Customs Facilitation and Export Efficiency of Emerging Industries in Yibin's Cross-Border E-Commerce Pilot Zone: A Policy

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ABSTRACT

Cross-border e-commerce has become an important pathway for inland cities to participate in international trade and transform local industrial advantages into export competitiveness. In China, cross-border e-commerce comprehensive pilot zones provide institutional space for customs supervision innovation, logistics coordination, digital trade development, and trade facilitation. Taking Yibin in Sichuan Province as a regional case, this paper examines how customs facilitation mechanisms support the export efficiency of emerging industries within the framework of a cross-border e-commerce pilot zone.

Yibin's "Blue and Green" industries mainly refer to the digital economy and green new energy sectors, including digital services, power batteries, and photovoltaic-related industries, which have grown substantially in recent years — with the power battery sector reaching RMB 88.9 billion in output and the digital economy sectors generating over RMB 54 billion in 2022. These sectors are characterized by high technical content, complex supply chains, strict delivery requirements, and stronger compliance needs. Drawing on national policy documents, international organization frameworks, academic literature, and regional industrial materials, this paper develops a mechanism framework consisting of four dimensions: time efficiency, cost reduction, coordination efficiency, and compliance stability.

The analysis suggests that customs facilitation does not merely accelerate customs clearance; it also reduces institutional transaction costs, strengthens multi-actor coordination, improves regulatory predictability, and supports firms' participation in cross-border trade. The paper further identifies practical challenges related to regulatory mode matching, fragmented use of facilitation tools, logistics coordination, and enterprise compliance capacity. It proposes policy recommendations for establishing an industry–regulatory mode matching mechanism, integrating trade facilitation tools, strengthening front-end compliance guidance, and improving multi-actor coordination. The study contributes to understanding how inland pilot zones can use customs facilitation to support emerging industry exports and enhance regional export competitiveness.

Keywords: Cross-Border E-Commerce; Customs Facilitation; Trade Facilitation; Export Efficiency; Emerging Industries

INTRODUCTION

Cross-border e-commerce has become an important pathway through which regional economies participate in international trade and transform local industrial advantages into export competitiveness. Compared with traditional trade models, cross-border e-commerce relies more heavily on digital platforms, logistics coordination, customs services, data exchange, and trade facilitation. It reduces certain market entry barriers for firms by lowering information search costs, expanding access to overseas buyers, and enabling more flexible forms of international transactions. China's cross-border e-commerce import and export value reached RMB 2.11 trillion in 2022, representing a nearly tenfold increase over the preceding five years, with export value alone reaching RMB 1.55 trillion (He, 2023). Previous studies have shown that cross-border e-commerce can reshape export channels, reduce transaction costs, and support firms in entering global markets through online platforms and cross-border service systems (Ma et al., 2018; Deng & Wang, 2016; Gomez-Herrera et al., 2014).

In China, the establishment of cross-border e-commerce comprehensive pilot zones has provided an important institutional platform for the development of new foreign trade models. These pilot zones are designed to explore innovations in customs supervision, logistics coordination, taxation services, information sharing, and digital trade governance. Rather than functioning merely as administrative zones for e-commerce transactions, they represent a policy instrument for improving trade facilitation and supporting the transformation of foreign trade. As of 2021, China had established 132 comprehensive pilot zones nationwide, with related enterprise registrations growing 72.2% to over 10,900 new companies in that year alone, and the total number of active cross-border e-commerce enterprises reaching approximately 33,900 (Wang & Yang, 2022). Empirical studies have found that the establishment of cross-border e-commerce pilot zones can promote the development of cross-border e-commerce, improve trade facilitation, and contribute to the high-quality development and upgrading of foreign trade (Zhang et al., 2020; Lin et al., 2023; Chang, 2023).

Trade facilitation is particularly important in the context of cross-border e-commerce because this trade model is often characterized by smaller batches, higher transaction frequency, more fragmented orders, and stronger requirements for delivery timeliness. According to the World Trade Organization, trade facilitation involves the simplification, modernization, and harmonization of export and import procedures (World Trade Organization, N.D.). For cross-border e-commerce, this means that customs clearance, logistics coordination, electronic data exchange, risk management, and regulatory predictability all become essential factors influencing trade efficiency. The World Customs Organization (2022) also emphasizes that customs authorities play a crucial role in cross-border e-commerce through advance electronic data, risk-based supervision, stakeholder cooperation, and effective control mechanisms.

For inland cities, the importance of customs facilitation is even more pronounced. Unlike coastal cities with direct seaport advantages, inland cities often face constraints related to logistics distance, multimodal transport, customs coordination, and access to international markets. As a result, improving customs services and trade facilitation capacity becomes a key way to reduce institutional transaction costs and enhance export efficiency. Studies on less-developed cross-border e-commerce pilot zones show that such regions may face limitations in industrial foundations, policy coordination, digital infrastructure, logistics capacity, and enterprise readiness (Xiao et al., 2022). Empirical evidence further suggests that while pilot zone policies significantly promote export development in eastern cities, their effects in western regions remain statistically insignificant, indicating that inland cities require stronger institutional support—including customs facilitation—to fully benefit from pilot zone policies (Chang, 2023; Lin et al., 2023). Therefore, for inland pilot zones, customs facilitation is not simply a matter of accelerating clearance procedures; it is also part of a broader institutional support system for regional export development.

Yibin, located in southern Sichuan Province, provides a relevant regional case for examining this issue. Sichuan Province's cross-border e-commerce transaction value grew from RMB 11 billion in 2018 to RMB 70.09 billion in 2021, a growth rate of 53.8%, with over 2,300 registered enterprises in pilot zones and 92 overseas warehouses covering a total area of 600,000 square metres (Chen, 2023). Sichuan has actively promoted cross-border e-commerce development through comprehensive pilot zones, platform construction, overseas warehouses, multimodal transport, supply chain efficiency, enterprise cultivation, and cross-border talent development (Chen, 2023). As one of the inland cities participating in this broader provincial development pattern, Yibin's cross-border e-commerce pilot zone offers an opportunity to explore how local industrial advantages can be connected with international markets through institutional facilitation and customs service innovation. The approval of Yibin as a cross-border e-commerce comprehensive pilot zone also reflects China's continued expansion of pilot zone policies to inland and non-coastal cities (State Council of the People's Republic of China, 2022).

At the industrial level, Yibin has promoted the development of emerging industries described in local policy discourse as 'Blue and Green' industries. According to a local official media report, this concept refers to Yibin's industrial transformation toward the 'Blue Ocean' of the digital economy and green new energy sectors, with a focus on strengthening emerging industries such as power batteries, crystalline silicon photovoltaic products, and the digital economy (Guo, 2022). The scale of these industries has grown substantially in recent years. In 2022, Yibin's power battery sector achieved an industrial output value of RMB 88.9 billion, a year-on-year increase of 4.54 times; the intelligent terminal sector reached RMB 49.08 billion, growing 11.1%; and the information technology services industry generated RMB 5.682 billion in revenue, a 29.9% increase (Hu, 2023). In the photovoltaic sector, five major projects had been established by late 2022 with total planned investment exceeding RMB 60 billion, and 25 additional projects involving RMB 162.9 billion in investment were under negotiation (Guo, 2022). These sectors differ from traditional low-value export sectors because they tend to involve higher technological content, more complex supply chains, stronger compliance requirements, and stricter delivery schedules. These characteristics make customs facilitation particularly relevant to their export efficiency.

Against this background, this paper examines how customs facilitation mechanisms support the export efficiency of emerging industries in Yibin's cross-border e-commerce pilot zone. Instead of providing a broad assessment of the overall development of the pilot zone, the paper focuses on the policy mechanisms through which customs services and trade facilitation measures influence export efficiency. Specifically, it develops a four-dimensional mechanism framework consisting of time efficiency, cost reduction, coordination efficiency, and compliance stability. These dimensions are derived from the literature on trade facilitation, customs modernization, cross-border e-commerce governance, and logistics coordination (World Bank, N.D.; OECD, 2025; World Customs Organization, 2022; Wu, 2023; Ye, 2023).

This study adopts a qualitative policy analysis approach based on document analysis, literature review, and regional case analysis. It draws on Chinese and international studies on cross-border e-commerce, trade facilitation, logistics coordination, and customs supervision, as well as official policy documents and international organization reports. By focusing on Yibin, this paper aims to contribute to the understanding of how inland cross-border e-commerce pilot zones can support emerging industry exports through customs facilitation. The findings also provide practical implications for improving regulatory mode matching, integrating facilitation tools, strengthening logistics coordination, and enhancing front-end compliance guidance for export-oriented firms.

LITERATURE REVIEW

Cross-Border E-Commerce and Regional Export Development

Cross-border e-commerce has become an important channel for regional economies to participate in international trade and expand export markets. Compared with traditional trade models, it relies on digital platforms, online transactions, logistics networks, and electronic payment systems to connect domestic firms with overseas buyers. In this process, firms may reduce information search costs and reach international customers more directly (Ma et al., 2018).

Cross-border e-commerce also changes the way firms enter foreign markets. Business-to-business e-commerce platforms can improve transaction efficiency and help firms build early connections with overseas partners (Deng & Wang, 2016). At the same time, cross-border e-commerce development may still be constrained by logistics, trust, regulatory barriers, and cross-border transaction costs, which means that digital platforms alone cannot fully guarantee export efficiency (Gomez-Herrera et al., 2014).

In China, cross-border e-commerce comprehensive pilot zones have become an important policy instrument for promoting new forms of foreign trade. These pilot zones provide institutional space for regulatory innovation, customs supervision reform, logistics coordination, taxation services, and digital trade development. Pilot zone construction can promote cross-border e-commerce development by improving trade facilitation and information infrastructure (Zhang et al., 2020).

The effect of pilot zones is not limited to trade volume expansion. Cross-border e-commerce comprehensive pilot zones can also support the high-quality development of foreign trade by promoting regional innovation and industrial upgrading (Lin et al., 2023). They may further contribute to export transformation by improving export scale and export technological complexity (Chang, 2023). This is particularly relevant to regions seeking to develop higher-value and technology-intensive industries.

However, the development of cross-border e-commerce is shaped by regional conditions. Inland and less-developed cities often face weaker industrial foundations, insufficient digital infrastructure, limited logistics capacity, and coordination difficulties among government departments and enterprises (Xiao et al., 2022). Therefore, cross-border e-commerce development requires not only online platforms but also customs facilitation, logistics coordination, and policy support.

Trade Facilitation and Customs Services

Trade facilitation is central to improving the efficiency of cross-border e-commerce. It generally refers to the simplification, modernization, and harmonization of export and import procedures (World Trade Organization, n.d.). In practice, it includes simplified documentation, electronic data exchange, transparent procedures, risk management, border agency cooperation, and more predictable customs services (OECD, 2025).

For cross-border e-commerce, trade facilitation is especially important because transactions are often fragmented, frequent, and time-sensitive. Compared with traditional bulk trade, cross-border e-commerce requires faster clearance, smoother logistics coordination, and more efficient information exchange. In China, trade facilitation policies embedded in cross-border e-commerce pilot zones have been found to significantly promote cross-border e-commerce development (Zhang et al., 2020).

Other empirical studies also support the positive relationship between trade facilitation and cross-border e-commerce development. Trade facilitation can improve the operating environment for cross-border e-commerce

by reducing procedural constraints and enhancing institutional efficiency (Zhu, 2022). However, the effects of trade facilitation policies may differ across eastern, central, and western regions, which suggests that regional development conditions influence policy outcomes (Liu, 2023).

Customs services are a key part of trade facilitation. In cross-border e-commerce, customs authorities are responsible not only for clearance and supervision but also for risk management, data coordination, enterprise guidance, and compliance support. International customs frameworks emphasize the role of advance electronic data, risk-based supervision, stakeholder cooperation, and effective control mechanisms in facilitating legitimate cross-border e-commerce while maintaining regulatory security (World Customs Organization, 2022).

For emerging industries, customs facilitation is particularly important. Products in the digital economy and green new energy sectors often involve complex classification rules, origin certification, intellectual property protection, safety requirements, and higher compliance standards. Therefore, customs facilitation should not be understood simply as faster clearance. It also includes professional guidance, predictable procedures, risk prevention, and enterprise compliance support. These elements can reduce institutional transaction costs and improve the stability of export operations (World Bank, n.d.).

Logistics Coordination and Export Efficiency

Cross-border e-commerce depends on the coordination between online transactions and offline delivery systems. Although digital platforms create market access, export efficiency still relies on logistics, warehousing, customs clearance, data sharing, and after-sales services. Logistics barriers and regulatory uncertainty may reduce the efficiency of cross-border e-commerce operations (Gomez-Herrera et al., 2014).

Logistics coordination is especially relevant for inland cities. Compared with coastal regions, inland cities often face longer transportation distances, greater reliance on multimodal transport, and higher dependence on logistics infrastructure and customs coordination. Cross-border e-commerce logistics is usually characterized by small batches, high frequency, and strict delivery requirements, which traditional logistics models may not fully satisfy (Ye, 2023).

Cross-border e-commerce and cross-border logistics need strategic, functional, and operational coordination. Information sharing among e-commerce firms, logistics providers, and customs authorities can reduce communication barriers and improve the efficiency of product delivery (Wu, 2023). This is particularly important for inland pilot zones, where logistics efficiency depends on the coordination of multiple actors and systems.

Trade facilitation, logistics, and connectivity are closely linked. Efficient export operations require not only simplified border procedures but also reliable logistics services, coordinated border management, and predictable goods movement (World Bank, n.d.). For inland cross-border e-commerce pilot zones, logistics coordination is not merely a business issue. It is also a policy issue because customs services, logistics platforms, bonded zones, and local trade service systems need to work together to reduce delivery delays and institutional friction.

Compliance Stability and Risk-Based Governance

Risk-based governance provides a way to balance facilitation and control. Customs facilitation does not mean weakening regulation. Instead, it requires more accurate risk identification, differentiated supervision, advance guidance, and stronger cooperation among customs authorities, enterprises, platforms, and logistics providers (World Customs Organization, 2022). For compliant firms, predictable rules and risk-based procedures can reduce unnecessary intervention and improve clearance efficiency.

International trade facilitation indicators also emphasize information availability, advance rulings, appeal procedures, fees and charges, automation, and border agency cooperation (OECD, 2025). These elements are closely related to compliance stability because they help firms understand regulatory expectations and reduce uncertainty in cross-border operations.

For emerging industries, compliance stability is particularly important because products may involve technical standards, safety requirements, intellectual property concerns, origin rules, and environmental or low-carbon requirements in overseas markets. Therefore, customs facilitation should include front-end compliance guidance, risk warning, classification consultation, origin certification services, and differentiated services based on enterprise credit and compliance records. Such measures can reduce compliance uncertainty and improve the stability of export operations.

Overall, the literature shows that cross-border e-commerce export efficiency depends on the interaction of digital platforms, trade facilitation, customs services, logistics coordination, and compliance governance. However, most existing studies focus on the general policy effects of pilot zones or the overall development of cross-border e-commerce. Less attention has been paid to how customs facilitation mechanisms operate in inland pilot zones that seek to support emerging industries. This study addresses this gap by focusing on Yibin and developing a mechanism framework based on time efficiency, cost reduction, coordination efficiency, and compliance stability.

METHODOLOGY

This study adopts a qualitative policy analysis approach to examine how customs facilitation supports the export efficiency of emerging industries in Yibin's Cross-Border E-Commerce Pilot Zone. The purpose of this study is not to estimate the quantitative effect of customs facilitation on export performance, but to explain the policy mechanisms through which customs services, trade facilitation measures, logistics coordination, and compliance support may improve export efficiency in an inland pilot zone context. A qualitative policy analysis approach is appropriate because the research focuses on institutional arrangements, regulatory processes, policy tools, and regional industrial characteristics rather than firm-level statistical outcomes.

The study combines document analysis with regional case analysis. Document analysis is suitable for examining policy-oriented issues because it allows the researcher to interpret official documents, policy frameworks, institutional arrangements, and published studies in relation to a specific research problem. In this paper, document analysis is used to identify how cross-border e-commerce pilot zones, trade facilitation policies, customs supervision models, and logistics coordination mechanisms are discussed in existing literature and policy materials. This approach helps clarify the institutional logic through which customs facilitation may influence export efficiency.

Yibin is selected as the regional case because it represents an inland city seeking to use cross-border e-commerce policy tools to support emerging industry exports. Compared with coastal cities, inland cities usually face greater dependence on multimodal logistics, customs coordination, institutional platforms, and trade service systems. Existing studies on less-developed pilot zones show that such regions often face constraints related to industrial foundations, infrastructure, enterprise readiness, and interdepartmental coordination (Xiao et al., 2022). Therefore, Yibin provides a useful case for analysing how customs facilitation may help inland cities overcome location-related constraints and improve export efficiency.

The data and materials used in this study come from four main sources. The first source consists of academic literature on cross-border e-commerce, trade facilitation, pilot zone policy effects, logistics coordination, and export upgrading. These studies provide the theoretical and empirical basis for understanding the relationship

between cross-border e-commerce and regional export development (Ma et al., 2018; Zhang et al., 2020; Lin et al., 2023). The second source consists of international organization reports and frameworks related to trade facilitation, customs modernization, cross-border e-commerce governance, and logistics connectivity, including frameworks from the WTO, WCO, World Bank, and OECD (World Trade Organization, n.d.; World Customs Organization, 2022; World Bank, n.d.; OECD, 2025). The third source includes Chinese policy documents and official materials concerning cross-border e-commerce comprehensive pilot zones, customs supervision modes, and new forms of foreign trade, including the State Council's 2022 approval of the Yibin pilot zone and regulatory announcements issued by the General Administration of Customs on B2B export supervision (General Administration of Customs of the People's Republic of China, 2020; State Council of the People's Republic of China, 2022). These materials were used to understand the institutional background of pilot zone development and the functions of different customs supervision models. The fourth source includes publicly available local policy and media materials related to Yibin's industrial transformation and "Blue and Green" industries. These materials provide regional evidence on the development of the digital economy and green new energy sectors, including power batteries, crystalline silicon photovoltaic products, and digital industries (Guo, 2022; Hu, 2023).

Documents were selected based on three criteria: direct policy relevance to cross-border e-commerce pilot zones and customs supervision; institutional authority, with priority given to national regulations, provincial plans, and international organization frameworks; and temporal coverage from 2018 to 2024, which captures the key period of China's pilot zone expansion and Yibin's industrial transformation. The analytical process followed a two-stage, mechanism-oriented logic. In the first stage, policy documents were examined to identify the stated objectives and operational scope of relevant customs facilitation instruments, including advance declaration, risk-based inspection, B2B export supervision models (9710 and 9810), origin certification services, and enterprise credit classification systems. In the second stage, these instruments were mapped onto the four-dimensional framework to assess their potential pathways to improved export efficiency. This mapping was guided by established trade facilitation indicators from the WTO, WCO, and OECD, which provided analytical benchmarks for interpreting policy content and identifying mechanism linkages.

The study is policy-oriented and interpretive in nature, and its findings should not be understood as statistically generalizable results. While quantitative indicators such as customs clearance time, logistics cost per shipment, and firm-level export growth rates would provide stronger empirical validation, enterprise-level customs clearance data for Yibin's pilot zone is not yet publicly available, as the zone was approved in 2022 and remains in an early development stage. Future research with access to enterprise survey data or customs clearance records can build on this framework to provide empirical verification. The study aims to provide an analytical explanation of how customs facilitation may operate within a specific inland pilot zone and how such mechanisms may support emerging industry exports, generating practical implications for local governments, customs authorities, cross-border e-commerce platforms, and export-oriented firms.

Policy and Industrial Context of Yibin

Yibin's Cross-Border E-Commerce Pilot Zone and Inland Development Context

Yibin is an important city in southern Sichuan Province and has increasingly positioned itself as a regional node for open economic development in western China. Unlike coastal cities that benefit from direct seaport access, inland cities usually rely more heavily on institutional platforms, logistics coordination, customs services, and trade facilitation mechanisms to participate in international trade. In this context, the approval and construction of the China (Yibin) Cross-Border E-Commerce Comprehensive Pilot Zone provides an important policy basis for promoting new forms of foreign trade and supporting local enterprises in connecting with overseas markets (State Council of the People's Republic of China, 2022).

The development of Yibin's cross-border e-commerce pilot zone should also be understood within the broader development pattern of Sichuan Province. Sichuan has promoted cross-border e-commerce development through comprehensive pilot zones, platform construction, information sharing, overseas warehouses, multimodal transport, supply chain improvement, enterprise cultivation, and talent development (Chen, 2023). These policy directions are especially relevant to inland cities because cross-border e-commerce development in such regions depends not only on online platforms but also on logistics channels, customs coordination, local industrial foundations, and supporting service systems.

From the perspective of institutional design, cross-border e-commerce pilot zones provide space for testing new trade models, customs supervision modes, taxation services, logistics arrangements, and digital trade governance. China's cross-border e-commerce customs supervision system includes multiple regulatory models, including retail export, B2B direct export, overseas warehouse export, and bonded cross-border e-commerce models. B2B export modes such as 9710 and 9810 have been further promoted through customs supervision pilot policies (General Administration of Customs of the People's Republic of China, 2020). These regulatory models provide firms with multiple options for organizing export transactions, warehousing, logistics, and customs clearance.

However, the coexistence of multiple regulatory modes also increases the complexity of policy application. Enterprises need to understand the differences among these modes and match them with product characteristics, transaction types, logistics arrangements, and compliance requirements. For inland cities such as Yibin, this complexity creates a stronger need for customs guidance, policy explanation, and regulatory service support. Therefore, customs facilitation in Yibin should not be narrowly understood as faster clearance. It also includes regulatory mode guidance, declaration support, data coordination, and compliance services that help firms reduce institutional friction in the export process.

The Meaning of Yibin's "Blue and Green" Industries

The term "blue and green" industries is a local policy expression used in Yibin's industrial transformation. According to a local official media report, Yibin has promoted industrial upgrading toward the "blue ocean" of the digital economy and green new energy sectors, with a focus on strengthening emerging industries such as power batteries, crystalline silicon photovoltaic products, and the digital economy (Guo, 2022). This definition is important because it shows that Yibin's "blue and green" industries are not general traditional industries, but emerging sectors connected with digital transformation, green development, and new industrialization.

The 'blue' dimension mainly refers to the digital economy. In Yibin's industrial development context, this includes intelligent terminal manufacturing, digital technology services, data-related industries, and platform-based economic activities. By 2022, Yibin's intelligent terminal sector had achieved an output value of RMB 49.08 billion, growing 11.1% year-on-year, with companies such as Duowei producing smartphones and other digital devices primarily for export to markets in Russia, Southeast Asia, and beyond (Hu, 2023). The information technology services industry simultaneously reached RMB 5.682 billion in revenue, growing 29.9%, while 33 new digital economy core industry projects were signed with a combined investment of RMB 11.498 billion (Hu, 2023). Digital trade and e-commerce development also depend on data flows, digital infrastructure, platform governance, and supportive policy environments (UNCTAD, 2024).

The 'green' dimension mainly refers to green new energy industries, especially power batteries and crystalline silicon photovoltaic products. Yibin has rapidly emerged as one of China's most significant power battery production bases. Following its 2019 agreement with CATL for an initial 30 GWh production facility, Yibin expanded the cooperation to ten phases with total investment reaching RMB 64 billion; by 2022, CATL's Yibin facilities produced 72 GWh of power batteries with an output value of RMB 56 billion (Hu, 2023). With over 80 supply chain enterprises established in the city, the power battery sector as a whole achieved an industrial

output value of RMB 88.9 billion in 2022, a year-on-year increase of 4.54 times, contributing significantly to Yibin's regional GDP of over RMB 340 billion (Hu, 2023). In the photovoltaic sector, which grew from virtually nothing to initial scale within two years, five major projects had been established by late 2022 with total planned investment exceeding RMB 60 billion, including a 20 GW solar cell production project completed in just 150 days (Guo, 2022). An additional 25 photovoltaic projects involving RMB 162.9 billion in investment were simultaneously under negotiation (Guo, 2022). These industries typically have high added value, strong technical attributes, complex supply chains, and higher requirements for quality control and delivery stability.

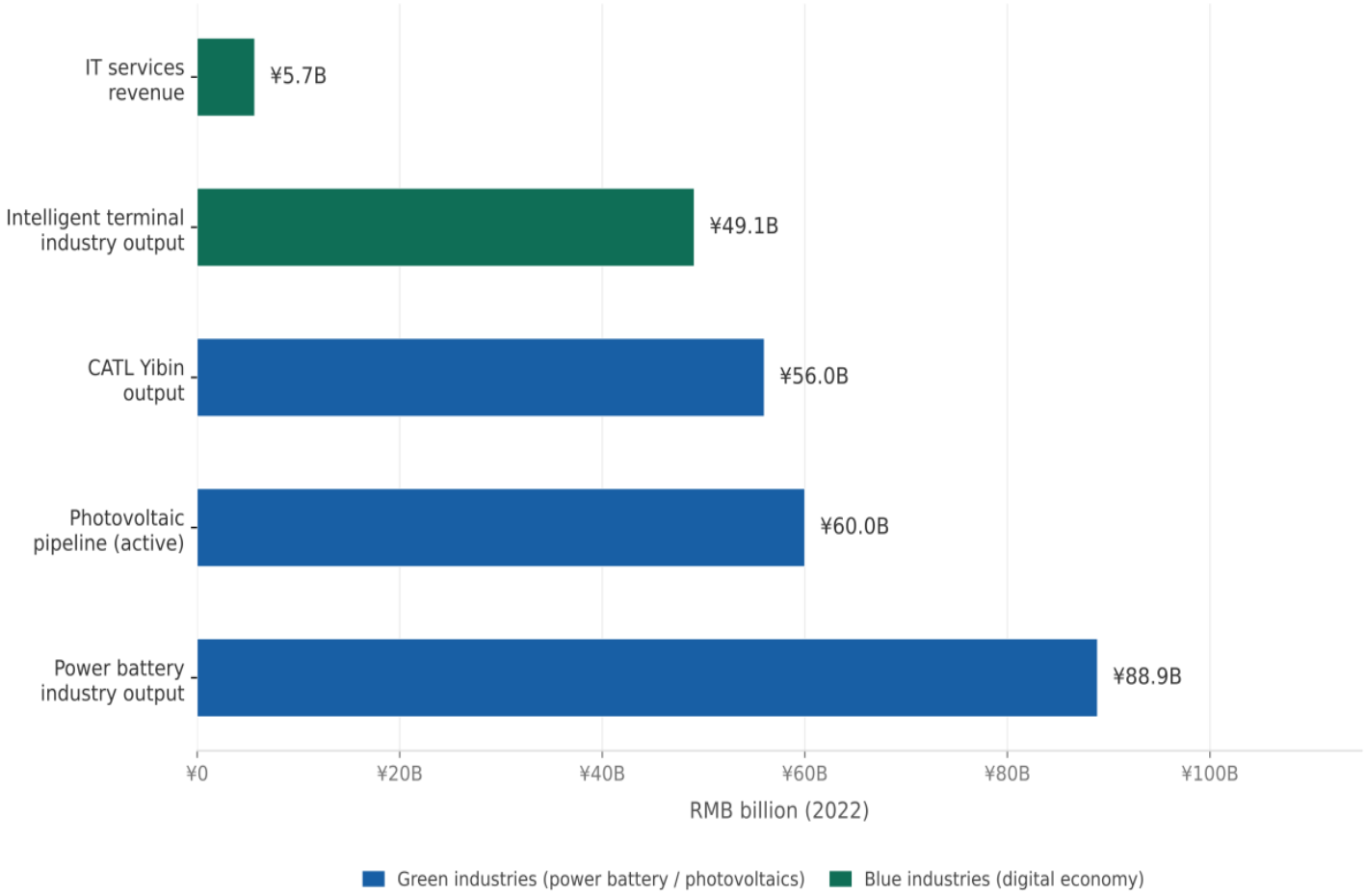

Figure 1. Output Values of Yibin's "Blue and Green" Industries (2022)

Sources: Hu (2023); Guo (2022). Note: Photovoltaic pipeline shows total planned investment for active projects only.

Compared with ordinary consumer products, Yibin's "blue and green" industries have stronger requirements for institutional support. Digital economy products may involve intellectual property protection, data-related compliance, product standards, and rapid market response. Green new energy products may involve product classification, technical parameters, safety requirements, origin rules, and international market standards. As a result, customs facilitation becomes a key institutional factor in transforming local industrial advantages into export competitiveness.

Export Characteristics and Customs Service Needs

The export characteristics of Yibin's emerging industries can be summarized in four dimensions: technical complexity, delivery sensitivity, compliance intensity, and supply chain coordination. First, products in the digital economy and green new energy sectors often involve strong technical attributes. Power batteries,

photovoltaic components, intelligent terminals, digital devices, and related equipment require accurate customs classification, complete declaration elements, and clear documentation. If enterprises make errors in product classification, origin information, or declaration materials, customs clearance may be delayed and export costs may increase.

Second, these industries are sensitive to delivery schedules. Emerging industrial exports are often connected with overseas production plans, project delivery cycles, customer contracts, and supply chain arrangements. Therefore, customs clearance efficiency directly affects firms' ability to meet delivery commitments. Trade facilitation can reduce delays and improve the predictability of cross-border goods movement through simplified procedures, better border coordination, and improved logistics connectivity (World Bank, n.d.). This is especially important for inland cities, where logistics distance and multimodal transport may already create time pressure.

Third, compliance requirements are relatively high. Emerging industrial products may involve customs classification, valuation, origin certification, intellectual property protection, safety supervision, and overseas market access requirements. For green new energy products, environmental and low-carbon requirements in overseas markets may also become increasingly relevant. Customs facilitation therefore needs to combine clearance efficiency with professional guidance and risk prevention. International customs frameworks emphasize that cross-border e-commerce facilitation should be supported by advance electronic data, risk management, stakeholder cooperation, and effective customs control (World Customs Organization, 2022).

Fourth, these industries require coordinated logistics and regulatory services. Cross-border e-commerce transactions are completed through the interaction of online platforms, logistics providers, warehouses, customs authorities, and local trade service systems. If these actors are poorly coordinated, enterprises may face repeated data submission, inconsistent information, longer delivery cycles, and higher institutional transaction costs. Studies on cross-border logistics also show that cross-border e-commerce logistics requires high-frequency, small-batch, and time-sensitive delivery systems, which makes information sharing and logistics coordination particularly important (Ye, 2023; Wu, 2023).

Why Customs Facilitation Matters for Yibin

Customs facilitation is central to Yibin's effort to promote the export development of emerging industries. For inland pilot zones, customs services are not simply administrative procedures; they are part of a broader export support system. Efficient customs facilitation can help firms shorten clearance time, reduce procedural costs, improve access to policy tools, and strengthen compliance capacity. More importantly, it can increase the predictability of export operations, which is essential for firms participating in international supply chains.

In Yibin's case, customs facilitation can operate through both direct and indirect channels. Directly, facilitation measures such as advance declaration, appointment-based inspection, electronic data exchange, origin certification services, and risk-based supervision may reduce clearance delays and improve delivery stability. Indirectly, customs services can help enterprises understand regulatory modes, select appropriate export pathways, make better use of tax and origin-related policies, and avoid compliance errors. These functions are closely related to the broader goals of trade facilitation, which include simplifying procedures, reducing trade costs, improving coordination, and enhancing predictability (World Trade Organization, n.d.; OECD, 2025).

Customs facilitation is also important because Yibin's emerging industries are still in the process of expanding their international market presence. Enterprises may have strong production capacity but limited experience with cross-border e-commerce rules, customs supervision modes, overseas warehouse models, origin rules, and international compliance requirements. Without sufficient institutional guidance, the benefits of the pilot zone may not be fully converted into export competitiveness. This is consistent with studies showing that less-

developed or inland pilot zones often require stronger policy coordination, enterprise support, and service systems to overcome development bottlenecks (Xiao et al., 2022).

Based on the above context, customs facilitation is not treated as a narrow clearance procedure in this study, but as a policy mechanism linking Yibin's cross-border e-commerce pilot zone with the export efficiency of its emerging industries. The following section further explains this mechanism through four dimensions: time efficiency, cost reduction, coordination efficiency, and compliance stability. These dimensions reflect the practical pathways through which customs services and trade facilitation measures may support export-oriented firms in inland pilot zones.

Policy Mechanisms Linking Customs Facilitation and Export Efficiency

Time Efficiency Mechanism: Customs Facilitation, Delivery Cycles, and Fulfilment Stability

Time efficiency is one of the most direct mechanisms through which customs facilitation affects export efficiency. In cross-border e-commerce, export transactions are usually more fragmented and time-sensitive than traditional trade. Orders are often smaller in size but higher in frequency, while customers expect shorter delivery cycles and more predictable fulfilment. Therefore, customs clearance speed and procedural predictability directly influence firms' ability to complete international orders on time.

Trade facilitation improves time efficiency by simplifying procedures, reducing administrative delays, and improving the predictability of border processes. The simplification, modernization, and harmonization of export and import procedures are central to trade facilitation (World Trade Organization, n.d.). In practical terms, this may include advance declaration, electronic documentation, risk-based inspection, appointment-based clearance, and better information exchange among customs authorities, logistics providers, and enterprises. These measures can reduce waiting time and improve the stability of cross-border goods movement.

For inland pilot zones such as Yibin, time efficiency is particularly important because logistics distance and multimodal transport may already increase delivery pressure. Compared with coastal cities, inland cities often need to rely on road, rail, air, river transport, bonded platforms, and regional logistics nodes to connect with overseas markets. Reliable logistics and predictable border procedures are therefore essential to improving export efficiency (World Bank, n.d.).

The relevance of time efficiency for Yibin's industries is illustrated by the scale and pace of their development. CATL's Yibin facilities produced **72 GWh of power batteries in 2022** (Hu, 2023), requiring stable and predictable export logistics to fulfil supply chain commitments across international markets. Similarly, Yibin's intelligent terminal companies export to Russia, Southeast Asia, and other regions, where shipment delays can directly affect contractual delivery performance. For inland cities like Yibin, where goods must travel through multimodal transport chains before reaching international markets, every reduction in customs clearance time translates into improved delivery predictability. Customs facilitation innovations such as advance declaration and pre-clearance procedures have been shown to compress clearance times substantially, strengthening the link between production capacity and export fulfilment (He, 2023).

In summary, customs facilitation enhances time efficiency by reducing procedural delays, improving clearance predictability, shortening delivery cycles, and strengthening fulfilment stability for Yibin's export-oriented emerging industries.

Cost Reduction Mechanism: Institutional Transaction Costs and Export Competitiveness

The second mechanism is cost reduction. Export costs are not limited to production and transportation costs. Firms also face institutional transaction costs, including documentation costs, customs declaration costs, compliance costs, coordination costs, and costs caused by delays or uncertainty. In cross-border e-commerce, these costs may become more significant because transactions are frequent, documentation requirements are detailed, and logistics chains involve multiple actors.

Trade facilitation reduces institutional transaction costs by simplifying procedures, improving transparency, and making border processes faster, cheaper, and more predictable (World Bank, n.d.). For firms operating in competitive international markets, such cost reductions can improve pricing flexibility and export competitiveness.

In China's cross-border e-commerce context, pilot zone policies have been associated with improvements in trade facilitation and institutional efficiency. Trade facilitation policies embedded in cross-border e-commerce pilot zones have been shown to promote cross-border e-commerce development by improving information infrastructure and reducing institutional barriers (Zhang et al., 2020). Other studies also suggest that trade facilitation has a positive impact on cross-border e-commerce development by improving the overall operating environment and reducing procedural constraints (Zhu, 2022).

For Yibin's emerging industries, the cost dimension is particularly significant given the complexity of their export documentation. Power battery products must meet precise classification standards, and photovoltaic components require origin certification to qualify for tariff preferences under regional trade agreements. Empirical evidence from China's cross-border e-commerce pilot zone policies also supports this mechanism. Zhang et al. (2020) found that trade facilitation policies embedded in pilot zones promoted cross-border e-commerce development with a net policy effect coefficient of approximately 0.33, while Lin et al. (2023) found that pilot zone establishment raised foreign trade quality by an average of 2.15%. For Yibin, where the power battery industry alone achieved an output of RMB 88.9 billion in 2022 (Hu, 2023), even marginal reductions in per-unit institutional costs can represent substantial aggregate savings across the supply chain.

Origin certification and trade agreement utilization further transform customs services into practical cost advantages, especially for green new energy products embedded in international supply chains. Customs services related to origin certification, policy explanation, and documentation support can help firms convert policy benefits into price competitiveness.

In summary, customs facilitation improves export competitiveness by lowering institutional transaction costs, reducing compliance-related uncertainty, and helping firms transform policy benefits into cost advantages.

Coordination Efficiency Mechanism: Customs, Logistics, Platforms, and Local Governance

The third mechanism is coordination efficiency. Cross-border e-commerce is not completed by a single actor. It involves online platforms, exporters, logistics providers, warehouses, customs authorities, payment service providers, and local government departments. If these actors do not coordinate effectively, firms may face repeated data submission, inconsistent information, delayed clearance, unclear responsibilities, and higher transaction costs.

Coordination efficiency is especially important because cross-border e-commerce combines digital information flows with physical goods movement. Digital platforms may generate orders, but goods still need to pass through warehousing, logistics, customs declaration, inspection, and delivery. If information between platforms, logistics providers, and customs systems is not well connected, the advantages of digital trade may be weakened. Digital

trade facilitation emphasizes the importance of paperless trade, electronic data exchange, and institutional interoperability in improving trade efficiency (Duval & Kong, 2017).

Cross-border e-commerce and cross-border logistics operate within the same value chain and require strategic, functional, and operational coordination. Information sharing among e-commerce firms, logistics providers, and customs authorities can reduce communication barriers and improve delivery efficiency (Wu, 2023). For inland cities, this coordination is particularly important because export goods often need to pass through multiple logistics nodes before reaching international markets.

The coordination efficiency mechanism is also related to border agency cooperation. Trade facilitation indicators include border agency cooperation, automation, information availability, and governance as key dimensions of trade facilitation (OECD, 2025). These dimensions suggest that customs facilitation is not only about what customs authorities do internally. It also depends on how customs authorities coordinate with other agencies, platforms, logistics systems, and enterprises.

The coordination challenge is particularly acute for Yibin given the scale and diversity of its emerging industries. With over 80 supply chain enterprises in the power battery sector alone (Hu, 2023), and 33 newly signed digital economy projects in 2022 (Hu, 2023), the city's export ecosystem involves numerous actors whose logistics, declaration, and delivery processes must be aligned. Sichuan Province's cross-border e-commerce development, which reached a transaction value of RMB 70.09 billion in 2021, with over 2,300 registered enterprises and 92 overseas warehouses (Chen, 2023), also demonstrates the scale of coordination required across the provincial supply chain. For Yibin's pilot zone to function effectively, customs services must be connected with logistics providers, bonded platforms, and digital trade systems to reduce the institutional friction that inland cities face relative to their coastal counterparts.

In summary, customs facilitation improves coordination efficiency by strengthening information exchange, promoting cooperation among trade-related actors, reducing procedural duplication, and lowering institutional friction.

Compliance Stability Mechanism: Risk Management, Regulatory Predictability, and Export Confidence

The fourth mechanism is compliance stability. Export efficiency depends not only on speed and cost but also on whether firms can operate under stable and predictable regulatory conditions. In cross-border e-commerce, firms may face risks related to customs declaration, product classification, valuation, origin certification, intellectual property protection, safety supervision, and overseas market regulations. If these risks are not managed effectively, firms may encounter clearance delays, additional costs, penalties, or contract uncertainty.

This issue is more pronounced for emerging industries, where digital economy products may involve intellectual property protection, product standards, and data-related compliance issues, while green new energy products may face safety certification, technical parameters, origin rules, carbon-footprint documentation, and environmental standards. Therefore, firms need not only faster customs clearance but also clearer rules, professional guidance, and predictable regulatory interpretation.

Risk-based governance provides a way to balance facilitation and control. Customs facilitation does not mean relaxing regulatory requirements. Rather, it requires customs authorities to use data, risk analysis, and differentiated supervision to facilitate legitimate trade while maintaining regulatory security. International customs frameworks emphasize advance electronic data, risk management, stakeholder cooperation, and effective control mechanisms in cross-border e-commerce governance (World Customs Organization, 2022). This approach allows customs authorities to provide more convenience for compliant firms while focusing regulatory resources on higher-risk activities.

Regulatory predictability further reduces uncertainty by helping firms understand customs requirements, classification standards, documentation procedures, and risk points before export activities begin. Trade facilitation indicators also highlight the importance of information availability, advance rulings, appeal procedures, automation, and border agency cooperation (OECD, 2025). These elements help firms improve compliance planning and reduce uncertainty in export operations.

The compliance dimension is especially relevant for Yibin's photovoltaic and power battery industries, which face increasingly complex regulatory environments in overseas markets. European and North American markets have tightened requirements for battery safety certification, carbon footprint documentation, and supply chain transparency, while photovoltaic products face scrutiny related to origin rules and anti-dumping measures in some markets. Empirical research confirms that the effects of trade facilitation policies differ across regions, with western Chinese cities showing weaker responses to pilot zone policies than eastern cities (Chang, 2023; Lin et al., 2023). This suggests that firms in inland regions like Yibin need stronger compliance support infrastructure to translate production capacity into export performance. Front-end customs guidance, risk warning systems, and differentiated services for compliant enterprises are therefore not supplementary features but core components of an effective facilitation system for Yibin's export development.

In summary, customs facilitation strengthens compliance stability by improving regulatory predictability, reducing compliance uncertainty, supporting risk management, and enhancing firms' confidence in continuous participation in international markets.

Integrated Mechanism Framework

The four mechanisms discussed above are interconnected rather than separate. Time efficiency helps firms shorten delivery cycles and improve fulfilment stability. Cost reduction lowers institutional transaction costs and strengthens price competitiveness. Coordination efficiency reduces friction among customs, logistics, platforms, and local service systems. Compliance stability reduces regulatory uncertainty and supports continuous export operations. Together, these mechanisms explain how customs facilitation can support the export efficiency of emerging industries in an inland cross-border e-commerce pilot zone.

This mechanism framework also shows that customs facilitation should be understood as a comprehensive institutional function. It is not limited to faster clearance at the border. It includes procedure simplification, policy guidance, electronic data exchange, logistics coordination, risk-based supervision, origin certification, enterprise compliance support, and regulatory predictability. This broader understanding is consistent with international trade facilitation and customs governance frameworks (World Trade Organization, n.d.; World Customs Organization, 2022).

Based on the above analysis, the integrated mechanism can be summarized in Figure 2. Customs facilitation, supported by the cross-border e-commerce pilot zone, improves time efficiency, reduces trade compliance and institutional transaction costs, strengthens multi-actor coordination, and enhances regulatory predictability. These mechanisms jointly contribute to improved export efficiency of emerging industries.

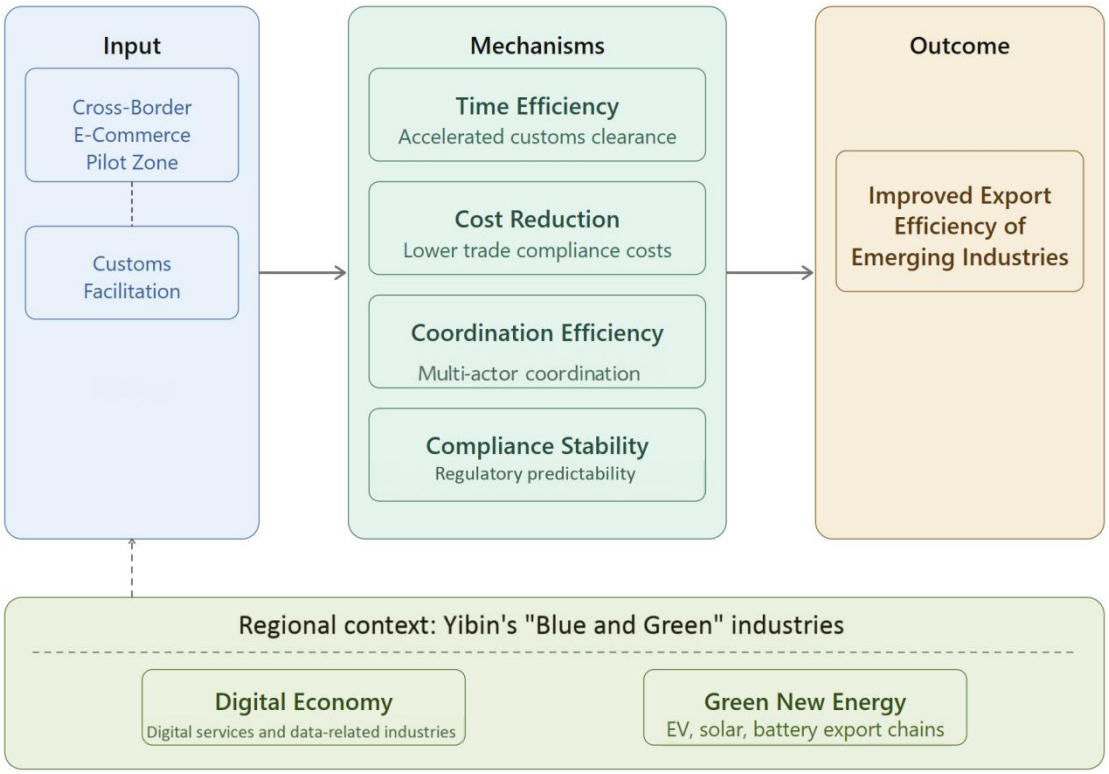

Figure 2. Mechanism Framework Linking Customs Facilitation and Export Efficiency of Emerging Industries

Source: Developed by the author based on the literature review and policy analysis.

Under this framework, Yibin's cross-border e-commerce pilot zone can better support the export development of digital economy and green new energy industries if customs services are connected with logistics systems, regulatory modes, enterprise needs, and local industrial characteristics. This mechanism provides the analytical basis for identifying current challenges and proposing policy recommendations in the following section.

Challenges and Policy Recommendations

Key Challenges

Although customs facilitation can support export efficiency through time efficiency, cost reduction, coordination efficiency, and compliance stability, these mechanisms may not operate automatically. In inland pilot zones, the effectiveness of customs facilitation depends on whether enterprises, customs authorities, logistics providers, digital platforms, and local government departments can work together under a coordinated policy framework. For Yibin, the export development of emerging industries through cross-border e-commerce still faces several practical challenges.

Insufficient Matching Between Regulatory Modes and Industrial Characteristics

The first challenge is the insufficient matching between cross-border e-commerce regulatory modes and the characteristics of emerging industries. China's cross-border e-commerce customs supervision system includes different models such as 9610, 9710, 9810, 1210, and 1239, which correspond to different transaction types, logistics arrangements, and customs procedures. These models provide enterprises with multiple export pathways, but they also increase the complexity of policy understanding and operational choice.

For firms in digital economy and green new energy sectors, regulatory mode selection is not merely a procedural issue. Different products may vary in terms of order size, transaction frequency, technical attributes, warehousing needs, delivery schedules, and compliance requirements. If enterprises choose a regulatory mode only based on short-term convenience, they may face higher compliance risks, repeated documentation, longer clearance time, or additional institutional costs in later stages. This problem may be more visible in inland and less-developed pilot zones, where enterprises often have weaker experience in cross-border e-commerce operations and limited familiarity with policy tools (Xiao et al., 2022).

The challenge is therefore not the absence of regulatory modes, but the lack of precise matching between industry characteristics and regulatory pathways. Without sufficient guidance, enterprises may not fully understand which mode is more suitable for B2B direct export, overseas warehouse export, bonded operation, or small-batch cross-border transactions. This weakens the practical effect of the pilot zone and reduces the ability of customs facilitation to support export efficiency.

Limited Integrated Use of Trade Facilitation Tools

The second challenge is the limited integrated use of trade facilitation tools. Trade facilitation involves multiple policy instruments, including simplified procedures, electronic data exchange, risk-based inspection, origin certification, credit management, taxation-related services, and border agency cooperation. However, enterprises may understand these tools separately rather than as an integrated support system.

Some firms may know that advance declaration or appointment-based inspection can help reduce clearance time, but they may not fully combine these tools with origin certification, tax-related services, logistics planning, and enterprise credit management. As a result, the cumulative effect of facilitation policies may not be fully released. Existing studies show that trade facilitation policies can promote cross-border e-commerce development, but their effects depend on information infrastructure, local economic conditions, and regional implementation capacity (Zhang et al., 2020; Liu, 2023).

This challenge is particularly relevant to emerging industries. Digital economy and green new energy firms often need coordinated support across customs declaration, logistics, origin rules, classification, and compliance guidance. If facilitation tools remain fragmented, enterprises may still face institutional transaction costs even when individual policies exist. Therefore, improving export efficiency requires not only the availability of facilitation measures but also their integrated application.

Weak Logistics Coordination and Compliance Capacity

The third challenge concerns logistics coordination and compliance capacity. Cross-border e-commerce relies on the coordination of online platforms, logistics providers, customs authorities, warehouses, and local trade service systems. For inland cities, logistics coordination is especially important because goods often need to pass through multiple transport nodes before reaching international markets. Cross-border e-commerce logistics is usually characterized by small batches, high frequency, and strict delivery requirements, which may not be fully supported by traditional logistics models (Ye, 2023).

Coordination problems may occur when information systems are not connected, logistics schedules are not aligned with customs procedures, or enterprises need to submit similar information repeatedly to different actors. These problems can increase delivery time, raise costs, and reduce the predictability of export operations. Cross-border e-commerce and cross-border logistics need closer strategic, functional, and operational coordination, especially through information sharing among e-commerce firms, logistics providers, and customs authorities (Wu, 2023).

Compliance capacity is another related challenge. Emerging industries may involve complex product classification, origin certification, intellectual property protection, safety supervision, and overseas market requirements. If enterprises lack sufficient compliance knowledge, they may face customs delays, documentation errors, or uncertainty in export procedures. Customs facilitation therefore needs to be combined with front-end guidance, risk warning, and enterprise compliance training. International customs frameworks also emphasize risk management, stakeholder cooperation, and effective customs control in cross-border e-commerce governance (World Customs Organization, 2022).

Policy Recommendations

To address the above challenges, Yibin should further improve customs facilitation by strengthening regulatory mode matching, integrating facilitation tools, improving logistics coordination, and enhancing enterprise compliance capacity. These recommendations are designed to support the export efficiency of emerging industries within the cross-border e-commerce pilot zone.

Establish an Industry–Regulatory Mode Matching Mechanism

First, Yibin should establish an industry–regulatory mode matching mechanism. This mechanism should link industry type, product characteristics, transaction mode, logistics arrangement, and customs service focus. Instead of providing general policy guidance to all firms, customs authorities and local trade service departments can offer more targeted guidance according to the needs of digital economy and green new energy enterprises.

For digital economy-related products, such as digital devices, intelligent terminals, and data-related services, regulatory guidance may focus on small-batch transactions, intellectual property protection, declaration accuracy, and flexible market response. For green new energy products, such as power batteries and photovoltaic-related products, guidance may focus more on product classification, safety requirements, origin certification, technical documentation, and delivery stability.

In practice, different customs supervision modes may be suitable for different business scenarios. B2B direct export may be supported through relevant B2B export models, while overseas warehouse exports may be organized through the overseas warehouse model, and bonded operations may rely on bonded cross-border e-commerce arrangements. These choices should not be applied mechanically. Instead, enterprises should be guided to select appropriate modes based on product attributes, order structure, logistics conditions, and compliance requirements. Such a matching mechanism can reduce trial-and-error costs and improve the precision of customs facilitation.

Promote the Integrated Application of Facilitation Tools

Second, Yibin should promote the integrated application of trade facilitation tools. The improvement of export efficiency requires more than one isolated policy measure. Customs facilitation should be organized as a package of services that combines clearance facilitation, origin certification, tax-related guidance, credit management, logistics coordination, and compliance support.

For time-sensitive exports, enterprises may benefit from better coordination between advance declaration, electronic documentation, appointment-based inspection, and logistics scheduling. For cost-sensitive exports, customs and local departments can provide clearer guidance on origin certification, trade agreement utilization, and tax-related policy services. For firms with good compliance records, risk-based supervision and differentiated services may help reduce unnecessary intervention while maintaining regulatory security.

This integrated approach is consistent with the broader logic of trade facilitation. Trade facilitation is not simply about reducing one procedural step; it aims to improve transparency, simplify procedures, strengthen cooperation, and make cross-border trade more predictable (World Trade Organization, n.d.; OECD, 2025). For Yibin, the key task is to transform scattered facilitation tools into a coordinated service system that firms can understand and use effectively.

Strengthen Front-End Compliance Guidance and Risk Warning

Third, Yibin should strengthen front-end compliance guidance and risk warning for emerging industry exporters. Since digital economy and green new energy products often involve higher technical and regulatory requirements, enterprises need support before problems appear in customs clearance. Front-end guidance can help firms prepare accurate documentation, choose suitable regulatory modes, understand origin rules, and avoid classification or declaration errors.

Customs authorities may provide targeted compliance guidance in areas such as product classification, origin certification, intellectual property protection, safety supervision, and overseas market access requirements. For firms exporting power batteries, photovoltaic-related products, or digital devices, such guidance can reduce uncertainty and prevent delays caused by incomplete or inaccurate declarations. Risk warning can also help enterprises identify potential compliance problems before goods enter the export process.

Risk-based governance should be strengthened at the same time. For firms with good compliance records, differentiated facilitation measures can improve clearance efficiency and reduce unnecessary intervention. For higher-risk products or transactions, targeted supervision can maintain regulatory security. This approach can create a positive cycle of "compliance in exchange for facilitation," which is consistent with international customs governance principles (World Customs Organization, 2022).

Improve Logistics and Multi-Actor Coordination

Fourth, Yibin should improve coordination among customs authorities, logistics providers, cross-border e-commerce platforms, bonded zone operators, local government departments, and enterprises. Since cross-border e-commerce combines digital transactions with physical delivery, export efficiency depends on the smooth connection of data flows, logistics flows, and regulatory procedures.

A practical approach is to strengthen information sharing and process coordination among key actors. For example, customs procedures should be better connected with logistics schedules, platform data, warehouse operations, and enterprise declaration systems. Local departments can also help coordinate common issues faced by enterprises, such as logistics delays, unclear policy interpretation, or repeated data submission.

For inland cities, multimodal transport and logistics connectivity are especially important. Reliable logistics services and coordinated border management are essential for making goods movement faster, cheaper, and more predictable (World Bank, n.d.). Therefore, Yibin should not treat customs facilitation and logistics improvement as separate tasks. Instead, they should be integrated into a broader export service system that supports the development of emerging industries.

Summary

The challenges faced by Yibin are not mainly caused by the absence of policy tools, but by the need to improve policy matching, tool integration, logistics coordination, and compliance capacity. To better support the export efficiency of emerging industries, customs facilitation should move from single-procedure improvement to a more systematic service model. By establishing an industry–regulatory mode matching mechanism, integrating

facilitation tools, strengthening front-end compliance guidance, and improving multi-actor coordination, Yibin can better transform the institutional advantages of the cross-border e-commerce pilot zone into export competitiveness for its “Blue and Green” industries.

CONCLUSION

This paper examined how customs facilitation supports the export efficiency of emerging industries in Yibin’s Cross-Border E-Commerce Pilot Zone. Rather than providing a broad evaluation of the overall development of the pilot zone, the study focused on the policy mechanisms through which customs services, trade facilitation measures, logistics coordination, and compliance support may improve export efficiency. The case of Yibin is particularly relevant because it represents an inland city seeking to connect emerging industries with international markets through cross-border e-commerce and institutional facilitation.

The analysis shows that customs facilitation can influence export efficiency through four interconnected mechanisms. First, the time efficiency mechanism helps firms shorten customs clearance and delivery cycles, thereby improving fulfilment stability. Second, the cost reduction mechanism lowers institutional transaction costs by simplifying procedures, improving policy accessibility, and reducing uncertainty in customs-related processes. Third, the coordination efficiency mechanism strengthens cooperation among customs authorities, logistics providers, platforms, bonded zone operators, local departments, and enterprises. Fourth, the compliance stability mechanism improves regulatory predictability and reduces compliance uncertainty through risk-based supervision, front-end guidance, and differentiated services.

These mechanisms are especially important for Yibin’s “Blue and Green” industries, which mainly refer to the digital economy and green new energy sectors. Unlike ordinary low-value export products, these emerging industries often involve higher technical content, stricter delivery requirements, more complex supply chains, and stronger compliance needs. Therefore, their export efficiency depends not only on production capacity and market demand, but also on customs clearance efficiency, logistics coordination, origin certification, product classification, safety supervision, and regulatory predictability. In this sense, customs facilitation functions as a key institutional bridge between local industrial advantages and international market participation.

The paper also identifies several practical challenges. These include insufficient matching between regulatory modes and industrial characteristics, limited integrated use of trade facilitation tools, weak logistics coordination, and insufficient enterprise compliance capacity. To address these challenges, Yibin should strengthen industry–regulatory mode matching, promote the integrated application of facilitation tools, enhance front-end compliance guidance and risk warning, and improve multi-actor coordination among customs, logistics, platforms, and local government departments. These measures can help transform the institutional advantages of the cross-border e-commerce pilot zone into practical export competitiveness.

This study contributes to the discussion on cross-border e-commerce pilot zones by shifting attention from general trade growth to the specific role of customs facilitation in supporting emerging industry exports. It also provides a policy-oriented framework for understanding how inland cities can use customs services and trade facilitation mechanisms to overcome location-related constraints and improve export efficiency. However, the study is mainly based on qualitative policy analysis and document-based interpretation. It does not provide firm-level quantitative evidence on the direct impact of customs facilitation on export performance. Future research may further examine this issue using enterprise data, customs clearance data, logistics time data, or comparative cases across different inland pilot zones. Such research would help verify the mechanisms proposed in this paper and provide more detailed evidence for improving cross-border e-commerce policy implementation.

Ethical Approval

This study is based on publicly available documents, academic literature, policy materials, and secondary sources. It did not involve human participants, animals, or the collection of personal data. Therefore, ethical approval was not required.

Conflict of Interest

The authors declare that there is no conflict of interest.

Data Availability Statement

The materials used in this study are derived from publicly available academic literature, policy documents, official reports, and public media sources. No primary dataset was generated or analysed during the current study.

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REFERENCES

1. Chang, H. (2023). The impact of cross-border e-commerce comprehensive pilot zones on the transformation and upgrading of export trade. *Commercial Economic Research*, (22), 130–133. [In Chinese]
2. Chen, X. J. (2023). Research on the high-quality development path of cross-border e-commerce in Sichuan under the background of comprehensive pilot zones. *Foreign Economic Relations & Trade*, (3), 28–31. [In Chinese]
3. Deng, Z., & Wang, Z. (2016). Early-mover advantages at cross-border business-to-business e-commerce portals. *Journal of Business Research, 69*(12), 6002–6011. https://doi.org/10.1016/j.jbusres.2016.05.015
4. Duval, Y., & Kong, M. (2017). *Digital trade facilitation: Paperless trade in regional trade agreements* (ADBI Working Paper No. 747). Asian Development Bank Institute. https://www.adb.org/publications/digital-trade-facilitation-paperless-trade-regional-trade-agreements
5. General Administration of Customs of the People's Republic of China. (2020). *Announcement on expanding the pilot supervision of cross-border e-commerce B2B exports* [关于开展跨境电子商务企业对企业出口监管试点的公告]. http://www.customs.gov.cn/
6. Gomez-Herrera, E., Martens, B., & Turlea, G. (2014). The drivers and impediments for cross-border e-commerce in the EU. *Information Economics and Policy, 28*, 83–96. https://doi.org/10.1016/j.infoecopol.2014.05.002
7. Guo, X. J. (2022, November 23). "Blue and green" new tracks ["一蓝一绿"新赛道]. *Yibin Daily*, p. 3. [In Chinese]
8. Hu, X. (2023, April 18). The economic palette of Yangtze River First City Yibin: From one black, one white to one blue, one green. Economic Information Daily, p. 6. [In Chinese]
9. He, X. B. (2023). Analysis of cross-border e-commerce logistics model innovation paths under the digital economy background. National Circulation Economy, (12), 8–11. https://doi.org/10.16834/j.cnki.issn1009-5292.2023.12.045 [In Chinese]

10. Lin, L., Lan, X. Q., & Chen, A. Z. (2023). Mechanisms and effects of cross-border e-commerce comprehensive pilot zones in driving high-quality development of foreign trade. *Economic Forum*, (10), 102–112. [In Chinese]
11. Liu, J. H. (2023). The impact of China's trade facilitation policies on the development of cross-border e-commerce. *Times of Economy & Trade*, (2), 73–76. https://doi.org/10.19463/j.cnki.sdjm.2023.02.012 [In Chinese]
12. Ma, S., Chai, Y., & Zhang, H. (2018). Rise of cross-border e-commerce exports in China. *China & World Economy, 26*(3), 63–87. https://doi.org/10.1111/cwe.12243
13. OECD. (2025). *OECD trade facilitation indicators: Monitoring policies up to 2025*. OECD Publishing. https://www.oecd.org/en/publications/oecd-trade-facilitation-indicators_fd6f27dc-en.html
14. State Council of the People's Republic of China. (2022). *Approval on establishing cross-border e-commerce comprehensive pilot zones in Langfang and other cities, including Yibin* [国务院关于同意在廊坊等城市设立跨境电子商务综合试验区的批复]. https://www.gov.cn/
15. UNCTAD. (2024). *Digital economy report 2024: Shaping an environmentally sustainable and inclusive digital future*. United Nations. https://unctad.org/publication/digital-economy-report-2024
16. Wang, T. T., & Yang, J. (2022). Research on development problems and countermeasures of small and medium-sized enterprises in cross-border e-commerce comprehensive pilot zones. China Business Review, (21), 16–18. [In Chinese]
17. World Bank. (n.d.). *Trade facilitation, logistics and connectivity*. https://www.worldbank.org/ext/en/topic/trade/trade-facilitation-logistics-connectivity
18. World Customs Organization. (2022). *Framework of standards on cross-border e-commerce*. https://www.wcoomd.org/-/media/wco/public/global/pdf/topics/facilitation/activities-and-programmes/ecommerce/wco-framework-of-standards-on-crossborder-ecommerce_en.pdf
19. World Trade Organization. (n.d.). *Trade facilitation*. https://www.wto.org/english/tratop_e/tradfa_e/tradfa_e.htm
20. Wu, Y. J. (2023). Endogenous mechanism and implementation path of the coordinated development of cross-border e-commerce and cross-border logistics in Fujian Province. *Modern Marketing*, (7), 82–84. https://doi.org/10.19921/j.cnki.1009-2994.2023-07-0082-0028 [In Chinese]
21. Xiao, X. C., Sun, X., Wei, N., & Meng, H. D. (2022). Development bottlenecks and breakthrough paths of cross-border e-commerce comprehensive pilot zones in less-developed regions. *Market Modernization*, (6), 39–41. [In Chinese]
22. Ye, M. (2023). Problems and strategies in the development of cross-border e-commerce logistics under the new situation. *Logistics Sci-Tech, 46*(14), 87–89. [In Chinese]
23. Zhang, X. B., Shi, Y. T., & Xu, B. C. (2020). Trade facilitation and the development of China's cross-border e-commerce: An empirical analysis based on the difference-in-differences method. *East China Economic Management, 34*(2), 94–103. https://doi.org/10.19629/j.cnki.34-1014/f.190610003 [In Chinese]
24. Zhu, W. (2022). The impact of trade facilitation on the development of China's cross-border e-commerce. *Commercial Economic Research*, (23), 150–153. [In Chinese]