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# FEATURES OF THE IMPLEMENTATION OF INTERNATIONAL TECHNOLOGY TRANSFER PROJECTS IN THE AGRO-INDUSTRIAL SECTOR

## ОСОБЛИВОСТІ РЕАЛІЗАЦІЇ ПРОЕКТІВ МІЖНАРОДНОГО ТРАНСФЕРУ ТЕХНОЛОГІЙ В АГРОПРОМИСЛОВОМУ СЕКТОРІ

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An enterprise of any form of ownership at the stage of active development and stable entrepreneurial activity begins to expand economic ties and seeks to enter foreign markets. The trends of globalization in the world economy and informatization of society, which have recently become the most discussed topics among foreign and domestic scientists, have provoked not only the emergence of new globalized needs, their unification and universalization, made the consumer more informed and demanding in their choice, but also changed certain principles of consumption, increased society's fastidiousness to environmental friendliness, energy-saving qualities of goods, safety of consumption, etc. The article develops practical recommendations on the advantages and disadvantages of the supply of agricultural equipment in the context of in-depth international cooperation. The development of this strategy for the supply of agricultural equipment has certain features, it must take into account the laws, international standards, traditions of the countries, corporations and markets to which it is planned to enter.

**Keywords:** international transfer, enterprise, equipment, agricultural equipment, management, international activity, production, international cooperation, agricultural sector.

Сучасна міжнародна співпраця створює надзвичайно великі перспективи для вітчизняних підприємств агропромислового сектору. Підприємство будь-якої форми власності на стадії активного розвитку та стабільної підприємницької діяльності починає розширювати економічні зв'язки та прагне вийти на зовнішні ринки. В умовах сьогодення, враховуючи системні кризи, конкуренцію серед суб'єктів господарювання та зміни, головною умовою виживання на ринку є їхня здатність до інвестиційно-інноваційної діяльності та реалізації проектів міжнародного трансферу технологій. Зарубіжні підприємства використовують трансфер технологій як спосіб просування на міжнародний ринок, а для українських підприємств – це можливість формування інноваційної системи на комплексній основі. Трансфер технологій є інструментом поширення та впровадження технологій. Постачання є однією із частин логістики, зокрема міжнародної, яка включає закупівлю, транспортування обладнання, внутрішню його перевірку та зберігання закупленого. Впровадження та комерціалізація конкурентоспроможних передових технологій, ефективний технологічний обмін розширяють можливості високотехнологічного імпорту та експорту, сприятимуть запровадженню єдиних норм економічного розвитку та налагодження співробітництва у цій сфері між Україною та передовими країнами світу. У статті розроблено



практичні рекомендації щодо переваг та недоліків постачання сільськогосподарського обладнання в умовах поглибленої міжнародної співпраці. Вирішено ряд завдань, зокрема: досліджено переваги та недоліки постачання обладнання; виокремлено особливості та доцільність постачання сільськогосподарського обладнання в умовах поглибленої міжнародної співпраці; розглянуто методи постачання сільськогосподарського обладнання в умовах поглибленої міжнародної співпраці; досліджено загальну характеристику діяльності ТзОВ «Агротехніка» та його основні показники фінансово-економічної та зовнішньоекономічної діяльності; та визначено особливості постачання сільськогосподарського обладнання даного підприємства. Для цього використані статистичний та графічний методи, фінансово-економічний аналіз, метод порівняння та узагальнення експертних оцінок. Розроблено стратегію постачання сільськогосподарського обладнання, яка враховує певні особливості. А саме вона повинна враховувати закони, міжнародні стандарти, традиції країн, корпорацій і ринків, на які планується вихід. Подано практичні рекомендації щодо переваг та недоліків постачання сільськогосподарського обладнання в умовах поглибленої міжнародної співпраці.

**Ключові слова:** міжнародний трансфер, підприємство, обладнання, сільськогосподарське обладнання, управління, міжнародна діяльність, виробництво, міжнародна співпраця, аграрний сектор.

**Staging problems.** Large-scale global globalization processes directly affect the importance of the foreign economic sector in the country's economy. The main element of the country's foreign economic sector is international cooperation. The organization of the supply of material and technical means is designed to provide enterprises, in particular the agro-industrial sector, with agricultural equipment of all kinds, inventory, etc. Therefore, properly organized material and technical support is of great importance for the normal functioning of an enterprise in the agro-industrial sector, the implementation of the production program and a high culture of customer service.

**Analysis of the latest research and publications.** Many scientists and scientists have paid attention to the issue of equipment supply in the context of in-depth international cooperation. Among them F. Kotler, G. Armstrong, A. Dayan, T. Levitt, as well as V. I. Belyaev, A. F. Pavlenko, L. V. Balabanova and many others. The specifics of the supply of agricultural equipment are in the field of view of leading international institutions. Scientific works of scientists are also devoted to them, including: Musienko N., Baranovska S. [1], T. E. Ostriukova [2]. Theoretical and methodological foundations of logistic management of agricultural enterprise are set forth in the works of O. I. Galenko [3]. The theoretical foundations of procurement logistics are disclosed in the works of Eganov O. Y., Dumenco K. M., Bandura V. M., Gaisha O. O., Aramyanyan A. M., Kairov O. S., Pylypenko S. M. [4].

**Highlighting previously unresolved parts of the general problem.** Properly organized material and technical support is of great importance for the normal functioning of an agricultural enterprise, the implementation of a certain production program and a high culture of

customer service. Accordingly, it is necessary to study the features of the supply of agricultural equipment and, in particular, to highlight its advantages and disadvantages in the context of deepening international cooperation.

**Formulation of the goals of the article (statement of the task).** The purpose of the study is to highlight the essence of the supply of agricultural equipment, to determine the capabilities of Ukraine and its enterprises of the agro-industrial sector in establishing international cooperation.

**Presentation of the main material of the research.** The domestic market of the agro-industrial sector continues to feel the consequences of the full-scale invasion of the Russian Federation on the territory of Ukraine, which caused a significant decrease in imports of agricultural machinery to the country, but over the past year there has been a certain slowdown in this process. Given the current conditions, Ukraine does not have enough of its own production of agricultural machinery, so it depends on imports of this type of equipment from other countries. According to the State Statistics Service of Ukraine, in 2023, Ukraine imported agricultural machinery worth USD 1.2 billion. This accounted for 3.4% of total imports of goods. The main suppliers of agricultural machinery for Ukraine were Germany (18.9%), Poland (14.8%), China (12.7%), the USA (10.4%) and Italy (7.6%) [5]. The volume of exports of products of the agro-industrial sector prevails over the export of goods of the metallurgical sector, although for decades these have been quite equivalent channels for bringing foreign exchange earnings into the Ukraine. As for equipment, electrical machinery (5.1%): insulated wires, cables, electric heaters, telephones, alarm equipment and other electrical accessories. According to the Ministry of Agrarian Policy of Ukraine,

the total amount of losses caused to the agricultural sector as a result of the large-scale Russian invasion of Ukraine as of September 15, 2023, reached USD 6.6 billion. United States. At the same time, indirect losses in Ukraine's agriculture due to a decrease in production, the blockade of ports and an increase in production costs are estimated at USD 34.25 billion. (in particular, in crop production due to a decrease in production – 11.2 billion US dollars; in animal husbandry – 348.7 million US dollars; losses due to a decrease in the production of winter crops are estimated at 3 billion US dollars; perennial crops – at 322 million US dollars; losses due to logistics disruption amount to 18.5 billion US dollars). The total number of business entities of the agro-industrial complex that suffered losses as a result of the armed aggression of the Russian Federation, is 2653 units. (the area of arable land decreased by 1.9 million hectares, perennial plantations – by 9 thousand hectares). In addition, an area of about 1 million hectares needs to be inspected for the presence of explosive objects [5].

One of the key trends in the agricultural machinery market in 2023 is the growth in imports of low-power tractors, in particular those with a capacity of less than 18 kW. This is especially noticeable in the category of new and used tractors, where 3194 units of new and 831 units of used tractors were imported in January-July 2023. Compared to the same period in 2022, this increase is 20.6% and 16.9%, respectively. This increase in imports of low-power tractors indicates a change in the demand and strategies of agricultural enterprises due to the difficult market situation. On the other hand, imports of agricultural machinery in categories with high engine power show a decline in both quantity and value. For example, imports of tractors with an engine power of 75 to 130 kW decreased by 32.55% in quantity and 23.2% in value. Also, tractors with an engine power of more than 130 kW decreased by 12.5% in number and by 4.5% in cost. These dynamics indicate the influence of geopolitical and economic factors on the choice of equipment by farmers and agricultural enterprises. In January-July 2023, there is also a decrease in imports of combine harvesters – by 13.8% in quantity and by 30.3% in value. The number of imported cultivators decreased even more – by 46%, and their customs value – by 29.2%. A significant reduction in imports of sowing equipment in quantitative terms – by 53.1% – is explained by a significant reduction in imports of cheap Chinese equipment. Against

the background of a general reduction in the volume of imports of agricultural machinery to Ukraine in 2023, there is an increase in imports of plows and disc harrows. This trend can be explained by an increase in imports of cheap Chinese-made products and an increase in the customs value of products from European manufacturers. According to forecasts, in 2024, the agricultural machinery market will continue to decrease compared to 2023 to about 20–25% [6]. This decline is due to various factors, such as the crisis in the country's economy, inflation, reduced agricultural production, and a shortage of energy resources. Against the background of these challenges, there is an increase in imports of used equipment, spare parts and the restoration and restoration of old equipment. To carry out successful activities in foreign markets, it is necessary to conduct a thorough situational analysis, which is based on the development of certain expert-import systems that allow taking into account the uncertainty of market information. The need of the economy for items of material and technical support is determined depending on their capacity on the basis of standards for one enterprise, place or one employee. The following requirements are imposed on the organization of the supply of material and technical equipment: timeliness and completeness of delivery; continuity and high quality, namely compliance with current standards and conditions; cost-effectiveness, which involves the correct choice of the form of supply, etc. Items of material and technical equipment include: technological equipment, equipment for moving cargo, technological and household equipment, devices, overalls and uniforms, furniture, non-standard equipment, paper, paper products, advertising inventory, building materials, fuel. The need for appliances, furniture and inventory is calculated according to the equipment standards enterprises, appliances, furniture and inventory. Equipment and items of technical equipment of the farm are accepted in terms of quantity and quality. We will conduct a study of the activities of Agrotechnika LLC. Table 1. the main economic indicators of the activity of Agrotechnika LLC are presented and in Figure 1 – the dynamics of income from the sale of exports of agricultural products.

In the process of designing, manufacturing and selling products of agricultural engineering enterprises, there is a constant interaction of various participants in the industry, which is divided into external and internal. For more than 15 years, Agrotechnika LLC has been

Table 1

Main economic indicators of Agrotechnika LLC

Salary No.	Performance indicators of the enterprise	Actual data for periods, thous. UAH.				
		2021	2022	Deviation	2023	Deviation
1	Income (revenue) from the sale of products, thousand UAH.	6267,1	48543,1	42276	39746,4	-8796,7
2	Income (revenue) from the sale of export products, thousand tons UAH.	672,4	2274,5	1602,1	1836,7	-437,8
3	Net profit (loss), thousand UAH	3250,3	2738,2	-512,1	2621,5	-116,7
4	Fixed assets	19052,5	18033,2	-1019,3	16733,2	-1300
5	Material costs	2285,5	4282,4	1996,9	3766,3	-516,1
6	Other operating expenses	4498,8	1084	-3414,8	1384,3	300,3

Note: formed by the authors on the basis of the data of Agrotechnika LLC

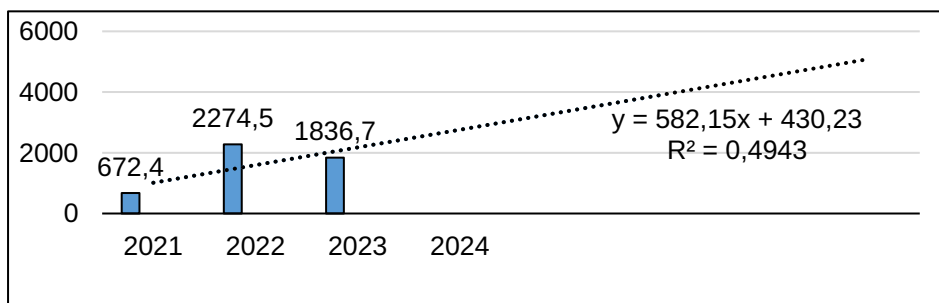


Figure 1. Dynamics of income (revenue) from the sale of export products. Agrotechnika LLC for the period 2021–2023, thousand tons UAH

Note: formed by the authors on the basis of the data of Agrotechnika LLC

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supplying high-tech equipment and machinery for agricultural enterprises of Ukraine from leading European manufacturers. Among the products offered by the company are equipment for milking cattle, equipment for harvesting feed and feeding animals, equipment for comfortable keeping of animals, front loaders and trailers with reloaders. In addition, the company manufactures tillage equipment, machines for potato growing, forage harvesting equipment, spare parts for machines of its own production and other agricultural machinery, and provides their service. The company is constantly working on the improvement of agricultural machinery that meets the quality indicators of the most modern technologies of chemical treatment of plants and meets the most stringent requirements of labor and environmental protection. Agrotechnika Ltd. cooperates with many foreign enterprises, systematically participates in various international and industry exhibitions and fairs of agricultural machinery, constantly works to improve the technical level of its products. It exports its products to Moldova, Slovakia, the

Baltic countries, maintains business relations with Italy and Germany. It is also increasing international cooperation with China.

Today, more than 4 thousand items of machinery and equipment are manufactured, which makes it possible to perform almost all technological operations in agro-industrial production.

The export of domestic machinery, carried out to 44 countries of the world, has fallen over the past five years, and the main exported machines are tillage equipment, machines for potato growing, mills, machines for chemical plant protection (trailed and mounted sprayers), etc.

With the arrival of a new investor at the enterprise, new opportunities are opening up for the company in the revival of stable sales of agricultural equipment from abroad, as well as the establishment of contacts with foreign suppliers of spare parts, as well as the exchange of new achievements in the field of science with them. With accession to the world market, the question of the competitiveness of products and services inevitably arises.

Therefore, the determining criterion of the competitiveness of Agrotechnika LLC, and at the same time the success, is the understanding and satisfaction of the needs and requirements of buyers of the world market. The main tasks to improve the organization of the supply of agricultural equipment are: correct determination of the need for raw materials, equipment, fuel, inventory; development of optimal supply schemes for enterprises; timely conclusion of contracts with suppliers and motor transport companies; exercising control over the sale of goods or services and the fulfillment of contractual obligations; ensuring uninterrupted timely and complete supply of materials, inventory and equipment to the enterprise; economical consumption of raw materials due to their better transportation, etc.; timely quantitative and qualitative acceptance and release by financially responsible persons. Taking into account that the delivery of goods is the final stage of the execution of the contract of sale, at which the transfer of goods from the seller to the buyer takes place, the final financial settlement is made at the end of the transaction. The delivery of the goods may take the form of direct delivery of the goods to the buyer or delivery by transport to a specified place. Purchasing decisions are based on factors of delivery, handling, marginal benefit, and market price fluctuations. The main task of the company's supply authorities is to provide production with the necessary material resources of appropriate completeness and quality in a timely and optimal manner.

A set of organizational, economic, technical and economic measures aimed at providing the commodity mass of trade enterprises, which include Agrotechnika LLC, has proven itself. Equipment must meet the requirements of traffic safety, labor protection, ecology and fire safety.

The purpose of supply is to ensure that the company receives the necessary raw materials, materials, goods and services in the right time in the right place, from a reliable supplier, timely fulfillment of its obligations, with good service (both before and after the sale) and at a favorable price. As for *the organizational factors*, we can focus on the order of work on the supply of goods (planning and organizing the replacement of equipment of the main production; replacement and replenishment of equipment of auxiliary production). For this purpose, an analysis of the technical and economic level of production is carried out; patent information, the results of research work are studied; the needs of the equipment are determined; the volume of investments and the sources of their coverage are determined; a reconstruction plan is drawn up; The economic efficiency of the planned activities is determined. *Economic factors include (price, financial costs for maintenance, the amount of activity costs, the level of costs, the volume of turnover, etc.)*. And we will refer to the technical and economic factors as *an example (raw materials, material, volume, structure, etc.)*.

Table 2. We will determine the advantages and disadvantages of the implementation of

Table 2

**Advantages and disadvantages of the implementation  
of international technology transfer projects of Agrotechnika LLC**

Advantages	Disadvantages
The possibility of a better and more prompt study of the market, and therefore the ability to quickly adapt production to the changed conditions.	<i>The product (equipment)</i> does not always meet the requirements of traffic safety, labor protection, ecology and fire safety.
Price criterion (correspondingly lower purchase price)	Failure to comply with the requirements for the order and delivery of material resources in terms of quality, size and dimensions
Rhythmic and timely support of the production process	The quality of foreign (Chinese) equipment does not always meet GOSTs and standards and is not high enough and sometimes worse than domestic brands
Availability of consumables and spare parts	Non-compliance with delivery times. The timing of equipment delivery is not entirely clear
Reduced production costs	VAT tax benefits do not apply
Avoiding shortages	There is no state compensation for buyers of foreign equipment

Notes: grouped by the authors by [3; 5]

international technology transfer projects of Agrotechnika LLC.

In the activities of an enterprise in the agro-industrial sector, the quality of services is the most important indicator, as it largely determines its survival in market conditions.

Therefore, when purchasing certain equipment, we must take into account the production or use of quality products – this is one of the most reliable ways for the company to ensure its way to achieve high profits.

The quality of products is influenced by a large number of factors. Classification of factors influencing product quality: *external factors*: technical (level of development of equipment and technology, R&D, frequency of innovations); socio-cultural (type of consumer culture, standard of living of the population, demographic situation); economic (level of income of the population, financing of scientific research, support programs); human factor (qualifications, education, general erudition, experience, attitude

to work, gender, age). *Internal factors*: technical (type of manufactured products; condition of equipment; quality of materials); organizational (planning, rhythm of work, organization of work and rest, provision of materials); economic (the amount of wages, the content of defects, the cost of production); social (recruitment, advanced training of employees). Thus, product quality is a multi-level, systemic category that reflects the ability of an organization to meet the needs of all parties interested in its activities, while achieving sustainable development in a constantly changing competitive environment.

The trend of the last ten years has been the transition from domestic equipment for the provision of agricultural services to imported ones. That is why the supply process is based on the rhythmic and timely provision of the production process with the necessary equipment.

Failure to comply with the terms of delivery of products at any stage causes violation of the terms of production of intermediate or

Table 3

**Features of the implementation of international technology transfer projects in the agro-industrial sector and recommendations for their implementation**

Features	Recommendations
Settlement of the issue with the lease of premises and equipment	Tenants and landlords must agree to settle issues related to the lease of premises or equipment. In cases where there is no mutual understanding, the Chamber of Commerce and Industry must issue certificates of force majeure circumstances, with which you can defend your interests in court.
Non-compliance with delivery deadlines (rhythmic and timely provision of the production process)	Many enterprises are not operating at full capacity, as the number of employees has decreased. Basically, these issues do not relate to force majeure. In these cases, companies choose a different strategy: some agree with partners on new delivery times, while others stock up on raw materials for 2-3 months in advance.
Repayment of business loan obligations to banks	This is a particularly acute problem for entrepreneurs, micro and small businesses whose work is suspended during quarantine or temporary <i>suspension of land relations under martial law</i> . According to the law, the lack of money is not force majeure, and the loan must be repaid even during the quarantine period. However, as of today, banks have already begun to provide loan repayment holidays to micro and small businesses in the form of deferred payments on the body of the loan for up to several months (for example, Oschadbank).
Delay in export due to queues at customs	According to the law, such circumstances are not force majeure. The Chamber of Commerce and Industry advises to work out logistics issues based on operational information on the workload of checkpoints.
Non-fulfillment of obligations by partners	The problem arises with the introduction of quarantine and the declaration of martial law in the countries where the counterparty is located. In this case, the Chamber of Commerce and Industry can help to find out about the financial condition of the partner. The best option is to check information about the financial condition of the counterparty before entering into a transaction.

Notes: formed by the authors by [2–3; 5]

final finished products in the subsequent links of the chain.

At the same time, non-compliance with the requirements in accordance with the order and the supply of material resources in terms of quality, dimensions and dimensions that do not meet it, leads to an increase in the cost of products.

In turn, timely delivery of material resources of the required quality for production, completeness and assortment allows you to reduce labor costs for the manufacture of products and time losses due to equipment downtime in the absence of material resources. Thus, the quality of the production functions or services performed depends on the high-quality functioning of the supply not only in this particular link, but also in all subsequent stages of production. Thus, having

highlighted the advantages and disadvantages of the implementation of international technology transfer projects of this enterprise, we can focus on the features and recommendations for their implementation (Table 3).

**Conclusions.** Regarding the development of the implementation of international technology transfer projects, it is necessary to take into account the advantages and disadvantages of the supply of equipment, the purpose of which is to ensure that the enterprise of the agro-industrial sector receives the necessary raw materials, materials, goods and services at the right time and in the right place, from a reliable supplier, as well as the timely fulfillment of its obligations, with good service (both before the sale, and after it) and at a bargain price.

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