

## DIGITAL INNOVATION IN CUSTOMS PROCESSES: DRIVING THE REPUBLIC OF MOLDOVA'S INTEGRATION INTO THE EU SINGLE MARKET

DOI: <https://doi.org/10.53486/dri2026.04>  
UDC: [004.78:339.543](478):339.92

Ana LEȘAN

Academy of Economic Studies of Moldova

Chisinau, Republic of Moldova

[annaleshan00@gmail.com](mailto:annaleshan00@gmail.com)

[lesan.ana@ase.md](mailto:lesan.ana@ase.md)

ORCID ID: 0009-0003-2103-6141

**Abstract:** *The digitalization of customs administration represents an essential element of the institutional and economic convergence process of the Republic of Moldova with the European Union, serving as a central pillar in its accession path. In the context of the candidate country status and the implementation of rigorous obligations assumed through the Association Agreement and the DCFTA, the modernization of the digital customs infrastructure contributes directly to the reduction of non-tariff barriers, the efficiency of external trade flows, and the increase of national economic competitiveness. This paper analyzes the strategic implementation of key state-of-the-art information systems – NCTS 5, AES, AIS, EES, BQS, and e-AEO – and highlights the technical mechanisms through which they facilitate functional integration into the European Single Market. The research methodology is based on a mixed approach, combining the documentary analysis of national digital transformation strategies with the evaluation of performance indicators provided by the Customs Service and reports from international organizations. The analyzed data reflect the impact of automation on customs clearance times and transactional costs for economic operators. The results of the study demonstrate that the digitalization of customs processes constitutes not just a simple administrative reform, but a strategic instrument for structural integration, capable of eliminating information asymmetries and ensuring the traceability of goods in real-time. The conclusions indicate that the interoperability of Moldovan information systems with the digital architecture of the European Union is the fundamental premise for transforming borders into efficient logistical hubs, accelerating economic convergence and strengthening the Republic of Moldova's position within European value chains.*

**Keywords:** *Customs Digitalization, European Single Market, Trade Facilitation, Republic of Moldova, Customs Processes*

**JEL:** F13; F15; O24; O33; L81

### Introduction

The integration of the Republic of Moldova into the European Union entails a complex process of legislative, institutional, and technological harmonization. The customs domain occupies a central position in this process, as it serves as the primary interface between the national economy and the European economic area. Given that approximately 70% of Moldovan exports are directed toward European Union member states, the efficiency of customs processes directly influences external competitiveness and the capacity for integration into European value chains.

Although preferential access to the community market is guaranteed through the DCFTA, administrative and procedural barriers can generate additional costs for economic operators. Border wait times, paper-based documentation, the lack of digital interoperability, and redundant controls can diminish the acquired tariff advantages. In this context, the digitalization of customs processes becomes an essential tool for reducing transaction costs and achieving functional integration into the Single Market.

The research problem consists of evaluating the extent to which the digital modernization of customs administration effectively contributes to the integration of the Republic of Moldova into the European economic space. The research hypothesis posits that the implementation of information systems

interoperable with the European Union's digital infrastructure reduces non-tariff barriers and strengthens institutional convergence.

### **Research Problem**

The current (or pre-digital) framework of customs operations in the Republic of Moldova has been characterized by a series of structural dysfunctions that acted as genuine non-tariff barriers to trade. These negative aspects can be synthesized through the following analytical axes:

**1. Procedural Redundancy and the "Parallel Documentation" Phenomenon** The reliance on physical, paper-based information flows has generated an inefficient administrative architecture. Manual processing of customs declarations entails a high rate of human error and data redundancy, as economic operators are frequently compelled to provide identical information to multiple regulatory authorities.

**2. Information Asymmetry and Lack of Predictability** The absence of interoperable digital systems has perpetuated a state of information asymmetry between customs authorities and the private sector. Without real-time monitoring capabilities, clearance processes have become unpredictable, generating significant opportunity costs for stakeholders.

**3. Technical Incompatibility with the Community Space (The Technological Gap)** Technological decoupling has forced border crossing points to function as logistical bottlenecks. At these points, procedures must be re-initiated from scratch upon entry into the EU common space, effectively neutralizing the advantages of geographical proximity.

**4. Integrity Vulnerabilities and Compliance Risks** Analog systems are, by definition, opaque. Frequent physical interaction between the declarant and the customs official, coupled with the lack of automated risk analysis mechanisms, has facilitated structural vulnerabilities regarding integrity and professional ethics.

### **Theoretical Framework of Customs Digitalization and Economic Integration**

In economic literature, trade efficiency is frequently analyzed through the lens of Transaction Cost Theory. According to this approach, costs associated with administrative processes, information verification, and regulatory compliance can significantly influence the volume and structure of international trade. Within the customs domain, these costs are generated by complex bureaucratic procedures, repetitive controls, lack of document standardization, and procedural uncertainty.

The digitalization of public administration has the potential to mitigate these costs by automating information flows and standardizing interactions between the authority and the business environment. According to World Bank reports (2024), electronic filing systems and automated risk analysis reduce processing times and increase transparency, thereby contributing to an improved investment climate. Integration into the European Single Market, however, implies more than mere administrative efficiency. It involves the elimination of non-tariff barriers and the harmonization of technical and procedural standards. In the absence of digital interoperability, procedural discrepancies can function as indirect barriers, adversely affecting the competitiveness of exporters. Thus, technological convergence becomes a prerequisite for economic convergence.

Currently, the digital infrastructure of the Customs Service (CS) lacks the necessary integration capacity with European information systems. It is not yet integrated with transit or tariff management resources, which hampers the real-time movement and verification of documents. Many digital counterparts do not exist in Moldova, and the incomplete harmonization of the Moldovan regulatory framework with the EU Customs Code hinders full digitalization and legal compliance.



**Figure 1. Digital Transformation of Customs**

*Source: Developed by the author*

The program will modernize the customs infrastructure to ensure the rapid and secure exchange of data with EU customs authorities. Concurrently, customs officials will undergo training to effectively utilize these new technologies.

#### **Strategic Coordinates of Customs Digitalization**

The modernization process is built upon four priority pillars:

- **Interoperability and Integration:** Synchronizing the national IT ecosystem with that of the EU to ensure a bidirectional data flow, secured by state-of-the-art protocols.
- **Transition to "Paperless Customs":** Eliminating bureaucracy through instantaneous document processing, thereby reducing the need for the physical presence of economic operators.
- **Traceability through Dedicated Systems:** Utilizing platforms such as TSD-PN (Temporary Storage Declaration and Presentation Notification) for the end-to-end monitoring of goods, from the notification of arrival to the release for customs.
- **Data Integrity:** Adopting the electronic signature as a mandatory standard to guarantee the non-repudiation and authenticity of transactions.

#### **Modernization of Customs Infrastructure and Institutional Convergence**

The process of customs digitalization in the Republic of Moldova is aligned with the Digital Transformation Strategy 2023–2030 and the commitments undertaken through the National Customs Digitalization Program 2025–2030. The implementation of modern information systems aims to synchronize with the European digital architecture and ensure effective participation in common transit mechanisms and information exchange.

A central element of this transformation is the implementation of the **New Computerized Transit System (NCTS 5)**. This system allows for the electronic filing of transit declarations, automated data validation, and the transmission of standardized messages to the customs authorities involved in the operation. The process is conducted entirely in a digital format, from the initiation of transit to its discharge. By utilizing European standardized formats, the declaration is mutually recognized across states participating in the common transit procedure, eliminating the need to repeat procedures at each border crossing. From an economic perspective, this mechanism reduces transit times and the

uncertainty associated with deliveries. From an institutional perspective, NCTS ensures the integration of the Republic of Moldova into a shared digital network, representing a concrete step toward procedural convergence.

Complementarily, the **AES (Automated Export System)** and **AIS (Automated Import System)** fully digitalize export and import flows. These platforms allow for the pre-lodgment of declarations and the performance of risk analysis before the physical arrival of goods at the border. Consequently, customs control becomes selective and based on risk profiles, reducing generalized manual interventions. Real-time data exchange with European authorities strengthens interoperability and facilitates the mutual recognition of information.

The digitalization of border management is further enhanced by the implementation of the **Entry/Exit System (EES)**, which aligns the Republic of Moldova with European standards for border security and control. In parallel, the **Border Queuing System (BQS)** introduces digital scheduling for border crossings, effectively reducing wait times and congestion at customs checkpoints. This reduction in idling time has direct economic implications, as logistical costs are significantly influenced by the total duration of transit.

This process is consolidated through the digitalization of the **Authorized Economic Operator (e-AEO)** status. The recognition of "trusted traders" and the subsequent reduction in the frequency of physical inspections facilitate their integration into European value chains and bolster external competitiveness.

#### **Impact on Competitiveness and Foreign Trade Structure**

Recent statistical data indicate an increase in the Republic of Moldova's exports, but also a rise in the trade deficit. This evolution reflects structural vulnerabilities, including a dependence on low-value-added exports. While the digitalization of customs processes cannot, by itself, alter the structure of national production, it creates the necessary conditions for structural transformation.

By reducing transaction costs and increasing the predictability of deliveries, the business environment benefits from a more stable framework. Foreign investors are highly sensitive to administrative efficiency and the degree of interoperability with the European market. In this regard, customs modernization can function as a catalyst for attracting investment into export-oriented sectors.

However, the positive impact depends on complementarity with industrial policies and human capital development. Digitalization is a necessary but not sufficient condition for the structural transformation of the economy.

#### **Challenges and Limitations of the Digitalization Process**

The implementation of complex information systems involves significant financial investments and necessitates the strengthening of administrative capacity. Risks associated with cybersecurity, dependence on technological infrastructure, and the continuous need for staff training represent substantial challenges. In the absence of proper institutional adaptation, technological modernization may lead to temporary dysfunctions.

Consequently, digitalization must be accompanied by organizational reforms and the consolidation of an institutional culture oriented toward efficiency and transparency.

#### **Conclusion**

The analysis demonstrates that the digitalization of customs processes contributes significantly to the functional integration of the Republic of Moldova into the European Single Market. The implementation of interoperable systems reduces administrative barriers, consolidates procedural convergence, and enhances the predictability of foreign trade. Digitalization represents more than a mere technical modernization; it serves as an instrument of structural convergence with the European Union. However, to generate a sustainable economic impact, it must be integrated into a broader strategy for industrial development and export diversification.

In light of its European trajectory and status as a candidate country, the Republic of Moldova has earnestly assumed its requisite commitments. Consequently, the analysis of Moldova's economic

evolution for the year 2025 highlights an optimistic paradox: although the country has reached a historical peak in exports, their structure remains vulnerable due to a reliance on raw materials within the goods sector. The innovation of customs processes through advanced digitalization emerges not only as a technical necessity but as a strategic solution for overcoming this bottleneck. The integration of new systems generates a multiplier effect on the national economy through three fundamental directions.

Firstly, synchronization with European standards through digitalization eliminates "invisible" (non-tariff) barriers, allowing finished Moldovan products to compete in the Single Market without the burden of double bureaucracy, thereby facilitating the necessary transition from volume-based exports to value-added exports. Secondly, the resulting efficiency and competitiveness, achieved by reducing border wait times and lowering operational costs, transforms the Republic of Moldova into a predictable partner. In conclusion, the innovation of customs processes through digitalization constitutes an essential vector for European integration, contributing to the transformation of borders from spaces of administrative control into functional nodes of an interconnected economy.

#### References

1. AGENȚIA NAȚIONALĂ PENTRU SIGURANȚA ALIMENTELOR (ANSA), 2024. *Manualul procedurilor de certificare pentru exportul în UE*. Chișinău: ANSA.
2. BANCA NAȚIONALĂ A MOLDOVEI, 2025. *Balanța de plăți a Republicii Moldova: Raport anual 2024*. Chișinău: BNM.
3. BIROUL NAȚIONAL DE STATISTICĂ AL REPUBLICII MOLDOVA, 2025. *Comerțul exterior al Republicii Moldova: serie statistică*. Chișinău: BNS.
4. CAMERA DE COMERȚ ȘI INDUSTRIE A RM, 2025. *Catalogul exportatorilor și statutul AEO în 2025*. Chișinău: CCI.
5. EUROPEAN COMMISSION, 2024. *Economic Reform Programme of Moldova (2024-2026): EU Assessment*. Brussels: DG TAXUD.
6. FALCĂ, M., 2024. Digitalizarea proceselor vamale și competitivitatea exporturilor. *Revista Economică*, nr. 2, pp. 45-58.
7. GUVERNUL REPUBLICII MOLDOVA, 2023. *Strategia de Transformare Digitală a Republicii Moldova pentru anii 2023-2030*. Chișinău: Monitorul Oficial.
8. IDIS VIITORUL, 2025. *Evoluția comerțului exterior: De la materii prime la produse cu valoare adăugată*. Chișinău: IDIS Viitorul.
9. LUPAȘCU, A. și CENUȘA, D., 2024. *Integrarea Republicii Moldova în Piața Unică Europeană: Bariere non-tarifare și standarde de calitate*. Chișinău: Expert-Grup.
10. MINISTERUL DEZVOLTĂRII ECONOMICE ȘI DIGITALIZĂRII, 2024. *Raport privind implementarea Acordului de Asociere RM-UE (DCFTA)*. Chișinău: MDED.
11. MOLDOVA FRUCT, 2023. *Standarde de calitate pentru accesul pe piața unică*. Chișinău: Asociația Moldova Fruct.
12. SERVICIUL VAMAL AL REPUBLICII MOLDOVA, 2024. *Ghidul utilizatorului NCTS 5: Proceduri de tranzit digitalizat*. Chișinău: SV.
13. UNIDO, 2023. *Quality Infrastructure and Digitalization in Emerging Economies*. Vienna: UNIDO.
14. USAID MOLDOVA, 2025. *Modernizarea logisticii comerciale: Impactul e-Borderoului asupra exporturilor*. Chișinău: USAID.
15. WORLD BANK, 2024. *Moldova Economic Update: Navigating European Integration*. Washington D.C.: World Bank Group.