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Vertical Partnership Arrangements as a Tool for Strengthening the Resilience of Agricultural Enterprises Under Martial Law in Ukraine and European Integration

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ABSTRACT

The full-scale war has sharply increased the dependence of Ukrainian agricultural enterprises on the quality of coordination along the "raw material producer – processor – exporter" chain, especially in the sunflower oil segment, where logistics disruptions, shortages of working capital and volatility of world prices directly affect the resilience of all market participants. The purpose of the study is to substantiate vertical partnership arrangements between sunflower seed producers and processing enterprises as a tool for strengthening the resilience of agricultural enterprises under martial law and European integration. The methodological framework combines structural-logical, comparative and analytical methods with elements of the institutional and value chain approaches. The empirical base includes USDA, FAO and UNCTAD data, sectoral market reviews and recent academic studies on vertical coordination, contract farming, agricultural value chain finance and the impact of war on the Ukrainian agricultural sector. The study shows that a predominantly spot-based interaction model intensifies price asynchrony, causes uneven deliveries, raises transaction costs and complicates the fulfilment of export contracts during periods of logistical stress. Partnership arrangements based on formula pricing, agreed delivery schedules, staged payments, advance financing and logistics booking reduce the risk of idle processing capacity, improve the predictability of raw material supply and support the producer's financial liquidity. It is also demonstrated that, under European integration, such arrangements acquire an additional function by facilitating compliance with quality requirements, traceability and digital sales support. Vertical partnership arrangements should be treated as a managerial mechanism for stabilizing agribusiness rather than as an auxiliary form of cooperation. Their practical implementation can reduce vulnerability to wartime and market shocks, strengthen contractual discipline and support the continuity of export-oriented processing.

KEYWORDS

sunflower oil, vertical coordination, agricultural enterprises, partnership arrangements, resilience, martial law, European integration.

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СОЦІАЛЬНИЙ РОЗВИТОК: економіко-правові проблеми

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Вертикальні партнерські взаємодії як інструмент підвищення стійкості аграрних підприємств в умовах воєнного стану в Україні та євроінтеграції

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СТАТТЯ

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АНОТАЦІЯ

Повномасштабна війна різко підвищила залежність українських аграрних підприємств від якості координації вздовж ланцюга «виробник сировини – переробник – експорт», особливо у сегменті соняшникової олії, де логістичні збої, дефіцит оборотного капіталу та волатильність світових цін безпосередньо впливають на стійкість усіх учасників ринку. Мета дослідження полягає в обґрунтуванні вертикальних партнерських взаємодій між виробниками насіння соняшнику та переробними підприємствами як інструменту підвищення стійкості аграрних підприємств в умовах воєнного стану та євроінтеграції. Методичну основу становлять структурно-логічний, порівняльний і аналітичний методи, елементи інституційного та ланцюгового підходів, а також інтерпретація статистичних і аналітичних матеріалів USDA, FAO, UNCTAD, галузевих оглядів та сучасних академічних праць із проблем вертикальної координації, контрактних моделей і стійкості агропродовольчих ланцюгів. Встановлено, що спотова модель взаємодії між виробником сировини та переробником посилює цінову асинхронність рішень, провокує нерівномірність поставок, підвищує транзакційні витрати й ускладнює виконання експортних контрактів у періоди логістичних збоїв. Показано, що партнерські моделі співпраці з формульним ціноутворенням, погодженими графіками відвантаження, етапними платежами, елементами авансування та логістичним бронюванням знижують ризик простою переробних потужностей, покращують прогнозованість сировинного забезпечення і зміцнюють фінансову ліквідність виробника. Доведено, що в умовах євроінтеграції такі моделі мають додаткову цінність, оскільки спрощують узгодження вимог до якості, простежуваності та цифрового супроводу збуту. Вертикальні партнерські взаємодії доцільно розглядати як управлінський механізм стабілізації аграрного бізнесу, а не як допоміжну форму кооперації. Їх практичне впровадження дає змогу зменшити вразливість до воєнних і ринкових шоків, підвищити контрактну дисципліну та підтримати безперервність експортоорієнтованої переробки.

КЛЮЧОВІ СЛОВА

соняшникова олія, вертикальна координація, аграрні підприємства, партнерські взаємодії, стійкість, воєнний стан, євроінтеграція.

1. Introduction

For Ukrainian agricultural enterprises involved in the production and processing of sunflower, the issue of sustainability is no longer reduced to yield or current price conditions. Martial law has made critical the ability of participants in the value chain to agree on delivery times, settlement terms, logistics routes, and quality parameters in a mode of increased uncertainty.

In the segment of sunflower oil, the problem is of particular importance, since the processing link turns Ukraine's raw material advantage into foreign exchange earnings and a stable presence in foreign markets. In the absence of stable vertical links, logistical disruptions, liquidity shortages, price volatility and a change in the regulatory environment quickly transform into losses for both the seed producer and the processor.

2. Literature Review

The modern body of research on vertical coordination in the agricultural sector has shifted from a general description of contractual relations to an analysis of specific mechanisms through which coordination affects the sustainability, costs and competitive positions of participants in the value chain. The theoretical basis of this direction remains the transactional approach of Williamson, within which the choice of the organizational form of interaction is determined by the level of uncertainty, the specificity of assets, the frequency of transactions and the costs of monitoring the implementation of agreements [18]. In the applied dimension, Stonehouse and Snowdon, interpreting the logic of competitive advantage, show that a stable position in the market is formed not only through production parameters, but also through the ability of the enterprise to build coordinated strategic configurations of supply, processing and sales [16]. Against this background, Mugwagwa et al. prove that the effectiveness of contract farming depends not on the very fact of concluding a contract, but on the correspondence of its type to a specific combination of market risks, information asymmetry and coordination costs [11]. A similar logic is developed by Ba et al., who consider vertical coordination as a continuum of organizational decisions between the spot market and deeper integration, emphasizing that the inclusiveness and economic return of such models are determined by the design of incentives, risk allocation and negotiation architecture between the parties [1].

A separate layer of literature is formed by works on the competitiveness of the agricultural sector in the context of the digitalization of market interaction. Perehuda and Korobova substantiate that digital marketing tools in the agricultural sector do not perform an auxiliary communication function, but become a tool for regulating competitiveness through the expansion of demand analytics, more accurate market positioning and faster adjustment of sales decisions [13]. In the adjacent dimension, Charlebois et al. demonstrate that digital traceability in agri-food value chains reduces verification costs, increases trust in the origin of products, and simplifies access to more demanding market segments [3]. Pakseresht et al., in a systematic review of blockchain technologies, show that digital architectures have the greatest value where the issues of quality verification, data immutability and distributed trust directly affect the execution of contracts and minimization of non-compliance risks [12]. For the study of partnerships between sunflower seed producers and processors, these conclusions are important because the competitive position is increasingly determined not only by the price of raw materials, but also by the ability of the parties to ensure the predictability of deliveries, transparency of quality parameters and manageability of contractual conditions.

For the Ukrainian context, research on the impact of the full-scale war on agricultural production, exports, and logistics has become crucial. Jagtap et al. show that the Russian-Ukrainian war has caused not only physical disruptions in supply chains but also a systematic revision of trade configurations, delivery routes, and risk insurance mechanisms in the global food space [9]. Poursina et al. analyzing the economic effects of the Black Sea Grain Initiative, demonstrate that institutional decisions in the field of logistics can directly affect prices, trade flows, and profitability of agricultural exports [14]. Countryman et al. quantify the scale of the reduction in Ukrainian agricultural exports as a result of war shocks, emphasizing that export losses are the result not only of a drop in production, but also of a disruption in throughput and an increase in the cost of logistics [4]. Steinbach and Goyal additionally show that even individual political and logistical events related to the functioning or curtailment of the

Black Sea route cause significant price fluctuations in agricultural commodity markets and change the expectations of trade participants [7; 15].

The military-logistical dimension of Ukrainian agricultural exports is most fully covered in the works, where the object of analysis is infrastructure restrictions, alternative routes and cost consequences of restructuring supplies. The World Bank, in a special report on the transport and logistics system of Ukraine, states that the long-term sustainability of exports depends on the synchronization of port, railway, border and warehouse infrastructure, as well as on the reduction of transaction losses at the joints between individual links of the transport chain [19]. Yanovska et al. specify this logic for Ukrainian grain exports, identifying the most critical bottlenecks of military logistics and arguing the priority of solutions that reduce delays, overloads and costs on the routes of movement of agricultural products [20]. For the sunflower and sunflower oil market, this arrangement is of particular importance, since the effectiveness of interaction between the producer of raw materials and the processor depends not only on the purchase price, but also on the ability of the parties to synchronize the rhythm of supplies with logistics windows, inventory turnover and the risks of disruption of export contracts.

Another important area of literature concerns regulatory requirements for the quality and safety of agricultural products in the European market. The European Commission's norms on the maximum permissible levels of pesticide residues set strict parameters for product acceptability and form a basic level of regulatory discipline for exporters [6]. The 2023 ACN Network Review shows that food safety control in the EU increasingly relies on mechanisms for rapid detection of non-conformities, interstate coordination and evidentiary traceability [14]. The practical dimension of these requirements is summarized by the CBI, which emphasizes that access to the European market of grains, oilseeds and legumes is ensured not only by commercial competitiveness, but also by compliance of products with regulatory, phytosanitary, quality and documentation standards [2]. In the case of vertical partnerships, this means that coordination between the producer and the processor should include not only price conditions, but also mechanisms for joint quality control, documentation of the origin of raw materials and management of the risk of non-compliance with export requirements.

The subject sectoral context for this study is complemented by works directly devoted to the Ukrainian sunflower oil market and external parameters of its functioning. Makarchuk characterizes the sunflower oil market in Ukraine as structurally strong, but vulnerable to fluctuations in the external environment, logistical restrictions and changes in the conditions of access to sales markets [10]. The International Monetary Fund's data on the dynamics of world commodity prices, as well as the USDA's operational assessments of the Ukrainian agricultural sector, allow us to consider partnership cooperation not only as an organizational form, but also as a tool for adaptation to price cycles, trade changes and liquidity risks [8; 17].

Thus, the available body of literature quite convincingly covers certain components of the problem: the theory of transactional coordination, digitalization of market interaction, military logistical shocks, regulatory barriers of the European market and general parameters of the competitiveness of the agricultural sector. At the same time, the applied mechanism of long-term partnership between sunflower seed producers and processing enterprises under the conditions of military pressure and European integration restrictions is still covered in fragments. It is not sufficiently disclosed how, within a single interaction model, it is possible to combine price adaptability, ensuring producer liquidity, stability of raw material supply for the processor, contractual risk distribution and compliance with external regulatory requirements.

3. Problem Statement

The article is aimed at theoretical substantiation and development of practical recommendations for the formation of partnership models of interaction between sunflower seed producers and processing enterprises as a tool for increasing the resilience of agricultural enterprises under martial law and European integration.

To achieve this goal, the following tasks have been defined: to analyze Ukraine's position in the world market of sunflower oil; to assess the structure of exports by the main directions of supply; to find out the impact of logistics restrictions on the production cycle; to identify imbalances in the interaction of raw material producers and processors; to substantiate the economic feasibility of

partnership models and to formulate management recommendations for the coordination of supply volumes, price parameters and contract discipline.

4. Methods and Materials

The methodological construction of the study is formed on the basis of structural-logical, comparative, analytical and monographic methods. Elements of institutional and chain approaches to the interpretation of the interaction between the producer of raw materials and the processor are used. The empirical base consists of statistical and analytical materials from USDA, FAO, UNCTAD, industry market reviews, as well as modern academic publications on the problems of vertical coordination, contract models, financing of agricultural chains and the impact of the war on the Ukrainian agricultural sector [1; 7; 8; 13; 19; 17].

5. Results and Discussion

Sunflower oil remains one of the key segments of Ukrainian agricultural exports, which combines a significant raw material base, advanced processing and a sustainable international presence. According to the USDA, Ukraine retains its status as one of the leading exporters of sunflower oil even in wartime, although the volume of supplies already significantly depends on the state of infrastructure, logistics routes, and the availability of raw materials [19].

After 2022, the stability of this segment is only partially determined by production factors. Additional pressure is formed by the destruction of transport infrastructure, changes in export routes, an increase in the cost of transportation, and a shortage of working capital. Assessments of the losses and consequences of the war for the agricultural sector confirm that the war shock undermines both the physical logistics and the financial viability of producers and processors [1; 2; 10; 13].

Under such conditions, vertical partnerships should be considered as a way of institutional ordering of relations between the producer of raw materials and the processor. Their value lies in the ability to reduce uncertainty, redistribute risks between the parties and maintain the rhythm of the chain "seed production – processing – oil export" [5; 6; 11; 20].

Table 1. Sunflower oil exports: Ukraine and key exporters (marketing years, thousand tons)

Country	2023/24	2024/25	2025/26
Ukraine	6 264	4 744	4 175
Russia	4 400	4 200	4 250
Argentina	1 198	1 600	1 525
Türkiye	1 189	1 001	800
European Union	991	691	650

Source: built by the authors based on USDA Foreign Agricultural Service data [19].

The dynamics shown in Table 1 show that Ukraine retains its position as one of the largest exporters of sunflower oil in the world, but compared to peak values, its export potential has become significantly more sensitive to crop fluctuations, internal competition for raw materials, and logistics costs. Under such conditions, long-term partnerships serve as a stabilizer of raw materials and reduce the risk of uneven capacity utilization [19].

The geography of Ukrainian sunflower oil exports is concentrated around two groups of markets: the EU, as the closest sales area with high requirements for traceability and contractual discipline, and the countries of Asia and the Middle East, as major importers of vegetable oils. Such a structure requires both logistical flexibility and the ability to maintain stable supply parameters from Ukrainian processors [17; 19].

The structure of imports of Ukrainian sunflower oil in the 2024/2025 marketing year demonstrates a high concentration of sales in a limited group of markets. For exporters and processors, this means both the ability to work with large and predictable buyers and increased dependence on trade conditions, logistics of certain areas and the bargaining power of counterparties. In such circumstances, the partnership model within the country becomes a prerequisite for external contractual reliability.

Table 2. Main importers of Ukrainian sunflower oil

Country	Imports in 2024/2025 MY, thousand tons t	Share in the structure of exports, %	$ million
India	858.8	18.10	711.1
Spain	686.9	14.48	586.7
Romania	572.3	12.06	472.1
Netherlands	512.2	10.80	452.2
Italy	470.1	9.91	415.4
Poland	412	8.68	348.4
Türkiye	380.4	8.02	76.1

Source: Built by the authors based on Latifundist data [17].

A comparison of average contract prices shows that Ukrainian sunflower oil is sold in different markets with unequal export margins. Higher prices in certain European destinations reflect not only the solvency of importers, but also quality requirements, predictability of logistics and the service component of the contract. For the producer of raw materials, this means that the instability of supplies within the country directly affects the ability of the processor to hold profitable external contracts.

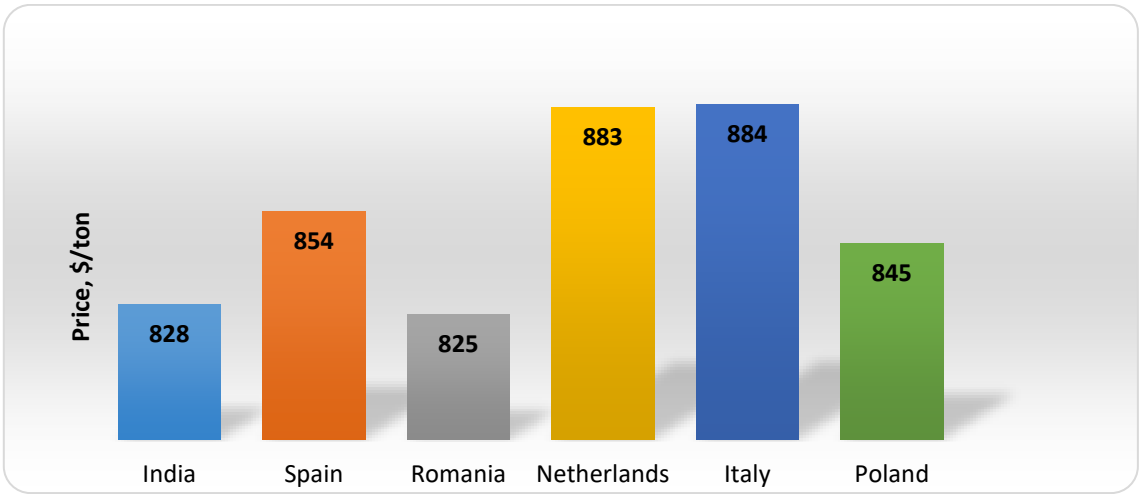

Figure 1. Average contract prices by importing countries

Source: Built by the authors based on data from the USDA Foreign Agricultural Service and Latifundist [17; 19].

The European direction has another important feature: integration into the EU market reinforces the role of traceability, standardization, coordinated planning and digital market analytics tools. Therefore, partnerships between producers and processors go beyond simple price bargaining and include the coordination of quality, timing, inventory data and sales parameters. This logic corresponds to modern approaches to agri-food chains, in which digital tools and coordination mechanisms are considered as interrelated factors of competitiveness [3; 18].

Logistical restrictions directly disrupt the rhythm of the production cycle in the chain "production of sunflower seeds – processing – export of oil". In wartime, external infrastructure risks quickly turn into internal management problems: schedule disruptions, delayed payments, warehouse overloads, and downtime. Border capacity and weaknesses of railway infrastructure remain the most critical for Ukrainian agricultural exports [8].

The structural characteristics of sunflower oil exports show a high dependence of the industry's performance on the stability of the processing link. Processing enterprises convert raw material potential into a product with higher added value, so their sustainability is determined by access to the foreign market and the quality of internal coordination with seed suppliers [4; 14].

The key problems in the interaction between sunflower seed producers and processing enterprises include price asynchrony of decisions, supply failures in the phase of downward

conjuncture, peak bursts of supply in the phase of price growth, as well as additional transaction costs arising from repeated negotiations, quality control and settlement of deviations from agreed parameters [5; 9].

The outlined dysfunctions are systemic in nature. Price volatility, uneven supplies, limited liquidity, and military logistics mutually reinforce each other. Therefore, the solution to the problem lies not in the field of situational procurement decisions, but in the formation of stable rules of interaction between key participants in the chain.

Partnerships between sunflower seed producers and processors should be understood as an institutionalized form of long-term economic interaction, within which the parties agree on the principles of pricing, volumes, schedules, financial conditions, quality requirements and procedures for responding to changes in the market situation. This format brings relations closer to the model of controlled vertical coordination, reduces the effect of market turbulence and expands access to financial instruments [6; 11; 16; 15; 20].

The logic of "producer-processor" partnerships as a managerial response to market imbalances should be detailed in several areas.

Partnership as a mechanism for equalizing the price risk for the producer and the risk of downtime for the processor. The key function of such a model is to redistribute risks over time. The manufacturer needs to reduce losses from price failure, for the processor, to avoid stopping capacity due to a lack of raw materials. Formula pricing, price corridors, and long-term framework contracts make it possible to reduce the severity of this conflict.

Table 3. Equalization of producer price risk and processor downtime risk

Direction of implementation	Practical tool	Implementation mechanism	Expected effect
Formula Pricing	Contract pegged to an external indicator (FOB Black Sea/stock index)	Consolidation of the formula: Base price +/- premium/discount for quality; Monthly adjustments	Reducing speculative "waiting"
Price corridor	Min–Max Price Range	Fixing the lower warranty limit and upper limit	Balance of interests in case of sharp fluctuations
Option model	Right to adjust part of the volume	Contracted volume + part with flexible price	Flexibility without disruption of supply
Long-term framework contract	1–3 marketing years	Annual specification of volumes and schedules	Predictability of the raw material base

Source: Developed by the authors based on [5; 20].

The tools given in Table 3 show that the reduction of price risk for the producer and the risk of downtime for the processor is achieved through the transition from a one-time spot agreement to a formalized contractual architecture. The more clearly the parties fix the pricing rules and options for adjusting conditions, the lower the probability of supply disruption during periods of market turbulence becomes.

Guaranteed sales and production liquidity during the marketing year. For the manufacturer, partnership means a stable sales channel and the predictability of the movement of funds. When sales are time-spaced and backed by agreed payments, the need for forced inventory retention and lending under adverse conditions decreases.

Table 4. Provision of the manufacturer's working capital during the marketing year

Direction of implementation	Practical tool	Implementation mechanism	Expected effect
Advance payment	Pre-season financing for the future harvest	Partial advance payment (10–30%) with volume fixation	Liquidity stabilization
Forward contracts	Selling part of the crop in advance	Signing before harvest with a delivery schedule	Planned cash-flow
Affiliate Financial Lines	Three-sided model: producer-processor-bank	The processor acts as a guarantor or anchor buyer	Loan rate reduction
Schedule of staged payments	Installments with fixed dates	30% – on delivery, 40% – after 5 days, 30% – after 10 days	Predictability of cash flows

Source: Developed by the authors based on [9; 20].

Table 4 demonstrates that the financial component of the partnership is central to the stabilization of the production cycle. Advances, forward contracts, trilateral financial lines and phased payment schedules make it possible to link the movement of raw materials with the movement of funds and reduce the cash gaps of the manufacturer.

Continuous loading of processing and elimination of downtime in the phase of falling prices. For the processor, partnership is a tool for production planning. The presence of an agreed raw material portfolio reduces dependence on the daily market, and the calendarization of deliveries and bonuses for rhythm creates incentives for a more uniform flow of seeds.

Table 5. Ensuring continuous loading of the processing

Direction of implementation	Practical tool	Implementation mechanism	Expected effect
Supply Calendarization	Quarterly/monthly charts	Division of the annual volume into uniform batches	Reducing seasonal dips
Quotas	Minimum guaranteed volume from the manufacturer	Consolidation of the share of the crop in the contract	Stable loading
Rhythm Awards	Schedule Bonus	Surcharge for delivery in the "low season"	Stimulation of uniformity
Collaborative planning	Coordination meetings 2-4 times a year	Coordination of production and processing plans	Reducing uncertainty

Source: Developed by the authors based on [2; 8].

The measures reflected in Table 5 indicate that the continuity of loading processing capacities is determined by the physical availability of raw materials and the consistency of their receipt in time. Coordinating schedules and stimulating rhythmic deliveries reduces dependence on situational market surges.

Smoothing out peaks in the price growth phase. During an upward environment, the market often faces excessive simultaneity of sales decisions. For the processor, this creates a burden on receiving, transport, warehouses and the payment circuit. The partnership model allows these peaks to be distributed through agreed delivery windows, priority acceptance lines, and logistical bookings.

Table 6. Smoothing out peaks in the price growth phase

Direction of implementation	Practical tool	Implementation mechanism	Expected effect
Reception window system	Pre-booking the delivery date	Online Transport Slot Schedule	Elimination of queues
Priority of partner deliveries	Dedicated Receiving Line	Separate time slots for partners	Reducing car downtime
Payment protocol	Financial limits and guaranteed payment terms	Fixed maximum deferral	Prevention of cash gaps
Logistics pool	Merging transport and warehouses	Joint use of elevators and tanks	Reduced infrastructure load

Source: Developed by the authors based on [7; 8].

The partnership model of interaction institutionalizes mechanisms for smoothing peak loads. Structuring supplies through agreed quotas, time slots, and payment protocols makes it possible to distribute flows without losing contractual discipline and without compromising the quality of service. As a result, the partnership acts as a mechanism for stabilizing the operational continuum of the chain "production – processing – export", transferring the behavior of the parties from the mode of situational reaction to the mode of coordinated planning.

6. Conclusions

The study made it possible to deepen the understanding of vertical partnerships as a tool for increasing the resilience of agricultural enterprises in the sunflower oil segment. For the Ukrainian market under martial law, the key source of instability is a combination of external shock and internal inconsistency of decisions between the producer of raw materials and the processor.

The analysis showed that the spot interaction model increases price asynchrony, liquidity shortages, uneven supply and downtime of processing facilities. On the other hand, partner configurations that combine formula pricing, forward contracts, staging payments, delivery scheduling, and logistics booking reduce transaction costs and increase the predictability of the export chain.

The practical value of the results obtained lies in the proposed set of management decisions, which can be used by agricultural enterprises, processing companies and industry associations to stabilize relations in the value chain. In the context of European integration, partnerships acquire additional importance, as they facilitate the coordination of requirements for quality, traceability, contractual discipline and digital sales support. It is advisable to associate the prospects for further research with the construction of a quantitative model for assessing the effectiveness of partner configurations and the development of a system of indicators of the rhythm of deliveries and financial stability.

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