

OPTIMIZING MOLDOVA'S AGRI-FOOD SUPPLY CHAINS FOR THE INTEGRATION INTO THE EUROPEAN UNION

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Abstract

Moldova's agri-food sector faces significant supply chain challenges as it prepares for deeper European Union (EU) market integration. This study evaluates Moldova's logistics performance and infrastructural connectivity in a regional context, drawing on World Bank's Logistics Performance Index (LPI) data. The findings reveal that Moldova ranks low on LPI (97th out of 139 in 2023) with critical bottlenecks in customs clearance and transport infrastructure. Road and rail connectivity constraints—exacerbated by outdated infrastructure and limited port access—impede efficient trade flows. Case studies from Eastern Europe illustrate how targeted logistics optimization, digital transformation, and cooperative business models can enhance supply chain performance. Drawing on best practices from new EU member states and candidates, the analysis underscores that aligning with EU food safety and phytosanitary regulations is both a major challenge and an achievable goal. Strategic investments in infrastructure, adoption of digital logistics systems, and capacity-building for standards compliance emerge as pivotal solutions for Moldova's agri-food supply chains to compete in the EU single market.

Key words: agri-food supply chain, logistics performance index, transport infrastructure, EU Integration, Food safety compliance, Digital Transformation, cooperatives, Republic of Moldova

INTRODUCTION

Moldova's agri-food industry is a cornerstone of the national economy and a key driver of export earnings, yet its supply chains must overcome significant hurdles to integrate with the European Union (EU) market. In recent years, Moldova has pursued closer economic ties with the EU, culminating in a Deep and Comprehensive Free Trade Area (DCFTA) and candidacy for EU membership [16, 2]. These developments present both opportunities and obligations: local agri-food producers gain preferential access to a vast market, but they also face stricter logistics efficiency requirements and rigorous EU food safety and phytosanitary standards [5, 21, 13]. This research addresses the critical question of how Moldova can optimize its agri-food supply chains to meet the demands of EU integration. We combine an analysis of international logistics performance benchmarks with firm-level insights from Moldovan agri-food companies to provide a comprehensive, data-driven assessment.

Prior research highlights that Moldova's agri-food sector continues to confront substantial structural and logistical barriers, including fragmented agricultural production, limited infrastructure, and insufficient compliance with EU regulations [17, 22]. Moreover, ensuring sustainable development and food security remains a crucial objective, reinforcing the urgency to address these challenges systematically [5, 19].

Trade facilitation indicators consistently rank Moldova behind its neighbors Romania and Ukraine, reflecting chronic issues in transport infrastructure, border management, and supply chain coordination. These inefficiencies are not merely theoretical – they exact real costs on exporters. For example, preparing export documentation in Moldova takes 48 hours on average, versus less than 2 hours in the EU; consequently, the median export transaction time is nearly 12 times longer than in neighboring EU countries [4]. Such delays undermine competitiveness and highlight the urgency of modernization. Furthermore, as an agrarian economy, Moldova depends on efficient farm-to-market logistics for high-

value produce like fruits, vegetables, and wines. Any bottleneck – whether potholed roads, scarce refrigerated storage, or slow customs clearance – can erode product quality and reliability, impeding market access.

In this context, the purpose of the paper is to evaluate Moldova's current agri-food supply chain challenges, analyze regional logistics and infrastructural gaps, and identify strategic solutions drawn from EU integration experiences of comparable Eastern European countries. The aim is to provide evidence-based recommendations for improving Moldova's logistical performance, institutional capacities, and compliance with EU standards to facilitate competitive integration into the European Union agri-food market.

MATERIALS AND METHODS

This paper is structured to first evaluate Moldova's current logistics performance and infrastructure connectivity, then examine case studies of successful supply chain enhancements in comparable contexts, and finally discuss the gaps and reforms needed for EU compliance.

Section 2 reviews Moldova's LPI rankings and pinpoints logistics bottlenecks relative to regional benchmarks.

Section 3 analyzes the state of transport routes (road, rail, and port) linking Moldovan producers to EU markets.

Section 4 discusses EU integration challenges – notably aligning with EU food safety, quality, and phytosanitary regulations – and draws on best practices from similar economies to propose solutions. The conclusions synthesize these findings, emphasizing strategic priorities for policymakers and industry stakeholders to strengthen agri-food supply chains in the lead-up to EU accession.

RESULTS AND DISCUSSIONS

Logistics performance and benchmarking

Several studies indicate that Moldova's logistical inefficiencies negatively affect its agri-food export competitiveness, especially compared to its regional peers [17, 21, 22].

These structural limitations directly translate into delays, increased transaction costs, and diminished product quality for perishable goods, highlighting the pressing need for investments in logistics infrastructure and technology [19, 22]. As emphasized by recent analyses, the underdeveloped cold-chain storage capacities and inadequate transport infrastructure substantially weaken Moldova's export potential [17, 19].

A useful starting point for assessing Moldova's supply chain readiness is the World Bank's Logistics Performance Index (LPI), a multidimensional measure of trade logistics efficiency. The LPI scores countries on a scale from 1 (lowest) to 5 (highest) across components such as customs efficiency, infrastructure quality, international shipment ease, logistics competence, tracking and tracing, and timeliness. In the latest LPI (2023), Moldova's overall score is 2.5, placing it 97th out of 139 countries. This ranking trails all EU member states and several regional peers [4]. By comparison, Romania scored 3.2 (approximately in the top 50 globally), and Ukraine scored 2.7 (rank ~79th) despite the disruptions of conflict [1].

Table 1. LPI Score (2023) – Moldova vs. Regional Peers

Country	Over all LPI	Cust oms	Infra struc ture2 015	Inter natio nal Ship ment s	Logi stics Com peten ce	Tracki ng & Tracin g	Time liness
Moldova (MD)	2.5	1.9	1.9	2.7	2.8	2.8	3.0
Ukraine (UA)	2.7	2.4	2.4	2.8	2.6	3.1	2.6
Georgia (GE)	2.7	2.6	2.3	2.7	2.6	3.1	2.8
Romania (RO)	3.2	2.7	2.9	3.4	3.3	3.6	3.5

Source: developed by the author based on World Bank Data, LPI [1, 26, 2].

Table 1 summarizes LPI indicators for Moldova and select regional benchmarks, highlighting Moldova's lag in key areas.

Moldova shows the lowest logistics scores, notably in Customs and Infrastructure.

Moldova's weakest points are customs clearance and infrastructure, both scoring only 1.9 out of 5 in 2023 (ranked near the bottom globally at ~132–133rd) [1]. This indicates systemic problems in border procedures –

lengthy paperwork, physical inspections, and coordination issues among border agencies – as well as inadequate transport infrastructure [14]. By contrast, Moldova's scores in logistics competence, tracking, tracing, and timeliness are somewhat higher (around 2.8–3.0), suggesting that once goods are past the border and on domestic soil, the professionalism of logistics services and ability to meet delivery schedules are closer to regional norms. Nonetheless, even these aspects significantly trail EU standards. For instance, Romania's tracking & tracing score of 3.6 far exceeds Moldova's 2.8, reflecting Romania's more advanced adoption of digital tracking systems in freight transport [26].

Notably, Moldova has made incremental progress – its LPI rank improved from 116th in 2018 to 97th in 2023 – but it remains an *outlier* in Eastern Europe. Within the Europe & Central Asia region, Moldova has one of the lowest LPI scores. World Bank analysis [1] confirms that Moldova scores lower than Belarus, Georgia, and all EU neighbors on every LPI component, underscoring a broad performance gap. These data align with the lived experience of firms: according to the Enterprise Surveys, 35% of large firms in Moldova identified transportation as a major business constraint, the highest share in the sub-region [4]. The consistency between macro-level indices and firm perceptions reinforces the urgency of tackling logistics bottlenecks.

Several factors drive Moldova's underperformance. One is border management inefficiency. Despite reforms such as e-declaration systems, Moldova's customs procedures remain a serious bottleneck, with duplicate checks and long queues at checkpoints causing 2–3 day delays at busy borders. In 2018, Moldova ranked last among Eastern European peers on the LPI Customs index [4]. Another factor is the historical underinvestment in transport infrastructure. Decades of neglect and limited budgets have left roads in poor condition and railways deteriorating. Logistics infrastructure (e.g. warehouses, cold storage) is among the least developed in post-Soviet countries. Most storage facilities are outdated Soviet-era

buildings repurposed as warehouses, with virtually no modern temperature-controlled logistics centers. Until recently, even basic cold chain capacity was insufficient – only 250 out of 633 cold storage facilities in the country have pre-cooling, and a mere 46 have sorting/grading equipment for produce [4]. This limits exporters' ability to maintain quality for perishables. Moreover, third-party logistics providers are scarce; many producers and retailers operate their own trucks and storage, resulting in fragmented, sub-scale logistics operations.

Overall, the LPI analysis reveals a logistics performance divide that Moldova must bridge to join the EU single market on competitive terms. Improvements in customs facilitation and infrastructure are particularly critical. The next sections delve deeper into these areas by examining Moldova's transport routes and physical connectivity, and by exploring how peer countries have tackled similar challenges.

Transportation-infrastructure and access to routes

Geography and infrastructure profoundly shape agri-food supply chains. Moldova is a small, landlocked country, bounded by Ukraine to the north and east and Romania (EU) to the west. Lacking direct sea access apart from a short Danube River segment in the far south, Moldova relies on overland corridors – road and rail – to connect to seaports and EU markets [25]. This section evaluates Moldova's principal transportation routes, identifying critical limitations and areas for improvement in road, rail, and port connectivity [7].

-Road network.

Roads carry the majority of Moldova's domestic and international freight. The country's road network handles farm-to-market transport within Moldova and links producers to border crossings and ports abroad. Key highways connect the capital Chișinău and regional centers like Bălți to Romania and Ukraine. However, road quality is a persistent concern. Many sections suffer from poor pavement, insufficient maintenance, and capacity bottlenecks (e.g. single-lane stretches) which slow down transport and raise vehicle operating costs. The freight cost for dry goods

in Moldova (non-temperature-controlled) ranges from about US\$1.2 to \$1.4 per truck-km, significantly higher than the regional benchmark, largely due to *bad road conditions* increasing fuel and maintenance costs [3, 4]. By contrast, in neighboring EU countries, road freight costs per km are considerably lower under better infrastructure conditions. Upgrading critical trade corridors – such as the routes from Chişinău to the Romanian border – is thus paramount. Moldova has begun addressing this through projects with international partners (e.g. rehabilitating the M1 and M2 highways), but the network remains patchy. Additionally, border crossing infrastructure on roads is problematic: limited processing lanes and lack of joint controls with neighbors lead to long queues. Trucks often wait many hours (or days, in peak season) at major border points like Leușeni–Albita (to Romania) due to congested facilities and complex procedures. Improving border infrastructure and procedures (e.g. joint customs control, more inspection bays, weight stations) would markedly reduce transit times.

-Railway connectivity

Moldova's Soviet-built railway system has deteriorated to a point where it handles only a small fraction of freight traffic today. The state rail operator Moldovan Railway ("Calea Ferată din Moldova" - CFM) oversees about 1,200 km of track, much of which is in need of rehabilitation. Nearly 45% of railway tracks are past their service life and fully depreciated, and 60% of rolling stock (locomotives and wagons) is obsolete [4]. Aging infrastructure imposes severe speed restrictions and reliability issues – there is a wagon shortage (only ~63% of needed wagons are available) and frequent locomotive breakdowns. As a result, rail transport in Moldova has fallen out of favor except for low-value bulk commodities (e.g. minerals, grain) that are less time-sensitive. This is problematic because efficient rail could otherwise be a cost-effective mode for long-haul export shipments (especially for bulky agri-food products, like grain or bottled wine, destined for seaports).



Map 1. Moldova's railway network, showing main lines and connections to Ukraine (UA) and Romania (RO). Much of the network requires rehabilitation, and links through Transnistria in the east are non-operational, limiting access to Ukrainian Black Sea ports.

Source: Railway map of Moldova. Image: Wikimedia Commons. © Maximilian Dörrbecker [6]

Moldova's rail connectivity is further complicated by geopolitics and differing rail gauges. The main Soviet-gauge lines traditionally gave access eastward to Ukrainian Black Sea ports, especially Odesa. However, the historical route from Chişinău to Odesa via Transnistria is currently closed due to the Transnistria separatist region, forcing all rail cargo to detour or switch to trucks. In practice, most Moldovan export cargo headed to Odesa port is now moved by road rather than rail. Westward, Moldova has a rail link to Romania at Ungheni (on the Iaşi–Chişinău line), but the break-of-gauge (former Soviet 1,520mm to EU standard 1,435mm [20]) necessitates either bogie exchange or transloading at the border, incurring delays and costs. These technical and political barriers mean that rail carries a negligible share of high-value agri-food exports. Without major investments – such as track rehabilitation, modernization of rolling stock, and perhaps installing dual-gauge segments or new interoperable rail links to Romania – Moldova's rail will remain a secondary transport option. Plans are

underway to restructure CFM and adopt a new Railway Code aligned with EU practices, which could open the sector to investments and improve service in the long run.

-Port access

Being landlocked, Moldova depends on foreign seaports for overseas trade [8]. There are three primary port options: Odessa and Chornomorsk in Ukraine, and Constanța in Romania (on the Black Sea), in addition to Moldova's small domestic Danube port at Giurgiulești. Each comes with limitations. Historically, Odessa (Ukraine) was the transit point for much of Moldova's containerized and bulk exports, due to geographic proximity (~200 km from Chișinău) and established logistics [24]. Since the outbreak of war in Ukraine, however, access to Odessa/Chornomorsk has been constrained or made risky, pushing Moldova to re-route more trade via Romania. Giurgiulești, located at the southern tip of Moldova where it touches the Danube, is the country's only seaport. While a strategic asset, Giurgiulești International Free Port is relatively small – it can handle barges and smaller seagoing vessels on the Danube, and has facilities for grains, oil products, and containers, but its throughput is limited. Moreover, Giurgiulești lacks direct rail connections to the rest of Moldova's rail system (cargo must be trucked to the port) and until recently had infrequent feeder barge services to bigger ports. Even when used, shipments via Giurgiulești often require a transshipment at Constanța (Romania) to reach ocean-going ships, adding 3–4 days transit and extra cost [4]. Constanța, on the other hand, is a large deep-sea port with direct ocean access and has become more prominent for Moldovan trade during the Ukraine conflict. The downside is distance and transit time: routing through Constanța entails a longer overland journey (whether by road or rail via Romania) and border crossings. It typically adds several days of transit compared to Odessa in peacetime.

Moldova's physical connectivity challenges include: inadequate road quality increasing transport costs and unpredictability; a moribund rail system that fails to offer a viable alternative for most exporters; and reliance on

external ports with attendant political and logistical vulnerabilities. Potential areas for improvement are clear. On roads, investments in trade corridors and border facilities will yield immediate benefits by cutting delay and cost. On rail, pursuing the ongoing reform and selectively upgrading critical links (for instance, rehabilitating the north-south rail to Giurgiulești or developing intermodal hubs) could gradually shift more freight to rail. There are early positive signs – in 2023, emergency initiatives like the EU's "Solidarity Lanes" [9] have funded upgrades to rail links and Danube navigation to help Moldova and Ukraine maintain exports. Over the long term, integrating Moldova into the Trans-European Transport Network (TEN-T) – as envisaged by recent EU plans – would systematically address these connectivity gaps [15].

Case studies: logistics optimization and cooperative models

To chart a path forward, Moldova can draw lessons from other countries that have modernized agri-food supply chains under similar conditions. This section highlights a few case studies from Eastern Europe focusing on logistics optimization, digital transformation, and cooperative enterprise models. These examples demonstrate how targeted interventions can yield improvements in efficiency, market access, and compliance – outcomes highly relevant for Moldova's EU integration ambitions.

Digital transformation in agri-food Supply Chains. Across Central and Eastern Europe, agri-food companies are increasingly adopting digital technologies to streamline their supply chains. A recent multi-country study by Szegedi et al. (2022) [23] surveyed over 100 companies in the region and found that businesses expect digital transformation to significantly enhance logistics and marketing performance. The primary drivers for going digital were *quality improvement*, *market demand*, and *technology push*, while anticipated benefits included better sales and customer relations, followed by gains in logistics (e.g. improved inventory management, tracking) and production efficiency. This suggests that even medium-sized food processors see value in tools like

enterprise resource planning (ERP), real-time shipment tracking, and online marketplaces. In practice, some Eastern European agribusinesses have implemented digital supply chain platforms with notable success. For instance, in Serbia an EU-supported project recently established an integrated electronic food safety and traceability system that connects all inspection agencies on one platform, as mentioned by EU support for food chain in Serbia [10].

This system allows authorities and producers to instantly verify a product's origin, safety certifications, and export eligibility, greatly accelerating compliance checks. Within months of launch, Serbia reported more efficient inspections and improved confidence in export documentation, facilitated by the EU's €1.3 million investment in the underlying IT system. Moldova can take inspiration from such initiatives – indeed, the government has begun developing a National Single Window for trade and piloting digital tools in customs, but progress has been slow [4]. Accelerating digitalization (e.g. e-logistics portals, blockchain traceability for wine and organic products, mobile apps linking farmers to buyers) could leapfrog many of Moldova's legacy problems by reducing human error, increasing transparency, and integrating small producers into larger networks [3].

Logistics Hubs and cooperative storage. Another optimization approach is the development of logistics hubs or cooperatively owned storage and distribution centers. Fragmentation is a major issue in Moldova – thousands of small farms and processors, each trying to organize transport individually, cannot achieve economies of scale. In countries like Poland and Lithuania, agricultural cooperatives have transformed this landscape. Several case studies in EU new member states show that cooperatives can *improve market efficiency and bargaining power* for farmers [11]. For example, cooperative groups in Poland and Hungary have challenged monopolistic intermediaries by collectively marketing and transporting produce. In Lithuania, dairy farmer cooperatives jointly invested in milk chilling and freight services, ensuring daily collection

routes reach even small farms, which solved the problem of difficult access to processing for smallholders. Similarly, cooperatives in Slovakia and Bulgaria have enabled small farmers to access markets by sharing the costs of transportation and storage. These models are instructive for Moldova, where small-scale producers dominate the horticulture and dairy subsectors. By forming producer groups or logistics cooperatives, farmers could pool resources for better trucking services, consolidate loads to fill containers bound for the EU, or jointly operate modern cold storage facilities that none could afford individually. Not only does this reduce per-unit transport costs, it also improves product quality (through proper post-harvest handling) and consistency of supply volumes – factors crucial for attracting large EU buyers. Strengthening cooperative business organization can thus be a powerful tool to optimize logistics from the bottom up.

Public-Private Partnerships in infrastructure

Upgrading national logistics often requires coordination between government and industry. A case in point is Romania's experience in the 2000s. In preparation for EU accession in 2007, Romania heavily invested in its highway network and border infrastructure, aided by EU pre-accession funds and PPP arrangements. One notable initiative was the development of the Constanța port and intermodal facilities which today serve not only Romania but also landlocked neighbors. Although Romania still faces infrastructure gaps, its LPI infrastructure score (2.9) is considerably higher than Moldova's 1.9, reflecting sustained improvements [4]. The Moldovan government, with support from international donors, is pursuing similar projects – for instance, rehabilitating the M3 road to better connect Giurgiulești port and implementing output-based contracts for road maintenance [4]. These efforts need to be scaled up and paired with logistics service development (such as encouraging modern 3PL providers to enter the Moldovan market). The creation of inland logistics centers at strategic locations (near Chișinău or Bălți) through PPPs could provide integrated services

like warehousing, consolidation, and customs brokerage, which would especially benefit agri-food exporters who often lack dedicated logistics departments. In all these cases, a common thread is capacity building – whether technological, organizational, or infrastructural. Eastern European examples demonstrate that improvements in supply chain performance are achievable through concerted action. The challenge is translating this interest into concrete projects, which often requires initial public investment or donor support to overcome coordination failures.

Integration of the Republic of Moldova into the European Union: challenges and pathways to compliance.

Meeting the stringent EU sanitary and phytosanitary (SPS) standards remains one of Moldova's most challenging tasks. Despite legislative harmonization efforts, the actual implementation and enforcement of these standards have significant shortcomings, contributing to high rejection rates of Moldovan agri-food exports at EU borders [5, 19, 22]. Previous research suggests that enhancing diagnostic capacities, introducing robust traceability systems, and adopting comprehensive quality management practices are essential steps towards mitigating these compliance issues [19, 22]. Moreover, successful models from other Eastern European countries demonstrate that strategic investments in infrastructure and certification processes significantly boost compliance readiness and facilitate smoother integration into the EU market [16, 21, 22].

Successfully integrating into EU agri-food markets demands more than efficient logistics; it requires meeting stringent EU regulatory standards for food safety, plant and animal health (SPS measures), and quality. For Moldovan producers and exporters, the compliance challenge is significant. Yet, several peer countries have navigated similar transitions, offering valuable lessons. In this section, we examine the main EU integration hurdles for Moldova's agri-food supply chains and discuss solutions and best practices to address them.

Sanitary and phytosanitary (SPS) standards. The EU's "farm-to-fork"

regulations cover everything from pesticide residues on fruits to hygiene in dairy processing plants. Moldovan products must align with these standards to gain full access to the EU market. Currently, gaps in compliance and enforcement are evident. Many Moldovan farmers and food processors have limited knowledge of EU technical requirements. Critical elements of the safety infrastructure – such as accredited laboratories for testing and traceability systems for animal products – are still developing. The National Food Safety Agency (ANSA) has been working to harmonize Moldova's SPS regulations with EU law, adopting thousands of pages of EU directives into national legislation. However, implementation capacity remains weak: laboratory diagnostics capabilities and product traceability mechanisms "*remain low*" [4]. For example, ensuring full traceability from farm to retail (a core EU requirement) is difficult when many small farmers sell through informal channels. A telling indicator is border rejections – over 2010–2022, an increasing share of Moldovan food exports were rejected by EU border controls due to safety issues, reaching 50% of all rejections in 2022 (the rest being mostly by the US) [18]. This trend underlines that while the EU is now Moldova's main export destination, meeting its standards is an ongoing struggle.

Compliance best practices. Other Eastern European countries provide models for strengthening SPS compliance. A common strategy is to upgrade testing and certification infrastructure with EU assistance. For instance, prior to EU accession, countries like *Latvia and Bulgaria invested heavily in modern laboratories* and obtained international accreditation for their testing facilities, often through twinning projects with EU member state agencies. Moldova is following suit: new testing labs (for example, for animal health and food quality) have been established or upgraded in Chişinău, but ensuring they operate to EU-recognized protocols is key. Another best practice is implementing comprehensive on-farm quality schemes. *Poland's experience* in the dairy sector is illustrative – with government incentives, thousands of small dairy farmers adopted EU-

compliant milk handling practices (cold storage at farm, regular veterinary checks) well before accession, facilitated by dairy processors who provided training and equipment [11]. This kind of value-chain approach (lead firms mentoring their suppliers) could be replicated in Moldova's fruit and vegetable sector, where exporters help their network of growers achieve Global G.A.P. certification for orchards and fields. Notably, several Moldovan companies are already moving in this direction – e.g. a large horticultural exporter has introduced a private standard for its apple suppliers, including pesticide use monitoring and harvest handling guidelines, to ensure the entire supply meets EU norms. Scaling such initiatives would improve overall compliance readiness.

Institutional reforms and EU support. Government agencies play a critical coordinating role. Negotiating equivalence agreements (whereby the EU recognizes Moldova's control systems as equivalent) can smooth trade in sectors like dairy, meat, or eggs. A recent success story is Moldova's first authorization to export class-A eggs to the EU in 2024, achieved by the George Standard poultry factory after it implemented EU-standard biosecurity and traceability measures [12]. This milestone – the result of investments in modern facilities and close work with veterinary authorities – shows that compliance is feasible. To replicate it broadly, Moldova must continue aligning regulations (Chapter 12 of EU *acquis* on food safety) and improve inspection regimes. The Serbian case again offers inspiration: Serbia's introduction of an integrated food safety information system, mentioned earlier, was explicitly aimed at fulfilling EU accession Chapter 12 requirements [10]. The EU provided funding and expertise for that project, acknowledging that building such systems has high returns for both candidate country and EU (safer imports, less border friction). Moldova is receiving similar support under various EU programs and the recently launched EU Solidarity Program – for example, EU experts have been advising ANSA on risk-based inspection and residue monitoring programs, and funds have been allocated for new border inspection posts

that meet EU specifications. Ensuring these initiatives are fully implemented and staffed with trained inspectors will be crucial so that, when Moldova is assessed for EU entry, its food safety control system is deemed robust.

Market access and knowledge. Beyond regulations, Moldovan producers must also adapt to market-driven standards and logistics norms in the EU. Retail chains in the EU often have strict requirements for packaging, labeling, barcoding, and delivery scheduling. Several survey respondents mentioned lack of knowledge about European market preferences as a barrier. About 80% of Moldovan agri-food firms not yet exporting said they *wish to start exporting*, but many do not know how to navigate standards and buyer expectations [4]. Bridging this knowledge gap is part of integration. Programs under EU4Business and other technical assistance have been organizing trainings for Moldovan SMEs on export marketing and certification. Expanding such capacity-building, possibly through public-private partnerships (e.g. an “Export Academy” involving successful exporters mentoring newer ones), can disseminate best practices. Also, fostering closer cooperation with neighboring Romania could help – Romanian companies that source from Moldova or have joint ventures can transfer know-how on EU compliance. This cross-border industry collaboration is already occurring to some extent (e.g. wine producers have partnerships for EU distribution), and could be incentivized further by both governments.

In tackling EU integration challenges, it is evident that logistics and compliance go hand in hand. Efficient supply chains will amplify the benefits of meeting standards, by getting certified, high-quality products to market faster and more reliably. Conversely, investing in compliance (labs, certifications, training) adds value to the improved logistics infrastructure. Therefore, Moldova's strategy should be holistic: upgrade “hard” infrastructure and “soft” infrastructure (institutional and human capacity) in parallel. Best practices from Eastern Europe underscore the importance of political will, stakeholder engagement, and external support in driving these reforms. With

sustained commitment, Moldova can transform its agri-food supply chains from a domestic bottleneck into a springboard for competitive export growth in the EU.

CONCLUSIONS

The experiences discussed in this study underscore that modernizing Moldova's agri-food supply chains requires comprehensive efforts that go beyond mere physical infrastructure upgrades. Institutional reforms, capacity building, and adopting proven logistics optimization strategies from comparable Eastern European contexts will be instrumental in Moldova's journey towards sustainable EU integration. Addressing these multifaceted challenges strategically can unlock significant growth potential in Moldova's agri-food sector, turning existing logistical bottlenecks into competitive advantages on the European market.

Moldova stands at a critical juncture in its path toward European integration. The agri-food sector, rich with potential owing to the country's fertile soils and entrepreneurial producers, can be a catalyst for prosperity if its supply chain inefficiencies are addressed. This study has shown that Moldova's current logistics performance is subpar by international standards, hampered by infrastructure deficits, cumbersome trade procedures, and fragmented coordination. The **Logistics Performance Index data** and firm-level evidence converge on a clear message: to compete in the EU market, Moldova must significantly reduce transportation delays and uncertainty, and elevate its compliance with quality and safety standards.

Key priorities emerging from our analysis include:

-Rehabilitating infrastructure. Modernizing roads and railways that form trade corridors to the EU is essential. Improved physical connectivity will lower freight costs and transit times. Public investment, augmented by EU and IFI funding, should target the most critical links (e.g. border highways, last-mile links to logistics hubs). Establishing intermodal facilities and upgrading the Giurgiulești port's

connectivity can also enhance resilience by diversifying export routes.

-Enhancing trade facilitation. Moldova needs to continue overhauling its customs and border management. Completing the National Single Window for trade, streamlining customs inspections with risk-based systems, and increasing transparency will remove administrative frictions. The goal should be to approach EU "best practice" clearance times (measured in minutes or hours, not days). This also means deepening cooperation with Romanian and Ukrainian border agencies, including pursuing joint border checkpoints with the EU to simplify crossings.

-Digital and organizational innovations. Embracing digital logistics solutions can accelerate progress. As case studies showed, investments in IT systems for tracking, inventory, and certification management yield high returns in efficiency and trust. Moldova should leverage its growing IT sector to tailor affordable digital tools for agri-food SMEs – for example, mobile apps for farmers to coordinate truck pickups or blockchain-based platforms to document product provenance. Moreover, encouraging **cooperative models** and industry clusters will allow smaller players to achieve scale and share resources, making the supply chain more cohesive and robust.

-Building compliance capacity. Meeting EU standards is arguably the toughest challenge, but one where incremental gains can open significant market opportunities. Moldova should continue aligning its regulatory framework with the EU acquis, but most importantly, it must invest in the institutions and people who enforce and implement these standards. Expanding laboratory testing capabilities, training inspectors and company quality managers, and supporting firms in obtaining certifications will build a culture of quality. Engaging in regional knowledge exchange – learning from countries like Romania, Serbia, or the Baltic states that underwent similar transitions – can provide practical roadmaps for upgrading SPS controls and infrastructure.

-Public-private collaboration. Finally, a coordinated approach is needed. The government, private sector, and development

partners must work in concert. Initiatives such as creating an Agro-Logistics Task Force or a Supply Chain Council could facilitate regular dialogue, ensuring that policy reforms address the real constraints faced by businesses on the ground and that businesses are aware of and contribute to government plans (e.g. infrastructure projects or new regulations). Success in supply chain optimization will be measured by more Moldovan products reaching EU shelves efficiently and being recognized for their quality.

In conclusion, optimizing Moldova's agri-food supply chains is a multifaceted endeavor – one that blends hard infrastructure upgrades with soft skill enhancements and systemic reforms. The evidence and cases discussed in this paper demonstrate that while Moldova's current logistics and compliance gaps are significant, they are by no means insurmountable. With strategic focus and sustained implementation of the solutions outlined, Moldova can shorten the distance (figuratively and literally) between its farmers and European consumers. In doing so, it will not only fulfill the technical requisites of EU integration but also unlock new competitiveness and growth for one of its most important economic sectors. The road to EU membership may be long, but improving the roads (and rails, and regulations) that carry Moldova's food to market is a decisive step forward on that journey.

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