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Reconstruction of Logistics Services in Cross-Border E-Commerce and Consumer Continuance Intention on Platforms: The Mediating Role of Digital Logistics Services

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Abstract

Against the backdrop of accelerating global trade and rising consumer expectations, cross-border e-commerce must urgently increase consumers' willingness to reuse them. This study uses social exchange theory (SET) and resource dependency theory (RDT) to look at how business process reengineering (BPR) in cross-border e-commerce logistics services helps with digitalising the services, resulting in consumers being more likely to keep using the platform. The study also investigates information sharing and supply chain integration (SCI) as variables. This study used a sample of Chinese cross-border e-commerce enterprises and employed confirmatory factor analysis and structural equation modelling (SEM) as analytical methods. The findings indicate a positive relationship between logistics service BPR and logistics service digitisation. Our results also show that SCI positively moderates the relationship between BPR and logistics service digitalization by enhancing cross-organizational collaboration and information flow. We further find that greater information sharing cross-border e-commerce platforms and logistics service providers strengthens SCI's moderating effect, indicating a secondary moderating role of information sharing. This study proposes an innovative interactive perspective and, drawing on SET, constructs three models to identify the boundary conditions influencing the relationship. It provides a theoretical foundation and practical reference for cross-border e-commerce platforms seeking to optimize digital logistics services and enhance consumers' willingness to reuse the platform.

Keywords: cross-border e-commerce; business process reengineering; digitalization of logistics services; supply chain integration; information sharing; consumer continuance intention



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1. Introduction

Due to the explosive growth of globalisation and digital technology, cross-border e-commerce, a nascent business model, transcends geographical and market constraints [1,2], enabling consumers to obtain products globally. This purchasing strategy significantly broadens product choices for buyers, providing access to a wider array of different and distinctive things beyond local market limitations. Sellers can use cross-border e-commerce platforms to access the global market, thereby broadening their consumer base, enhancing

sales, and diversifying their revenue [3,4]. From an operational model standpoint, cross-border e-commerce amalgamates buyers, sellers, platforms, and third parties, mirroring the conventional domestic e-commerce framework [5]. Nonetheless, cross-border transactions markedly differ from domestic ones. Transgressing national and customs boundaries complicates relations among the four entities. Furthermore, purchasers encounter considerable uncertainties throughout the transaction process, such as information asymmetry, logistical delays, and cultural disparities [6,7]. These problems impact consumers' buying experiences and exert pressure on the operational efficiency and sustainable development of cross-border e-commerce platforms. Therefore, improving operational efficiency and fostering consumer resentment for cross-border e-commerce platforms have become key issues in both academia and practice. However, relying solely on the operational logic of domestic e-commerce models is insufficient to address the complexity and volatility of multi-party relationships in a cross-border context. To address these challenges, cross-border e-commerce companies need to fundamentally reconfigure their business processes and accelerate the digitization of logistics services. Such process reengineering and service innovation can reduce transaction uncertainty, improve coordination efficiency, and enhance consumer trust, thereby promoting continued consumer engagement with cross-border e-commerce platforms.

However, there is still a gap in the existing literature on how cross-border e-commerce platforms can structurally enhance their service delivery and operational mechanisms to mitigate transaction uncertainty and thus influence consumers' reuse behavior. First, previous research on platform usage intention has mainly focused on three consumer-related dimensions: culture, psychology, and technology [8,9]. For example, at the cultural level, studies have examined how platform cultural values impact user behavior [10]. At the psychological level, research has explored factors such as perceived risks and trust-building, which positively impact users' platform reuse intention [9]. At the technological level, platform innovations, such as compatibility and relative advantages, have been shown to enhance users' platform continuance intention [11,12]. Since e-commerce platforms transcend traditional geographical boundaries, consumer behaviors beyond national borders need to consider cross-cultural influences. Purchase intention, perceived risk, and perceived product quality are each strongly affected by cultural factors, including collectivism and uncertainty avoidance [13,14]. Studies at the psychological level have concluded that factors such as convenience, habits, trust, and behavioral intention are drivers of consumer participation in live e-commerce shopping. These studies provide valuable insights; however, they mainly focus on the external perspective of consumer decision-making enterprises to enhance the re-use intention of cross-border e-commerce platforms, while ignoring how enterprises can improve their operational efficiency based on the perspective of internal business process reengineering to enhance consumers' re-use intention of cross-border e-commerce platforms.

Secondly, limited research has methodically investigated the effect of business process reengineering (BPR) in logistics services and the digitisation of cross-border logistics on consumers' intention to continue using platforms, specifically from the viewpoint of cross-border e-commerce firms. As consumer demand diversifies, cross-border e-commerce platforms and logistics providers must urgently advance digitisation of logistics services through business process reengineering to improve the shopping experience. Figure 1 depicts the alterations in China's cross-border e-commerce logistics services prior to and after the BPR. This change is not only a necessary measure to cope with market changes but also a key path to enhance platform user stickiness and sustainable competitiveness. Specifically, achieving logistics service digitization is essential for improving user experience, reducing operational complexity, and meeting the diverse needs of modern consumers [15].

Figure 2 shows the digital logistics tracking interface for consumers on a cross-border e-commerce platform. However, this process depends on the implementation of BPR. Business process reengineering enables the automation, informatization, and coordination of logistics processes by optimizing and innovating the logistics service chain. It also reduces manual errors and improves the efficiency and accuracy of logistics services [16]. This optimization not only reduces the burden on users to find third-party logistics platforms during cross-border shopping but also improves platform convenience and enhances its appeal to users [17,18].

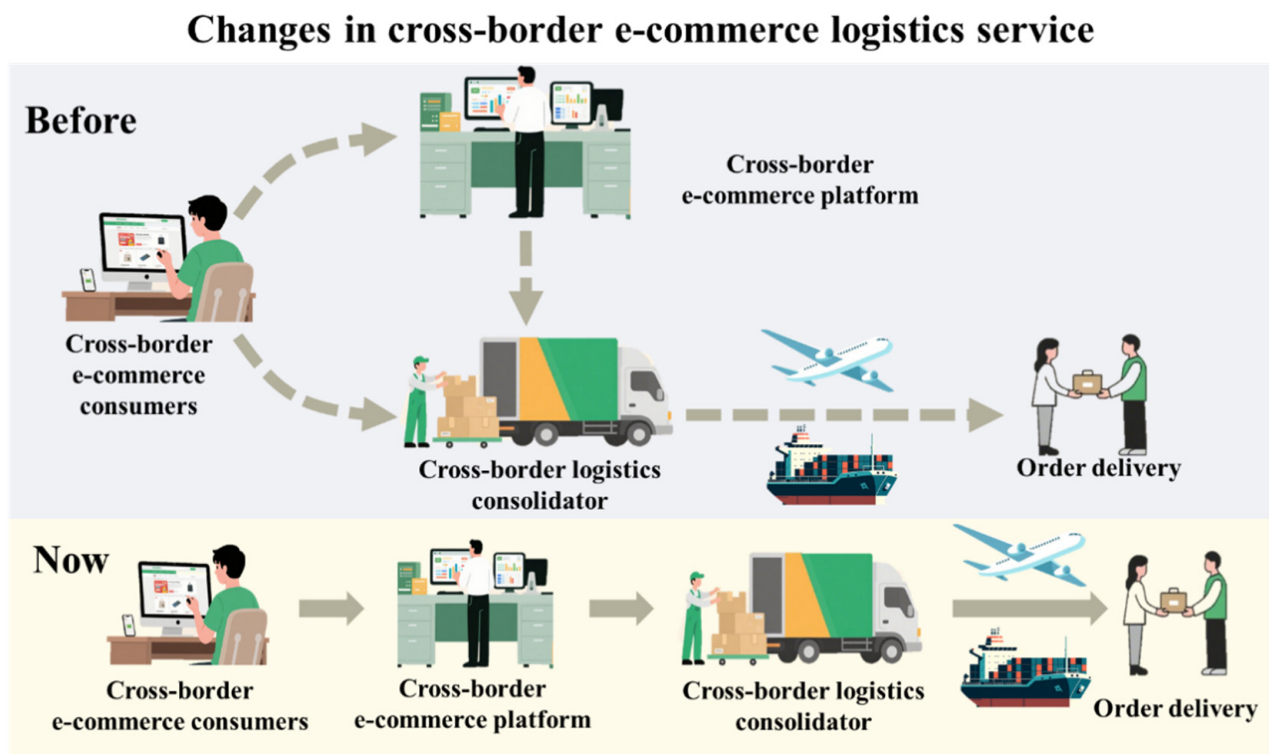


Figure 1. Changes in China's cross-border e-commerce logistics.

Finally, Research on how to efficiently increase cross-border e-commerce's operational efficiency and boost customers' desire to stick around is still lacking, nevertheless. Initially, studies on international e-commerce platforms have mostly concentrated on financial performance [19,20], paying little attention to important aspects of the customer experience, including platform usability. Business procedures were frequently difficult in the early days of cross-border e-commerce [21]. Specifically, foreign consumers frequently had to get in touch with third-party forwarding providers to finish the final delivery after completing orders [22]. Despite the ongoing growth of the cross-border e-commerce category, this shopping model has brought to new light difficulties, especially regarding the logistics service process. Platforms face potential losses in profits, a decrease in market share, more responsibility issues in logistics, and trust problems due to complicated processes, privacy breaches, and risks with data transactions because users independently reach out to forwarding providers. These elements make cross-border e-commerce logistics and user experience management more complex and unclear, which makes it difficult for customers to want to use the platform again [17,18].

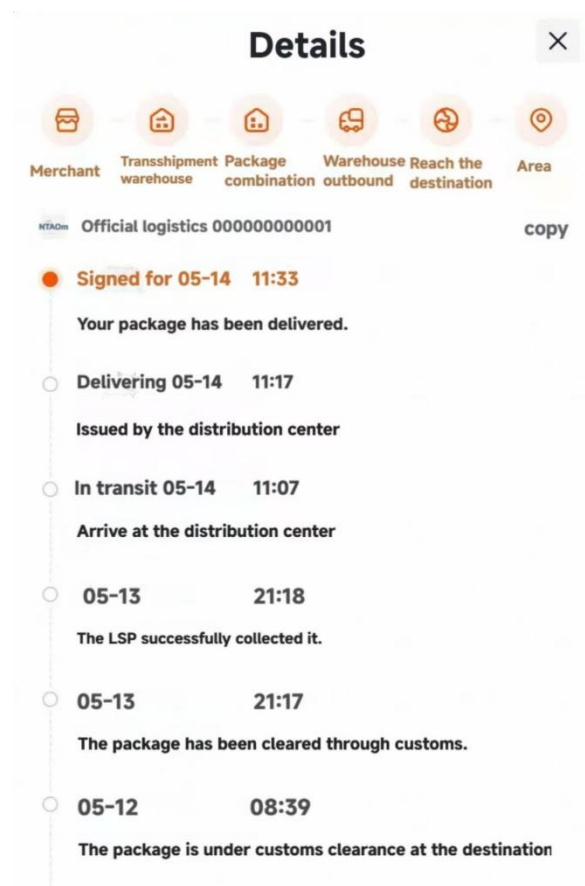


Figure 2. Digital logistics tracking interface for consumers on cross-border e-commerce platforms.

Therefore, we propose the following research questions:

RQ1: Does the business process reengineering of logistics services on cross-border e-commerce platforms affect consumers' willingness to reuse?

RQ2: How does the business process reengineering of logistics services on cross-border e-commerce platforms affect consumers' willingness to reuse?

To address the aforementioned research questions and address the lack of research on consumer continuance purchase intention in the cross-border e-commerce sector, this study constructs a research model within the framework of social exchange theory (SET), while also incorporating resource dependence theory (RDT) as a supporting perspective. According to [23], RDT highlights that organizations are not entirely independent and are instead immersed in a dynamic and complex external environment. They depend on other partners for essential resources, including knowledge, technology, finance, and legitimacy. As a result, although business process reengineering (BPR) can increase internal efficiency and flexibility through process optimization and restructuring, the quality and availability of external resources play a major role in how well BPR is implemented in the digitalization of logistics services (DOIS). In particular, BPR by itself does not always result in an improvement in digital services; other dependencies severely limit its efficacy. Therefore, this study also performs a moderating impact analysis to determine the parameters in which BPR maximizes its effectiveness in the setting of cross-border e-commerce platforms.

According to resource dependence theory, organizations need to rely on other parties to get essential resources because they are not self-sufficient [23]. Therefore, this study argues that to achieve effective multi-party business process reengineering (BPR), companies must aggressively encourage supply chain integration to accomplish successful multi-party business process reengineering (BPR). This will guarantee steady access to external

resources and lessen the unpredictability brought on by dependence. This study identifies supply chain integration (SCI) as the primary moderating variable. SCI coordinates the information and resource flows across organizations and departments, thereby optimizing the operational efficiency of the entire supply chain. During BPR implementation, SCI plays a particularly critical role by facilitating smoother and more efficient cross-organizational collaboration. SCI encourages the responsiveness and adaptability of different supply chain nodes, in addition to minimising information silos [24].

However, existing research has rarely systematically explored the boundary conditions between cross-border e-commerce business process reengineering and digital logistics services, particularly the moderating role of supply chain integration (SCI) in this process [25]. Social exchange theory argues that the stability of inter-organizational relationships and the effectiveness of cooperation depend on reciprocity and fairness [26], and transparent information sharing is a crucial prerequisite for maintaining this reciprocity. In other words, SCI can only truly optimize cross-organizational collaboration and resource allocation when supply chain members can fully exchange information and resources. Specifically, in an environment where cross-border and customs barriers complicate the relationship between the four parties, the coordination role of SCI may be significantly weakened due to information asymmetry or when supply chain nodes restrict the flow of resources due to competitive considerations, and may even lead to distrust and opportunistic behavior in the cooperative relationship [27]. Therefore, information sharing has become a key path to eliminate communication barriers caused by information asymmetry and improve the adaptability and response speed of each link node. According to resource dependence theory, environmental uncertainty stems from an organization's reliance on external partners for critical information [28]. When faced with a highly uncertain environment, SCI promotes business process reengineering with the help of information sharing. By building a real-time and transparent information flow, supply chain partners can collaborate and make decisions more efficiently, this will effectively promote business process restructuring while reducing environmental uncertainty and further accelerate the digital transformation of overall logistics services [29,30].

Thus, we operationalise information sharing as a secondary moderator. To investigate the combined moderating impacts of supply chain integration and information sharing, we create a three-way interaction model.

2. Literature Review

2.1. Social Exchange Theory

This study examines how BPR influences platform continuance intention through the digitisation of logistics services, using SET as a guide. According to [31], SET constitutes one of the most significant theoretical frameworks in all areas of social psychology, sociology, and management. This theory was initially created to explain how people interact with one another in social situations [32,33]. It emphasises the interactional relationship between people or organisations based on return expectations and rests on the logic of resource exchange and reciprocity rules [26]. Unlike traditional economic exchange theories, SET not only focuses on tangible assets but also emphasizes intangible values such as trust, commitment, and information sharing [34]. These exchange behaviors often occur in organizational environments characterized by resource scarcity and conflicting interests [35].

SET has been frequently employed in organisational relationship management to explain how connections among supply chain participants are formed, developed, and maintained [36]. According to [31], the main ideas behind it are: (1) one party does something good (or bad) to another party; (2) the second party responds in a similar way; and (3) these back-and-forth actions build a strong (or weak) relationship over time between

the two parties. This study, which is based on SET, views the BPR that platform companies promote as a type of positive exchange behaviour that helps forwarding suppliers maximise their operational efficiency by offering cutting-edge digital technology and system assistance. Suppliers respond by offering top-notch logistics services, which helps to create a high-quality bilateral relationship mediated by the digitisation of logistics services [37].

This idea is applicable to the study's context. Platform companies encourage information exchange and cooperative integration with forwarding providers by rethinking their initial business operations using digital technology [38]. First, information sharing fosters resource coordination and process collaboration at the organisational level, which improves the supply chain's overall operational efficiency. It also reflects the ongoing communication and trust-building process between the platform and suppliers [11,39,40]. Customers can benefit from more dependable and convenient service experiences as platforms attain greater visibility and transparency in order processing, feedback tracking, and distribution management as logistics service digitisation advances [15].

Second, consumers' perceived value of the service further strengthens their satisfaction and trust in the platform, thereby increasing their willingness to reuse [41,42]. This platform-led positive action (i.e., BPR) triggers favorable responses from both suppliers and consumers, ultimately fostering the development of high-quality relationships consistent with the core logic of SET: reciprocity, feedback, and relationship deepening. Specifically, first, BPR creates higher perceived value for consumers and suppliers through process optimization and logistics service innovation, thereby signaling the platform's mutual benefit. Second, SCI reduces transaction friction and opportunistic risks among partners by coordinating cross-organizational resource and information flows, thereby enhancing mutual expectations. Finally, information sharing, based on transparent and symmetrical cross-border logistics digital flow data, continuously deepens the sense of trust and security between partners. The three interact to build a dynamic cooperative mechanism centered on the logic of social exchange. This process not only promotes the digitization of logistics services but also effectively enhances consumers' positive evaluation and feedback on service quality, thereby establishing a virtuous interactive relationship between businesses and consumers based on digital value [43]. For example, Amazon's cross-border e-commerce business has achieved real-time data sharing across borders through continuous business process reengineering (BPR) and digital supply chain integration (SCI) across its global e-commerce and logistics systems. With transparent logistics information flows, Amazon not only improves warehousing and delivery efficiency but also enhances consumer trust and satisfaction through traceable order information.

However, despite SET's wide applicability in supply chain research, its explanatory power in DOIS, especially within platform-dominated supply chains, remains underexplored. Therefore, identifying how DOIS affects platform continuance intention through relationship mechanisms under the SET framework has important theoretical and practical significance. In addition, examining the key factors that strengthen or weaken the link between BPR and platform performance can offer valuable insights for enterprises developing more effective digital strategies.

2.2. Resource Dependence Theory

According to resource dependence theory, organizations must trade essential resources with outside parties because they are immersed in complex settings and cannot function entirely on their own. In addition to capital, knowledge, technology, and raw commodities, these resources also comprise multifaceted components like legitimacy and human resources [23]. Because such resources are often controlled by external institutions, organizations form structural dependencies, which are the source of environmental uncertainty [28].

It can be seen that the main responsibility of an organization is to control and reduce this external uncertainty to ensure its survival and development [44].

According to the resource dependence theory, a company's internal initiatives will frequently fall short of their anticipated efficacy if they are not supported by outside sources [45]. In particular, the main goal of business process reengineering (BPR) in an organization is to increase flexibility and efficiency through process restructuring. It will be challenging to overcome the limitations caused by reliance on outside resources; nevertheless, this reform is solely implemented in the enterprise's closed operation [46]. The impact of the BPR process's conversion into digital logistics services (DOIS) will be significantly minimized, particularly in the context of cross-border e-commerce and logistics, if it ignores essential resources like consumer transaction and behavior data, the operational capabilities of logistics service providers, or external support of pertinent digital technologies [47]. In actuality, the organization's ability to effectively manage external dependencies limits the transition path from BPR to DOIS, which never happens organically.

Therefore, RDT provides a key theoretical perspective for this study: the dynamic tension between internal transformation (BPR) and external dependence. For BPR to truly promote the digitalization of logistics services, it must rely on the effective integration of external resources and the mitigation of uncertainty. This perspective directly leads to the subsequent regulatory mechanism—how supply chain integration and information sharing can serve as strategic means to help companies gain the initiative in resource dependency relationships, thereby amplifying the transformational effect of BPR on DOIS.

2.3. Hypothesis Development

RDT highlights that businesses need to rely on important resources in the external environment and cannot be entirely self-sufficient [23]. The technology, data, and system resources needed for logistics digitization on cross-border e-commerce platforms are frequently provided by outside partners. Uncertainty and pressure to negotiate can result from this reliance. By reorganizing core operations like order processing, warehouse management, and transport tracking, platforms can improve internal operational efficiency and create an “absorptive capacity” for external technology and data resources [48]. BPR is a strategic internal response for platforms to address their reliance on external resources. Platforms can more successfully incorporate external resources obtained through supply chain integration (SCI) and convert them into transparent, traceable, and superior digital logistics services (DOIS) thanks to this capacity.

In Figure 3, the research model is shown. In 1990, Hammer originally put up the idea of BPR. Its main goal is to restructure an organisation's current processes to significantly increase service effectiveness and cost efficiency [49]. By removing departmental barriers, integrating workflows, and increasing employee decision-making authority, BPR prioritises process-based holistic analysis and creates a flexible organisation structure focused on customer needs [50,51]. The integration of BPR with digital technology has gained broad acceptance due to the quick development of Industry 4.0 and information technology [52]. Ferraris underlined that information technology plays a critical role in the execution of BPR. Process-level IT skills, for instance, aid in enhancing process performance [53]. Digital technology accelerates the process's value reconstruction in addition to serving as a tool for process reengineering. For instance, cloud platforms and big data facilitate the methodical integration and optimisation of business processes, artificial intelligence (AI) enhances the effectiveness of routing and scheduling, and the Internet of Things (IoT) permits real-time perception of logistics nodes [15,29].

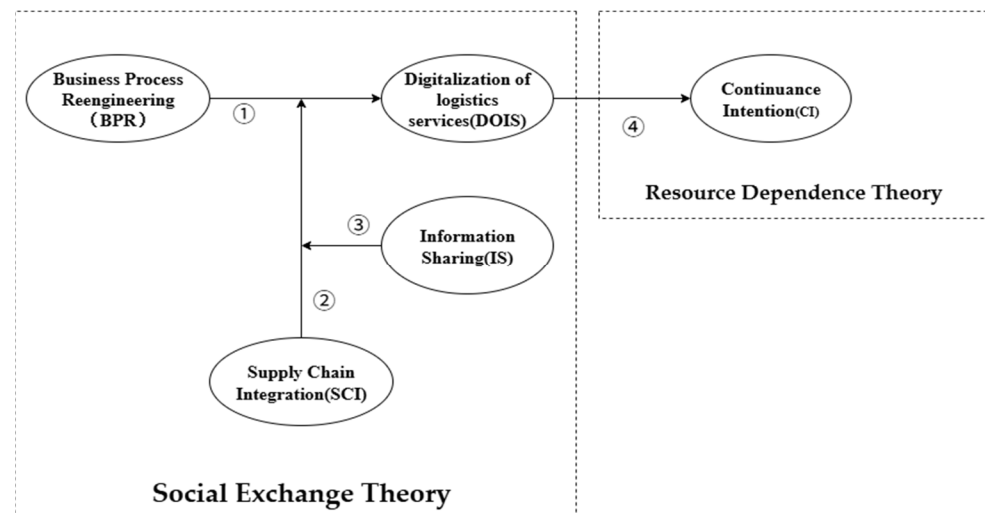


Figure 3. Research Model.

Over the past ten years, the logistics service industry's competitive dynamics have changed due to the rapid growth of technological innovation, which has also encouraged the digital transformation of existing logistics service organisations [15,54]. Blockchain, big data, and cloud computing are instances of digital technologies that can foster innovation [55], enabling logistics firms to become more responsive and efficient [29]. Achieving real-time, complete transparency from suppliers to customers; tiny batches; different product variations; networked processes; and decentralised, autonomous management are the primary promises of the digitalisation of logistics services. Only by utilising the full supply chain can these advantages be realised [56].

On Chinese cross-border e-commerce platforms, logistics is not only a critical link in completing transactions but also directly determines the final product's market price and consumers' willingness to pay [57]. Research [58] shows that the complexity of cross-border logistics (such as transportation distance, customs clearance procedures, and warehousing connections) often significantly increases transaction costs. For example, a survey shows that logistics and customs fees for cross-border e-commerce products entering the Chinese market can account for 20–30% of the final retail price [17]. Furthermore, lengthy customs clearance and shipping cycles are widely considered a major barrier to consumer experience. According to reports from iResearch and Nielsen, Chinese consumers generally accept an average cross-border e-commerce delivery time of 7–10 days. However, in reality, some cross-border orders experience fulfillment times exceeding 15 days, significantly reducing consumer satisfaction and willingness to repurchase [59].

Furthermore, the digitalization of logistics services not only creates value at the operational level but is also deeply embedded in consumers' purchasing and post-purchase processes, particularly in terms of delivery time and logistics costs. First, from the perspective of operational efficiency, according to iResearch Consulting, Chinese cross-border e-commerce companies can improve order processing efficiency by over 30% by applying big data and intelligent scheduling systems, significantly shortening the time from order placement to delivery. Second, in terms of stakeholder relationships, the application of blockchain and cloud platforms can enhance transparency in cross-border logistics processes, allowing consumers to track their packages in real time and fostering trust in the platforms. Research shows that over 70% of Chinese cross-border e-commerce consumers consider transparent and traceable logistics information an important factor in their repurchase [15,60].

From a customer experience perspective, logistics services have become a crucial component of consumer perceived value. JD.com International and Tmall Global, for example, have successfully reduced cross-border delivery times from an average of 15 days to under 7 days by establishing overseas warehouses. This improvement has directly boosted customer satisfaction and repeat purchase rates [61]. In terms of business model innovation, the digitization of cross-border logistics has also promoted the “forward warehouse + last-mile delivery” model, enabling 48 h delivery for some high-frequency consumer goods, further narrowing the experience gap between cross-border and domestic e-commerce.

In terms of strategic differentiation and competitive advantage, logistics services are increasingly viewed by consumers as a core component of the post-purchase experience. Research shows that over 60% of Chinese consumers are willing to pay a premium for faster delivery [62], while over half of consumers will lose trust in a platform if they encounter delivery delays [63]. This means that the digitalization of logistics services not only helps platforms save costs (it is estimated that automated sorting can reduce warehousing operating costs by approximately 20%) but also directly impacts user retention and market competitiveness.

To integrate business and engineering processes and achieve flexible, efficient, green, environmentally friendly, and low-cost production operations, Industry 4.0's essential concept is to leverage emerging information technologies to enable the Internet of Things and services [64]. As a result, logistics should embrace a more comprehensive approach and fulfil Industry 4.0's demands by utilising appropriate technologies and enhancing supply chain partners' vertical and horizontal integration [56,65]. Thus, reengineering the entire supply chain business process is necessary for the digitisation of logistics services [56].

Resource dependence theory (RDT) states that an organization's growth is contingent upon its capacity to obtain and incorporate essential external resources [23]. By offering physical facilities and services like transportation and warehousing, logistics transit service providers assist cross-border e-commerce platforms in expanding their cross-border logistics coverage and surpassing the constraints of their initial operational scope. But this dependence on outside resources also puts more pressure on the platforms' ability to integrate and adjust their processes. In this situation, business process reengineering, or BPR, is crucial. In addition to optimizing the platform's internal operational efficiency, BPR makes it possible for it to efficiently absorb and use the external resources offered by transit service providers by radically reorganizing core processes like order processing, inventory management, and shipment tracking [66].

According to resource dependency theory (RDT), external institutions frequently control important resources, creating structural dependencies inside the business that contribute to environmental uncertainty [28]. Consequently, the implementation of digital logistics services (DOIS) is made possible by BPR. According to [67], the digitalization of logistics services is evident not only in the intelligence and traceability of processes but also in the strong vertical and horizontal integration and excellent cooperative relationships fostered by supply chain partner interactions [68]. According to earlier research, the extensive use of digital technology can greatly increase supply chain management's efficacy and efficiency and offer a more practical means of exchanging information across organizations [69]. Thus, as a strategic internal innovation tool, BPR not only helps the platform reduce the uncertainty caused by reliance on external logistics, but it also turns that reliance into a motivating factor for advancing DOIS, which reflects the fundamental value of resource acquisition and utilization that RDT emphasizes in digital transformation. The following theory is put out in light of the discussion above:

H1: *Business process reengineering is positively correlated with logistics service digitalization.*

Cross-border e-commerce platforms depend more and more on effective cooperation with logistics service providers in the face of economic globalisation and escalating competition to satisfy rapidly changing customer demands. Based on resource dependence theory (RDT), organizations must obtain and utilize key resources through external cooperation to alleviate the uncertainty brought about by environmental dependence [23]. Therefore, in the context of cross-border e-commerce platforms, according to [24,70], SCI is generally regarded as a crucial mechanism for improving collaboration efficiency between platforms and logistics service providers. It is a prerequisite for information sharing and process collaboration. Three aspects of SCI are typically covered: supplier, customer, and internal integration [71,72]. Internal integration makes it easier for the platform's internal operations to coordinate responses and exchange information [73]. Through real-time consumer communication, customer integration generates market insights and predictions [74], ultimately allowing businesses to more effectively and efficiently respond to client wants [75]. To provide structural support for the digitalisation of logistics services, supplier integration entails close relationships between cross-border e-commerce platforms and logistics service providers in areas like data sharing, order forecasting, and inventory management [76], to reduce the uncertainty of external dependence and improve resource utilization efficiency. As a unified mechanism for horizontal and vertical integration, SCI strengthens the internal process optimization and digital absorption capabilities built by BPR by enhancing cross-organizational resource acquisition and allocation capabilities, thereby significantly improving the effectiveness of BPR's transformation into digital logistics services (DOIS).

Only by overcoming internal procedures and upstream and downstream data hurdles can the digitalisation skills of logistics service providers be effectively boosted on cross-border e-commerce platforms. Logistics service providers, for instance, can use platform data to optimise their business processes, enhancing transportation visualisation, distribution flexibility, and cost control capabilities. A platform offers real-time feedback on orders, payments, and customer preferences and integrates deeply with their warehousing and route planning systems [77]. In particular, efficient supply chain integration maximises the synergistic benefits of process reconstruction by strengthening the link between BPR and logistics service digitisation [78,79].

Modern cross-border e-commerce platforms increasingly rely on a complex supply chain network—consisting of logistics service providers, technology platforms, and upstream and downstream merchants—to ensure timely and efficient delivery of goods and services [77]. Under constant pressure to control costs and ensure service quality, cross-organizational collaboration, mutual trust, and resource sharing have become central to achieving high-performance delivery. This aligns with SET's principles of reciprocity and continuous relationship building. For instance, when a platform provides a stable order flow, shares user data, and offers technical interfaces, logistics service providers often reciprocate by improving service responsiveness and resource allocation, thereby achieving two-way value creation [31].

However, the strategic value of supply chain integration is often overlooked across different national or organizational cultures. For example, [80] found that, despite extensive supply chain management practices in Japanese manufacturing companies, SCI had not been fully recognized as a key intermediary mechanism for improving performance. Recent studies have further suggested that a high level of integration between companies not only improves information transparency but also enhances supply chain resilience and adaptability through real-time coordination and early risk warning mechanisms [81].

Effective BPR, however, frequently requires strong digital support for logistical operations in the partnership between cross-border e-commerce platforms and logistics service providers. This collaborative relationship essentially reflects the external dependence and

cooperative acquisition logic emphasized by the resource dependence theory (RDT) [23]. Through coordination, system synergy, and general partner participation, supply chain integration (SCI), a dual horizontal and vertical integration mechanism, can reduce the unpredictability of this dependency. In particular, SCI facilitates the conversion of BPR accomplishments into superior, transparent, and traceable digital logistics services (DOIS) by speeding up and improving the efficiency of cross-organizational resource integration as well as the platform's coupling between external resource acquisition and internal process adaptation [82]. Based on the above discussion, we propose the following hypothesis:

H2: *Supply chain integration positively moderates the relationship between BPR and digitalization of logistics service.*

2.3.1. Three-Way Interaction Effect of Information Sharing

In the context of highly competitive global trade, a major challenge for cross-border e-commerce platforms is effectively managing partnerships with logistics service providers across a geographically dispersed but highly coordinated supply chain. To improve overall operational efficiency, companies must actively leverage the synergies enabled by supply chain integration and information sharing to enhance their responsiveness to dynamic market environments and increase consumers' willingness to reuse platforms [70]. As the cross-border logistics environment becomes increasingly complex and uncertain, sharing timely, relevant, and reliable across firms significantly improves the system's ability to detect environmental changes, reducing ambiguity and risk exposure [77].

In line with existing research, high-quality information exchange is crucial for advances in supply chain coordination, product and service quality, cost control, and competitive advantage [65]. For the purpose of improving supply chain procedures, stimulating cooperative operations, and boosting organisational performance, information management and data sharing have thus emerged as critical components [83–85]. High-level information sharing, in particular, occurs between cross-border e-commerce platforms and logistics service providers. This interaction not only helps platforms promptly identify external needs and modify internal procedures, but it also establishes the groundwork for cooperative communication between SCI and BPR [36]. further contended from the standpoint of SET that sharing supplier information is fundamentally a resource exchange behaviour founded on reciprocity and trust [86,87]. A reliable information-sharing mechanism between logistics service providers and cross-border e-commerce platforms enhances the strategic synergy of supply chain integration. This makes it easier to convert process reengineering into digital logistics services.

Based on resource dependence theory (RDT), an organization's main responsibility is to manage and lessen outside uncertainty to secure its continued existence and growth [80]. Platforms for cross-border e-commerce invariably depend on the infrastructure and data support offered by outside forwarding service providers as logistics become more digitalized. By giving priority to the exchange of customer resources and transaction logistics data, information sharing—a crucial tool for reducing this dependency risk—allows platforms to engage with forwarding service providers in an efficient manner. On the other hand, forwarding service providers give input on their logistical data and service capabilities in response to platform requirements. Strategic supply chain relationships are strengthened by ongoing information sharing among various stakeholders, which also improves cross-organizational transparency and collaborative efficiency. Such collaborations aid in preserving long-term collaborative stability and generating greater value for customers and other partners, as noted by [7]. Based on the above theoretical evidence and empirical examples, we propose the following hypothesis:

H3: *The higher the degree of information sharing, the stronger the positive moderating effect of supply chain integration on the relationship between business process reengineering and digitalization of logistics service.*

2.3.2. The Impact of Logistics Service Digitization on Platform Continuance Intention

Existing logistics service providers (LSPs) have been compelled to digitise as a result of the rapid growth of digital technology, which has drastically altered the competitive landscape of the logistics service industry [15]. To differentiate logistical value, digitalisation is essential [29]. Logistics services use advanced digital technologies to quickly adapt, process information, and analyse all their operations, like distribution, warehousing, and information services. Platforms are able to provide clients with a convenient purchasing experience by enabling vertical integration from suppliers to customers through these “one-click” processes. Customers who profit from the digitisation of logistics services are probably going to use the platform once more. This process creates a very enduring working relationship.

The concepts and reasoning for SET are in line with this sequence of interactive behaviours and reciprocal willingness. Digital technologies are strategically significant for generating value and operational results in the supply chain (SC), according to academic research [88–91]. For example, according to [3], building logistics networks with digital technologies enhances resilience and responsiveness, enabling companies to improve their competitiveness and provide more efficient and transparent service delivery [3,92]. Moreover, companies can lower the costs, boost profit margins, and run more sustainably by employing sophisticated computations and obtaining large-scale logistical data through analytical technologies like big data [93], hyperconnectivity, and supercomputing [56]. Accordingly, we propose the following hypothesis:

H4: *Digitalization of Logistics service is positively correlated with platform continuance intention.*

3. Methodology

3.1. Sample

We created a questionnaire to gather information from a sample of Chinese cross-border e-commerce businesses to test our theories. The following factors make China an appropriate empirical setting. First, China is the world’s largest cross-border e-commerce market. Its online cross-border e-commerce sales have reached €566 billion, surpassing the United States and ranking first globally [94,95]. Cross-border e-commerce in China has grown steadily since 2008. The number of transactions increased from 0.7 trillion yuan in 2008 to 10.5 trillion yuan in 2019, representing an average yearly growth rate of about 20%. This trend reflects China’s strong development potential and its leading position in cross-border e-commerce.

Second, as a representative of developing countries, China holds a leading position in the digitalization of cross-border e-commerce logistics among its peers. Companies such as SF Express and China Post have established a relatively comprehensive digital logistics service system, providing a strong empirical basis for examining how business process reengineering promotes the digitalization of logistics services and further affects the willingness to reuse platforms. This also offers a valuable point of comparison with other emerging economies with weak logistics digitalization infrastructures. Third, the Chinese government has prioritized the development of the digital economy and logistics system, introducing a series of policies such as “Internet+” and the “Digital Silk Road” to promote the digital transformation of e-commerce and logistics services, thereby creating a favorable institutional environment. This policy background not only accelerates the

adoption of information technology and the reengineering of enterprise service processes but also provides a favorable empirical context for studying the relationship between business process reengineering and digitalization.

Finally, studying the willingness of cross-border e-commerce consumers to reuse Chinese cross-border e-commerce platforms will help identify consumer behavior patterns in developing economies under digital logistics environments and provide both theoretical and practical insights for other emerging markets. Therefore, using China as the empirical context is not only representative of reality but also offers strong external validity for broader applications.

3.2. Measurement Items and Bias Testing

All latent variables in this study are measured in accordance with the existing literature and adjusted to a moderate extent, ensuring conceptual fit and empirical applicability within the study's context. *BPR* refers to the fundamental redesign and cross-departmental integration of key business processes supported by information technology, aiming to achieve comprehensive improvement in process efficiency and corporate performance. To assess *BPR*, we follow the measurement scales proposed by [96,97]. A representative measurement item is: "Our company has fundamentally redesigned its core business processes with the support of information technology."

SCI refers to the high degree of coordination and collaboration in information, processes, and resources between enterprises and their upstream and downstream partners at both the strategic and operational levels, aiming to improve overall supply chain efficiency and responsiveness. This study adopts the scale developed by [97] for *SCI* measurement. A representative measurement item is: "Our company maintains a good and stable cooperative relationship with cross-border suppliers." Information sharing (*IS*) refers to the extent to which key operational data, such as logistics, inventory, and orders, are shared between an enterprise and its supply chain partners, emphasizing the timeliness, accuracy, and systematic support of information. This study uses the scale developed by [98] for *IS* measurement. A representative measurement item is: "Our supply chain partners share accurate and timely logistics inventory information with us."

Digitalization of logistics services (*DOIS*) refers to the use of modern information technologies, including the Internet of Things and digital platforms, by enterprises to improve the responsiveness, real-time visualization, collaborative efficiency, and service integrity of logistics processes. To measure this variable, this study uses the scale developed by [99,100]. A representative measurement item is: "We use Internet of Things technology in the logistics process to achieve real-time monitoring." Continuance Intention (*CI*) refers to the enterprise's evaluation of whether customers will continue to use the platform for purchases based on their transaction behavior, feedback, and usage records, reflecting the customer's loyalty and stickiness on the platform. Its measurement is based on [101,102] and adapted to reflect the enterprise perspective of online shopping platforms. A representative measurement item is: "Our customers often place repeated orders through this platform." See Table 1 for detailed item content.

Table 1. Scale development.

	Measurement Item	Source
Business Process Reengineering (BPR)	Strongly disagree (1)/ Strongly agree (7)	
	BPR1. My company has redesigned key logistics processes related to consumer interactions by deploying information technology.	
	BPR2. We restructured our consumer-facing logistics business processes to improve process flexibility and consumer responsiveness.	• [96]
	BPR3. My company undertook an organization-wide and cross-functional redesign of processes related to consumer logistics.	• [97]
	BPR4. After restructuring the logistics process for consumers, my company has improved the overall management decision-making response speed.	
	BPR5. Our company sees the reengineering of consumer logistics processes as a key strategic initiative.	
Digitalization of logistics services(DOIS)	Strongly disagree (1)/ Strongly agree (7)	
	DOIS1. Our logistics services utilize digital technologies to respond rapidly to cross-border e-commerce demands.	
	DOIS2. Technologies, such as Internet of Things (IoT) applications, enhance real-time monitoring of logistics operations.	
	DOIS3. Customers can access updated order status at any time through our digital logistics platform.	• [99]
	DOIS4. Our digital logistics systems support automatic tracking and timely delivery.	• [100]
	DOIS5. The platform improves coordination and communication efficiency with supply chain partners.	
	DOIS6. We provide end-to-end logistics services through digital platforms to meet diverse customer needs.	
	DOIS7. Our company continuously invests in logistics digitalization to enhance service innovation.	

Table 1. Cont.

	Measurement Item	Source
Supply Chain Integration (SCI)	Strongly disagree (1)/ Strongly agree (7)	
	SCI1. My company has established a stable cooperative relationship with multinational logistics service providers to achieve the integration and optimization of cross-border logistics processes.	
	SCI2. My company maintains efficient communication with the cross-border logistics service provider at all organizational levels.	
	SCI3. My company's platform supply chain team and logistics service providers have achieved effective collaboration in key operational links.	• [97]
	SCI4. Strategic cooperation with cross-border logistics suppliers has enhanced our company's ability to implement the cross-border e-commerce platform strategy.	
	SCI5. Our company aligns operational goals with long-term cross-border logistics partners to achieve supply chain synergy and integration.	
Information Sharing (IS)	Strongly disagree (1)/ Strongly agree (7)	
	IS1. Our supply chain partners share accurate and complete logistics information with us.	
	IS2. Our company has established systems to enable seamless exchange of supply chain data.	• [98]
	IS3. The information shared by my supply chain members is timely and complete.	
	IS4. The information shared by my supply chain members with us is sufficient and reliable.	
Continuance Intention (CI)	Strongly disagree (1)/ Strongly agree (7)	
	CI1. Our customers frequently return to use our platform for shopping.	
	CI2. Many customers repeatedly place orders through our platform.	• [101]
	CI3. Our platform has a high rate of returning customers.	• [102]
	CI4. Most of our active users continue to make purchases on our platform over time.	

An overview of the sample profile is reported in Table 2. The questionnaire collection period is from 1 May 2024 to 1 February 2025. A total of 209 valid questionnaires were collected. Although SEM analysis generally recommends a large sample size to ensure the

robustness of model estimation, according to the standards of [103], for structural equation models, the sample size should be at least 5–10 times the number of observed variables. The 209 valid enterprise-level samples ultimately obtained in this study not only met this basic standard but also possessed high research value. Unlike typical consumer survey samples, enterprise-level data refers to data collection using the enterprise as the unit of analysis. This is more challenging to obtain, provides more comprehensive information, and can more directly reflect the management characteristics of cross-border e-commerce platforms in their actual operations and partnerships. Therefore, the data size of this study not only met the minimum methodological requirements, but also maintained its quality and representativeness consistent with previous literature using similar research designs, providing a solid foundation for SEM estimation and inference. To ensure sample quality, this study conducted several bias tests—including common method bias, non-response bias, discriminant validity, multicollinearity, and marker variable analysis—since the data were obtained through questionnaire surveys. First, to test the common method bias (CMB), the Harman single-factor test was used. The results show that the unrotated first factor only accounts for 28.7% of the total variance, well below the 50% threshold, indicating that common method bias was not a significant concern.

Table 2. Sample profile.

Items	Category	Frequency	Percentage
Firm size (FS)	1–10	98	46.9%
	11–50	75	35.9%
	51–200	30	14.4%
	>200	6	2.9%
Total sales (TS) (USD)	<\$100,000	56	26.8%
	\$100,000–\$500,000	65	31.1%
	\$500,000–\$1 Million	42	20.1%
	\$1 Million–\$5 Million	32	15.3%
	\$5 Million–\$10 Million	9	4.3%
	>\$10 Million	5	2.4%
Firm age (FA) (years)	<1	32	15.3%
	1–3	87	41.6%
	3–5	55	26.3%
	>5	35	16.7%
Main industry (MI)	Consumer electronics	52	24.9%
	Fashion clothing	45	21.5%
	Home life	38	18.2%
	Sports and outdoor	16	7.7%
	Beauty	19	9.1%
	Mother and baby pets	39	18.7%
R&D investment (RDI) ratio/(annual revenue)	<1%	89	42.6%
	1–3%	67	32.1%
	3–5%	32	15.3%
	5–10%	15	7.2%
	>10%	6	2.9%

* N = 209.

Second, to evaluate non-response bias, we conducted independent sample *t*-tests on key variables, such as enterprise size and age, between the early samples and the late respondents. The results show that the differences between the two groups of samples on each variable are not statistically significant (*p*-values > 0.1), indicating that non-response bias was not a significant concern. Third, we used the Heterotrait-Monotrait Ratio (HTMT)

to assess discriminant validity between latent variables. The results show that the HTMT values between all constructs are below the conservative threshold of 0.85, with the highest value being 0.71, confirming that the latent variables had good discriminant validity.

Fourth, to further control for method bias, this study adopted the marker variable approach by introducing a theoretically unrelated control variable (respondents' environmental awareness). The results show that the correlation coefficients between this variable and the main research variables were all below 0.10 and statistically insignificant, suggesting minimal method bias. Finally, we used the variance inflation factor (VIF) to test potential multicollinearity problems. All VIF values were below 3.3, with a maximum of 1.14, indicating no serious collinearity issues in the model. In summary, all bias tests indicate that the study data were reliable and valid, with low risk of bias and robust research conclusions.

4. Results

4.1. Confirmatory Factor Analysis

To verify the measurement reliability and validity of each latent variable, this study used confirmatory factor analysis (CFA) to evaluate the measurement model (Table 3). The model fit index results showed that CMIN = 444.812, df = 265, CMIN/df = 1.679, CFI = 0.959, TLI = 0.954, RMSEA = 0.057, SRMR = 0.038, with all indicators meeting the recommended standards [104], confirming good overall model fit. The standardized factor loading (λ) of each measurement item on its corresponding latent variable ranged from 0.714 to 0.937, all of which exceeded the recognized threshold of 0.70 [105], supporting the reliability of the indicators.

Table 3. Confirmatory factor analysis results.

Construct	Item	Mean	SD	λ	alpha	AVE	CR
BPR	BPR1	5.019	1.411	0.828	0.939	0.756	0.887
	BPR2	5.215	1.372	0.902			
	BPR3	5.144	1.454	0.878			
	BPR4	5.005	1.382	0.849			
	BPR5	5.081	1.447	0.888			
DOIS	DOIS1	5.163	1.391	0.823	0.947	0.717	0.947
	DOIS2	5.019	1.441	0.866			
	DOIS3	4.947	1.458	0.784			
	DOIS4	5.072	1.359	0.831			
	DOIS5	5.129	1.393	0.864			
	DOIS6	5.124	1.353	0.894			
	DOIS7	5.134	1.352	0.862			
SCI	SCI1	4.746	1.534	0.882	0.953	0.804	0.894
	SCI2	4.656	1.534	0.886			
	SCI3	4.598	1.494	0.903			
	SCI4	4.766	1.684	0.875			
	SCI5	4.689	1.627	0.937			
IS	IS1	5.187	1.240	0.817	0.899	0.695	0.901
	IS2	5.206	1.394	0.810			
	IS3	5.172	1.282	0.793			
	IS4	5.335	1.331	0.910			

Table 3. Cont.

Construct	Item	Mean	SD	λ	alpha	AVE	CR
CI	CI1	3.416	1.276	0.797	0.862	0.616	0.865
	CI2	3.574	1.396	0.827			
	CI3	3.440	1.104	0.796			
	CI4	3.416	1.186	0.714			

Note: CMIN = 444.812, df = 265, CMIN/df = 1.679, CFI = 0.959, TLI = 0.954, RMSEA = 0.057, SRMR = 0.038.

4.1.1. Reliability

Cronbach α coefficients for all latent variables exceeded 0.86, and the composite reliability (CR) also exceeded 0.86, ranging from 0.862 to 0.953. Similarly, composite reliability (CR) ranged from 0.865 to 0.947, surpassing the recommended threshold of 0.70 [106], which indicates high internal consistency for each scale (Table 4).

Table 4. Discriminant validity analysis results.

	BPR	DOIS	SCI	IS	CI	FA	FS	RDI	TS
BPR	0.869								
DOIS	0.199 ***	0.847							
SCI	0.214 ***	0.400 ***	0.897						
IS	0.177 **	0.462 ***	0.234 ***	0.834					
CI	0.323 ***	0.315 ***	0.325 ***	0.285 ***	0.784				
FA	−0.013	−0.193 ***	−0.184 ***	−0.020	−0.030	-			
FS	−0.009	0.007	−0.033	0.011	0.046	0.164 **	-		
RDI	−0.008	0.300 ***	0.292 ***	0.155 **	0.216 ***	−0.138 **	−0.105	-	
TS	0.046	0.154 **	0.078	0.130 *	0.044	−0.008	0.227 ***	0.090	-

Note: The diagonal values (in bold) represent the square root of the Average Variance Extracted (AVE). Off-diagonal values indicate the correlations among constructs. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels.

4.1.2. Convergent Validity

For convergent validity, the average variance extracted (AVE) of all latent variables exceeded the standard of 0.50, ranging from 0.616 to 0.804, indicating that the measurement items effectively explain their corresponding latent structures (Table 4).

4.1.3. Discriminant Validity

In addition, Discriminant validity was supported, as the square root of each construct's AVE exceeded its correlations with other constructs, meeting the criteria proposed by [106] and confirming that the constructs were well differentiated (Table 4).

4.2. Hypothesis Testing Results

The results of hypothesis testing in this study are as follows (Table 5). First, Model 1 serves as the baseline model, which only considers the impact of control variables on DOIS, namely firm age, firm size, R&D investment, and total sales. The results indicate that R&D investment ($\beta = 0.4073$, $p < 0.01$) and total sales ($\beta = 0.0912$, $p < 0.1$) have a positive impact on DOIS. Firm age ($\beta = -0.2659$, $p < 0.05$) has a negative impact, while firm size ($\beta = 0.0335$, $p > 0.1$) has no significant impact. Model 2 presents the test results for hypothesis 1. The results show that BPR has a significant positive impact on DOIS ($\beta = 0.2309$, $p < 0.01$). Therefore, Hypothesis 1 is supported.

Table 5. Hypothesis testing results.

	<i>Dependent Variable (DV) = DOIS</i>						<i>DV = CI</i>
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>	<i>Model 7</i>
<i>Firm age</i>	−0.2659 ** (0.1104)	−0.2071 ** (0.0973)	−0.1774 ** (0.0857)	−0.1816 ** (0.0853)	−0.1963 ** (0.0862)	−0.2149 *** (0.0818)	0.0350 (0.1017)
<i>Firm size</i>	0.0335 (0.0657)	0.0316 (0.0572)	0.0099 (0.0504)	0.0042 (0.0503)	0.0162 (0.0503)	0.0281 (0.0477)	−0.0238 (0.0597)
<i>R & D investment</i>	0.4073 *** (0.1002)	0.2289 ** (0.0908)	0.1694 ** (0.0803)	0.1530 * (0.0805)	0.1422 * (0.0799)	0.1616 ** (0.0758)	−0.1002 (0.0946)
<i>Total sales</i>	0.0912 * (0.0511)	0.0490 (0.0448)	0.0296 (0.0395)	0.0318 (0.0393)	0.0320 (0.0395)	0.0270 (0.0374)	0.0165 (0.0468)
<i>BPR</i>		0.2309 *** (0.0587)	0.4250 *** (0.0573)	0.4017 *** (0.0588)	0.4178 *** (0.0588)	0.4090 *** (0.0557)	
<i>SCI</i>		0.3106 *** (0.0495)	0.4509 *** (0.0471)	0.4336 *** (0.0481)	0.4340 *** (0.0480)	0.4183 *** (0.0456)	
<i>BPR × SCI</i>			0.2188 *** (0.0282)	0.2169 *** (0.0281)	0.2283 *** (0.0286)	0.2371 *** (0.0272)	
<i>IS</i>				0.0958 * (0.0575)	0.0270 (0.0751)	0.0907 (0.0724)	
<i>BPR × IS</i>					0.0148 (0.0308)	0.0929 *** (0.0333)	
<i>SCI × IS</i>					−0.0768 ** (0.0308)	0.0167 (0.0350)	
<i>BPR × SCI × IS</i>						0.0710 *** (0.0146)	
<i>DOIS</i>							0.1927 *** (0.0636)
<i>Constant</i>	4.6895 *** (0.3899)	2.3367 *** (0.4618)	0.7470 (0.4548)	0.4946 (0.4775)	0.8110 (0.5336)	0.5433 (0.5086)	2.5838 *** (0.4629)
<i>N</i>	209	209	209	209	209	209	209
<i>Adjusted R²</i>	0.1139	0.3287	0.4809	0.4854	0.4961	0.5475	0.0225

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Standard errors in parentheses.

To test the moderating role of *SCI* between *BPR* and *DOIS*, we include both *SCI* and its interaction term with *BPR* ($BPR \times SCI$) in Model 3. The results indicate that the interaction term is positive and significant ($\beta = 0.2188$, $p < 0.01$), supporting Hypothesis 2. Figure 2 illustrates the moderating effect. As shown in Figure 4, *SCI* has a significant positive moderating effect on the relationship between *BPR* and *DOIS*. When *SCI* is high, the positive impact of *BPR* on *DOIS* is stronger; when *SCI* is low, the effect is relatively weaker. Specifically, when *SCI* is high, *DOIS* increases more sharply with rising *BPR*, indicating that strong supply chain integration enhances a firm's ability to digitalize logistics services through business process reengineering. Conversely, when *SCI* is low, the marginal driving effect of *BPR* on *DOIS* is weaker, resulting in a slower growth rate. This interaction effect further illustrates that supply chain integration, as a cross-organizational collaboration mechanism, enhances the impact of internal process optimization on logistics digitalization, thereby supporting Hypothesis 2.

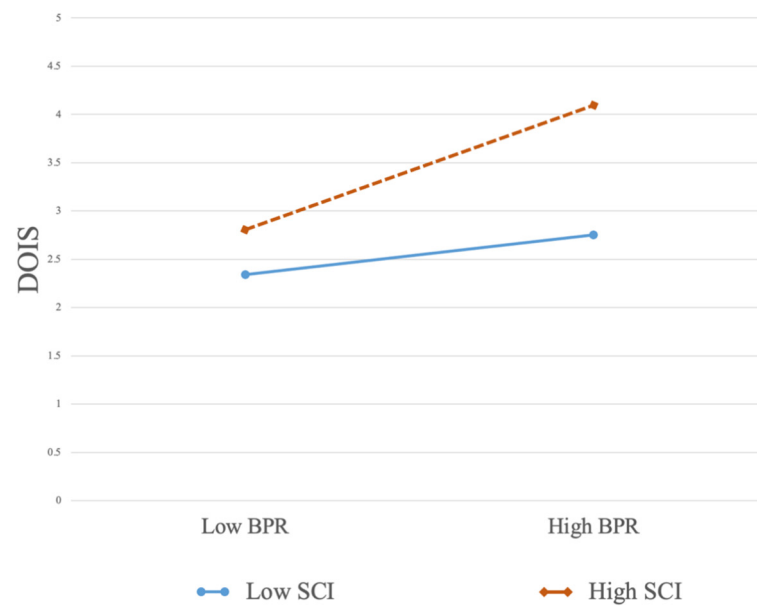


Figure 4. Moderating effects of SCI.

To test how IS affects the moderating effect of SCI, we introduced two interaction terms ($BPR \times IS$ and $SCI \times IS$) and a three-term interaction term ($BPR \times SCI \times IS$). The results indicate that the coefficient of the three-way interaction term is positive and significant ($\beta = 0.0710, p < 0.01$), providing empirical support for Hypothesis 3. This effect is illustrated in Figure 5. As shown in the figure, the three-way interaction term ($BPR \times SCI \times IS$) exhibits a significant moderating effect. Specifically, when both SCI and IS are high (yellow dotted line), the positive impact of BPR on DOIS is strongest, resulting in the greatest improvement in DOIS. In contrast, when SCI is high, but IS is low (green dotted line), BPR still positively affects DOIS, though the marginal effect is significantly weakened. When SCI is low (blue and brown solid lines), the positive impact of BPR on DOIS is limited, regardless of the IS level, and the rate of change is relatively modest. Finally, we tested the effect of DOIS on CI in Model 7. The results confirm a positive and significant relationship between the two ($\beta = 0.1927, p < 0.01$), supporting Hypothesis 4.

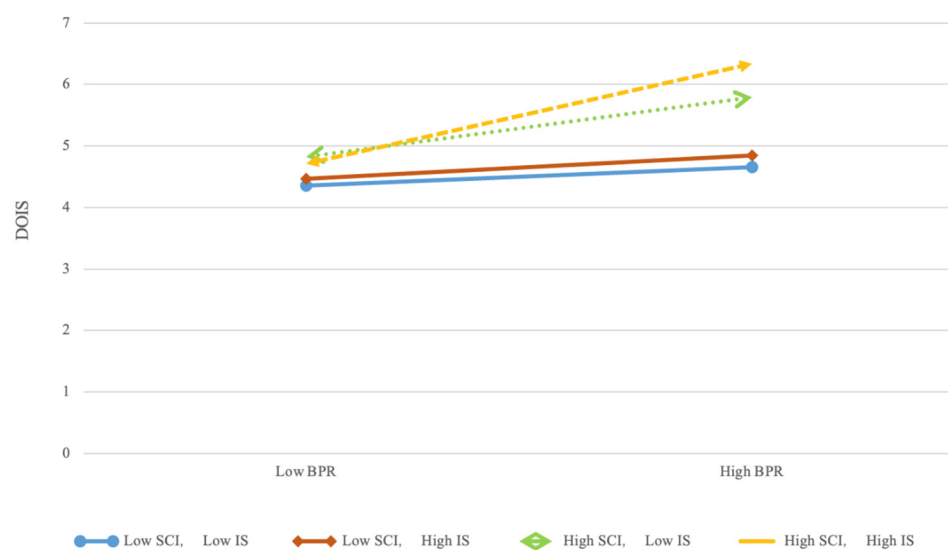


Figure 5. The three interactive moderating effects of IS.

5. Discussion

This study is based on SET as the main theory and Resource Dependence Theory (RDT) as the supporting theory how consumers' propensity to continue using a cross-border e-commerce platform is affected by the logistics BPR of those platforms. We ran a questionnaire survey aimed at Chinese enterprises involved in cross-border e-commerce to evaluate the concept empirically. We used SEM and confirmatory factor analysis to analyse the data. Our results indicate that logistics business process reengineering (BPR) on cross-border e-commerce platforms can effectively promote the digital transformation of customer-facing logistics services, thereby increasing users' continued use of the platforms ($\beta = 0.2309, p < 0.01$), supporting Hypothesis H1. Furthermore, the study found that the collaborative efficiency between e-commerce platforms and cross-border logistics service providers significantly enhances the relationship between logistics BPR and the DOIS index ($\beta = 0.2188, p < 0.01$), providing strong support for Hypothesis H2. Furthermore, the three-way interaction between BPR and information sharing (IS) was positive and significant ($\beta = 0.0710, p < 0.01$), confirming Hypothesis H3. Finally, the application of IS was significantly positively correlated with the level of collaboration ($\beta = 0.1927, p < 0.01$), supporting Hypothesis H4. Overall, these results suggest that the moderating effects of BPR and information sharing are crucial in promoting the digitalization of logistics services and user loyalty on cross-border e-commerce platforms.

5.1. Theoretical Contribution

First, Existing literature has largely focused on external factors of cross-border e-commerce, such as environmental and legal institutions, emphasizing that consumers' perceptions of supplier trustworthiness may vary depending on the legal framework of their country/region, the level of national integrity, and the supplier's own website policies and reputation [107]. Scholars have also extensively explored how consumers' behavioral patterns, cognitive and affective states, approach and avoidance behaviors [30,108], and product attributes (such as product perception and price) influence cross-border e-commerce platform selection [5]. However, these studies largely focus on macro-institutional or consumer decision-making in cross-border e-commerce platform selection, overlooking the role of internal supply chain logistics in the cross-border e-commerce context. In particular, the critical role of digital logistics services in fostering user trust, enhancing the transaction experience, and further strengthening platform reuse intention remains underdeveloped. This is based on the core concept of social exchange theory (SET), namely that interdependence promotes the establishment of high-quality relationships [26]. This study further reveals how digital logistics services can promote the long-term stability of the relationship between cross-border e-commerce platforms and users through interactive and reciprocal mechanisms. The results imply that the influence is interactive and reciprocal rather than one-way or isolated. Interconnected systems and cooperative structures provide the digital logistics services that cross-border e-commerce platforms offer to customers. In order to offer end-to-end logistics visibility, digitalisation makes it easier for cross-border e-commerce businesses to connect vertically with end users and horizontally with cross-border logistics service providers and other ecosystem partners [56]. Customers' sustained usage of these easy-to-use and open logistics services encourages enduring relationships with the platform. The SET's explanatory power is extended to the setting of digitally integrated cross-border logistics by this recurrent cycle of digital service delivery and customer reuse.

Second, this study shows that intelligent, networked digital technologies, bolstered by reengineered logistics business processes and both vertical and horizontal integration with cross-border logistics service providers and consumers, enable the digitisation of logistics services offered by cross-border e-commerce platforms. This process confirms

the view of resource dependence theory, which states that enterprises cannot operate completely independently due to their complex and dynamic environment and must reduce uncertainty by exchanging key resources with external organizations [109]. Business process reengineering has been the subject of much research in the fields of education, construction, ports, and internal and public administration in recent years. Very little research has focused on BPR in relation to cross-border transshipment logistics run by e-commerce platforms. By examining how Chinese cross-border e-commerce platforms reorganise their logistics procedures to improve transshipment efficiency and customer experience through digital logistics innovations, this study broadens our understanding of BPR.

Third, our model shows that SCI and IS, as moderator variables, jointly define the boundary conditions of how BPR affects DOIS. Most existing studies focus on the organizational perspective; however, recent research emphasizes the need to examine digital transformation outcomes from the supply chain perspective [110]. Therefore, we use the supply chain integration between cross-border logistics service providers and cross-border e-commerce platforms as the main moderating variable. Although causal inferences regarding cross-organizational logistics integration are often complex, our findings demonstrate that this form of SCI plays a positive and significant moderating role in the model. Achieving effective logistics integration also requires the establishment of information-sharing mechanisms between e-commerce platforms and consumers to ensure the consistent and reliable flow of information across the service chain. Thus, we regard platform–consumer information sharing (IS) as a secondary moderator. Therefore, we treat IS as a secondary moderator. Overall, within the context of logistics business process reengineering, consumer-facing information sharing not only facilitates the development of collaborative mechanisms between platforms and consumers but also broadens the research scope of BPR and provides technical and relational support for enhancing digital logistics services.

Finally, our findings support the proposed hypotheses and align with previous research. For example, the positive impact of third-party logistics service providers on consumer behavioral intentions aligns with findings in the European e-commerce context [4]. However, by focusing on Chinese cross-border e-commerce platforms, We found that the complexity of international logistics is even more pronounced, primarily reflected in the significant impact of government regulations, customs policies, and legal systems on cross-border waiting times and logistics costs for consumers. The complexity of international logistics amplifies the critical role of business process reengineering (BPR) and supply chain integration (SCI) in achieving digital transformation. Furthermore, differences in the institutional environment, regulatory enforcement, and market conditions of cross-border logistics services in “Western” countries may lead to inconsistent performance of the intermediary role of digital logistics services in different countries. Compared with the study that only partially supports the mediating role of digital logistics in the US market, our results demonstrate a more pronounced impact of digital logistics in the Chinese context. In China, the regulatory system for cross-border e-commerce includes import and export regulations, customs clearance and tax policies, etc. [111]. For example, China Customs has implemented a “single window” system for cross-border e-commerce, allowing traders to submit standardized information and documents through a single portal to meet all regulatory requirements related to import, export and transit, thereby simplifying and optimizing cross-border trade processes and reducing costs and delays. Therefore, this study constructs a tripartite interaction model through SET, which provides an important contribution to the theoretical understanding of platform economy. According to resource dependency theory, organizations’ vulnerability to environmental uncertainty stems from

the structural dependence that results from important resources being frequently controlled by outside institutions [28]. One of the main features of the digital platform economy in the context of cross-border e-commerce is the unequal distribution of resources among platforms, customers, and logistical service providers, as well as the ensuing systemic power disparity. According to RDT this theoretical viewpoint, businesses' main responsibility is to manage and reduce external uncertainty through strategic planning to secure their ongoing existence and growth [44]. Incorporating RDT insights, this study suggests three ways that cross-border e-commerce platforms can accomplish this goal: first, reorganizing logistics operations systems to achieve process intelligence and standardization through business process reengineering (BPR) to lessen passive reliance on external uncertainty; second, combining the resources of e-commerce platforms and cross-border logistics service providers to generate complementary resource synergies and improve the system's overall operational capabilities; and third, encouraging information sharing between the platform and customers to lessen information asymmetry and improve transaction transparency and trust. By using the aforementioned route, the platform may preserve its operational stability and competitive edge in an unpredictable climate while also reducing the risks associated with external dependence. Building mutual trust and exchanging value between e-commerce platforms, customers, and logistics service providers—based on the SET principles—creates new ways to solve relationship and operational problems in the platform-driven cross-border logistics system.

5.2. Practical Implication

The research's conclusions present beneficial ideas for how international e-commerce platforms might encourage users to stick with them. Cross-border e-commerce platforms need to acknowledge that the digital logistics services they offer have a direct impact on their customers' decision to keep using the platform, highlighting the crucial role that these services play. In particular, to improve the logistics experience for customers, cross-border e-commerce platforms should optimise logistics service processes like order processing, warehousing management, and cross-border delivery by implementing digital logistics technologies like automation technology, AI path planning, and cross-border tracking systems. The study also affirms that supply chain integration can improve this relationship through data sharing and cooperation with international logistics service providers. In order to integrate retailers and logistics service providers and use intelligent technologies to produce a dynamic match between supply capacity and customer demand, cross-border e-commerce platforms should be at the forefront. This integrated digital infrastructure will improve the platform's elasticity and scalability in addition to improving consumers' intention to continue using it. The moderating effect of supply chain integration becomes even stronger with information sharing (e.g., real-time synchronisation of logistics status for customers). To improve communication and trust between customers and platforms, cross-border e-commerce platforms should create highly interactive information-sharing features, including feedback channels, personalised delivery preference settings, and satisfaction return visits.

Second, the existing logistics and supply chain networks have grown increasingly complicated and demanding as a result of economic globalisation and offshore manufacturing trends [112]. Through the logistics business process reorganisation (BPR) of cross-border e-commerce platforms (such as system docking and resource collaboration), cross-border logistics service providers link platforms and consumers. They can also track logistics errors and responsibilities at the local and global levels, supporting integrated end-to-end logistics services. The critical importance of logistics service providers in international supply chains can be highlighted by this skill, which may greatly improve the effectiveness of digital

logistics services. To prevail in the intricate world of international trade, logistics service providers need to build dynamic collaboration capabilities with platforms by integrating technologies like blockchain tracking and intelligent customs declaration. The regulatory function of information sharing also demonstrates that to increase customer satisfaction with the platform, logistics service providers must provide end-to-end visualisation and open data interfaces. Logistics service providers should specifically move from traditional outsourcing roles to strategic partners within the platform ecosystem and encourage the adoption of technical and management measures like performance coordination with the platform, data infrastructure sharing, and distribution plan synchronisation. This project offers online retailers an original viewpoint on management for cross-border supply chain cooperation.

Finally, in response to RQ1, “Does business process reengineering of logistics services on cross-border e-commerce platforms affect consumers’ willingness to reuse services?”. This study confirms the beneficial effects of digital logistics services (such as smart returns and real-time tracking) on intentions to continue using them, giving online retailers an initial basis upon which to choose cross-border e-commerce platforms. To lessen the uncertainty of cross-border transactions, online retailers should give priority to collaborating with platforms that have strong digital logistics capabilities. Regarding RQ2: How does business process reengineering of logistics services on cross-border e-commerce platforms affect consumers’ willingness to reuse? The study also highlights how consumer-platform information sharing, including input on logistics concerns and preference data, can improve supply chain response times and indirectly boost online retailers’ sales growth. To achieve effective and convenient cross-border service delivery, online retailers should integrate their fulfilment, inventory, and return processes with the platform logistics business process restructuring. Retailers may simultaneously enhance customer experiences and order visibility and delivery predictability by integrating data with platform solutions. The existing logistics and supply chain networks have grown increasingly complicated and demanding as a result of economic globalisation and offshore manufacturing trends [38]. Through the logistics business process reorganisation (BPR) of cross-border e-commerce platforms (such as system docking and resource collaboration), cross-border logistics service providers link platforms and consumers. They can also track logistics errors and responsibilities at the local and global levels, supporting integrated end-to-end logistics services. The critical importance of logistics service providers in international supply chains can be highlighted by this skill, which may greatly improve the effectiveness of digital logistics services. To prevail in the intricate world of international trade, logistics service providers need to build dynamic collaboration capabilities with platforms by integrating technologies like blockchain tracking and intelligent customs declaration. The regulatory function of information sharing also demonstrates that to increase customer satisfaction with the platform, logistics service providers must provide end-to-end visualisation and open data interfaces. Logistics service providers should specifically move from traditional outsourcing roles to strategic partners within the platform ecosystem and encourage the adoption of technical and management measures like performance coordination with the platform, data infrastructure sharing, and distribution plan synchronisation. This project offers online retailers an original viewpoint on management for cross-border supply chain cooperation. This project offers online retailers an original viewpoint on management for cross-border supply chain cooperation.

6. Conclusions

This study investigates cross-border transshipment logistics within the context of e-commerce platforms and develops a structural equation model grounded in the core

premise of SET—that reciprocal dependence fosters high-quality relationships through mutual interactions. The findings reveal a positive relationship between the digitalization of logistics services provided by cross-border e-commerce platforms and consumers' intention to continue using the platform [113]. Furthermore, the study demonstrates that such logistics service digitalization is enabled by intelligent and interconnected digital technologies, supported by the logistics business process reengineering of the platform and both vertical integration with consumers and horizontal integration with cross-border logistics service providers. Finally, this study, informed by resource dependence theory (RDT), reveals the key role played by moderators—supply chain integration and information sharing—in the impact of logistics business process reengineering (BPR) on the digitalization of consumer-oriented logistics services. The results demonstrate that these two mechanisms not only mitigate the uncertainty associated with external resource dependence but also jointly define the boundary conditions under which BPR influences DOIS.

There are a number of limitations to this study that open up new research directions. First, a well-known Chinese e-commerce platform was chosen as the case for this investigation; however, it is not the only company offering such services [81]. Future research should compare data across multiple platforms to expand the sample size. Second, this study focuses on the transshipment service from Chinese e-commerce platforms to South Korea without comparing it to other countries or regions. Future studies should compare the performance of similar services across different countries or regions to broaden the scope of analysis. Third, this study adopts a platform thinking approach as its starting point, focusing on e-commerce platforms, transshipment service providers, and consumers. Platform suppliers should be included in the analysis of future studies to give a more thorough grasp of the whole industrial chain.

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Institutional Review Board Statement: This study involved an anonymous questionnaire survey on general consumer behavioral intentions. According to the South Korean Ministry of Education's "Guidelines on Ethics Management for National Research and Development Projects" 2022, (Article 8, Paragraph 4, Subparagraph 5), research involving anonymous questionnaires conducted without direct contact with participants, where anonymity is guaranteed and risks are minimized, is eligible for exemption from Institutional Review Board (IRB) review. Our study strictly adhered to these conditions: No direct contact: Data was collected solely through an anonymous online/paper questionnaire. Anonymity Guaranteed: No personally identifiable information (PII) such as name, ID number, or specific contact details was collected. Responses could not be linked back to individuals. Minimal Risk: The questionnaire focused solely on non-sensitive topics related to general consumer behavior and intentions (e.g., shopping habits). It did not inquire about sensitive personal information (health, finances, political views, illegal activities) or pose any foreseeable physical, psychological, social, or legal risks to participants. Therefore, formal IRB approval was not required for this study. Participants were informed about the anonymous nature of the survey and provided implied consent by voluntarily completing and submitting the questionnaire.

Informed Consent Statement: All subjects gave written informed consent in accordance with the "Declaration of Helsinki." Respondents were assured of confidentiality and anonymity. All participation is voluntary.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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