

**EXTENDING THE VALUE-BASED ADOPTION
MODEL ON USAGE INTENTION FOR CROSS-
BORDER E-COMMERCE PAYMENTS IN CHINA**

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2025

**EXTENDING THE VALUE-BASED ADOPTION
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BORDER E-COMMERCE PAYMENTS IN CHINA**

by

FU JIAOLONG

**Thesis submitted in fulfilment of the requirements
for the degree of
Doctor of Philosophy**

September 2025

ACKNOWLEDGEMENT

First and foremost, I would like to express my deepest gratitude to my main supervisor, Dr. Nor Hasliza Binti Md Saad, for her exceptional guidance, unwavering support, and insightful advice throughout the course of this research. Her expertise, patience, and encouragement have been instrumental in the successful completion of this thesis. Dr. Nor Hasliza's dedication to my academic and personal growth has been truly inspiring, and I am profoundly grateful for her mentorship. I am also deeply indebted to my co-supervisor, Associate Professor Dr. Zulnaidi Bin Yaacob, for his invaluable contributions and continuous support. His critical insights, thoughtful feedback, and rigorous academic standards have greatly enhanced the quality of my work. Dr. Zulnaidi's encouragement and belief in my abilities have been a constant source of motivation. I would like to extend my sincere thanks to the faculty and staff of the School of USM in Malaysia. Their assistance and the resources they provided have been crucial to the advancement of my research. The supportive and stimulating academic environment at USM has played a significant role in my educational journey. Additionally, I am grateful to my colleagues and friends at USM, whose camaraderie and shared experiences have made this journey enjoyable and enriching. Their support and encouragement have been invaluable, both academically and personally. Finally, I owe a profound debt of gratitude to my family. Their unwavering love, understanding, and sacrifices have been the cornerstone of my journey. Without their support, this achievement would not have been possible.

Thank you all for being part of this incredible journey.

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LIST OF ABBREVIATIONS

B2B	Business to Business
B2C	Business to Customer
B2B2C	Business to Business to Customer
B2M	Business to Manager
BCG	The Boston Consulting Group
CBEC	Cross-border E-commerce
CNY	Chinese Yuan
C2C	Customer to Customer
C2B	Customer to Business
C2M	Customer to Manufacturer
CIPS	Cross-border Interbank Payment System
M2C	Manufacturers to Consumer
PLS-SEM	Partial Least Squares-Structural Equation Modeling
SEM	Structural Equation Modeling
SMEs	Small and Medium Enterprises
SWIFT	Society for Worldwide Interbank Financial Telecomm
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
USD	US Dollar (USD)
UTAUT	Unified Theory of Acceptance and Use of Technology
VAM	Value-based Adoption Model
ICT	Information and Communications Technology

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Appendix A	SAMPLE OF QUESTIONNAIRE
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**PENAMBAHAN MODEL PENERIMAAN BERASASKAN NILAI TERHADAP
NIAT PENGGUNAAN BAGI PEMBAYARAN E-DAGANG MERENTAS
SEMPADAN DI CHINA**

ABSTRAK

Pembayaran e-dagang rentas sempadan (CBEC) memainkan peranan penting dalam memudahkan perdagangan antarabangsa dan aliran modal, berfungsi sebagai mekanisme pembayaran digital antara negara atau wilayah. Walaupun pertumbuhan pesat CBEC sebagai bentuk E-dagang yang baru muncul, perkembangannya masih dikekang oleh cabaran yang wujud. Terutamanya, sistem pembayaran rentas sempadan ketinggalan di belakang infrastruktur pembayaran domestik yang sangat maju, bergelut untuk memenuhi permintaan pengguna global yang semakin meningkat. Untuk menangani jurang ini, kajian ini menyiasat niat penggunaan pengguna terhadap pembayaran CBEC dengan menggunakan Model Penerapan Berasaskan Nilai (VAM). Penyelidikan mengkaji bagaimana nilai yang dilihat—dibentuk oleh risiko yang dirasakan, faedah yang dirasakan dan pengorbanan yang dirasakan—mempengaruhi keputusan penggunaan pengguna. Berdasarkan literatur terdahulu, persepsi risiko diuraikan lagi kepada lima dimensi utama: risiko prestasi, risiko kewangan, risiko masa, risiko psikologi dan risiko keselamatan maklumat. Melalui analisis structural equation modelling (SEM) terhadap 434 respons tinjauan menggunakan Smart PLS 4.3, penyelidikan ini mengenal pasti risiko prestasi ($\beta=0.28$, $p<0.01$), risiko kewangan ($\beta=0.31$, $p<0.01$), risiko masa ($\beta=0.19$, $p<0.05$), dan risiko keselamatan maklumat ($p<0.03$) dan risiko keselamatan maklumat ($p<0.03$). persepsi risiko pembayaran. Penemuan ini bertujuan untuk mengenal pasti faktor kritikal yang mempengaruhi

persepsi risiko pengguna dalam pembayaran CBEC, menawarkan pandangan untuk meningkatkan penggunaan sistem pembayaran dan kepuasan pengguna.

EXTENDING THE VALUE-BASED ADOPTION MODEL ON USAGE INTENTION FOR CROSS-BORDER E-COMMERCE PAYMENTS IN CHINA

ABSTRACT

Cross-border e-commerce (CBEC) payment plays a pivotal role in facilitating international trade and capital flows, serving as the digital payment mechanism between countries or regions. Despite the rapid growth of CBEC as an emerging form of E-commerce, its development remains constrained by inherent challenges. Notably, cross-border payment systems lag behind highly advanced domestic payment infrastructures, struggling to meet the escalating demands of global users. To address this gap, this study investigates consumers' usage intention toward CBEC payments by applying the Value-Based Adoption Model (VAM). The research examines how perceived value—shaped by perceived risk, perceived benefit, and perceived sacrifice—influences users' adoption decisions. Drawing on prior literature, perceived risk is further decomposed into five key dimensions: performance risk, financial risk, time risk, psychological risk, and information security risk. Through structural equation modelling (SEM) analysis of 434 survey responses using Smart PLS 4.3, this research identifies performance risk ($\beta = 0.28$, $p < 0.01$), financial risk ($\beta = 0.31$, $p < 0.01$), time risk ($\beta = 0.19$, $p < 0.05$), and information security risk ($\beta = 0.33$, $p < 0.01$) as the core constituents of CBEC payment risk perception. The findings aim to identify critical factors affecting consumers' perceived risk in CBEC payments, offering insights to enhance payment system adoption and user satisfaction.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

This chapter establishes the research context by presenting the background and articulating the problem statement regarding perceived risks in cross-border E-commerce (CBEC) payments within the Chinese market. Building upon this foundation, the study's research questions and objectives are derived, framed within the context of the research's significance and scope. The chapter concludes by providing clear definitions of key terminology and outlining the organizational structure of subsequent sections.

1.1.1 The Global Cross-border E-commerce (CBEC)

E-commerce, in essence, refers to the utilization of the Internet to facilitate the purchase of goods and services, encompassing financial transactions and data exchange (Rosário & Raimundo, 2021). The widespread integration of digital technology, particularly the Internet and mobile technologies, has significantly reshaped the global business landscape by introducing the revolutionary concept of E-commerce and expanding cross-border E-commerce. This transformative E-commerce technology has supplanted traditional brick-and-mortar setups, retail stores, and conventional market structures, giving rise to new concepts such as virtual value chains, E-stores, global consumers, and heightened competition (Kumar & Kaur, 2021). E-commerce vendors leverage technological advancements like interactive 3D platforms, 360-degree imagery, and virtual reality to gain a competitive edge and maintain their position in the ever-evolving E-commerce market (Mansor et al., 2018).

Cross-border E-commerce (CBEC) refers to a digital business model in which the customers and business sellers are situated in different countries or regions.

(Hazarika & Mousavi, 2021). Cross-border E-commerce (CBEC) has emerged as a significant channel for facilitating international trade. (Li and Chan, 2016; Kim et al., 2017). It includes both export and import. Although CBEC and traditional E-commerce platforms share the commonality of conducting trading activities online, there exist several distinctions between the two (Y. H. Hsiao et al., 2017a). These disparities encompass areas such as logistics, customs regulations, cybersecurity, customer relationship management, and payment methods. Notably, the volume of CBEC transactions has witnessed a substantial surge in recent times. In 2021, the global E-tailing volume reached US\$4.9 trillion. It is expected to grow by more than 50% in the next four years (Statista). Projections suggest that the annual global revenues generated from CBEC are poised to reach an impressive range of 250 to 350 billion dollars by the year 2025 (Valarezo et al., 2018a). This upward trend can be attributed to the growing global appeal for cross-border purchases, driven by the allure of competitive prices and an extensive array of product offerings.

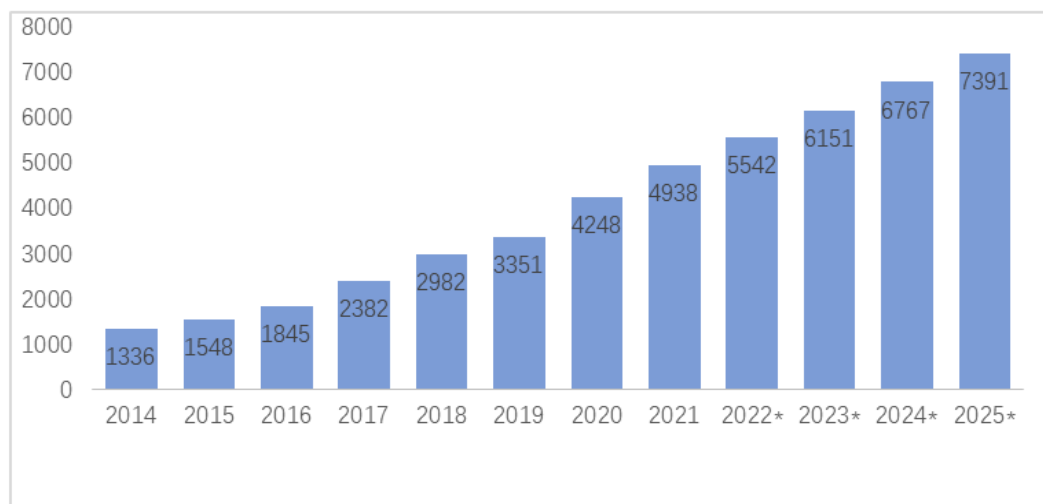


Figure 1.1 Retail E-commerce sales worldwide from 2014-2025 (Billion US dollars)

Source: Statistic 2022

In the future, it is foreseeable that CBEC will become a new engine of trade growth for countries and will play an important role in driving sustained economic growth (Y. Tu & Shangguan, 2018). The advent of the cross-border E-commerce era will deepen the international division of labor, change the transaction mode and reshape the trade pattern, which will also have a profound impact on promoting the intelligent transformation of manufacturing industries and other related industries across countries.

1.1.2 The Chinese Cross-border E-commerce (CBEC)

Nowhere is the rapid expansion of the E-commerce more apparent than in Asia. As discussed in *The World's Next E-commerce Superpower: Navigating China's Unique Online-Shopping Ecosystem* (BCG report, November 2011), China is leading the way, shedding its identity as solely a production center and emerging as a burgeoning consumer market, with an increasingly affluent and populous middle class eager to embrace online technologies and adopt the developed world's consumption styles. On a global scale, the Asia-Pacific region has witnessed the most significant growth in cross-border E-commerce. Notably, China leads the international E-commerce market in the Asia-Pacific region, with its market share soaring from 17% in 2011 to an impressive 83% in 2018 (Huo et al., 2017). The 2024 China Cross-border E-commerce Market Data Report by Net Sense shows that the market size of China's CBEC reached 17.6trillion yuan in the year of 2024, up 4.8% year-on-year from 16.8 trillion yuan in 2023. These statistics indicate that China currently holds a highly appealing market position, making it a compelling investment opportunity for companies worldwide.

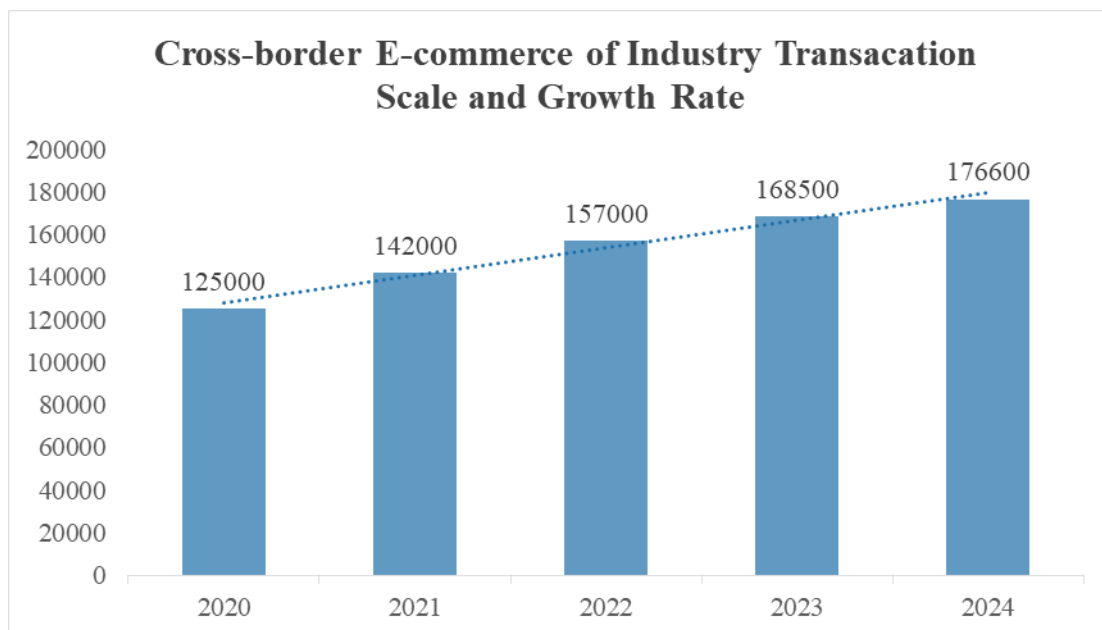


Figure 1.2 Cross-border E-commerce of Industry Transaction Scale and Growth Rate

Source: 100cn.com

The development of cross-border E-commerce in China is undeniably at the forefront globally, considering factors such as scale, market size, business operations, and the diversity of product categories. According to data from the "Electric Data" e-commerce database, cross-border E-commerce transactions in China accounted for 37.32% of the total import and export value of China's trade in goods, which totalled 42.07 trillion yuan in 2022. According to data from 100EC.cn (a leading Chinese e-commerce research platform), China's cross-border E-commerce GMV reached 17.65 trillion yuan in 2024, accounting for 40.27% of the country's total import-export trade volume (43.85 trillion yuan). The sector's penetration rate has shown consistent growth, with figures of 38.86% (2020), 36.32% (2021), 37.32% (2022), and 40.35% (2023) respectively. The penetration rate of the cross-border E-commerce industry has steadily increased, driven by the growth of the industry and the expansion of traditional foreign trade.

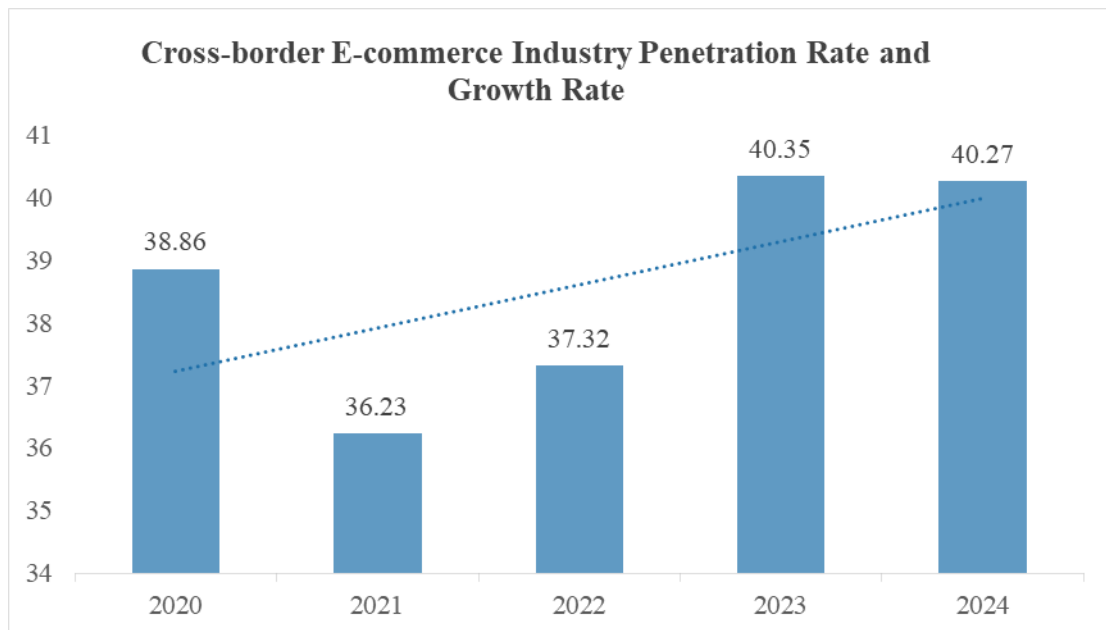


Figure 1.3 Cross-border E-commerce Industry Penetration Rate and Growth Rate

Source: 100cn.com

The evolution of complementary trade activities, including B2B (Business to Business, B2C (Business to Customer) , B2B2C (Business to Business to Customer), B2M (Business to Manager), C2B (Customer to Business), C2C (Customer to Customer), C2M (Customer to Manufacturer), M2C (Manufactures to Consumer), and others, has contributed to the creation of a dynamic and thriving market of CBEC (Ma et al., 2018a). The rapid growth of China's CBEC sector, fueled by supportive policies and improved platform infrastructure, has spawned influential global players like AliExpress, Amazon, and DH gate. These platforms are reshaping international trade norms while driving the development of a complete industry chain spanning marketing, payments, logistics, and financial services (See Figure 1.4).



Figure 1.4 Cross-border E-commerce Industry Chain

Source: adapt from (Y. Wang et al., 2018)

1.1.3 Cross-border E-commerce Payment

Cross-border E-commerce payment serves as a critical component in facilitating international trade and capital flows, functioning as the digital payment mechanism between countries or regions. Technically, it refers to the integrated process wherein platform sellers utilize communication, computer, and information security technologies to establish connections among merchants, consumers, and financial institutions. This process enables the complete cycle of currency payment, fund transfer, capital settlement, and transaction analytic (Q. Zhu et al., 2020). Its central point lies in the realization of cross-border transfer of funds, which mainly includes cross-border receipt and payment of funds as well as clearing and settlement of funds. For example, in cross-border E-commerce, due to the different currencies held by buyers and sellers, it is necessary to exchange funds between two countries or regions through certain settlement instruments and payment systems to finally complete the transaction. Figure 1.5 demonstrates a simple CBEC payment process.



Figure 1.5 CBEC Payment Process

Source: Summarized by the author

As cross-border E-commerce continues to evolve, the diversity of payment methods has expanded significantly. Notably, third-party payment systems have experienced rapid growth, leading to the emergence of new and innovative payment solutions. Currently, there are four mainstream cross-border E-commerce payment methods, namely, bank remittance, international remittance companies, international credit cards, and third-party payment platforms. Among these, international credit cards and third-party payment platforms are mostly used by B2C and C2C types of cross-border E-commerce, while bank remittances are mostly used by B2B types of cross-border E-commerce. There are some scholars have even examined blockchain technology as a breakthrough in CBEC payments (T. C. Chen et al., 2021a; Liao & Shao, 2021; Q. Zhu et al., 2020). An overview of the historical evolution of global cross-border payments indicates that CBEC payments sprang up with the continuous development of the international industrial division of labor and international interaction activities. Data show that the total amount of global cross-border payments reached USD 218 trillion in 2022 generating huge benefits.

China's cross-border payment sector, though developing later than global counterparts, has achieved exponential growth driven by three factors: traditional trade expansion (24.5% export growth in 2021), cross-border E-commerce emergence, and increased individual mobility. Official data shows 21 payment institutions and 12 banks processed 1.93 billion transactions in 2021, with CBEC volume reaching 1.98 trillion yuan (15% YoY growth), expanding to 8.07 trillion yuan by 2022. The market now shows declining service fees and a strategic shift toward value-added services.

Consumer adoption for CBEC payment follows three behavioral models: TAM (perceived usefulness/interface ease), UTAUT (performance/effort expectancy), and VAM (risk-benefit analysis). These explain third-party platform dominance through superior UX (TAM), network effects (UTAUT), and risk mitigation (VAM), with Alipay's escrow service exemplifying value creation against currency conversion risks.

1.2 Problem Statement

Specifically, cross-border E-commerce, which is as a new cross-border trade model, has become a new growth point for China's E-commerce market and a new "blue ocean" for the E-commerce industry, it should be noted that CBEC still comprises a comparatively low portion of China's total import and export trade volume (Q. Zhu et al., 2020). The rapidly developing CBEC payments are accompanied by new types of payment risks, which urgently require new theoretical and practical research.

Thus, the purpose of this research is to provide a comprehensive framework for the composition of payment risk in cross-border E-commerce in order to improve the research on the payment risk literature. It aims to examine the impact of payment risk on consumers' willingness to use payment tools by mediating perceived value on

the basis of consumer behavior theory. From there, a risk composition framework is constructed by analyzing different cross-border payment risk composition variables.

1) Problem Related to Cross-border E-commerce (CBEC) in China

China's CBEC market has witnessed rapid growth, yet this expansion is predominantly driven by export-oriented CBEC, with import-focused CBEC exhibiting distinct structural challenges. When purchasing foreign products via CBEC platforms, Chinese consumers rarely adopt conventional cross-border purchasing methods; instead, they favor third-party e-commerce platforms over independent foreign websites (Giuffrida et al., 2017). This preference aligns with the landscape of brand entry into China: six main types of foreign brands utilize CBEC platforms to target Chinese consumers, including overseas independent online stores, platform storefronts, self-operated hypermarkets, vertical specialty marketplaces, flash sale sites, and WeChat stores (Ballestar et al., 2021). However, regulatory barriers persist: while domestic B2C platforms require a Chinese entity for retail operations, cross-border platforms mandate foreign-domiciled corporate status, creating hurdles for overseas producers without a physical presence in China. For purely foreign websites, penetrating the Chinese market remains arduous due to the dominance of domestic e-commerce giants, making customer acquisition costlier than participating in existing platform ecosystems (M. Miao & Jayakar, 2016; Z. Wang et al., 2007). Compounding this, many Chinese consumers avoid direct cross-border risks by purchasing overseas products through centralized platforms (e.g., Tmall Global, JD Worldwide) that stock foreign goods in bonded warehouses, enabling domestic payment and logistics—meaning even “imported” purchases often bypass formal cross-border payment systems.

Beneath these market dynamics lies a critical bottleneck: CBEC payment systems, which lag behind mature domestic infrastructure despite the market's 10.56% year-on-year growth to 15.7 trillion yuan in 2022 (NetEase E-Commerce Research Center, 2023). As Zimmermann (2016) notes, CBEC drives global trade growth but faces unique barriers, with payment inefficiencies exacerbating broader challenges like linguistic gaps and regulatory inconsistencies (Turban et al., 2017). Early reports (e.g., 2017 World Cross-Border E-Commerce Report) highlighted fragmented interoperability, underdeveloped network technologies, and security gaps in cross-border payments (World Trade Organization [WTO], 2017), while the 2017 China Mobile Security Risk Report revealed that 93% of phishing websites and 34.8% of malicious programs targeted mobile payments, threatening user security (China Internet Network Information Center [CNNIC], 2017).

More recently, the Committee on Payments and Market Infrastructures (CPMI, 2023) identified deeper structural flaws: non-standardized payment data, overly complex compliance procedures, outdated infrastructure, lengthy transaction chains, high costs, and restrictive service provider thresholds. These issues degrade payment performance across speed, cost, coverage, and transparency (Bank for International Settlements [BIS], 2022; Wang & Li, 2021), while reinforcing consumer wariness of formal cross-border transactions. Consequently, even as Chinese consumers purchase overseas products, many rely on domestic payment and logistics within bonded warehouse models, bypassing genuine cross-border payment systems—a trend that constrains the healthy development of import CBEC and amplifies inefficiencies in global trade flows (Chen & Xie, 2023).

2) Problem related to Usage Intention of CBEC Payment

As a crucial component in the rapidly developing Cross-Border E-commerce, CBEC payments can be seen as a new technology. Enhancing users' willingness to adopt these payment methods and alleviating their concerns become crucial aspects that require attention. A number of scholars have examined the model of consumers' willingness to use of new technology from different perspectives. Singaporean scholars (Kim et al., 2007) have identified factors such as perceived usefulness, perceived cost, and perceived value as factors that affect consumers' willingness to use. Davis & Venkatesh, (1996) developed the TAM (technology adoption theory) aiming to foresee the behavioral intentions of an individual or a predisposition to behave in a particular way about the adoption and use of an information system. UTAUT model (Venkatesh et al., 2003) is widely regarded as the most significant theory to show individuals' behaviors toward and adoption of Fin-tech innovations (Kalinić et al., 2021). The Value-Added Model (VAM) proposed by Kim et al. (2007) posits that the original Technology Acceptance Model (TAM), developed by Davis, Bagozzi, and Warshaw (1989), has limitations in explaining the acceptance of new information and communication technologies (ICT). According to VAM, individuals adopting new ICT should not be viewed solely as technology users; rather, they should also be considered as "consumers" engaged in a value-driven decision-making process. The VAM model moreover examines the factors influencing usage intention as a dependent variable. As it is easy to observe, customers' behaviors of using new technologies or products are necessarily based on the premise of usage intention. There are also some literatures categorizing the usage intention. They focus on the continuous use intention of the buyers of which, i.e., the willingness to repeat the use.(Ginting et al., 2023),for example, searching the repurchase intention of E-commerce customers in Indonesia,finding that there was a positive and significant

effect of e-service quality on customer satisfaction, while Miao et al., (2022) stated that perceived value is positively effecting the repurchase intention.

Although Chinese CBEC companies are working tirelessly to enhance their transactions, their development still receives a series of constraints. From the perspective of consumers, for whom cross-border E-commerce payment is a new Internet technology, it is necessary to examine CBEC payment risk on buyers' usage intention from the perspective of consumers' acceptance., whether they are willing to use the payment tool or not. In turn, intention to use is an important factor for consumers to eventually adopt usage behavior. Thus, applying consumers' usage intention to the CBEC payment and exploring the factors that influence usage intention are also urgent elements to be addressed.

3) Problem related to Cross-border E-commerce (CBEC) Perceived Risk

While domestic E-commerce research has extensively explored consumer-perceived risks (Marriott & Williams, 2018; Tandon et al., 2018), cross-border E-commerce introduces unique risk dimensions that remain understudied. CBEC' s complexity—encompassing internet technology, international trade regulations, cross-border payments, logistics, customs clearance, and language barriers—amplifies buyers' perceived risks (Mou et al., 2020). Among these components, the payment process is critical, as it directly determines transaction completion and is fraught with distinct challenges.

CBEC payments differ significantly from their domestic and traditional international trade counterparts. While both domestic E-commerce and CBEC involve credit risks, CBEC payments are characterized by greater process complexity, lower security, delayed settlement times, and exposure to exchange rate fluctuations (Chen & Xie, 2023; Wang & Li, 2021). Conversely, compared to traditional international

trade payments, CBEC transactions prioritize real-time processing and security, yet remain vulnerable to currency volatility (CPMI, 2023). A 2020 survey by the China Internet Network Information Center (CNNIC) found that 62.4% of respondents cited distrust of CBEC platforms and fear of fraud as primary deterrents to engaging in cross-border transactions, underscoring how information asymmetry fuels perceived risk.

Perceived risk is a foundational construct in E-commerce research (Glover & Benbasat, 2014), with studies identifying multiple risk dimensions—financial, time, performance, physical, social, and psychological (Marriott & Williams, 2018). For instance, Rosillo-Díaz et al. (2020) analyzed six risk types in E-commerce platforms, yet their framework lacked granularity for CBEC-specific contexts. In CBEC payments, risks such as financial uncertainty (e.g., hidden fees, currency conversion costs), time delays (e.g., prolonged settlement periods), and information security breaches (e.g., data leaks across jurisdictions) are particularly pronounced (Featherman et al., 2021; Yang et al., 2023). These risks are further compounded by regulatory disparities between countries, which heighten legal and compliance uncertainties (Kohl et al., 2020).

This study addresses these gaps by focusing on CBEC payment risks in China—a global leader in E-commerce adoption—to systematically identify risk factors and their impact on consumer behavior. By integrating insights from technology acceptance models (e.g., TAM; Davis, 1989) and perceived risk theory, this research provides a nuanced understanding of how payment-specific risks influence usage intentions in CBEC environments.

4) Problem related to Perceived Value in CBEC

Customer perceived value is widely recognized as a fundamental determinant influencing consumers' purchasing decisions (Fang et al., n.d.; Hsin Chang & Wang, 2011). The VAM model emphasized the importance of perceived value. Zeithaml (1988) defines customer perceived value as "the consumer's overall assessment of the utility of a product or service, determined by a consumer's perception of what is received and what is given." When the perceived benefits of a product or service surpass the perceived costs, the customer is likely to regard the item as possessing positive value. Perceived value enables enterprise brand building and is an essential prerequisite for users' willingness to use. Perceived value is intricately linked to customer demand, with scholars identifying it through various dimensions of customer demand, including product functionality, economic benefits, emotional response, and social context (Peng et al., 2019a). Utilitarian value, hedonic value, and social value are believed to be positively affecting the purchase intention in live-streaming (LS)E-commerce (Y. Wu & Huang, 2023a). Perceived value is contingent on the discrepancy between what a customer invests and what they receive in return.

Diverse methodologies exist for evaluating perceived value. For instance, Shaw & Sergueeva (2019) propose that perceived value is determined by the balance of costs and benefits associated with the transaction. On the other hand, Dhingra et al., (2020a) view perceived value as a trade-off between the perceived quality of the product or service and the sacrifices made based on its price. When customers feel that they have obtained more value than what they expended, their perception of value tends to be higher. Previous empirical models investigating the precursors to perceived value have primarily focused on the benefits and sacrifices perceived at the time of purchase (Adapa et al., 2020).

During the process of making purchase decisions, consumers engage in a comparative analysis of the perceived risks and values associated with the goods or services in consideration. Should the perceived risk be low, and the perceived value be high, consumers are more likely to experience satisfaction and, as a result, exhibit positive buying behaviour (Adapa et al., 2020). The perceived value of cross-border E-commerce buyers is one of the few issues that academia and industry urgently need to address. By combining previous analyses of customer perceived value in traditional domains and the usage of CBEC payments on the Internet, the issue of whether the perceived risk of CBEC buyers and their usage intention of CBEC payment tools through perceived value in which plays a role is a question that needs to be addressed.

1.3 Research Objectives

The objectives of this study are to examine links between variables which are as follows:

RO1: To identify and analyze the key factors contributing to perceived risk in cross-border E-commerce payments.

RO2: To identify and analyze the key factors affecting usage intention of cross-border E-commerce payments in addition to the perceived risk.

RO3: To examine the relationship between consumers' perceived risk of cross-border E-commerce payments and perceived value.

RO4: To examine the relationship between the factors affecting the usage intention of cross-border E-commerce payment and perceived value.

RO5: To examine the mediating role of the perceived value of cross-border E-commerce payments on the perceived risk of payment and usage intention.

1.4 Research Questions

Research questions for this study are based on research objectives which are as follows:

RQ1: What are the elements forming the cross-border E-commerce payment risk?

RQ2: What are the factors affecting the usage intention of cross-border E-commerce payments in addition to the perceived risk.

RQ3: Does the cross-border E-commerce payment perceived risk influence the perceived value?

RQ4: Do the factors affecting the usage intention of cross-border E-commerce payments influence the perceived value?

RQ5: Does the cross-border E-commerce payment perceived value mediate between cross-border E-commerce payment perceived risk and customer usage intention?

1.5 Scope of the study

By examining cross-border E-commerce payment risks, this research contributes to the existing literature. CBEC payment is a key factor affecting enterprises in conducting cross-border commerce activities, especially cross-border E-commerce activities. To date, there have been many theoretical studies on E-commerce payments, but few of them focus on cross-border E-commerce payments, and even fewer theoretical and practical studies examine cross-border E-commerce payment risks. Rather, this research will add to the literature by examining the issue of CBEC payment risk with evidence from China.

The five objectives are based on the research question and the problem statement of the study. These research objectives are achieved through a survey-based design. In terms of the variables examined, the study considered those that have not yet been used in order to generalize the developed instrument. From the theory of buyer behavior in management, the perceived value was recruited as an important mediating variable by analyzing existing models, exploring the elements of the perceived risk of cross-border electronic payment, and constructing its constitutive model with structural equation modeling (SEM) by questionnaire and SPSS, smart PLS 4.3 statistical tool.

Perceived value was selected as a mediator over other variables for several key reasons. First, it aligns closely with the core of the Value-based Adoption Model (VAM), which underpins this study, as VAM emphasizes that users' adoption decisions are driven by their assessment of value derived from a technology or service. Unlike other potential mediators such as trust or satisfaction, perceived value inherently integrates both benefits (e.g., convenience, security) and sacrifices (e.g., cost, effort) associated with cross-border e-commerce payments, making it a comprehensive bridge between perceived risk and usage intention. Second, in the context of cross-border transactions, where users often face higher uncertainty due to factors like currency differences and regulatory variations, perceived value serves as a critical evaluative lens through which risk perceptions are translated into behavioral intentions. Other variables may focus on single dimensions (e.g., trust primarily on reliability), but perceived value captures the holistic trade-offs users make, which is more relevant for understanding complex decision-making in cross-border payment scenarios. Additionally, prior studies in e-commerce have shown that perceived value

consistently mediates the relationship between risk-related factors and usage behavior, providing empirical support for its suitability here.

The respondents are selected as the consumers of Chinese E-commerce platforms, with participants chosen from different provinces to serve as subjects for investigation, with that advantage, more accurate buyer data is obtained. In terms of the scale of E-commerce buyers, during the World Internet Conference Wuzhen Summit, the "China Internet Development Report 2023" was released, revealing data that as of June 2023, the user base for online shopping in China reached 884 million, accounting for 82% of the overall internet users. Therefore, this research chooses Chinese E-commerce buyers as the research object to conduct a fuller and more accurate analysis.

1.6 Significance of the study

This study promises to contribute to the academic and practical knowledge of the formation mechanism of cross-border E-commerce risks and preventive measures of cross-border E-commerce payment risks. Thus, the study's significance will be discussed from two perspectives: the theory and the practice of view.

1.6.1 Theoretical Perspective

1) Validating Consumer Behavior Theories in Cross-Border E-commerce

Digital transformation has reshaped consumer decision-making processes, particularly in cross-border transactions (Bai & Sarkar, 2022). While traditional theories such as perceived risk (Bauer, 1960), perceived value (Zeithaml, 1988), and the Value-based Adoption Model (VAM) (Kim et al., 2007) have provided foundational insights into consumer behavior, their applicability in the context of

CBEC requires empirical validation (Sharma et al., 2021). This study addresses this gap by testing theoretical generalizability: evaluating whether established consumer behavior frameworks effectively explain user decisions in CBEC environments, where unique risks (e.g., currency fluctuations, regulatory disparities) and value propositions (e.g., product variety, cost savings) exist. This validation is critical for bridging the gap between theoretical frameworks and the complexities of modern e-commerce ecosystems, ensuring theories remain relevant in explaining global consumer trends (Verhoef et al., 2021).

2) Clarifying the Formation Mechanisms of CBEC Payment Risks

Previous studies on cross-border e-commerce (CBEC) payments have predominantly centered on transactional mechanisms, such as payment methods and settlement processes (Chen et al., 2020; Wang & Li, 2021), with insufficient exploration into the underlying formation mechanisms of risks (Zhang et al., 2022). This research advances scholarly understanding by undertaking three interrelated tasks: First, it deconstructs the multi-dimensional nature of payment risks, analyzing them from both horizontal (e.g., financial, security, and privacy risks) (Yang et al., 2023) and vertical (e.g., macroeconomic, regulatory, and technological risks) perspectives to pinpoint systemic vulnerabilities within CBEC payment systems. Second, it empirically examines the antecedents of perceived risk through structural equation modeling, quantifying the influence of factors such as cultural distance (Hofstede et al., 2010; Sousa & Lages, 2011), platform trust (Pavlou, 2003), and payment familiarity (Miltgen et al., 2013) on users' risk perceptions. Third, it develops a typology of CBEC payment risks, categorizing them into actionable clusters to facilitate targeted mitigation strategies for businesses and policymakers.

This multi-faceted approach not only addresses the theoretical gap in risk formation research but also provides a framework for translating academic insights into practical risk management solutions.

3) Contribute to complementing theoretical research on cross-border E-commerce

Given the intricate nature of payment risks in CBEC, existing literature has predominantly focused on theoretical classifications and manifestations of such risks (e.g., Zhang & Liu, 2021; Guo et al., 2020). In contrast, empirical investigations into perceived payment risks — particularly from the consumer perspective — remain underdeveloped.

This study addresses this imbalance by constructing a structural model of CBEC payment risks. Such a model enables the intuitive identification of security vulnerabilities within payment systems and quantifies the key factors influencing system security. By operationalizing these factors through primary data collected via questionnaire surveys and rigorous statistical analyses (including confirmatory factor analysis and structural equation modeling), the research provides a scientific, data-driven foundation for enhancing security protocols. This empirical framework not only facilitates the formulation of targeted risk mitigation strategies (e.g., optimizing encryption technologies, standardizing dispute resolution mechanisms) but also supplements and validates existing theoretical research on CBEC payment risks, thereby bridging the gap between conceptual taxonomies and practical risk management.

1.6.2 Practical Perspective

1) Enhancing Platforms' Risk Mitigation Capabilities to Boost User Adoption

Consumers’ perceived risks in cross-border payments—such as financial security risks, information privacy risks (e.g., data leakage) — directly determine their transaction intentions (Slade et al., 2015; Yang et al., 2023). By clarifying the specific components of these risks, platforms can implement targeted improvements:

Technical upgrades: For instance, addressing “information security risks” by integrating blockchain-based encryption (Accenture, 2023) or AI-driven real-time fraud detection systems to reduce user concerns about data breaches. These measures directly lower perceived risks, boosting conversion rates—particularly for first-time users—and fostering long-term platform loyalty.

2) Informing Policy-Making for a Harmonized Global Payment Ecosystem

Cross-border payment risks are often amplified by fragmented regulatory frameworks and inconsistent enforcement across jurisdictions (WTO, 2023). Research on risk composition can guide policymakers to standardize risk-related regulations, by developing unified definitions for “high-risk payment scenarios” (e.g., large-value transactions) and establish cross-border cooperation mechanisms to address “jurisdictional risk” (OECD, 2021). Prioritize consumer protection to mandate mandatory disclosure of payment-related risks (e.g., currency conversion costs) to mitigate “hidden cost risk” and create cross-border dispute arbitration bodies to reduce “redress inefficiency risk” (UNCTAD, 2023). Invest in infrastructure: Upgrade cross-border payment systems to minimize “transaction delay risk” and support interoperability between regional payment networks (e.g., linking China’s UnionPay with Europe’s SEPA) (World Bank, 2022). Such policies reduce systemic risks, fostering a more predictable environment for global E-commerce growth.

3) Guiding Merchants to Tailor Strategies for Target Markets

Perceived risk compositions vary by consumer demographics and product categories: for example, Gen Z shoppers prioritize “data privacy risk”, while luxury buyers are more sensitive to “financial security risk” (Zhang et al., 2022). Merchants can leverage these insights to segment marketing messages. Highlight “bank-level encryption” in promotions targeting privacy-conscious consumers (e.g., EU markets) and emphasize “price lock guarantees” for price-sensitive buyers in Southeast Asia (Li & Wang, 2022). Adapt payment options, offering region-specific methods (e.g., Alipay for Chinese users, PayPal for Western markets) to reduce “payment method familiarity risk” (Slade et al., 2015). Leverage social proof: Display user reviews focusing on successful payment experiences to counteract “peer influence risk” and build credibility (Zhou et al., 2023). These strategies enable merchants to differentiate their offerings and penetrate new markets more effectively.

1.7 Definition of key terms

Following are the key terms of the variables:

1.7.1 Cross-border E-commerce (CBEC)

Cross-border E-commerce encompasses international business activities conducted by trade entities from different customs territories, wherein transactions are completed and payments are processed through e-commerce platforms, while the delivery of goods depends on the international logistics system. (Ma et al., 2018b). For instance, a Chinese consumer purchasing cosmetics from a French brand’s official website via an e-commerce platform exemplifies CBEC, as it integrates cross-border payment systems (e.g., Alipay, PayPal) and global shipping services.

1.7.2 Cross-border E-commerce Payment

Cross-border E-commerce Payment refers to the overall process by that platform sellers establish connections between merchants and banks through communication, computer, and information security technologies to realize the overall process of currency payment, cash flow, capital settlement, and query statistics from consumers to financial institutions and merchants (Q. Zhu et al., 2020). For example, a U.S. buyer paying for a Chinese product via credit card must navigate exchange rate calculations, cross-border fee deductions, and compliance with both U.S. and Chinese financial laws.

1.7.3 Perceived Risk

Perceived risk refers to the degree to which consumers recognize the potential losses that may arise from the uncertainties associated with payment methods. (Y. Yang et al., 2015a). A consumer hesitating to use a new CBEC platform due to concerns about unauthorized charges exemplifies heightened perceived risk in this context.

1.7.4 Performance Risk

Performance risk is defined as the potential loss experienced when a product fails to meet expected performance standards, such as not functioning as advertised. (Lowe, 2010). Such failures are particularly impactful in CBEC due to the complexity of cross-border dispute resolution.

1.7.5 Financial Risk

The anticipated risk of incurring financial losses associated with the initial purchase and ongoing maintenance of a product or service (M. Featherman et al.,

2021). For example, a consumer might face financial loss if a foreign merchant charges additional “import processing fees” not disclosed during checkout.

1.7.6 Time Risk

Time risk is the anticipated potential for loss of time due to difficulty in using the product (M. Featherman et al., 2021), CBEC payment here. This risk is exacerbated by time zone differences and fragmented regulatory processes.

1.7.7 Information Security Risk

Information security risk is defined in GB/T 20984-2007 "Information Security Technology Information Security Risk Assessment Specification" as "the occurrence of a security incident and its impact on the organization caused by man-made or natural threats that exploit vulnerabilities in information systems and their management systems". For instance, a consumer's payment information might be compromised when transmitted between a U.S. platform and a Chinese logistics provider with weaker encryption protocols.

1.7.8 Psychological Risk

The anticipated potential for frustration and harm to one's self-esteem and peace of mind arising from the challenges, concerns, and stresses associated with ownership and usage. (M. Featherman et al., 2021). A first-time CBEC user might experience this risk when unsure if their payment will be processed correctly, leading to emotional distress.

1.7.9 Perceived Usefulness

Perceived usefulness is defined as the subjective belief of a potential consumer that utilizing a specific system will improve their job performance within an organizational context. (Davis & Venkatesh, 1996). For example, a buyer perceiving