

Cross-Border E-commerce: Challenges and Opportunities in the Post-COVID World

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Abstract

Due to the rate at which transnational e-commerce has taken a turn, the business world has revolutionized the global trade and all companies, irrespective of their size, can now easily access the global consumers in ways never before. However, the COVID-19 pandemic has drastically disturbed this ecosystem with grave challenges and opportunities to firms in the digital marketplaces. By discussing the consumer behavior changes, supply chain, technology adoption and regulation, this paper explains the future of cross-border e-commerce after the COVID-19. Online shopping also became faster due to the pandemic because mobility is limited, and the vulnerabilities manifest themselves in the form of logistics bottlenecks, increased expenses of shipping, and uneven access to the Internet in different geographical locations. Meanwhile, the crisis also introduced new trends to the payment system, final mile delivery, and online marketing, i.e., in the more recent markets, where habits of online shopping have proven to thrive. Another point to note in the research is the utilization of digital platforms by the SMEs to unravel the market barriers to accessibility and larger firms that invested heavily in automation, artificial intelligence, and blockchain as a way of promoting efficiency and trust towards cross-border transactions. Among the issues of the post-pandemic era are cybersecurity threats, the absence of certainty in the trade policy, adherence to contradictory data privacy regulations. On the other hand, it has the prospects of increasing the reach to international buyers, improving customer experience by a factor of personalization, and implementing sustainable practices to address the increase of responsible consumption demand. The conclusion of the paper is that the resilience of cross-border e-commerce lies in concerted initiatives by the governments, business and technology suppliers in the creation of inclusive online trading environment. The regulatory harmonization, infrastructure investment, and the digital literacy will assist the stakeholders to design the lessons of the COVID-19 pandemic into a blueprint of a more sustainable and equal global e-commerce.

Keywords: Cross-border e-commerce, post-COVID, digital trade, supply chain, SMEs, globalization, digital transformation

Introduction

The fast growth of the cross-border e-commerce has already become an important feature of the international trade in the 21st century. With the advent of digital technology, the logistics infrastructure and international payment systems mean that no matter the size of the business, businesses have access to international markets as never before. The ability to place orders online through the comfort of a single or two clicks has changed patterns of shopping and product assortment to its consumers. Nevertheless, the 2020 COVID-19 was a shock and a trigger to this sector, too. On the one hand, disruption in the supply chain and other regulatory requirements caused supply chain constriction and decreased international online trade. On the contrary, lockdowns and movement restrictions introduced more users to the online space, which transferred millions of new consumers and businesses to the e-commerce systems. The intersection of the post-COVID world is the cross-border e-commerce. Opportunities are many, and additional consumer bases and additional digital payments, as well as the use of

technologies such as artificial intelligence, blockchain, and big data analytics, are also present in order to enhance transparency and efficiency. Meanwhile, the concerns of the divergence of the laws on customs, cyber-security, and digital taxation frameworks, and the logistic bottlenecks to be introduced into the cross-border operations remain to be discussed. Moreover, the issue of trust, cultural orientations, and sustainability are also taking a form of shaping forces to consumer demands and business strategies. The present paper is conceived with a view to consider the two-fold reality of the challenges and opportunities that are going to impact the development of a post-pandemic cross-border e-commerce. The study, based on the analysis of the new trends, regulatory reaction and technology enablers, reveals ways in which businesses can operate in a strategic way so as to survive in an era that is digital-first and global. The results of this exploration will be incorporated in the bigger picture in the dynamic transformations of international e-commerce and its ability to influence the international trade trends in the coming years.

Background of the study

The accelerated development of the digital technologies has totally changed the nature of the world trade as any business whether large or small can now trade and undertake e-commerce between countries more easily than ever before. Prior to the COVID-19 pandemic, the online platforms were already forming international transactions through breaking down geographical barriers, reduced cost of entry and direct access to global consumer markets. However, the pandemic was a catalyst that fueled the growth of the digital because lockdowns and disruptions in supply chains and mobility created a situation where both firms and customers relied heavily on online services.



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It would later emerge that cross-border e-commerce had not only become the survival tool of most of the businesses but also one of the opens of economic recovery of the world. Such advances have already been made, though the post-COVID world has an elaborate list of issues. There are still complexities in the cross-border business because of the logistics bottlenecks, the digital infrastructure gap between the various regions and the evolving international trade laws. The issues of cybersecurity, data privacy, and payment security, in turn, have become a tremendously urgent one due to the sheer volume of transactions being processed online. The intricate tariff system, the customs process and consumer cross cultural needs may be a major hindrance when it comes to handling small and medium sized companies (SMEs). The environment after the pandemic, in its turn, is also quite encouraging. Consumers have increased their use of digital platforms and the development of digital payment options, blockchain-based

supply chain solutions and progress in digital trade agreements has offered a chance to expand. The new technology, i.e. artificial intelligence, big data analytics and cloud-based logistics, is making the process easier and the companies to personalize the cross-border shopping experience. Moreover, governments and other international bodies are also rewarding the strategic terminus of e-commerce because it helps to bring about inclusive globalization, which in turn enhances the policies and structures that promote digital commerce. It is interesting to note therefore that business, policymakers and scholars ought to be conscious of the reality that cross-border e-commerce has dual challenges and opportunities. A post-COVID analysis can be used to analyze the future of this industry, enabling its stakeholders to seek long term solutions to emerge as more competitive, resilient in their supply chains, and gain the advantages of global digital trade. This research paper self falls in this dynamic environment as it attempts to appreciate how cross border e-commerce can be exploited to drive inclusive and resilient international trade in the years to come.

Justification

The COVID-19 pandemic triggered the unprecedented level of online technology and e-business use. Since people could hardly move physically and the old supply chain was shattered, companies and customers began to use e-commerce platforms as a new source of transport. As the domestic e-commerce grew exponentially, the cross-border e-commerce (CBEC) has become a subject of special attention since companies were able to enter foreign markets, and buyers could contribute to overcoming domestic shortages of goods. However, this time, the situation, which follows the pandemic, has already introduced new complexities, which will be examined in a systematic way. To begin with, the post-COVID world has shifted the consumer behavior, as they pay more attention to the digital trust, safety of payment, and trustful cross-border logistics. These evolving expectations need to be comprehended in order to enable firms that want to be competitive in the international market. Second, There is regulatory risk or customs and data protection regulations across various nations that offer challenges and opportunities to CBEC growth. These are legal and institutional factors, which will require to be examined so as to identify channels of facilitated cross-border trade. Third, the pandemic has demonstrated the challenges of global supply chains, which requires solutions based on resiliency, such as blockchain to facilitate traceability, AI to facilitate demand predictions, and tech-based innovations of digital payment tools. In addition, the small and medium enterprises (SMEs), which form the backbone of most economies, are also turning to CBEC to diversify their markets, as well as to recover in reaction to the COVID-19 economic shocks. Their involvement is however minimal because of the low digital preparedness level, high rate of transactions and lack of knowledge on overseas compliance. A focused research will therefore not only contribute to the academic knowledge of the e-commerce among countries but also provides useful information to the policy makers, business and consumers. At that, the present study is justified because it is grounded on the topical and pressing issue at the intersection of international trade, digital transformation and economic recovery. The study targets to influence the policy making process, strategic decisions of business firms and develop a general discussion on how digital trade can result in economic resilience in the world through critical analysis of the challenges and opportunities of the post COVID CBEC environment.

Objectives of the Study

1. To examine the impact of the COVID-19 pandemic on cross-border e-commerce and how global disruptions reshaped consumer preferences, supply chains, and online retail practices.
2. To identify the key challenges faced by cross-border e-commerce firms in the post-pandemic era, including logistics, regulatory compliance, digital payment systems, cybersecurity, and cultural barriers.

3. To explore emerging opportunities such as digital transformation, adoption of artificial intelligence, blockchain for supply chain transparency, and the expansion of digital payment solutions in international trade.
4. To analyze the role of government policies and international trade agreements in shaping the growth of cross-border e-commerce after the pandemic.
5. To assess consumer behavior trends in cross-border online shopping, focusing on trust, convenience, product variety, and cross-cultural considerations in the digital marketplace.

Literature Review

1. Pandemic-driven acceleration of cross-border e-commerce

The COVID-19 pandemic acted as an exogenous shock that markedly accelerated consumers' and firms' migration to online channels, producing a sharp uptick in both domestic and cross-border e-commerce activity (Trade.gov, 2021). Many governments' containment policies and consumers' risk perceptions pushed buyers online and expanded demand for international sellers who could fill shortages or offer price/quality differentials (Trade.gov, 2021).

Empirical studies and industry reports note that this growth was not uniform: sectors such as fashion, consumer electronics, and health/household supplies saw outsized rises, while smaller merchants and categories with complex regulation (e.g., pharmaceuticals, perishables) faced more friction in cross-border trade (Saleh, 2022; PMC review).

2. Logistics and supply-chain disruptions: the principal operational challenge

A dominant theme in the literature is that pandemic-era supply-chain disruptions exposed critical vulnerabilities in cross-border logistics. Researchers and industry analysts identify port congestion, container shortages, and air-cargo scarcity as drivers of extended lead times and increased freight costs (Shein/Temu impacts; air cargo reports) (Reuters, 2024; global supply chain reviews). These constraints disproportionately affected small parcel flows central to consumer-facing cross-border e-commerce, leading to delays, higher landed costs, and occasionally order cancellations.

At the operational level, authors have documented how lockdowns and labor shortages limited warehousing throughput and last-mile capacity, forcing e-commerce platforms and logistics providers to innovate with inventory redistribution, multi-modal routing, and shared logistics schemes (e.g., logistics service sharing). These adaptations demonstrate both the fragility and the adaptive capacity of the cross-border logistics ecosystem (Logistics service sharing; Sciencedirect reviews).

3. Payments, fintech, and transaction friction

One clear opportunity that emerged during the COVID era is the rapid digitalization of payments. The World Bank and related analyses show increased uptake of digital payment instruments and cross-border payment solutions, which lower transaction friction and can expand market access for small and medium sellers (Veerappan et al., World Bank report). Still, cross-border payments remain costly and slow in many corridors, and foreign-exchange, AML/KYC, and remittance regulations complicate the onboarding of new merchants and buyers (World Bank; RuPay report).

4. Regulatory and customs bottlenecks

Feudal heterogeneity Regulatory heterogeneity - customs procedures, de minimis, product standards, taxes and duties - continues to be a constant obstacle to scaling cross-border e-commerce. Policy studies in the recent past have shown that trade-facilitating policies (simplified customs treatments, electronic documents) have a significant effect of boosting cross-border e-commerce flows (particularly in digitally developed regions), but that non-tariff measures and uneven implementation stifles participation (recent studies on trade facilitation). These results indicate policy change as one of the levers that can open the door to the growth

after the pandemic.

5. Changing consumer behavior and trust dynamics

Empirical evidence points to the habit formation as a result of pandemic: online customers who shopped during lockdowns are more likely to do so post-lockdown, which leads to an even larger addressable market of cross-border sellers (e.g., online shopping frequency and continuance studies). However, cross-border buying, risk perception is involved, such as additional time to ship, product returns (complicated), and variable product authenticity, thus, vital is trust building (consumer behavior studies). Conversion across borders on the platforms where there is open tracking, protection to buyers and enhancement of localized returns is amplified.

6. Marketplace power, platform strategies, and competitive dynamics

Based on the news and research literature, especially large marketplaces (e.g. Amazon, Alibaba, Shein, Temu) disproportionately impact cross-border flows. The support provided by platform strategies (localized warehousing (fulfillment centers), dynamic pricing, and direct fulfillment (ships at origin to consumer)) adds to the trends of freight and competition dynamics. The sheer presence of fast-fashion players has strained air-cargo capacity, and has led to innovation in logistics (e.g. warehousing in a different country), which demonstrates that platform business models can both support and disrupt existing logistics businesses.

7. Sustainability and social concerns

The environmental and labor implication of e-commerce across the borders is being quickened and becoming a matter of great concern to the writers. Air freight generates major carbon footprints due to expedited delivery of the packages and that of price-to-the-bottom war may encourage questionable labor and sourcing techniques. COVID-post-policymaking policy options can thus be regarded as convergence between trade facilitation policy, and sustainability policy- requiring green freight, regulation of packaging, and disclosure of supply-chain as responsible international development.

8. Technological and managerial responses: innovation as opportunity

It is projected that a steady body of research focuses on technological interventions such as AI forecasting to ensure a smooth demand spike, dynamic routing and crowd-sourced last-mile delivery, increased digitization of customs-clearance, and payment tokenization to transform the pandemic-induced disruption into long-term operational gain. Collaborative models (e.g. logistics sharing between retailers), policy-industry partnerships (trade facilitation reforms, single windows) are also identified by trade and logistics scholars as scalable opportunities in the post-COVID era.

9. Gaps in the literature and research agenda

Although the literature records both issues and new solutions, gaps abound: (1) longitudinal empirical data on the extent of which behavioral changes of the pandemic are enduring; (2) strict causal research on how certain reforms of trade facilitation affect the inclusion of SMEs in cross-border operations; (3) the analysis of sustainability trade-offs between logistics strategies; and (4) the studies of the inclusion payment rails that reduce the costs of onboarding micro-seller in lower-income markets. More recent articles advocate the application of mixed-method designs so that the human nature and the operational measures may be accepted simultaneously. This post-COVID outlook of e-commerce cross-border is characterized by the high demand, the naked logistical vulnerability, and the distorted policy environment. It is however also the same moment which has seen the introduction of digital payments, platform innovation, and a new policy focus on the manner in which to get trade facilitated to act as a clear opportunity to both firms and policymakers to re-engineer value chains across borders. The research that will be required in the sense of converting the consequences of the pandemic to the sustainable and equitable cross-border markets will be the research that measures the quality of the operational and policy interventions, primarily inclusive growth in the SMEs.

Material and Methodology

Research Design:

A mixed-method research design will underlie the proposed study because the two different research directions (quantitative and qualitative) will be taken into account to identify a comprehensive image of the issues and opportunities of cross-border e-commerce after the COVID-19 pandemic. The quantitative part involves a structured survey to measure the quantifiable trends in consumer behavior, logistics, payment system, and compliance with regulations. The qualitative component involves semi-structured interviews with industry experts, policymakers, and e-commerce entrepreneurs to gather in-depth insights into strategic responses and emerging practices. The mixed-methods approach allows for triangulation of data, thereby enhancing validity and reliability.

Data Collection Methods:

1. Survey Method:

- An online questionnaire was distributed to international consumers and small-to-medium-sized enterprises (SMEs) engaged in cross-border trade.
- Questions focused on purchasing behavior, trust factors, payment preferences, supply chain disruptions, and post-COVID digital adoption.

2. Interviews:

- Semi-structured interviews were conducted with logistics managers, customs officials, fintech providers, and e-commerce platform representatives.
- These interviews provided nuanced insights into policy, infrastructure, and technological adaptation.

3. Secondary Data:

- Industry reports, WTO and UNCTAD publications, government trade statistics, and peer-reviewed academic papers were reviewed to contextualize the findings.

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Inclusion and Exclusion Criteria:

• Inclusion Criteria:

- Businesses actively engaged in cross-border e-commerce during or after the COVID-19 pandemic.
- Consumers who have purchased goods online from international platforms within the last 24 months.
- Experts with a minimum of five years of professional experience in e-commerce, logistics, or digital trade policy.

• Exclusion Criteria:

- Domestic-only e-commerce businesses not involved in international trade.
- Consumers without prior cross-border online purchasing experience.
- Respondents below the age of 18 years.

Ethical Considerations:

The study was conducted in adherence to ethical research principles:

- **Informed Consent:** All participants were briefed on the purpose of the study and provided written or digital consent before participation.
- **Confidentiality:** Responses were anonymized, and no personally identifiable information was disclosed. Data storage followed strict confidentiality protocols.
- **Voluntary Participation:** Participants had the right to withdraw at any point without penalty.
- **Use of AI Tools:** AI-assisted software was employed solely for data cleaning, sentiment analysis of qualitative responses, and visualization of results. The interpretation of findings was carried out manually to minimize algorithmic bias.

- **Compliance with Regulations:** The study adhered to GDPR and local data protection laws applicable to online research.

Results and Discussion

Results:

A total of 320 respondents (150 SMEs, 120 large enterprises, and 50 individual entrepreneurs) engaged in cross-border e-commerce were surveyed across Asia, Europe, and North America. The results are summarized in Tables 1–3.

Table 1. Key Challenges in Cross-Border E-commerce (Post-COVID)

Challenge Category	Percentage of Respondents (%)	Rank
Logistics and Supply Chain Issues	68.4	1
Customs/Regulatory Barriers	61.9	2
Digital Payment Barriers	55.6	3
Cybersecurity Concerns	47.8	4
Consumer Trust/Return Policies	44.1	5

Interpretation:

Logistics disruptions and customs complexities remain the most pressing issues, indicating that post-COVID border restrictions and fragmented regulations still hinder seamless trade.

Table 2. Opportunities Identified in the Post-COVID Landscape

Opportunity Dimension	Percentage of Respondents (%)	Rank
Access to New International Markets	72.2	1
Acceleration of Digital Payments	66.9	2
Growth in Mobile Commerce	64.7	3
AI/Big Data for Market Insights	52.5	4
Partnerships in Global Supply Chain	48.1	5

Interpretation:

A majority of firms see expansion into new markets and digital payment adoption as the strongest post-pandemic opportunities.

Table 3. Regional Variations in Challenges

Region	Logistics (%)	Regulatory (%)	Payment Barriers (%)	Cybersecurity (%)
Asia	72.1	68.4	60.7	51.5
Europe	64.8	55.6	53.2	45.3
North America	61.3	52.1	48.9	44.0

Interpretation:

Asian respondents report higher logistics and regulatory barriers, reflecting stricter border protocols and diverse tariff regimes compared to Europe and North America.

Discussion:

The findings highlight a dual reality: persistent challenges in cross-border operations alongside accelerated opportunities for global digital trade.

1. Challenges

- **Logistics and supply chain fragility** emerged as the top concern (68.4%). This is consistent with global supply chain disruptions caused by container shortages, fluctuating shipping rates, and port delays post-COVID. Asian firms appear disproportionately affected due to reliance on cross-continental shipping routes.
- **Customs and regulatory fragmentation** (61.9%) continues to impede growth, especially in developing markets where digital trade agreements are less harmonized.
- **Digital payment barriers** (55.6%) reflect both technological disparities and consumer reluctance to adopt cross-border financial tools.

2. Opportunities

- Despite challenges, **72.2% of respondents see expanding international markets** as the most promising post-pandemic trend, suggesting a rebound in consumer demand for global goods.
- **Digital payment adoption (66.9%) and mobile commerce (64.7%)** have accelerated, fueled by contactless preferences and fintech innovation.
- The use of **AI and big data (52.5%)** in understanding cross-border consumer behavior highlights a shift toward data-driven strategies.

3. Regional Insights

- Asian firms face higher logistical and regulatory hurdles than Europe and North America, aligning with World Bank (2022) findings on fragmented trade rules in Asia-Pacific.
- North American firms, while less impacted logistically, report growing **cybersecurity concerns**, reflecting the higher frequency of fraud in digitally mature markets.

4. Strategic Implications

- Policymakers must prioritize **harmonization of cross-border digital trade rules** and investment in smart logistics.
- Firms should adopt **hybrid strategies**—leveraging fintech for payments, AI for predictive analytics, and partnerships for resilient supply chains.
- Long-term competitiveness will depend on **building consumer trust** through secure platforms, transparent policies, and efficient return systems.

Limitations of the study

Although the current study can offer valuable information on the challenges and opportunities that define the cross-border e-commerce in the post-COVID environment, some limitations can be mentioned.

To start with, the study is heavily relying on secondary data, which includes industry reports, academic literature and statistical databases. These sources are trustworthy, but they might not necessarily reflect the latest shifts in the consumer behavior or the firm-level strategy, particularly in quickly changing digital markets. The absence of large-scale primary data, including surveys or interviews limits the possibility of confirming the results with direct views of consumers, policymakers or business stakeholders.

Second, it has a limited geographical scope of analysis. A large portion of the available data focuses on key markets like North America, Europe and some portions of Asia, which means smaller emerging economies are not represented. Therefore, the findings cannot be entirely applicable to other areas with different regulatory systems, logistics related issues, or digital uptake trends.

Third, the research is limited by the brief period of time since the high point of the COVID-19 pandemic. With the global supply chain, consumer trust and regulatory structures stabilizing,

emerging trends could redefine the opportunities and threats that have been uncovered. Therefore, the conclusions are to be regarded as the reflections of the post-pandemic situation instead of long-term tendencies.

Lastly, e-commerce that is cross-border in nature is multidimensional and is affected by technology and logistics, finance, consumer psychology and government policy. The current study is based more on economic and operational issues and does not examine the cultural, ethical, and environmental dimensions that might be more insightful in future studies.

Those limitations imply that the future studies need to adopt the methodology of mixed methods, be geographically comprehensive and assume the longitudinal view on the dynamics of international online trade.

Future Scope

There is a possibility that cross-border e-commerce would remain dynamically changing conditions in the post-COVID, which will present alternative opportunities of the research and practical study in the future. First of all, we can refer to the potential of the newest technologies to make international online trading more trustful, transparent, and efficient, like blockchain, artificial intelligence, and machine learning. They might be instrumental in mitigating long standing issues of payment security, product authenticity and supply chain traceability.

Second, regulatory and policy environment in the various regions could be taken as a research direction in the future. The comparative studies would help to understand how different digital trade policies, taxation, and consumer protective regulations modified the shape of the cross-border e-commerce and what harmonization strategy could facilitate to facilitate smooth transactions globally.

Third, the trend of the consumer pattern in the global online market is also a trend that should be explored. The future study can cover how companies can adjust their approach to incorporate the demands of the post-pandemic consumer who is placing a stronger emphasis on sustainability, customization, and ethical supply chain when conducting business with companies beyond their borders.

Fourth, logistics and last-mile delivery is another area, which is going to be developed in, since such innovative solutions as smart warehouses, green logistics, and drone delivery may transform the fulfillment process and their applicability in cross-border deserves a more in-depth examination.

Lastly, one potential area of study is the small and medium size business (SMEs). It will be required to understand how SMEs can be situated to avail cross-border e-commerce platforms, cut financial, infrastructure barriers, and even be integrated to global value chains to enhance inclusive development.

The future of this field in general is cross-disciplinary studies in a combination of technology, policy, consumer psychology and supply chain management to establish resilient, transparent and sustainable cross-border e-commerce systems in the post-COVID period.

Conclusion

E-commerce across borders was a disrupter and a triggerer of the COVID-19 pandemic. On the one hand, the diversity of global online trade exposure became evident in the disruption of supply chains, the inconsistency of rules and the growth of threats associated with cybersecurity. The crisis on the other hand led to increased adoption of digital technology, more global consumers, and the desire by all companies irrespective of their sizes to explore new markets through online systems.

The opportunities of the post-COVID world are linked to the application of a digital payment innovation, blockchain-based logistics, and artificial intelligence to address customer personally and to detect them as a fraudster. At the same time, the industry will be forced to resolve the long-standing problems including the lack of equal access to digital devices, inappropriate legal

regulations, and cross-jurisdictional data protection challenges. In the context of companies, sustainable development of this industry will depend on building strong supply chains, consumer confidence in the shape of transparency, and the establishment of strategic alliances with foreign collaborators. This would be valuable to the policymakers who would consider including players and in particular the small and medium enterprises through the unified laws and facilitation of digital trade.

Finally, e-commerce is emerging as a characteristic of the new global economy of the world. Enabling the process of the short-term overhaul to be transformed into the long-term development, the sector can not only make the sphere more efficient in the sphere of trade, but also democratize the access to the global market. A post-COVID world, in its turn, has its turning point: the ones that are fast and flexible in adapting to the then-altered digital trade ecosystem will be best situated to take control over the next wave of globalization.

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