

Digitalization, Social Media Use, and E-Commerce Growth in Ecuador: Implications for Customs Logistics, 2022–2025

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Abstract

This study analyzes the evolution of digitalization, social media use, and e-commerce in Ecuador between 2022 and 2025 and examines their implications for customs logistics. The study used a quantitative, non-experimental documentary design based on secondary data and descriptive temporal comparisons. Statistical indicators were obtained from the National Institute of Statistics and Censuses (INEC), the Ecuadorian Chamber of Innovation and Technology (CITEC), and DataReportal. The analysis considered Internet access and use, digital literacy, e-commerce revenue, social media reach, and mobile-device use for digital transactions. Results show that household Internet access increased from 60.4% in 2022 to 71.3% in 2025, while the e-commerce market was projected to expand from approximately USD 3.848 billion in 2022 to USD 6.139 billion in 2025. The findings also indicate extensive social media reach and widespread mobile device use within Ecuador's digital commercial ecosystem. These combined observed and projected indicators characterize an expanding digital commercial environment and suggest increasing operational demands for logistics and customs systems responsible for processing cross-border transactions. The study provides a descriptive evidence base for understanding the relationship between digital-commerce expansion and the need for customs modernization in Ecuador.

Keywords

E-commerce, Digitalization, Social media, Customs logistics, Digital transformation, Ecuador

1. Introduction

E-commerce has undergone rapid transformation driven by technological development, increasing Internet connectivity, and changes in consumer behavior. Digital commerce has evolved from conventional online platforms toward integrated ecosystems that combine marketplaces, social media, mobile applications, electronic payment systems, and data-driven services. These developments have reduced geographical and temporal barriers, enabled continuous interaction between consumers and suppliers, and expanded access to digital markets [1, 2].

In Ecuador, the expansion of Internet access and the increasing adoption of digital platforms have created favorable conditions for the growth of e-commerce. Social media and mobile devices have become important components of the digital commercial environment, facilitating product discovery, communication between businesses and consumers, and access to online transactions. This transformation has been accompanied by increasing levels of connectivity and a progressive reduction in digital exclusion, strengthening the participation of individuals and firms in digitally mediated commercial activities [3, 4].

The expansion of e-commerce also creates new operational challenges for logistics and customs systems. Increasing volumes of digitally generated transactions, particularly those involving low-value and small-scale cross-border shipments, require customs authorities and logistics operators to combine

ICAIW 2026: Workshops at the 9th International Conference on Applied Informatics 2026, October 13–17, 2026, Orlando, United States

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regulatory control with faster, more standardized, and increasingly digital procedures. Previous research has associated the growth of e-commerce with changes in global supply chains, increasing demand for logistics services, and the need to modernize customs processes in response to more fragmented and continuous trade flows [5, 6].

Cross-border e-commerce introduces an additional layer of complexity because digitally initiated transactions eventually materialize as physical flows that must move through transport networks, distribution facilities, and border-control systems. Unlike conventional international trade, which is frequently organized around comparatively consolidated consignments and recurring commercial relationships, business-to-consumer e-commerce may generate large numbers of low-value parcels originating from heterogeneous sellers and destined for individual buyers. This fragmentation alters both the scale and the informational structure of customs operations. Processing capacity increasingly depends on the availability of accurate electronic data before arrival, the ability to identify risk within high-volume transaction streams, and procedures capable of separating legitimate low-risk shipments from consignments requiring further control. The World Customs Organization identifies advance electronic data, data quality, risk management, procedural simplification, efficient revenue collection, and transformative technologies as central components of cross-border e-commerce management [7]. These requirements suggest that customs logistics should be understood as an integral part of the digital-commerce ecosystem rather than merely as a downstream activity occurring after an online sale has been completed.

Although previous studies have examined e-commerce growth, digital consumer behavior, supply-chain transformation, and customs modernization separately, limited evidence has jointly examined the recent evolution of digitalization, social media adoption, and e-commerce activity in Ecuador and their implications for customs logistics. Therefore, this study analyzes the evolution of these indicators between 2022 and 2025 using secondary data from official and sectoral sources. The contribution of the study lies in integrating indicators of Internet access and use, digital literacy, e-commerce revenue, social-media reach, and mobile-device use into a descriptive analytical framework that provides evidence on the expansion of Ecuador's digital commercial ecosystem and the resulting need for continued modernization of customs logistics.

2. Related Work

2.1. Digital Commerce, Social Media, and Consumer Digitalization

The expansion of e-commerce has progressively transformed the interaction between consumers, firms, and digital platforms. Contemporary digital commerce integrates online marketplaces, social media, mobile applications, electronic payment systems, and data-driven personalization mechanisms within increasingly interconnected commercial ecosystems. These developments have expanded the availability of products and services while reducing geographical and temporal constraints associated with conventional retail activities [1, 2].

Digital platforms also influence the way consumers search for information, compare alternatives, and interact with commercial content. Recent studies indicate that digital purchasing behavior is increasingly shaped by online touchpoints and platform-based environments that facilitate continuous interaction throughout the customer journey [2, 8]. Social media forms part of this environment by increasing the visibility of products and facilitating communication between firms and potential consumers. However, high social-media penetration should not be interpreted automatically as evidence of purchase causation, since platform reach, user interaction, and completed transactions represent different dimensions of digital behavior.

In Ecuador, previous research has documented the sustained development of e-commerce and its increasing relevance for firms and consumers. Escalante et al. [9] describe the evolution of electronic commerce in Ecuador during the post-pandemic period, while Pogo Correa [10] highlights its growing relevance for international trade and the participation of small and medium-sized firms in external markets. These studies suggest that the expansion of digital commerce has become increasingly

interconnected with broader processes of digitalization, connectivity, and international commercial activity.

2.2. Digital Logistics and Customs Modernization

The growth of e-commerce extends beyond consumer behavior because digital transactions ultimately require physical fulfillment, transportation, delivery, and, in the case of international transactions, customs processing. Consequently, digital commerce has contributed to the transformation of supply-chain structures and logistics operations, particularly through the increasing use of data analytics, digital platforms, predictive logistics, and integrated information systems [1, 11].

Cross-border e-commerce creates specific operational challenges because it may generate large numbers of relatively small shipments that must be processed within shorter commercial cycles. Bi et al. [5] associate the development of cross-border e-commerce environments with institutional and enterprise digitalization, while logistics research emphasizes the importance of process integration and digital technologies for improving supply-chain responsiveness. These developments increase the relevance of standardized, traceable, and digitally supported logistics procedures.

The relationship between digital-commerce expansion and logistics performance is not necessarily proportional. A market may experience rapid growth in online demand while fulfillment capacity, border procedures, transport infrastructure, or institutional interoperability develop at a slower pace. This asymmetry can create bottlenecks at several stages of the cross-border transaction. Evidence from Latin America indicates that customs clearance and last-mile distribution remain particularly important sources of friction in international e-commerce logistics [12]. Consequently, greater digital connectivity on the consumer side does not by itself guarantee an equally efficient physical or administrative fulfillment system. For emerging markets, the capacity to convert digital demand into completed cross-border deliveries therefore depends on the simultaneous development of commercial platforms, logistics networks, and border institutions.

Trade facilitation provides a useful analytical bridge between these dimensions. Recent empirical research indicates that logistics, e-commerce infrastructure, and the customs environment can significantly influence cross-border e-commerce performance, although their relative importance varies according to national institutional conditions [13]. Digitalization can also reduce some of the compliance frictions associated with business-to-consumer shipments by improving information availability, document transmission, and coordination among logistics participants [14]. At the same time, interoperability becomes increasingly important as more actors exchange shipment, commercial, transport, and regulatory data. International initiatives on paperless trade therefore emphasize common data standards and interoperable digital frameworks as prerequisites for reducing duplication and enabling information to move more effectively across supply-chain participants [15].

In customs environments, digital transformation is particularly important because customs administrations must simultaneously facilitate trade and maintain regulatory control. Reyes Mena and Echanique Lavezzari [6] report that the incorporation of digital technologies and electronic systems has contributed to the modernization of Ecuadorian customs procedures. Similarly, Espinoza Casco et al. [16], examining the Peruvian customs digitalization process, identify digital transformation as an important mechanism for improving the agility and effectiveness of customs operations. Earlier research has also emphasized the relationship between customs administration performance, trade facilitation, and national competitiveness [17, 18].

Taken together, previous studies provide evidence on e-commerce expansion, digital consumer environments, supply-chain digitalization, and customs modernization. Nevertheless, these dimensions are commonly examined separately. Limited research has integrated recent indicators of digital connectivity, social-media adoption, e-commerce growth, and their logistics implications within the Ecuadorian context. This study addresses this gap through a descriptive integration of secondary indicators for the 2022–2025 period, focusing on the implications of Ecuador's expanding digital commercial ecosystem for customs logistics.

3. Materials and Methods

3.1. Research Design

This study employed a quantitative, non-experimental documentary design based on secondary data and descriptive temporal comparisons. The analysis integrated observed, survey-based, and projected indicators reported for the 2022–2025 period and focused on describing digital connectivity, social-media adoption, e-commerce activity, and selected characteristics of digital transactions in Ecuador.

The study did not seek to establish causal relationships between social-media use, digital purchases, and customs performance. Instead, it integrated the available observed, survey-based, and projected indicators and interpreted their implications for customs logistics using the empirical patterns and supporting literature.

3.2. Data Sources

Data were obtained from official and sectoral secondary sources. The National Institute of Statistics and Censuses of Ecuador (INEC) [3] provided indicators related to household Internet access, Internet use, and digital literacy. Information on e-commerce development and digital consumer behavior was obtained from reports produced by the Ecuadorian Chamber of Innovation and Technology (CITEC) [19]. DataReportal [4] provided contextual indicators related to social-media reach in Ecuador.

The information was organized through a data-systematization matrix that recorded the indicator, source, measurement unit, reference year, and reported value. This procedure allowed indicators from different sources to be compared within a common temporal framework while preserving their original definitions.

3.3. Variables and Indicators

The study organized the available information into four analytical dimensions: digital connectivity, social-media adoption, e-commerce activity, and digital transaction characteristics.

Table 1

Analytical dimensions, indicators, and data sources

Analytical dimension	Indicator	Measurement	Source
Digital connectivity	Household Internet access	Percentage of households	INEC [3]
Digital connectivity	Individuals using the Internet	Percentage of persons aged 5+	INEC [3]
Digital connectivity	Digital illiteracy	Percentage of persons aged 15–49	INEC [3]
Social-media adoption	Facebook potential advertising reach among population aged 13+	Potential advertising reach (%)	DataReportal [4]
E-commerce activity	Projected e-commerce revenue	USD billions	CITEC [19]
Digital transaction characteristics	Smartphone use for digital purchases	Percentage of surveyed digital consumers	CITEC [19]

Source: Authors' elaboration based on INEC [3], CITEC [19], and DataReportal [4].

Digital connectivity was used to characterize the technological conditions that enable participation in digital markets. Social-media indicators were interpreted as measures of platform reach and adoption rather than as direct measures of purchasing behavior. E-commerce revenue was used to describe the projected evolution of digital commercial activity, while mobile-device indicators were incorporated to characterize the technological channels through which digital transactions are conducted.

Customs logistics was not operationalized as a dependent variable because the available dataset does not contain a consistent longitudinal series of customs-efficiency indicators for the 2022–2025 period. Consequently, the study examines customs logistics as an analytical implication of the expansion of digital commerce rather than as an empirically measured outcome.

3.4. Data Analysis

The analysis was conducted using descriptive statistics and temporal comparisons. For percentage indicators, changes were examined through differences in percentage points across the study period. For monetary indicators, absolute and relative variations were considered to describe the evolution of e-commerce activity.

Temporal comparisons were performed where repeated observations were available across the 2022–2025 period. Annual INEC indicators were analyzed to identify temporal patterns in digital connectivity and digital exclusion. Point-in-time indicators, including social-media reach and mobile-device use, were incorporated as contextual measures and were not interpreted as temporal trends. Graphical representations were used to facilitate the interpretation of the available patterns.

No inferential statistical tests, causal models, or regression analyses were applied because the available information consists primarily of aggregated secondary indicators with a limited number of annual observations. Accordingly, the results are interpreted as descriptive evidence of the expansion of Ecuador's digital commercial ecosystem and not as proof of causal effects between the analyzed dimensions.

Finally, the implications for customs logistics were interpreted by contrasting the observed digital-commerce trends with previous research on cross-border e-commerce, supply-chain digitalization, and customs modernization. This analytical strategy separates the empirical findings obtained from the secondary indicators from the broader logistics implications derived from the scientific literature.

An additional analytical precaution concerned the heterogeneous nature of the secondary information. The dataset combines observed annual indicators, survey-based measures, point-in-time platform indicators, and projected market values; these categories were therefore not treated as statistically equivalent observations. INEC indicators were used to identify temporal changes in connectivity and digital exclusion, whereas CITEC revenue estimates were retained explicitly as market projections. Similarly, social-media reach and mobile-purchasing measures were interpreted as contextual indicators rather than longitudinal evidence. This distinction prevents differences in measurement basis from being concealed within a single aggregate trend. Accordingly, the study uses convergence among indicators to characterize the broader digital-commercial environment, while avoiding statistical claims that would require homogeneous observations or a longer time series.

4. Results

4.1. Digital Connectivity in Ecuador

The analyzed indicators show a sustained improvement in digital connectivity in Ecuador during the 2022–2025 period. According to INEC data [3], household Internet access increased from 60.4% in 2022 to 62.2% in 2023, 66.0% in 2024, and 71.3% in 2025. During the same period, the percentage of individuals using the Internet increased from 69.7% to 72.7%, 77.2%, and 80.1%, respectively.

Digital exclusion followed the opposite trajectory. Digital illiteracy decreased from 8.2% in 2022 to 7.6% in 2023, 5.4% in 2024, and 2.1% in 2025. Overall, the three indicators show a consistent improvement in digital connectivity and participation conditions throughout the analyzed period.

4.2. Projected E-Commerce Growth

The expansion of digital connectivity occurred within a context of expected growth in Ecuador's e-commerce market. The CITEC report used in this study [19], based on Statista estimates, projected

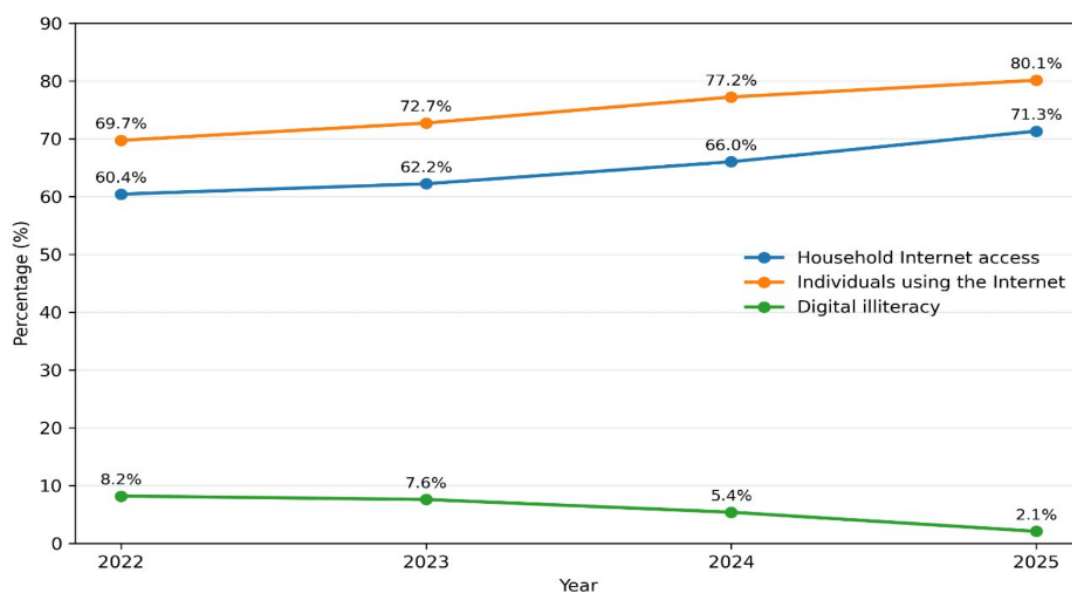


Figure 1: Evolution of selected digital connectivity indicators in Ecuador, 2022–2025.

Source: Authors' elaboration based on INEC [3].

Note: Household Internet access is measured at the household level; Internet use refers to persons aged 5 years and older; digital illiteracy follows the INEC definition for persons aged 15–49 years.

e-commerce revenues of approximately USD 3.848 billion in 2022, USD 4.481 billion in 2023, USD 5.251 billion in 2024, and USD 6.139 billion in 2025.

Across the projected series, e-commerce revenue was projected to increase by approximately 59.5% between 2022 and 2025. The annual values indicate a sustained projected growth pattern, with the market expected to expand progressively throughout the study period. CITEC also identifies electronics and fashion among the categories with the greatest contribution to e-commerce revenue, partly because of their comparatively higher average transaction values.

These projections should not be interpreted as observed annual market revenues. Rather, they provide an estimate of the expected expansion of Ecuador's digital commercial market and are used in this study to characterize the anticipated scale of e-commerce development during the analyzed period.

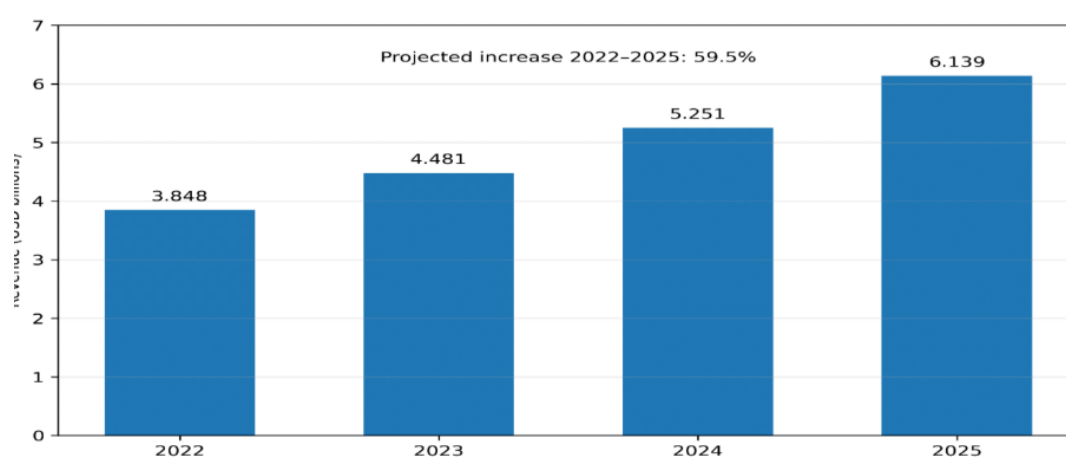


Figure 2: Projected e-commerce revenue in Ecuador, 2022–2025.

Source: Authors' elaboration based on CITEC [19] using Statista projections.

4.3. Social-Media Reach and Mobile Purchasing

The indicators reviewed for 2022 show that social media and mobile technologies already occupied an important position within Ecuador's digital environment at the beginning of the study period. DataReportal [4] reported that Facebook's potential advertising reach was equivalent to 92.2% of Ecuador's eligible population aged 13 years and older in early 2022.

This indicator represents the potential audience that could be reached through Facebook's advertising tools and should not be interpreted as the proportion of the population purchasing products through the platform. Platform reach, social-media use, exposure to commercial content, and completed purchases constitute different dimensions of digital behavior. Mobile devices were also highly relevant to online purchasing activity. According to CITEC's 2022 survey [19] of digitally active consumers, 80.6% of respondents reported that the mobile phone was the device they used most frequently to make online purchases. This result indicates the importance of mobile commerce as a technological channel within Ecuador's e-commerce ecosystem.

Together, these findings characterize an environment in which social-media exposure and mobile access were already widespread. However, neither indicator provides evidence that social-media use directly causes digital purchasing behavior.

4.4. Descriptive Synthesis of the Digital Commercial Ecosystem

Table 2 summarizes the principal indicators used to characterize Ecuador's digital commercial ecosystem. The evidence combines observed connectivity indicators, survey-based measures of digital behavior, and projected e-commerce market values. Differences in measurement basis and temporal coverage must therefore be considered when interpreting the results.

Table 2

Descriptive summary of the main digital ecosystem indicators.

Analytical dimension	Indicator	Reference period	Reported value/change
Digital connectivity	Household Internet access	2022–2025	60.4% → 71.3% (+10.9 percentage points)
Digital connectivity	Individuals using the Internet	2022–2025	69.7% → 80.1% (+10.4 percentage points)
Digital connectivity	Digital illiteracy	2022–2025	8.2% → 2.1% (-6.1 percentage points)
E-commerce activity	Projected e-commerce revenue	2022	USD 3.848 billion
E-commerce activity	Projected e-commerce revenue	2023	USD 4.481 billion
E-commerce activity	Projected e-commerce revenue	2024	USD 5.251 billion
E-commerce activity	Projected e-commerce revenue	2025	USD 6.139 billion
Social-media adoption	Facebook potential advertising reach among population aged 13+	2022	92.2%
Digital transaction channel	Mobile phone as most frequently used device for online purchases	2022	80.6% of surveyed digital consumers

Source: Authors' elaboration based on INEC [3], CITEC [19], and DataReportal [4].

The combined evidence describes an expanding digital commercial environment in Ecuador. Connec-

tivity indicators show greater access to digital infrastructure, while the CITEC projections anticipate substantial growth in the size of the e-commerce market. At the same time, the 2022 social-media and mobile-purchasing indicators demonstrate that platform exposure and mobile access were already highly relevant components of the country's digital ecosystem.

A relevant feature of this synthesis is that the indicators do not evolve with the same temporal depth. Connectivity can be observed annually throughout the study period, whereas social-media reach and mobile purchasing describe specific moments, and the e-commerce values correspond to market projections. The empirical basis is therefore stronger for identifying the direction of digital connectivity than for establishing comparable trajectories across every dimension. Even with this limitation, the indicators point in a broadly consistent direction: access to digital infrastructure expanded, digital exclusion declined, platform exposure was already extensive, mobile devices occupied a prominent role in online purchasing, and market projections anticipated continued e-commerce growth. The significance of this convergence lies less in any individual indicator than in the combined picture of a commercial environment becoming progressively more dependent on digital access and digitally initiated transactions.

These results do not constitute direct measurements of customs performance. Consequently, they are not used to infer changes in customs efficiency, clearance times, or logistics costs. Their implications for customs logistics are examined in the Discussion section by contrasting the observed and projected digital-commercial trends with previous research on cross-border e-commerce, supply-chain digitalization, and customs modernization.

5. Discussion

5.1. Expansion of Ecuador's Digital Commercial Ecosystem

The results indicate a sustained improvement in Ecuador's digital connectivity between 2022 and 2025. Household Internet access increased by 10.9 percentage points, Internet use increased by 10.4 percentage points, and digital illiteracy decreased by 6.1 percentage points during the analyzed period. These changes suggest that a larger proportion of the population has acquired the technological conditions required to participate in Internet-based activities and digital markets.

This improvement in connectivity occurred within a context of substantial projected growth in Ecuador's e-commerce market. According to the projections considered in this study, Ecuador's e-commerce market was estimated to expand from approximately USD 3.848 billion in 2022 to USD 6.139 billion in 2025, representing a projected increase of 59.5%. Although the available data do not establish a causal relationship between connectivity and e-commerce growth, the parallel evolution of these indicators reflects the increasing importance of digitally mediated commercial activity in Ecuador.

These findings are consistent with previous research describing the progressive development of e-commerce in Ecuador and other emerging economies. Escalante et al. [9] identify sustained growth in Ecuadorian electronic commerce during the post-pandemic period, while Pogo Correa [10] emphasizes the increasing relevance of digital commerce for international market participation. At the international level, Al Mashalah et al. [1] similarly describe digital transformation as a factor reshaping the interaction between e-commerce and supply-chain structures.

5.2. Social Media, Mobile Access, and Digital Transactions

The high potential reach of social-media platforms and the extensive use of smartphones for digital purchases further characterize the technological environment in which Ecuadorian e-commerce is developing. The 2022 indicators show a highly connected digital environment. Facebook's potential advertising reach corresponded to 92.2% of the eligible population aged 13 years and older, while 80.6% of the digitally active consumers surveyed by CITEC reported the mobile phone as the device most frequently used for online purchases. [19, 4].

These values should be interpreted carefully. Social-media reach represents potential platform exposure and does not demonstrate that social-media use directly produces purchasing behavior. Similarly, smartphone adoption describes the technological channel through which consumers access digital transactions rather than the determinants of their purchasing decisions. This distinction is important because digital connectivity, platform exposure, consumer interaction, and completed transactions represent related but conceptually different dimensions.

Nevertheless, the results indicate that Ecuadorian digital commerce increasingly operates within a mobile and platform-based environment. This observation is consistent with research showing that contemporary consumer journeys involve multiple digital touchpoints and increasingly integrated online environments [2, 8]. Consequently, the expansion of e-commerce should be understood not only in terms of transaction volume but also as part of a broader process of digital transformation involving connectivity, platforms, mobile technologies and digital transaction channels.

5.3. Implications for Customs Logistics

The expansion of digital commerce has implications that extend beyond consumer behavior. Every cross-border digital transaction involving physical goods ultimately requires transportation, logistics coordination, and customs processing. Therefore, growth in e-commerce potentially increases the operational importance of customs systems capable of processing fragmented, frequent, and digitally generated trade flows.

The present study does not directly measure customs efficiency, clearance times, inspection performance, or customs-processing costs. Consequently, the observed increase in digital connectivity and the projected expansion of the e-commerce market cannot be interpreted as empirical proof of changes in customs performance. Instead, the logistics implications identified here are derived by relating the available digital-commerce indicators to previous research on cross-border e-commerce and customs digitalization.

Previous studies support this interpretation. Reyes Mena and Echanique Lavezzari [6] highlight the contribution of digital technologies and electronic systems to the modernization of customs procedures in Ecuador. Espinoza Casco et al. [16] similarly describe the Peruvian customs digitalization process as a mechanism associated with more agile and effective operations. More broadly, research on digital supply chains emphasizes the growing role of integrated information systems, data-driven processes, and digital platforms in improving coordination and responsiveness across logistics networks [1, 11].

From this perspective, the main implication of the results is not that e-commerce growth has already improved or reduced customs efficiency, but that an expanding digital commercial ecosystem increases the strategic importance of customs modernization. Digital documentation, process standardization, information interoperability, transaction traceability, and electronic processing become increasingly relevant when trade flows originate in digital environments characterized by continuous transactions and potentially large numbers of small-scale shipments.

From an information-systems perspective, these requirements highlight the importance of interoperable digital platforms capable of integrating transaction, logistics, and customs information. The capacity to exchange and process structured information across commercial and regulatory systems becomes increasingly relevant as digitally initiated cross-border transactions expand. Accordingly, customs modernization should be understood not only as procedural digitalization but also as an information-integration challenge.

This information-integration requirement becomes more significant as customs administrations move from document-centered procedures toward data-centered control. Cross-border e-commerce places particular value on information received before physical arrival because risk assessment must increasingly be performed across a large number of comparatively small transactions. The WCO framework therefore gives a prominent role to advance electronic data, data quality, risk management, facilitation, revenue collection, security, and the use of transformative technologies [7]. The practical implication extends beyond replacing paper declarations with electronic forms. Digital modernization becomes operationally meaningful when commercial, transport, logistics, and regulatory information can be

exchanged in structured formats, validated across systems, and reused without unnecessary duplication. International paperless-trade initiatives similarly identify data standards and interoperability as foundations for creating more continuous information flows between businesses, transport operators, customs administrations, and other border agencies [15].

Evidence from customs automation initiatives reinforces this interpretation. UNCTAD's ASYCUDA programme illustrates how contemporary customs digitalization increasingly combines automated declarations, electronic information exchange, risk management, institutional coordination, and interoperability rather than treating these functions as isolated technological applications [20]. Recent cross-country evidence also points to a structural relationship between digital competitiveness and logistics performance: countries with stronger digital capabilities tend to perform better in logistics dimensions such as customs, infrastructure, tracking, and international shipments, although important mismatches remain between technological capacity and actual logistics outcomes [21]. This distinction is relevant for Ecuador. The expansion of connectivity and e-commerce does not automatically generate more efficient border logistics; institutional capacity must develop in parallel if digital commercial growth is to translate into smoother physical trade flows. In that sense, modernization requires both technological investment and organizational alignment among customs, logistics operators, digital platforms, and other entities participating in cross-border transactions.

5.4. Limitations and Research Implications

The findings should be interpreted within the limitations of the study. First, the analysis relies on aggregated secondary indicators obtained from different institutional and sectoral sources. Although these sources provide useful information on Ecuador's digital ecosystem, their indicators were produced for different purposes and do not necessarily share identical measurement procedures.

Second, the available information consists primarily of annual or point-in-time indicators, limiting the application of inferential statistical techniques. For this reason, the study does not estimate correlations, regressions, or causal relationships between Internet adoption, social-media use, e-commerce activity, and customs logistics.

Third, customs logistics was analyzed as an implication rather than as an empirically measured outcome because a consistent longitudinal series of customs-performance indicators was not available within the dataset used in this study. Future research could extend the analysis by incorporating indicators such as customs-clearance times, number of simplified declarations, digital-processing rates, inspection times, logistics costs, and transaction volumes. The availability of monthly or quarterly observations would also allow more robust statistical analysis of the relationship between e-commerce growth and customs operations.

Future extensions could also distinguish more explicitly between technological capacity and logistics performance. Recent international evidence demonstrates that strong digital capabilities do not invariably translate into equivalent logistics outcomes, since customs efficiency, infrastructure quality, institutional coordination, and implementation capacity can create significant differences among countries [21]. A future Ecuadorian dataset could therefore combine digital-connectivity and e-commerce variables with direct operational indicators of customs performance. With monthly or quarterly observations, time-series or panel-based approaches could examine whether increases in digital transaction activity coincide with changes in clearance performance, declaration volumes, inspection intensity, or processing costs. Such an extension would move the analysis beyond descriptive coexistence toward a more direct evaluation of the digital-commerce–customs relationship.

Despite these limitations, the study provides an integrated descriptive view of several dimensions that are frequently examined separately. By combining connectivity, social-media, mobile-use, and e-commerce indicators within a single analytical framework, the findings provide a basis for understanding the scale of Ecuador's recent digital-commercial transformation and the increasing relevance of customs and logistics modernization within that context.

6. Conclusion

The study identified an expansion of digital connectivity and a substantial projected increase in Ecuador's e-commerce market between 2022 and 2025. Household Internet access increased, and digital illiteracy decreased during the analyzed period, while available market projections anticipated substantial e-commerce growth. Social-media reach and the extensive use of smartphones for online purchases further indicate that digital commerce operates within a highly connected and mobile technological environment.

The available evidence does not demonstrate that social-media adoption directly causes digital purchasing behavior or that e-commerce growth produces measurable changes in customs efficiency. However, the combined evidence of expanding connectivity and digital-platform use, together with projected e-commerce growth, increases the relevance of logistics systems capable of supporting continuous and increasingly fragmented trade flows.

From a customs perspective, the main implication is the growing importance of digital modernization. The expansion of e-commerce strengthens the need for standardized procedures, electronic documentation, information interoperability, transaction traceability, and digital processing mechanisms capable of supporting cross-border transactions while maintaining regulatory control.

More broadly, the findings suggest that digital-market development and border modernization should not be approached as independent policy domains. Expanding online commercial activity increases the value of customs systems capable of receiving standardized data, exchanging information with logistics actors, and applying differentiated controls according to transaction risk. The policy challenge is therefore not digitalization in isolation, but the alignment of connectivity, commercial platforms, logistics capacity, and regulatory information systems as components of the same cross-border digital ecosystem.

The study is limited by the use of aggregated secondary indicators and the absence of a consistent longitudinal dataset of customs performance measures. Future research should therefore incorporate indicators such as clearance times, number of simplified declarations, transaction volumes, inspection times, digital-processing rates, and logistics costs. More granular monthly or quarterly data would also allow the application of inferential models to examine the relationship between e-commerce growth and customs operations more rigorously.

Declaration on Generative AI

During the preparation of this manuscript, the authors used ChatGPT (OpenAI) as an AI-assisted tool for grammar and spelling checking, paraphrasing and rewording, improving writing style and clarity, formatting assistance, and organizing information provided by the authors. The tool was not used to generate the research data, conduct the statistical analyses, determine the empirical results, or formulate the scientific conclusions of the study. All AI-assisted outputs were critically reviewed, verified, and edited by the authors, who take full responsibility for the content of the publication.

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