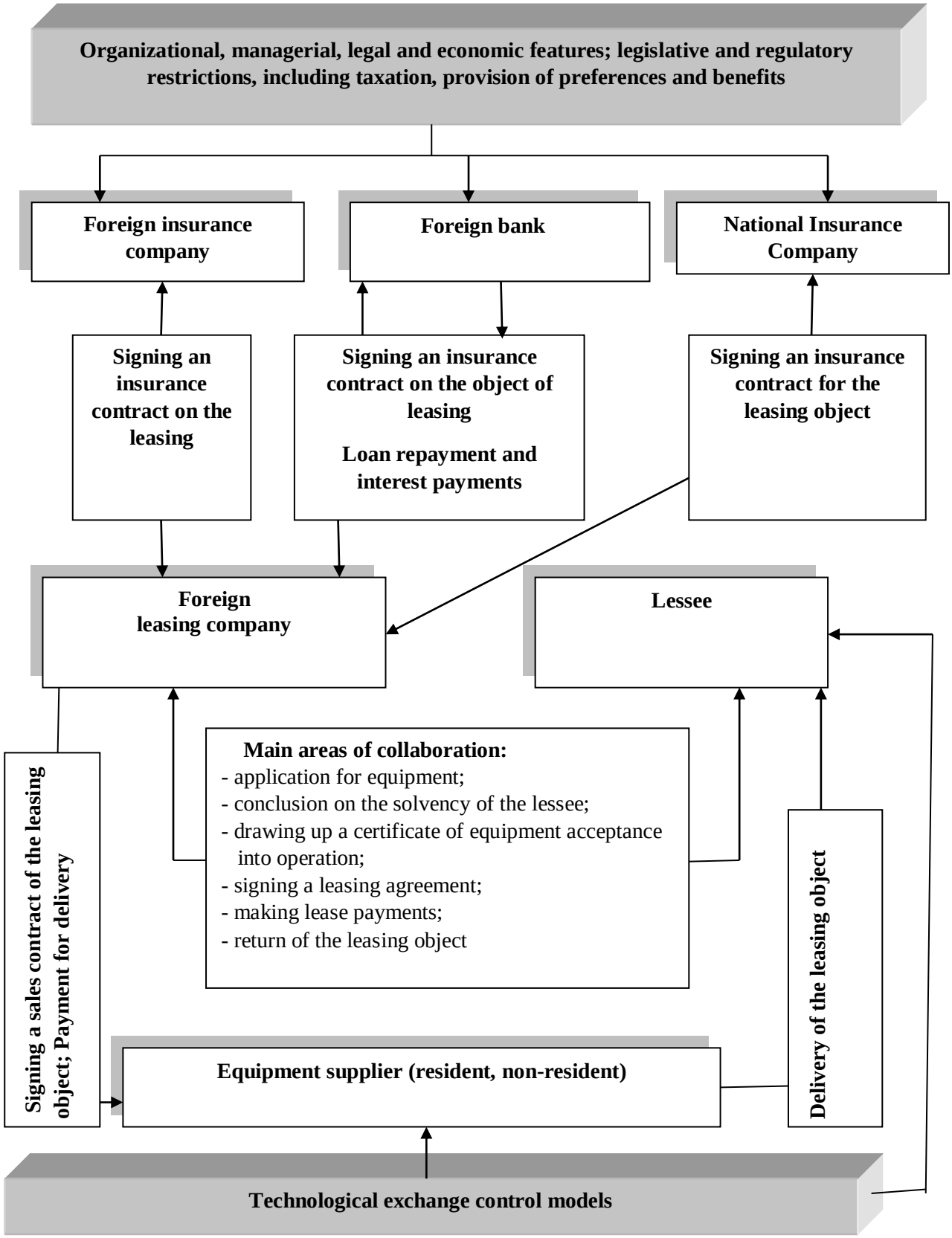

Fig. 1. Scheme of technological exchange in the process of international leasing operations
Source: developed by the author

A set of planning documents d_i^b is uniquely assigned to each financial plan b_i.

$$d_i^b = \{d_{ijb}^b, d_{ije}^b\}, \quad (3)$$

where d_{ijb}^b is the start date of the j-th planning document of the i-th financial plan;

d_{ijb}^b - an expiration date of the j-th planning document of the i-th financial plan;

N_i^d - the number of planning documents of the i-th financial plan.

Taking into account the definition of the lessee's budget, the following condition is fulfilled in the process of technological exchange in the form of leasing:

$$b_{ib} \le d_{ijb}^b,\ b_{ie} \ge d_{ije}^b\ \forall i = \overline{1, N^B},\ j = \overline{1, N_i^d}. \quad (4)$$

We will assume that in the lessee's budgeting system, income (expenses) are planned on a monthly basis.

Each planning document d_{ij}^b corresponds with many items of budget planning documents, according to which expenses or cash income is planned.

$$S_{ij}^{db} = \{s_{ijk}^{db}, p_{ijk}^{db}, f_{ijk}^{db}\},\ k = \overline{1, N_{ij}^{db}}, \quad (5)$$

where s_{ijk}^{db} is the k - th item of the j - th planning document of the i - th financial plan of the lessee;

p_{ijk}^{db} - the planned amount of income (expenses) on the k-th item of the j-th planning document of the i-th financial plan of the lessee;

f_{ijk}^{db} - the actual amount of income (expenses) on the k-th item of the j-th planning document of the i-th financial plan of the lessee;

N_{ij}^{db} - the number of items of the j-th planning document of the i-th financial plan of the lessee, according to which records are kept.

$$s_{ijk}^{db} \in S,\ \forall i = \overline{1, N^B}, \forall j = \overline{1, N_i^d},\ \forall k = \overline{1, N_{ij}^{db}}, \quad (6)$$

S is a set of items of the lessee's financial plan for which records are kept.

The item set is divided into two subsets: the income item subset S^+ and the expense item subset S^-. Then:

$$S = S^+ \cup S^-. \quad (7)$$

Let B^* is the general budget of the lessee's income and expenses.

$$B^* = \{b_n^*, b_b^*, b_e^*\}, \quad (8)$$

where b_n^* - the name of the general financial plan of the lessee;

b_b^* - the start date of the lessee's general financial plan;

b_e^* - the date of expiry of the lessee's general financial plan.

The general financial plan of the lessee B^* is unambiguously associated with many planning documents.

$$d^{*b} = \{d_{jb}^{*b}, d_{je}^{*b}\}, \quad (9)$$

where d_{jb}^{*b} is the start date of the j-th planning document of the lessee's general financial plan B^*;

d_{je}^{*b} - the date of the end of the j-th planning document of the general financial plan of the lessee B^*.

Given the definition of the lessee's financial plan, the following condition will be met:

$$b_b^* \le d_{jb}^{*b}, b_e^* \ge d_{je}^{*b} \ \forall j = \overline{1, N^{*d}}, \quad (10)$$

where N^{*d} is the number of planning documents for the lessee's general financial plan.

Each planning document d_j^{*b} corresponds with many items of planning documents of the lessee's general financial plan S_j^{*db}, according to which planning is carried out or funds are received.

$$S_j^{*db} = \{s_{jk}^{*db}, p_{jk}^{*db}, f_{jk}^{*db}\}, k = \overline{1, N_j^{*db}}, \quad (11)$$

where s_{jk}^{*db} is the k - th item of the j - th planning document of the general financial plan of the lessee B^*;

p_{jk}^{*db} - the planned amount of income (expenses) under the k-th item of the j-th planning document of the general financial plan of the lessee B^*;

f_{jk}^{*db} - the actual amount of income (expenses) under the k-th item of the j-th planning document of the general financial plan of the lessee B^*;

N_j^{*db} - the number of items for which the records are kept, of the j-th planning document of the general financial plan of the lessee B^*.

$$p_{jk}^{*db} = \sum_{i=1}^{N^B} p_{ijk}^{db}, \forall k = \overline{1, N_{ij}^{db}} j = \overline{1, N_i^d} : d_{jb}^{*b} = d_{ijb}^b, d_{je}^{*b} = d_{ije}^b, \quad (12)$$

$$f_{jk}^{*db} = \sum_{i=1}^{N^B} f_{ijk}^{db}, \forall k = \overline{1, N_{ij}^{db}} j = \overline{1, N_i^d} : d_{jb}^{*b} = d_{ijb}^b, d_{je}^{*b} = d_{ije}^b. \quad (13)$$

Let T be the set of leasing contracts of the lessee that he can conclude in the field of technological exchange.

$$T = \{t_i\}, i = \overline{1, N^T}, \quad (14)$$

where N^T is the number of leasing contracts of the lessee;

t_i - i-th lease contract of the lessee,

$$t_i = \{z_i, c_i, a_i^D, M_{ij}^A, a_{ij}^P, t_i^C, b_i^T\}, j = \overline{1, N_i^D}, \quad (15)$$

where z_i is a criterion of whether the lease contract is expendable or profitable (if $z_i = 1$, then the lease contract is profitable, if $z_i = -1$, then the lease contract is expendable);

$z_i = -1$ - a lot of data about the counterparty with whom a leasing contract can be made;

a_i^D - a lot of periods of delivery of equipment (technologies) of the i-th lease contract;

M_{ij} - a set of equipment (technologies) of the j-th delivery period of the i-th leasing contract;

a_{ij}^{P} - a set of sub-periods of the delivery payment made in the j-th delivery period of the i-th leasing contract;

t_i^C - the cost of the leasing contract;

b_i^T - a lot of sources of financing, the fulfillment of which includes cash receipts on the i-th leasing contract.

Thus, the proposed model for managing technological exchange will allow the lessee of equipment (technologies) to determine the most favorable conditions at the stage of leasing contract making.

Conclusions. The conducted scientific research leads to the following conclusions:

1. Technological exchange in the form of leasing is not just a financial agreement - it has both features of investment and innovation processes and features of credit relations. Given the complexity of the regulation of the rights and obligations of international leasing transactions, an objective need arose for modeling the organizational and economic mechanism of technological exchange in the form of leasing, standards unification of leasing activities and neutralizing the problems arising from differences in national legislation in the field of leasing transactions accounting.

2. The main advantages of technological exchange in the form of leasing include the following:

- sometimes it is actually the only source of transfer for assets use, the export and import of which is controlled by the state;
- it is an additional source of financing for the acquisition of foreign assets;
- it provides the country with sustainable long-term financing in conditions of unstable interest rates;
- it helps to diversify the investment portfolio and reduce the political risks of the lessee country.

3. Technological exchange in the form of leasing makes it possible to reduce the period of obsolescence of equipment without significant costs, contributes to the development of service divisions and after-sales service divisions.

4. Developed on the basis of the principles of system dynamics, the economic and mathematical model for technological exchange managing in the form of leasing allows the lessee of equipment (technologies) to determine the most favorable conditions at the stage of making a leasing contract.

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