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SUPPLY CHAIN MANAGEMENT OF MINERAL FERTILIZERS

A comprehensive monitoring of the functioning of the Ukrainian mineral fertilizers market has been carried out. It has been proven that strategic management of supply chains in the mineral fertilizer market is determined by the ability of business entities to form, maintain, and adapt the resource provision necessary for the effective functioning of the supply chain in a dynamic environment. The feasibility of using an approach to strategic choice is reasonably justified, according to which the organization of the supply chain should be based on the maximum use of the specific properties and potential inherent in the company's specific position within the chain, which allows for enhancing synergistic effects between its elements. A definition of the essence of the term "supply chain core" is proposed, which is considered as a strategically pivotal component that shapes the mission, value priorities, and resource configuration of the supply chain, determining its development trajectory and the selection of adaptive strategies in the long term. It is hypothesized that the strategic choice in the process of building a supply chain should be aimed at utilizing the capabilities of the supply chain core, which not only enables enhancing the synergy of its elements but also ensures adaptability to environmental changes. Within the study, a direct connection was established between the resource content of the supply chain core and the choice of supply chain management strategies. Testing the proposed hypothesis through the connection

УПРАВЛІННЯ ЛАНЦЮГАМИ ПОСТАЧАННЯ МІНЕРАЛЬНИХ ДОБРИВ

Проведено комплексний моніторинг функціонування ринку мінеральних добрив України. Доведено, що стратегічне управління ланцюгами постачання на ринку мінеральних добрив визначається здатністю суб'єктів господарювання формувати, підтримувати й адаптувати ресурсне забезпечення, необхідне для ефективного функціонування ланцюга постачання в умовах динамічного середовища. Обґрунтовано доцільність використання підходу до стратегічного вибору, згідно з яким організація ланцюга постачання має ґрунтуватися на максимальному використанні специфічних властивостей та потенціалу, притаманного конкретному положенню компанії в межах ланцюга, що дозволяє підсилювати синергійні ефекти між його елементами. Запропоновано визначення сутності терміна "ядро ланцюга постачання", що розглядається як стратегічно визначальна складова, що формує місію, ціннісні пріоритети та ресурсну конфігурацію ланцюга постачання, визначаючи траєкторію його розвитку та вибір адаптивних стратегій у довгостроковій перспективі. Висувається гіпотеза, що стратегічний вибір у процесі побудови ланцюга постачання має бути орієнтований на використання можливостей ядра ланцюга постачання, що уможливлює не лише підсилити синергію його елементів, а й забезпечити адаптивність до змін середовища. В межах дослідження встановлено прямий зв'язок між ресурсним наповненням ядра ланцюга постачання та вибором стратегій управління ланцюга постачання. Перевірка висунутої

between the resource capacity of the supply chain and the optimal supply chain strategy of the operators in the Ukrainian mineral fertilizer market will provide opportunities to more deeply reveal the mechanisms of supply chain management strategy formation and understand the logic of building the supply chain core in accordance with the goals that determine the orientation of the business model.

Keywords: supply chain, strategic management of supply chains, supply chain core, resource provision, mineral fertilizers.

гіпотези через зв'язок ресурсного наповнення ланцюга постачання й оптимальної стратегії ланцюга постачання операторів ринку мінеральних добрив України надасть можливості глибше розкрити механізми формування стратегій управління ланцюга постачання та зрозуміти логіку побудови ядра ланцюга постачання відповідно до цілей, які визначають орієнтацію бізнес-моделі.

Ключові слова: ланцюг постачання, стратегічне управління ланцюгом постачання, ядро ланцюга постачання, ресурсне забезпечення, мінеральні добрива.

JEL Classification: F14, L26, O33, L81.

Introduction

The evolution of conventional strategies for supply chain management within the mineral fertilizers sector is attributable to the multifaceted impact of external challenges and inherent risks within this market. Companies in this industry operate in a highly turbulent environment with multi-vector risk dynamics, including, in particular, threats of loss or restriction of access to financial, tangible, and intangible resources, destabilization of market relations, disruption of transport and logistics infrastructure, price volatility, loss of inventory, rolling stock, and logistics capacities. In accordance with the company's mission, strategic goals, and available resource potential, the choice of optimal approaches to strategic management of supply chains is formed, which best meet the established parameters of functioning and development.

The strategic aspect of supply chain management began to be deeply analyzed in the 1990s and 2000s. The development of globalization and information technologies changed the logic: supply chain started to be viewed not only as logistical function but as a strategic tool for gaining competitive advantage. Sunil Chopra, Martin Christopher, Mentzer, and others emphasized strategies for aligning supply and demand, and building partnerships. During this period, the perception of supply chain management evolved into a source of value creation, not merely cost reduction. In the 2000s, the approach to strategic supply chain management gradually took hold: integration into corporate strategies, the use of lean, flexible, hybrid strategies and customer-centric adaptation. By the 2010s, supply chain management was already considered a key component of strategic management, encompassing aspects of digitalization, sustainable development and crisis resilience. At present, the strategic management of supply chains has garnered the interest of scholars both domestically and internationally. For instance, Reshetniak (2024) emphasizes that the coexistence of models and approaches to structuring supply chain management is attributable to the evolution of understanding of its content, the selection of which is determined by the type of organization, industry, its business model, and strategic goals. Simonov (2023) posits that the competitiveness and effectiveness of supply chain management strategies are contingent upon the diverse approaches organizations adopt for supply

chain management analysis. In their 2024 study, Makarenko and Gutsal (2024) underscored the competitiveness of theoretical approaches and models of Supply Chain management, asserting their efficacy in managing and implementing competitive strategies. A similar opinion is expressed by Falovych (2018), who notes that strategic adaptability implies the ability of supply chain participants to change their behavior or structure in order to maintain, improve, or acquire new supply chain qualities in a changing environment. Kochubei (2019) considers strategic supply chain management as one of its components. It combines logistics, marketing, information technology and risk management, forming a holistic management system – from the supplier of raw materials to the end consumer through production and distribution links. Slone et al. (2010) posit that transportation, inventory, production management, order management, and cash flow are operational functions associated with a shorter planning horizon. Nevertheless, they are also imperative to the execution of any strategic plan. Conversely, the absence of a coherent strategy invariably results in a lack of direction and reduced efficiency in operations. Shapiro (2006) underscores the necessity of strategic planning to consider the interplay between strategy and functional operations. Lee (2021) emphasized the need for strategic alignment of goals, information exchange and incentive coordination. This reduces internal conflicts and enables the supply chain to operate as a unified strategic organism. It is noted that strategic management must take into account global changes in the external environment, such as digital transformation, geopolitics and pandemics. Sheffi (2022) argues that strategic supply chain management should be proactive, flexible and prepared for alternative future realities, rather than simply optimized for the current state or a single forecast. Chopra and Meindl (2016) stress that supply chain strategy must be aligned with the company's competitive strategy – that is what the company aims to achieve in the market should correspond to how the supply chain is designed and operates. There is a shared perspective among domestic and foreign scholars in recognizing the strategic role of supply chain management. Both Ukrainian and international researchers view supply chains not merely as logistical processes, but as a strategic resource that determines a company's competitiveness. Emphasis is placed on the integration and coordination of participants and processes within the supply chain, as well as on flexibility and adaptability. At the same time, Ukrainian scholars devote more attention to crisis management in supply chains under current conditions.

The objective of the present study is to ascertain the theoretical and methodological approach to selecting the optimal model of strategic management of supply chains in the mineral fertilizer market, taking into account the factors of influence and the surrounding business environment.

The authors propose to introduce the concept of "supply chain core" (SC core), which is analogous to the concept of "business core". The SC core is predicated on the value and resource provision of the SC. The strategic selection of a supply chain management approach, facilitated by business

modeling, enables the supply chain management to be structured to achieve its stated objectives. It is hypothesized that strategic choice within the framework of the supply chain organization will contribute to the maximum use of the specific capabilities and properties of the supply chain management core, thereby enhancing the synergy of supply chain management elements. Empirical testing of this hypothesis will facilitate the identification of adaptation problems and the formulation of models for the strategic management of the supply chain in the Ukrainian mineral fertilizer market.

We identify the main processes of the supply chain core, its components and efficiency depending on the content. To this end, in the three sections of the main part of the article, we will consistently reveal the business model, analyze the current state of the mineral fertilizer market of Ukraine, and prove the connection between the formation of the corresponding supply chain core and strategic supply chain management in the mineral fertilizer market of Ukraine.

1. Supply chain core as a strategically crucial element of the business model

The strategic management of the supply chain in the mineral fertilizer market is predicated on the ability of enterprises to form, maintain, and adapt the resources necessary for the effective functioning of the supply chain in a changing environment. The resource base, comprising material, financial, informational, personnel, technological, and infrastructure elements, serves as the foundation for implementing strategies aimed at achieving the objectives of competitiveness and efficiency of the supply chain management. The availability or shortage of critical resources determines the possibility of implementing strategies, affecting the choice of optimal supply routes, logistics models, the speed of response to risks, and the degree of flexibility in management decisions. Consequently, the provision of resources is not merely a mechanism to support Supply Chain management strategies; it is also an element that determines their effectiveness, the scale of their application, their adaptive potential, and their economic feasibility within a specific market and geopolitical context.

This study proposes an approach to strategic choice in the organization of supply chains. According to this approach, the formulation of strategy should be predicated on the optimal utilization of the supply chain’s distinctive capabilities and unique properties. This phenomenon can be attributed to its current position in the market and the prevailing logistics environment. This approach has been demonstrated to enhance the fundamental characteristics of the supply chain, thereby augmenting the synergy effect of its structural elements. In order to systematize approaches, by analogy with the category of "business core", the author proposes to introduce the concept of "supply chain core" (SC core). The SC core is defined as the value

and resource basis that ensures the functioning and development of the supply chain. In accordance with the selected strategy, the core of the supply chain management can be structured with the aid of business modeling tools to ensure optimal alignment with the stated strategic objectives.

The article proposes a hypothesis that the strategic choice in the process of organizing a supply chain should center on activating and unlocking the potential of specific capabilities and properties of the Supply Chain Management core. This, in turn, enhances the synergy of interaction between its elements and ensures an increase in the overall efficiency of the system.

The SC core is regarded as a strategically pivotal element of the business model, signifying a series of goods and/or services that form the basis of value creation, ensure a sustainable competitive advantage, and generate the majority of the SE's profit. The sustainable competitive advantage is determined by the creation of a specific product or service through the use of a particular combination of elements inherent to the core of the supply chain. The diagnosis of the core of a Supply Chain management facilitates the determination of the optimal architecture of the business model, thereby enabling the achievement of established targets concerning growth, margin, and strategic market positioning. This approach is intended to ensure increased strategic focus, avoid resource dispersion, and enhance supply chain management, thereby deepening the supply chain's core competencies. Consequently, the continuous analysis and evolution of the Supply Chain Management core have led to the reinforcement of a customized value proposition, thereby enhancing the market distinctiveness of the enterprise and establishing the foundations for the development of long-term competitive advantages. It is important to note the impact of sustainable development on the formation of the supply chain core. In strategic management, the principles of sustainability guide the selection of key suppliers and partners based on ethical criteria and reputational advantages, directing companies not only toward efficiency and cost reduction but also toward environmental safety and transparency. At the same time, these principles narrow the pool of potential suppliers but enhance the resilience and value of the core. In this context, core formation is more focused on strategic long-term cooperation rather than cost minimization. Applying a sustainable approach yields several positive effects, such as: increased resilience and reliability due to strategic suppliers adhering to standards, which reduces the risk of disruptions, crises or reputational damage; competitive advantages through a positive image and customer trust, which enhances the value of the product or brand; long-term partnerships based on ethical and sustainable practices, with transparent and mutually beneficial relationships with key suppliers; minimization of environmental, social and regulatory risks in strategically important links; innovative development through the supply chain core's encouragement of new technologies and practices oriented toward sustainable approaches.

The concept of "*core of the supply chain management*" is predicated on the convergence of scientific approaches that accentuate the role of fundamental processes in value creation, albeit from diverse vantages.

1. *Process-oriented* (Kolodizeva, 2015). This approach conceptualizes the supply chain as a sequence of business processes that generate value for the consumer. Within the confines of this conceptual framework, the core of Supply Chain management can be interpreted as a set of key operational processes. The absence of these processes precludes the implementation of fundamental logistics functions.

The foundation of this approach will be the SCOR model (Supply Chain Operations Reference model) (Becker, 2024).

SCOR=Plan+Source+Transform+Order + Fulfill+Return+Orchestrate

2. *Systemic* (Bilovol, 2018; Zapara, 2015; Ilchenko, 2016). The systemic approach regards the supply chain as an open, dynamic system that interacts with the external environment. In this particular instance, the core of the Supply Chain management is an internal subsystem that ensures the viability of the entire supply system. This methodological approach enables the analysis of the stability of the core, its capacity for adaptation, self-regulation, and recovery from external disturbances (resilience).

3. *Resource-functional* (Prykhno, 2023; Lebid & Zueva, 2020). This approach underscores the resources and functional structure of the business model. In this context, the core of supply chain management should be regarded as a set of critical resources and functions that generate primary customer value. The approach is rooted in the theoretical framework of the Resource-Based View (RBV). The definition of supply chain management as a field is inextricably linked to the core competencies that provide competitive advantages.

4. *Value-oriented* (Danylchuk, 2008). In this approach, the core of supply chain management is interpreted as the part of the supply chain that generates the largest share of value (value creation). In this context, the emphasis shifts from operational logic to the economic efficiency and marginality of each process. The foundation of this study is the concept of the value chain, as developed by M. Porter, which identifies primary processes as the core of the business. These processes encompass inbound logistics, operations, outbound logistics, marketing and sales, and services.

5. *Adaptive and dynamic* (Mikhno et al., 2020). In this approach, the core of Supply Chain management is regarded as an adaptive structure that can undergo changes in accordance with external conditions, market factors, and technological trends. This phenomenon is of particular pertinence in wartime or crisis situations.

The core of supply chain management can be viewed from different managerial and strategic perspectives, depending on the theoretical approach. These perspectives include the following: as a set of processes, as a system, as a resource platform, or as an economic value. In industries characterized

by elevated risk levels, such as the fertilizer market, the implementation of a multifaceted approach is of paramount importance. In such contexts, it is imperative to integrate stability, adaptability, and economic viability of the supply chain core in the face of uncertainty.

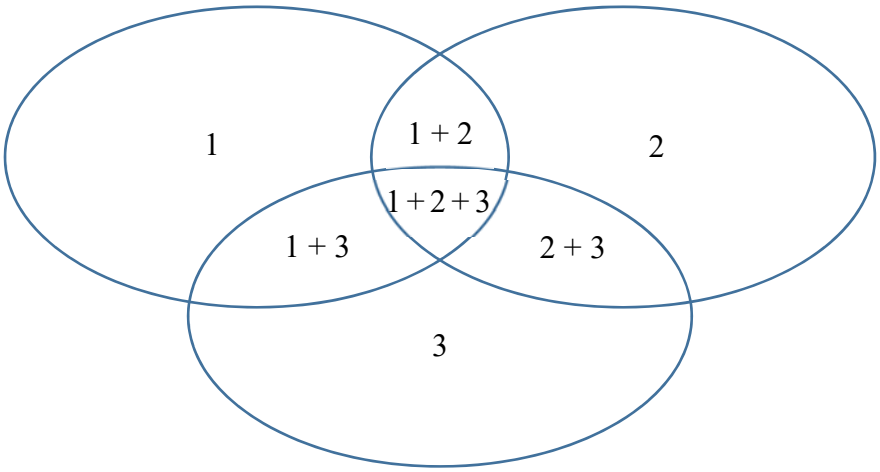
The mineral fertilizer supply chain core is not merely a set of technical or operational functions; rather, it is a strategic platform that ensures the efficiency and sustainability of logistics systems in a changing environment. To summarize, the core of the supply chain should include those components that significantly influence its formation and functioning, generate the majority of revenue and value and serve as the foundation for building resilient supply chains. These components include: key suppliers and customers; production, logistics and other capacities and technologies; key distributors and logistics partners; critical inventories and infrastructure; innovative and digital core platforms; qualified personnel. In the event of a disruption to the core of the supply chain, which may be caused by a number of factors, including the interruption of raw material supply, damage to transportation infrastructure, or production stoppage, the company's entire business model will be severely compromised. The following question is hereby posed for consideration: what strategy for supply chain management should be selected? It is imperative to ascertain whether the necessary resources, in the requisite quantity, are available to implement the chosen strategy. In order to respond to this inquiry, it is imperative to undertake a comprehensive analysis of the mineral fertilizer market and its supply chain.

2. Ukrainian mineral fertilizer market: realities, challenges, trends, tendencies

Already at the onset of the war, the situation in the agrochemical and agricultural products market changed drastically. The outbreak of full-scale armed aggression against Ukraine has significantly transformed the conditions for the functioning of the agricultural sector, in particular the activities of farms and agribusinesses (Ozarko & Chelombytko, 2022). Consequently, due to the ongoing hostilities and the subsequent temporary occupation of certain territories, a significant portion of the agricultural land remained uncultivated. This, in turn, resulted in a substantial decline in demand for mineral fertilizers. The decline in consumer activity and the destruction of key transportation infrastructure have contributed to the challenging nature of sales. A further critical factor was the obstruction of seaports, which restricted imports of mineral fertilizers and rendered logistics significantly more complex and expensive. The combination of these factors has resulted in a substantial decrease in the profitability of Ukrainian fertilizer producers and farmers who utilize the relevant resources in the production cycle. Consequently, the dissolution of production and logistics networks compelled Ukrainian companies to swiftly adapt to these novel circumstances. This necessitated an urgent redesign of supply chains, a reconfiguration of

logistics routes, the relocation of warehouses and production facilities to more secure regions, the identification of new contractors and resources, and the mobilization of additional funding to compensate for losses incurred due to the armed conflict.

The consumption of mineral fertilizers in the market is contingent upon the agrochemical requirements of crops for essential nutrients, namely nitrogen (N), phosphorus (P), and potassium (K), which are collectively referred to as macronutrients. These key macronutrients represent the primary components of the fertilizer demand structure, as they are instrumental in regulating plant growth, development, and productivity. A balanced application of nitrogen, phosphate, potash, and secondary micronutrients remains a key condition for increasing yields and ensuring food security. The primary operators within the mineral fertilizer market can be categorized into several distinct groups, namely producers, importers, and distributors. A company can have affiliations with multiple groups at the same time. To facilitate comprehension, the following schematic representation is provided in *Figure 1*.



1 – mineral fertilizer producers
2 – importers of mineral fertilizers
3 – distributors of mineral fertilizers
1 + 2 – mineral fertilizer producers who import their own fertilizers
1 + 3 – mineral fertilizer producers with their own distribution
2 + 3 – importers of mineral fertilizers with their own distribution
1 + 2 + 3 – mineral fertilizer producers with own imports and own distribution

Figure 1. Combination of groups of major mineral fertilizer market operators

Source: compiled by the authors.

Despite the potential for companies from different groups to engage in mutual sales of products, the agricultural producer as the final consumer remains a fundamental component of the mineral fertilizer market. Among agricultural producers, agricultural holdings hold a distinctive position, consuming substantial quantities of mineral fertilizers and playing a pivotal role in driving agricultural development in Ukraine (*Table 1*).

Table 1

Ranking of agricultural holdings by land bank area

Agricultural holding	Land bank, thousand hectares
Kernel	363
MHP	351.6
Ukrlandfarming	330
Agroprosperis (NCH)	290
Astarta-Kyiv	212
Continental Farmers Group	195
Epicenter Agro	167
Agrarian system technologies	150
Enselco Group of Companies	134
IMC	120
Agroton	110
Ukrprominvest-Agro	108
Agrain	100
LNZ	90
Vitagro	85
Privat-Agroholding	85
Tas Agro	83
Dawn	80
Krolevets Feed Mill	80
AgroVista	75
Agrotrade	70.5
Ristone Holdings	65.8
Western Bug	65
Panda	59
Baryshevska grain company	57
Eridon	55
Farm Forward	54
Freedom Farm	53
Volyn-Zerno-Product	52
Nibulon	51
Ukrainian Agrarian Holding	51
Agrotis	51
Chysta Krynytsia	50
Agrospetsservice	50
Southern Agricultural and Export Company (PAEC)	50

Source: LATIFUNDIST.COM (2025, January 1).

Table 2 shows the main national producers of mineral fertilizers.

Table 2

Major national producers of mineral fertilizers

Name	Product line	Potential production volume, thousand tons
OSTCHEM Group	Ammonium nitrate, limestone ammonium nitrate, urea, UAN, ammonia water, anhydrous ammonia	Up to 2600 tons
Odesa Port Plant	Urea, anhydrous ammonia	Up to 950 tons
DNIPRO AZOT	Urea, UAN, anhydrous ammonia, ammonia water	Up to 835
Sumykhimprom	Complex fertilizers (NPK)	Up to 157
GROSSDORF	UAN, NPK fertilizers,	Up to 250
Chemdivision	UAN, NPK FERTILIZERS	Up to 108
Ukragrokhimholding	Phosphogypsum, ammophos, superphosphate, nitroammophos, liquid suspension nitrogen-phosphorus fertilizer	Up to 120

Source: KURKUL (2019, June 28).

With the onset of full-scale aggression against Ukraine, only the OSTCHEM Group and Grossdorf continued to produce goods, albeit in reduced volumes.

The total volume of imports of mineral fertilizers to Ukraine is illustrated in *Table 3*.

Table 3

Imports of mineral fertilizers to Ukraine in 2024–2025

Type of mineral fertilizer (active ingredient)	2025 year, thousand tons	2024, thousand tons
N	842	704
NPK	379	274
NP	258	198
K	38	33
P	31	31
PK	14	8
B	0,5	0.7
Total	1563	1249

Source: Infoindustry (2025, July 17).

The ranking of importers by imported volume of mineral fertilizers for the 1st half of 2025 is shown in *Figure 2*.

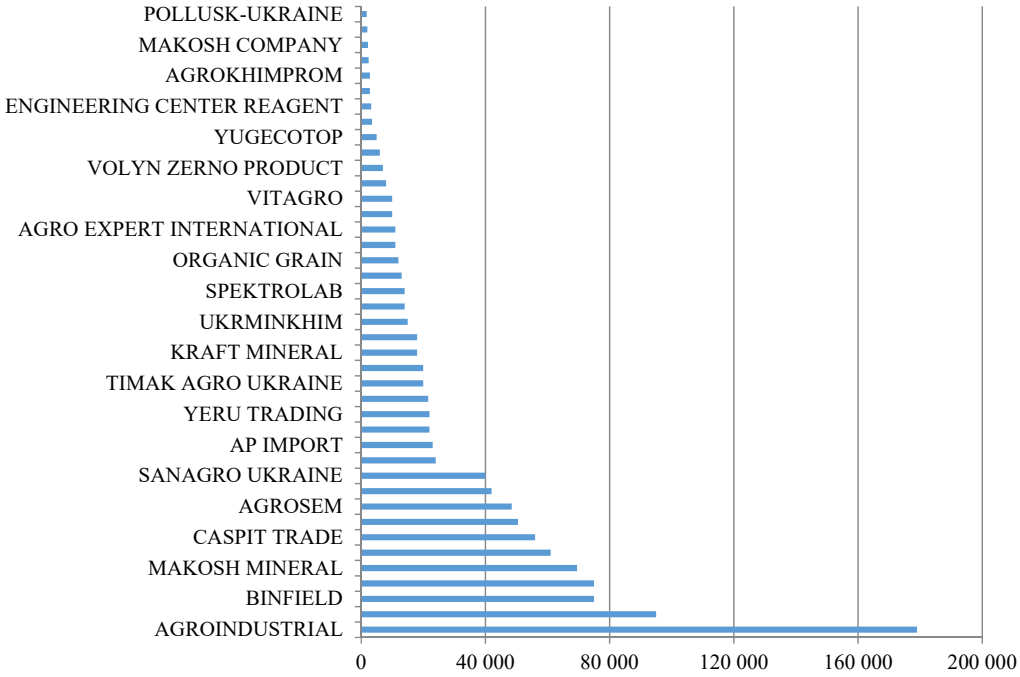


Figure 2. Ranking of importers by imported volume of mineral fertilizers in 1H2025

Source: Infoindustry (2025, July 17).

Ukraine has demonstrated the objective fundamental prerequisites necessary for the growth of the mineral fertilizer market. The current level of their use is significantly lower than in developed countries and has not yet reached the pre-war level of consumption. This finding suggests the presence

of a substantial, albeit as yet untapped, potential for the industry's advancement. According to forecasts, if the conservative scenario of market development continues, annual growth in mineral fertilizer consumption is expected to reach 8–10%. In the event of a more favorable scenario, the growth rate could reach 15–18% in the short and medium term (APK INFORM, 2025, February 6). In 2024, Ukraine's consumption of mineral fertilizers amounted to approximately 4.8 million tons. For illustrative purposes, it is noteworthy that in 2023, the total consumption of fertilizers in Ukraine amounted to 4.5 million tons, whereas in 2022, it stood at 2.3 million tons (Grygorash, 2025).

Full-scale military aggression has significantly altered the structure of mineral fertilizer imports to Ukraine. In the context of the prevailing circumstances, the importation of goods is executed from a diverse array of supplying regions, encompassing proximate countries such as Serbia, Turkey, and Georgia, as well as more distant areas including Azerbaijan, Turkmenistan, Egypt, Tunisia, Saudi Arabia, South Korea, and China (Kovalyov, 2025; Vetrova, 2025). In the aftermath of the seaport closures in the Greater Odesa region (Mykolaiv, Olvia, Odesa, Chornomorsk, Pivdennyi) under martial law, importers were compelled to expeditiously recalibrate their logistics, redirecting them to the Danube ports (Izmail, Reni, Ust-Dunaisk). However, it should be noted that these ports had previously accounted for a mere 5% of the aggregate volume of foreign trade cargo prior to the war (Demerzhi, 2025, February 26). However, the physical and technical characteristics of these ports limit their capacity to fully compensate for the loss of capacity of deepwater seaports. Specifically, the maximum volume of cargo transshipment on the Danube is approximately 10 million tons per year, whereas seaports have the capacity to handle up to 250 million tons. Moreover, the specifics of river navigation necessitate the use of vessels with restricted tonnage. This, in turn, results in increased logistics expenditures and a constricted potential geographical scope for deliveries (Tkachenko & Gromova, 2024). In light of these challenges, a substantial reorientation of import logistics to land corridors in the West was implemented during the 2022–2024 period. This process was accompanied by the development of new logistics hubs, in particular the so-called "dry ports" located near the EU border. The resumption of access to the ports of Greater Odesa in 2023–2024 led to the restoration of maritime logistics, which in turn significantly transformed import routes. There was an increase in tonnage, long-term contracts, and investments in the relevant infrastructure. It is noteworthy that the process of structural transformation of the mineral fertilizer market commenced prior to the onset of full-scale aggression. Prior to the war, the number of importers was increasing, contributing to heightened competition between domestic producers and importers and exerting influence on market prices. In particular, there are cases when products imported under pre-existing contracts without prepayment lose their economic feasibility during transportation due to lower domestic prices. This phenomenon is a hallmark of the contemporary mineral

fertilizer market, where the high volatility of the price environment compels importers to function at a loss or even to cease operations entirely in anticipation of a more favorable market scenario.

A recently emergent challenge pertains to the covert rivalry between fertilizer producers and retail chains, with each entity asserting its role as the pivotal entity in value creation within the forestry sector. Retail chains, with their extensive regional presence and advanced technological capabilities, have the ability to dictate terms even to leading producers that own primary sources of value creation. In such conditions, companies are compelled to develop effective distribution models, particularly by constructing structured networks, implementing flexible pricing policies, and transitioning to the "producer-end user" scheme. This enables them to fortify their control over the formation of consumer value and respond expeditiously to fluctuations in demand (Syvak, 2008). In such an environment, strategic planning necessitates continuous market monitoring, supply chain optimization, and the balancing of corporate participation across competing value chains.

3. Strategic management of supply chains in the mineral fertilizer market

It is hypothesized that the correlation between the notion of "supply chain core" and strategic management of supply chains within the mineral fertilizer market is pivotal to ensuring long-term competitiveness, enhancing operational efficiency, and maintaining flexibility in the face of risks and instabilities. In order to substantiate this link, it is necessary to consider the following evidence.

The term *"Supply Chain management core"* is employed to denote a strategic management focus. In the context of strategic planning, the Supply Chain management's core element is the part of the Supply Chain management that*:*

- the company's services and products offer substantial benefits to consumers. For instance, the company supplies mineral fertilizers during the peak season, stores agrochemicals in warehouses for the required period, provides agronomic support, administers mineral fertilizer application services, offers various credit programs, and delivers fertilizers "to the gate" according to the relevant schedule;
- the primary source of revenue is derived from the sale of high-demand mineral fertilizers, including ammonium nitrate and urea, as well as the delivery and application of these fertilizers. The delivery of anhydrous ammonia from the manufacturing facility to the agricultural setting by specialized transportation methods and its subsequent application through agronomic equipment constitutes a significant component of the revenue generation process;
- the foundation for constructing sustainable supply chain management is established, as evidenced by the acquisition of a network of bulk and liquid mineral fertilizers.

Consequently, the strategic management of the fertilizer market prioritizes the support and development of its fundamental elements, thereby ensuring the coherence of supplies, resources, and distribution channels with the company's primary products and services.

Influence of the Supply Chain management core on the choice of supply chain strategy. The characteristics of the supply chain core determine which supply chain strategy will be appropriate to apply to ensure the company's efficiency, flexibility and sustainability.

The supply chain core serves as the foundational element for the management of resources and infrastructure logistics. The systems of strategic management are predicated on the following core principle:

- warehouses, transportation, information systems are optimized for the main product range;
- human resources (agronomists, logisticians, sales managers) specialize in key areas;
- investments are directed to the development of competencies in the core areas.

Strategic management of the Supply Chain management as a mechanism for scaling the Supply Chain management core. The supply chain acts as a means:

- expanding the geography of sales of core products;
- entering new consumer segments through omnichannel logistics;
- extending the product line (e.g., related mineral fertilizers, bioactivators, microfertilizers).

Adaptation of the Supply Chain management to the change of the Supply Chain management core. If the core is transformed (e.g., the company switches from imports to its own production), then

- logistics routes, supply channels, and strategic stocks are rebuilt;
- the risk management strategy is changed;
- the digital architecture for supporting the Supply Chain management is updated.

It is imperative to comprehend the requisite components of the Supply Chain management core that are indispensable to the selected Supply Chain management strategy. The core of supply chain management can be meticulously structured to ensure the optimal realization of supply chain objectives by leveraging business modeling.

In order to verify the aforementioned assumptions and the proposed hypothesis, an analysis of the supply chain managements of major agrochemical market operators in Ukraine will be conducted. This analysis will establish the relationship between the supply chain management cores and supply chain management strategies of these organizations. As demonstrated in *Table 4*, the resource content of the Supply Chain Management core corresponds to a specific Supply Chain Management strategy that enables the optimization of the supply chain's potential.

Table 4

Relationship between the resource content and the optimal strategy of the Supply Chain management of the Ukrainian mineral fertilizer market operators

Company	Source Strategy. Core Strategy.	Make Strategy. Core	Deliver Strategy. Core	Inventory Strategy. Core	Digital & Analytics Strategy. Core	Return & Sustainability. Core	Optimal Supply Chain management strategy
OSTCHEM	Own production (ammonium nitrate, urea, ammonia, UAN, ammonia water), imports	Cherkasy Azot and Rivne Azot plants, packaging facilities	Road and rail delivery, cross-docking, seasonal booking, delivery from plant to farmer, fertilizer application services	Own regional warehouses	Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of replacement goods, financial ability to provide a discount to avoid returns	Lean + Resilient
Dniproazot	Own production (urea, ammonia, ammonia water, UAN)	Dniproazot plant, packaging facilities	Own railway logistics, seasonal booking, delivery from production to the customer	Warehouse for liquid fertilizers	Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of goods for replacement, financial ability to provide a discount to avoid returns	Lean + Resilient
Agroprosperis	Own imports, contracts with global producers			Own elevators, regional warehouses of responsible storage	Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of goods for replacement, financial ability to provide a discount to avoid returns	Lean + Agile + Adaptive
Eridon	Import, contracts with global manufacturers		All convenient types of delivery, use of third-party logistics organizations	Own distribution centers	Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of replacement goods, financial ability to provide a discount to avoid returns	Lean + Resilient + Agile + Digital
FREE SYSTEM	Own imports, contracts with global manufacturers		All convenient types of delivery, use of third-party logistics organizations	Regional warehouses of responsible storage	Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of replacement goods, financial ability to provide a discount to avoid returns	Lean + Adaptive/ Responsive
GROSSDORF	Own imports, contracts with global producers Production of UAN, ammonia water, complex fertilizers	Production lines for UAN, complex fertilizers, ammonia water	Road and rail delivery, cross-docking, seasonal booking, delivery from plant to farmer, fertilizer application services	Own regional warehouses	Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of replacement goods, financial ability to provide a discount to avoid returns	Lean + Resilient + Responsive
Yarylo	Own production of liquid complex fertilizers (LCF); contracts with manufacturers and importers	Production lines for the production of liquid complex fertilizers			Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of replacement goods, financial ability to provide a discount to avoid returns	Lean + Adaptive

End of Table 4

Company	Source Strategy. Core Strategy.	Make Strategy. Core	Deliver Strategy. Core	Inventory Strategy. Core	Digital & Analytics Strategy. Core	Return & Sustainability. Core	Optimal Supply Chain management strategy
Agro-chemical technologies	Own imports, contracts with global producers		Road and rail delivery, cross-docking, booking for the season	Own regional warehouses, custodial warehouses	Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of replacement goods, financial ability to provide a discount to avoid returns	Lean + Adaptive
Agrochemical product	Ammonia water production, contracts with global producers		Road and rail delivery, cross-docking, booking for the season, anhydrous ammonia application services	Own regional warehouses for ammonia and ammonia water storage	Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of replacement goods, financial ability to provide a discount to avoid returns	Lean + Resilient
FREYA	Production of UAN, UAN+rubbers	Production lines for UAN, UAN with humates	Road and rail delivery, cross-docking, booking for the season,		Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of replacement goods, financial ability to provide a discount to avoid returns	Lean + Adaptive
Azov contract	Own imports, contracts with global manufacturers		All convenient types of delivery, use of third-party logistics organizations	Warehouses of responsible storage	Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of replacement goods, financial ability to provide a discount to avoid returns	Lean + Adaptive/ Responsive
Belor Ukraine	Own imports, contracts with global manufacturers		All convenient types of delivery, use of third-party logistics organizations and own rolling stock	Warehouses of responsible storage	Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of replacement goods, financial ability to provide a discount to avoid returns	Lean + Adaptive/ Responsive + Agile
Macrochem	Own imports, contracts with global manufacturers		All convenient types of delivery, use of third-party logistics organizations	Own regional warehouses, custodial warehouses	Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of replacement goods, financial ability to provide a discount to avoid returns	Lean + Adaptive/ Responsive
Polygran Trade	Own imports, contracts with global manufacturers	Own packaging facilities	Auto and rail delivery, cross-docking, booking for the season	Own regional warehouses	Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of goods for replacement, financial ability to provide a discount to avoid returns	Lean + Adaptive
LNS	Own imports, contracts with global producers		Auto and rail delivery, cross-docking, booking for the season	Warehouses of responsible storage	Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of goods for replacement, financial ability to provide a discount to avoid returns	Lean + Adaptive/ Responsive
Agropartner	Own imports, contracts with global producers		All convenient types of delivery, use of third-party logistics organizations and own rolling stock	Own regional warehouses, custodial warehouses	Analytics of supply, demand, prices of raw materials, price environment for agricultural products	Availability of replacement goods, financial ability to provide a discount to avoid returns	Lean + Adaptive/ Responsive

Source: compiled by the authors.

Table 4 illustrates how the optimal supply chain management strategy is shaped by the components of the supply chain core and vice versa: the formation of the supply chain core is influenced by the chosen management strategy. Depending on specific conditions, the core components serve as tools for developing various supply chain management strategies. For example, the presence of in-house production and logistic capacities, along with financial resources, can support a Lean + Resilient strategy. In optimal periods, raw materials are produced for production and finished goods are delivered to storage facilities with minimal costs. On the other hand, market conditions may not favour the production of mineral fertilizers, prompting a shift toward imported products. In such periods, logistics and financial components become crucial for forming a Lean + Adaptive strategy, enabling adaptations to market conditions, procurement and delivery. All convenient delivery methods, the use of third-party logistics providers, seasonal product reservations, direct delivery "from factory to farmer" and fertilizer application services contribute to the development of a Responsible strategy. Thus, the combination of supply chain core components can serve as instruments for different strategies, depending on market conditions and strategic vision.

The selection of mineral fertilizer supply chain strategies should be informed by the particularities inherent to the industry, including seasonality of demand, logistical constraints, reliance on imported raw materials, energy intensity of production, high risk, and regulatory requirements. The digital component, which is formed on the basis of ERP/SCM systems, ensures the integrity of management at all stages of the supply chain, from the initial demand to the final delivery. The implementation of demand sensing analytics, derived from synthetic weather, market, and price data, enables organizations to adopt a proactive stance rather than a reactive one. Integration with agri-tech platforms has been demonstrated to transform the model of cooperation with agricultural producers, thereby creating B2B2C relationships and increasing customer loyalty. Consequently, the digital strategy that underpins the industry is instrumental in fostering flexibility, transparency, and innovative competitiveness.

Conclusions

Ukraine has objective fundamental preconditions for growth in the mineral fertilizer market. The current level of their use is significantly lower than in developed countries and has not yet reached the pre-war level of consumption. This finding suggests the presence of a substantial, albeit as yet untapped, potential for the industry’s advancement. The Ukrainian mineral fertilizer market is distinguished by a high degree of dynamism, driven by a combination of internal (infrastructure, production) and external (war, import dependence, currency risks, etc.) factors. The capacity of enterprises to establish, maintain, and expeditiously adapt their resource supply systems is imperative for ensuring their stable operation in a highly volatile environment. This ability constitutes the foundation of strategic management

of supply chains in the mineral fertilizer market. The enterprise's resource base, comprising material, financial, information, human resources, technological, and infrastructure components, is a critical element in implementing strategic approaches aimed at ensuring the competitiveness, efficiency, and sustainability of the supply chain. The availability, limited or shortage of key resources directly affects the choice and implementation of logistics models, the formation of supply routes, the ability of the enterprise to respond quickly to risks, and the level of managerial flexibility. In this context, resource provision should be regarded not only as a tool to support the implementation of logistics management strategies, but also as a systemic factor that determines their efficiency, adaptive potential, scale of practical implementation, and economic feasibility in specific market and geopolitical conditions. The concept of the "supply chain core" (SC core), which is predicated on the value and resource provision of the SC, was initiated. The fundamental principle of supply chain management is predicated on the business model that is specifically designed to achieve the stated objectives of supply chain management, contingent upon the selected strategy for the supply chain. The core of supply chain management should be regarded as a strategically pivotal element of the business model, signifying a set of goods and/or services that form the basis of value creation, provide a sustainable competitive advantage, and generate the bulk of supply chain management's profit. The study analyzes the key participants in the mineral fertilizer market, for which the structure of the supply chain management core is identified as a set of resource, production, logistics, and analytical elements that determine the functional basis of each company's business model. A comparative analysis reveals a direct correlation between the type of SE core and the selection of the strategic model for SE management.

The research findings confirm the hypothesis that strategic choices within supply chain organization enhance the full utilization of the unique capabilities and attributes of the supply chain core, thereby strengthening the synergy among its elements.

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