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## LOGISTICS PROCESSES OF WINE DISTRIBUTION: INTERNATIONAL AND DOMESTIC EXPERIENCE

### ЛОГІСТИЧНІ ПРОЦЕСИ ДИСТРИБУЦІЇ ВИНА: МІЖНАРОДНИЙ ТА ВІТЧИЗНЯНИЙ ДОСВІТ

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This article examines logistics processes in wine distribution from an international perspective with a focus on their application in the Ukrainian market. The study analyzes key supply models used in the wine industry, including the traditional B2B model, the direct to consumer approach based on tasting rooms, wine clubs, and online sales, as well as multichannel distribution systems. These models are evaluated in terms of market coverage, efficiency, and long term growth potential. The logistics chain is outlined from production and storage to transportation, customs procedures, distribution, and final delivery. Attention is given to quality preservation requirements such as temperature control, packaging, and regulatory compliance. Based on the experience of leading wine producing countries, modern logistics technologies and digital solutions are highlighted. The article also assesses challenges and development priorities for wine distribution in Ukraine.

**Keywords:** wine, wine distribution, wine industry, logistics, wine marketing, direct to consumer.

Стаття присвячена дослідженню організації логістичних процесів у дистрибуції вина з урахуванням міжнародного досвіду та можливостей його адаптації в Україні. Проаналізовано основні моделі постачання у виноробній галузі, зокрема традиційну B2B модель, орієнтовану на співпрацю з оптовими посередниками та сектором HoReCa, модель прямих продажів споживачам DTC, що охоплює дегустаційні зали, винні клуби, винний туризм та онлайн канали збуту, а також змішані багатоканальні системи дистрибуції. Оцінено їхні переваги, обмеження та вплив на рівень ринкового охоплення, ефективність операційної діяльності, формування лояльності споживачів і довгострокову стійкість виноробних підприємств. Розглянуто повний логістичний ланцюг вина від виробництва та зберігання до транспортування, митного оформлення, розподілу в торговельних мережах і доставки кінцевому споживачу. Особливу увагу приділено вимогам до збереження якості продукції, зокрема дотриманню температурного режиму на всіх етапах постачання, захисту від світла та вібрацій, використанню сучасних пакувальних матеріалів і виконанню міжнародних регуляторних норм у сфері торгівлі алкогольною продукцією. На прикладі Франції, Італії, Іспанії, Австралії та США досліджено сучасні інновації у сфері зберігання, транспортування та цифрового управління ланцюгами постачання, включно з автоматизованими складськими комплексами, цифровими інструментами управління запасами та використанням клімат контейнерів для далеких перевезень. Окремо проаналізовано стан логістики винної дистрибуції в Україні, визначено ключові виклики, пов'язані з воєнними діями, пошкодженням транспортної інфраструктури, а також наведено приклади успішного впровадження міжнародних практик. За результатами порівняльного аналізу визначено пріоритетні напрями розвитку, серед яких розширення частки DTC продажів, модернізація складської й транспортної інфраструктури, впровадження інноваційних пакувальних рішень та подальша цифровізація логістичних процесів з метою підвищення конкуренто-спроможності українських виноробів на внутрішньому й зовнішньому ринках.

**Ключові слова:** вино, дистрибуція вина, виноробна промисловість, логістика, маркетинг вина, прямі продажі.

**Statement of the problem.** In a global context, wine distribution plays a key role in ensuring effective communication between

producers and consumers, influencing the quality and availability of products on the market. Effective organisation of logistics processes



is critical to competitiveness. In Ukraine, this sector faces numerous challenges, including a lack of modern digital systems, insufficient automation of warehouses and transport routes, limited integration between B2B and DTC channels, and the impact of economic instability and military action. These factors create risks for product quality, timely deliveries, and meeting consumer demand. Analysis of international experience allows us to identify best practices that can be adapted to improve the efficiency of Ukrainian logistics and competitiveness in the global market.

**Analysis of Recent Research and Publications.** Recent studies on the organization of logistics processes in wine distribution, both internationally and in Ukraine, emphasize the complex interaction between traditional distribution practices and modern logistics innovations. In particular, Shymanovska-Dianich L.M., Pedchenko N.S., Lozova O.V., Kucher M.M., Steblyuk N.F., and Vyshnikina O.V. [1] analyze the development of Ukrainian wine industry enterprises under wartime conditions, focusing on distribution risks, disruptions of supply chains, and the need to improve business processes in sales and logistics. Research by Meish A. and Yadukha S. [2] addresses the formation of logistics subsystems for product distribution, highlighting structural efficiency and coordination within supply chains. Todoriuk O. and Ilchenko N. [3] examine the specific features of organized wine distribution, emphasizing the role of logistics planning and market structure. Davidenko O.M. [4] explores the structure of wine distribution in Ukraine, with particular attention to the growing role of the HoReCa sector and electronic commerce. Petrenko I.V. [5] focuses on the digitalization of logistics in winemaking, underlining the importance of inventory optimization and digital supply chain management tools.

Overall, these publications demonstrate a growing scientific interest in modernizing Ukrainian wine distribution systems. The integration of digital technologies, strategic logistics planning, and adaptive distribution models is consistently identified as a key factor for maintaining competitiveness and resilience under economic instability and geopolitical challenges. Comparative analysis with international practices presented in these studies provides valuable insights for improving operational efficiency and expanding market reach for Ukrainian wine producers.

**Highlighting previously unresolved parts of the overall problem.** Despite extensive research on wine distribution logistics, several issues remain insufficiently addressed. First, there is a lack of comprehensive integration of international best practices with the specific conditions of the Ukrainian market, particularly in the context of ongoing military conflict and economic instability. Second, the adaptation of digital supply chain solutions to small and medium-sized Ukrainian wine producers is underexplored, including practical approaches for inventory optimization, climate-controlled transportation, and real-time monitoring. Third, the balance between traditional B2B channels and direct-to-consumer (DTC) models requires further analysis to determine the most efficient and sustainable strategies under fluctuating market demand. Additionally, there is limited empirical research on the combined effects of logistics modernization, regulatory compliance, and packaging innovations on both product quality and customer satisfaction in Ukraine. Addressing these gaps is crucial for developing integrated, resilient, and competitive wine distribution systems that align international experience with domestic practical constraints.

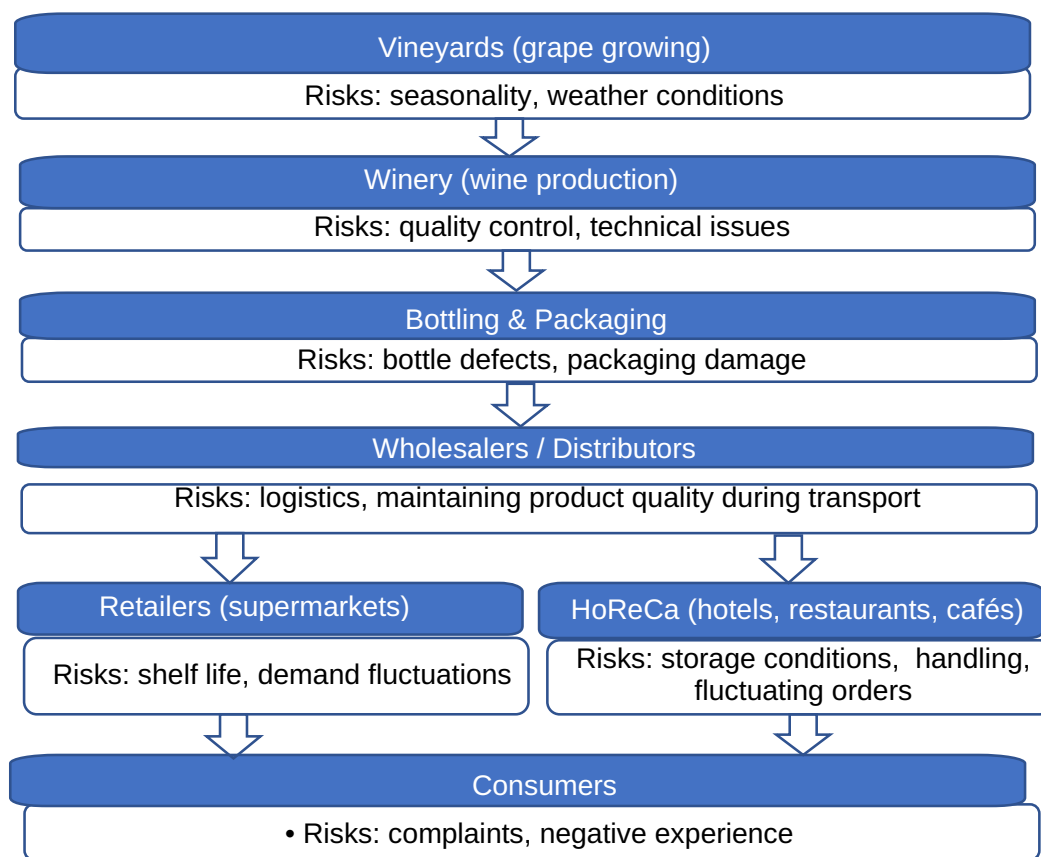
**Formulation of the article's objectives (problem statement).** This research article is aimed to analyse the main principles underlying the wine distribution system in foreign countries and in Ukraine. Determine the factors that affect the wine distribution system. Examining how different markets organize and manage the flow of wine from producers to consumers, including distribution channels, market segmentation, and regulatory compliance. To compare the Ukrainian wine distribution system with those of other countries, the research seeks to highlight unique characteristics and common challenges. This research is particularly important in the context of Ukraine's ongoing economic and geopolitical challenges, as it provides insights into how the wine industry can navigate these issues and enhance its distribution system using the main principles of functioning. The findings aim to support the development of a more resilient and efficient wine distribution network in Ukraine.

**Presentation of the main research material.** International wine trade in 2024 amounted to approximately 99.8 million hectoliters in export volume, remaining comparable to 2023 levels and demonstrating the resilience of global trade despite a decline in production. The total value of global wine trade was estimated at around

€35.9 billion [6]. The global wine market is valued at approximately USD 68.8 billion in 2025 and is projected to grow to USD 79–79.3 billion by 2034, with an average annual growth rate of about 1.6 percent [7]. Global wine consumption in 2024 reached approximately 214.2 million hectoliters. The largest wine importers worldwide are the United States, Germany, and France, with total global wine imports estimated at around 11.2 million tonnes, or approximately USD 33.2 billion [8]. During the war, Ukraine's vineyard area fell from 47,000 hectares to around 27,000 hectares. Despite this reduction, wine exports grew by 29 percent between 2022 and 2024. Ukrainian wines are now available in the United States, the United Kingdom, several European countries, as well as in the Nordic and Baltic regions. The number of countries importing Ukrainian wine increased from 21 to 39. At the same time, domestic wine consumption showed growth, rising by 3 percent for local wines and 29 percent for imported wines. Pricing remains a challenge, as Ukrainian wines are generally more expensive compared to producers in Italy, France, Spain, and the USA. Factors affecting competitiveness include supply chain issues such

as corks and bottles, logistics, currency volatility, and other operational constraints. Nevertheless, initiatives continue to support the promotion of Ukrainian wines and the development of the domestic wine industry [9]. In international wine logistics, key factors include production and consumption volumes, the stability of trade routes, and the impact of climate and economic changes on supply chains. For Ukraine, the domestic market relies heavily on imports, while export potential is limited in both volume and market structure.

So, the classic wine supply chain (Figure 1) shows the steps a product goes through from the vineyard to the end user, including key logistics processes and risks at each level. It begins with the cultivation of grapes, where seasonal fluctuations, adverse weather conditions, diseases, and other natural factors can significantly affect yield and quality. After harvest, grapes are sent to wineries for production, where processes such as fermentation, aging, and quality control are critical. Risks at this stage include technical failures, errors in the production process, breaches of quality standards, and potential loss of product. Once the wine is finished, it is bottled



**Fig. 1. Classic Wine Supply Chain**

Source: compiled by the author based on [10; 11]

and packaged for distribution, with possible risks including defective bottles, damaged packaging, and incorrect labeling, which can lead to returns and negatively impact the brand's reputation.

Distributors then deliver the wine to retail outlets and HoReCa channels, where logistical challenges such as transportation, temperature control, and preservation of product quality are paramount, especially in international shipments. In retail stores, risks arise from demand fluctuations, limited shelf life, and inventory management, while in hotels, restaurants, and cafes, storage conditions, proper handling, and unpredictable order volumes present additional challenges. Overall, the wine logistics process is multi-layered and highly dependent on consistent quality control, proper transportation, and storage at all stages. International experience

underscores the importance of integrated IT systems for supply chain monitoring, an area that remains underdeveloped in Ukraine, where the primary focus is often limited to transportation and distribution.

The presented scheme illustrates three main logistics models (Figure 2) used in wine distribution: centralized, decentralized, and hybrid. Each model organizes the flow of goods differently and provides specific advantages in terms of cost, delivery speed, and quality control. In the field of wine distribution, three primary logistics models are commonly implemented: centralized, decentralized, and hybrid. The centralized logistics model involves routing all wine deliveries through a single central warehouse. This approach allows firms to consolidate inventory, thereby reducing storage

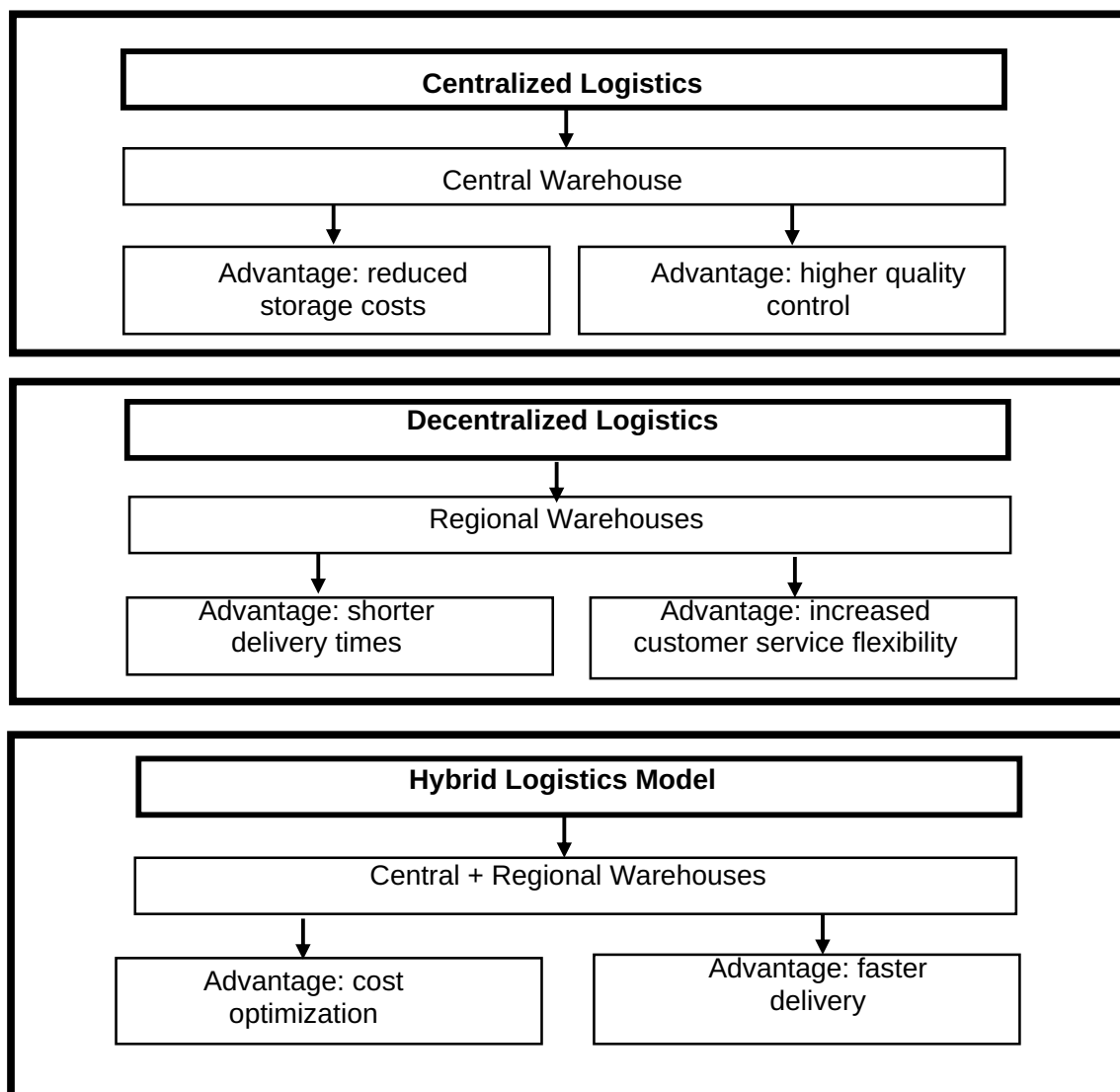


Fig. 2. Classic Wine Supply Chain

Source: compiled by the author

costs and minimizing the complexity associated with managing multiple locations. Centralization also enhances quality control, as all products are inspected and handled within a standardized environment. This model is particularly effective when maintaining consistency and adherence to strict quality standards is critical, although it may result in longer delivery times to distant regions.

The decentralized logistics model relies on a network of regional warehouses distributed across various geographic areas. Each warehouse serves local customers directly, which shortens delivery times and increases responsiveness to fluctuations in regional demand. This model offers greater flexibility in customer service and allows inventory levels to be adjusted according to local preferences. However, decentralized logistics can entail higher storage costs and more complex management due to the multiplicity of facilities.

The hybrid logistics model integrates elements of both centralized and decentralized approaches. In this system, core inventory is maintained in a central warehouse, while regional warehouses manage local deliveries. The hybrid approach seeks to optimize costs by minimizing unnecessary transportation and storage overheads, while simultaneously improving delivery speed and preserving quality control for key products. This model is particularly suitable for companies that aim to balance operational efficiency with responsiveness to dynamic market conditions.

Key insights from the wine logistics framework indicate that the organization of logistics directly influences cost-efficiency, delivery performance, and quality control throughout the distribution process. Companies typically select a logistics model based on factors such as market coverage, order volume, and product quality requirements. In international wine distribution, the hybrid model is increasingly favored, as it combines the advantages of both centralized and decentralized approaches, allowing for greater flexibility and efficiency in managing global supply chains. International experience demonstrates that the efficiency of wine distribution is closely linked to the level of logistics infrastructure development, digitalization, and the strategic balance between B2B and DTC channels.

France represents a highly structured and regulated wine logistics system, where centralized distribution through professional wholesalers remains dominant, particularly for exports. At the same time, French producers

actively develop direct-to-consumer (DTC) channels, including winery tasting rooms, wine clubs, and certified online platforms. Advanced temperature-controlled logistics, bonded warehouses, and digital traceability systems (including QR-based origin tracking) ensure product quality and regulatory compliance across international supply chains.

Italy demonstrates a more flexible and regionally diversified logistics model. Italian wine producers often rely on decentralized and hybrid distribution systems, combining regional warehouses with direct shipments to HoReCa and retail networks. Small and medium wineries actively use e-commerce platforms and logistics outsourcing, allowing them to reach foreign consumers directly while minimizing infrastructure costs. This approach has strengthened Italy's export resilience and reduced dependence on single distribution channels. Spain has focused on optimizing logistics costs through large-scale centralized warehouses and port-oriented export logistics. Spanish producers actively use the intermodal transport solutions, combining road, rail, and sea transport, particularly for bulk wine exports. Digital inventory management systems and automated bottling and packaging centers have allowed Spain to maintain price competitiveness in global markets while ensuring consistent quality standards.

Australia offers an example of a highly export-oriented logistics model adapted to long-distance shipments. The widespread use of climate-controlled containers, advanced forecasting systems, and digital supply chain monitoring tools (GPS, RFID) enables Australian wineries to deliver wine to Europe, North America, and Asia with minimal quality loss. DTC sales are strongly supported through online platforms, subscription-based wine clubs, and integrated logistics partnerships with global carriers.

The United States combines large-scale distribution networks with one of the most advanced DTC systems globally. Legal frameworks in many states allow wineries to ship directly to consumers, which has driven investment in digital order management systems, automated fulfillment centers, and last-mile delivery solutions. This hybrid structure provides high market responsiveness, data-driven demand forecasting, and strong customer loyalty.

Overall, international practice confirms that the hybrid logistics model, which integrates



Table 1

International comparison of wine distribution practices

Country	Basic logistics model	Key technologies/ solutions	Examples of DTC and digitalization	Features/ recommendations for Ukraine
France	Centralized with DTC elements	Temperature-controlled containers, digital tracking, warehouse automation	Wine clubs, tasting rooms, online stores	Use central hubs to monitor quality and compliance with EU standards
Italy	Hybrid (regional warehouses + DTC)	Digital platform for order processing, warehouse automation, consolidated deliveries	Online sales through platforms such as ShippyPro, wine clubs	Establish regional distribution centers near safe zones and develop online channels for the domestic market
Spain	Central + export orientation	Intermodal transport, digital inventory management, packaging control	Online platforms for export, automated storage	Develop export routes through secure ports and use intermodal transport to reduce costs
Australia	Hybrid, export	Climate-controlled containers, GPS/RFID monitoring	Online sales, wine club subscriptions	Implement climate containers for long-distance deliveries and tracking systems for supply chain transparency
The United States	Hybrid, with a focus on DTC	Temperature-controlled warehouses, digital logistics, demand forecasting	Direct deliveries to consumers via online and delivery across states	Develop DTC networks, use demand forecasting and digital logistics to reduce dependence on traditional channels
Ukraine	Hybrid (central warehouse + regional hubs + DTC)	Digital platforms for accounting and tracking, temperature-controlled storage, climate-controlled containers	Wine shops, tasting rooms, online sales, clubs, wine tourism	The hybrid model allows: 1) minimizing risks due to damaged infrastructure; 2) ensuring exports through the EU; 3) developing DTC and online channels; 4) improving quality control at the central warehouse.

Source: compiled by the author based on [10; 11]

centralized quality control with decentralized or direct distribution channels, offers the highest level of operational stability, flexibility, and market adaptability. For Ukraine, the choice of a logistics model is significantly influenced by wartime risks, infrastructure damage, disrupted supply routes, and increased transportation costs. Under these conditions, a fully centralized model increases vulnerability to logistical disruptions, while a fully decentralized system may lead to excessive costs and quality control challenges.

Based on international experience and domestic constraints, the hybrid logistics model appears to be the most suitable option for the Ukrainian wine industry during and after the war.

This model allows:

- risk diversification, by combining central warehouses in relatively secure regions with smaller regional distribution points;
- flexible routing, enabling rapid adaptation to changing transportation corridors, border procedures, and export routes;
- export support, as centralized hubs can ensure compliance with EU quality and customs requirements, while decentralized elements facilitate faster cross-border deliveries;
- development of DTC channels, including winery shops, tasting rooms, online sales, and wine tourism, which reduce dependence on intermediaries and increase margins;

– improved resilience, as digital supply chain tools allow real-time monitoring of inventory, transportation risks, and demand fluctuations.

Thus, the hybrid model enables Ukrainian wine producers to maintain quality control, expand market access, and adapt to unstable external conditions. In the long term, this approach supports the integration of Ukrainian wine logistics into European supply chains and enhances the international competitiveness of domestic producers.

**Conclusions.** The study confirms that logistics processes play a decisive role in the efficiency and competitiveness of wine distribution systems. International experience demonstrates that successful wine-producing countries rely on well-developed logistics infrastructure, digital supply chain management, and a balanced combination of B2B and direct-to-consumer distribution channels. France, Italy, Spain, Australia, and the United States illustrate that modern wine logistics increasingly shifts toward hybrid distribution models, which combine centralized quality control with flexible regional and direct sales mechanisms.

The analysis shows that centralized logistics models ensure high standards of quality control and regulatory compliance, particularly in export-oriented markets, while decentralized systems improve delivery speed and responsiveness

to local demand. However, global practice indicates that the hybrid logistics model offers the most effective solution by integrating the advantages of both approaches. The growing role of DTC channels, supported by digital technologies, enhances customer loyalty, increases profitability, and reduces dependence on intermediaries.

For Ukraine, the organization of wine distribution logistics is significantly influenced by wartime conditions, including infrastructure damage, disrupted transport routes, increased logistics costs, and heightened operational risks. Under such circumstances, purely centralized logistics systems are highly vulnerable, while fully decentralized models may result in excessive costs and quality management challenges. Therefore, the hybrid logistics model is the most appropriate and resilient solution for the Ukrainian wine industry.

The hybrid model enables risk diversification, flexible routing of supply chains, improved export readiness, and the development of direct-to-consumer sales channels. Its implementation, supported by digital logistics tools and improved storage and transportation technologies, can strengthen the stability of wine distribution, facilitate integration into European markets, and enhance the long-term competitiveness of Ukrainian wine producers.

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