

Artificial Intelligence-Enabled Logistics Resources and Customer Satisfaction Under Global Trade Disruptions: An Integrated RBV, EDT, and TCE Perspective

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Abstract:

The purpose of this study is to investigate the role of a firm's artificial intelligence-enabled valuable, rare, inimitable, and non-substitutable (AI-VRIN) based logistics resources in mitigating the effects of global trade disruptions on customer satisfaction. The study conducted conventional (inductive) qualitative content analysis of authoritative multilateral economic and strategic institutional reports to validate the proposed relationships and identify recurring disruption performance patterns. The reports used in the study are from World Trade Organisation (WTO), United Nations Conference on Trade and Development (UNCTAD), World Bank, International Monetary Fund (IMF), and DHL–New York University Stern School of Business. Based on the analysis, a moderated serial mediation model has been proposed that explains how global trade disruption influences transaction cost and logistics process performance, ultimately affecting customer satisfaction. Additionally, AI-VRIN-based logistics resources moderate the relationship between transaction cost and logistics process performance, thereby mitigating the cascading impact of global trade disruption on customer satisfaction. The findings of the study can be used by international supply chain, operations managers and strategic decision makers as the proposed model provides a strategic lens that may guide firms in sustaining customer satisfaction in highly dynamic and evolving global markets.

Keywords: Trade disruptions; Artificial intelligence-enabled logistics resources; Logistics performance; Customer satisfaction; Supply chain adaptability; Transaction Cost

Introduction

The international trade framework relies heavily on logistics networks (Zhang & Huang 2025). In recent years, many disruptive factors (e.g., pandemics - Singh et al. 2021; geopolitical conflicts Xiong & Sun 2025; blocked seaports Jeong et al. 2025; and environmental disasters Guo & Li 2025) have taken place in logistics networks. As a result, disruptions cause logistical inefficiencies; delays in shipping goods, higher transportation costs, lower levels of service reliability (Suson et al. 2023). The logistics process performance is frequently cited as an important predictor of customer satisfaction (Kawa & Zdrenka, 2024). Due to new levels of uncertainty, supply chain instability and cross-border dependencies, understanding the impact of global trade disruptions is now more important than ever. While numerous previous studies have looked at macroeconomic and organization-level impacts of

trade disruptions, organizations are one step removed from the disorganisation of the global supply chains and are experiencing these disruptions via their own internal processes. Logistics process performance is key to how effectively an organisation can absorb and react to trade shocks, which ultimately influences consumer satisfaction. Global trade disruptions create uncertainty and instability across international supply chains, yet the mechanisms through which these disruptions translate into downstream organizational and customer-level outcomes remain insufficiently integrated. In particular, limited research has examined how Global Trade Disruption increases Transaction Cost, constrains Logistics Process Performance, generates Logistics Performance Gaps, and ultimately influences Customer Satisfaction within a unified framework.

Most previous studies have concentrated predominantly on evaluating the impacts of certain interruption events (the Covid-19 outbreak, the blockage of the Suez Canal, and geo-political issues) separately and in relation to supply chain resiliency or operational performance. However, existing studies seldom explain how Global Trade Disruption systematically propagates through Transaction Cost and Logistics Process Performance to create observable Logistics Performance Gaps that shape Customer Satisfaction outcomes. This absence of an integrated transmission mechanism represents a critical gap in the literature. Thus purpose of this study is to understand how global trade disruptions influence performance logistics process performance and customer satisfaction through an integrated theoretical lens. The study combines transaction Cost Economics (TCE), the resource-based View (RBV), and expectation–Disconfirmation Theory (EDT). Drawing on institutional evidence from WTO, UNCTAD, World Bank, IMF, and DHL Global Connectedness reports , the paper develops and validates a multi-theory framework that links global shocks to both outcomes.

The next section presents the theoretical background underpinning the study. This is followed by a review of relevant literature on global trade disruptions, logistics process performance, , and consumer satisfaction. The paper develops a conceptual framework explaining the relationships between the key constructs. The final sections discuss implications, future research directions, and conclude the paper.

Theoretical Background :

Transaction Cost Economics (TCE) provides an explanation of the manner in which organizations manage their transactions to reduce costs associated with coordination and exchange. Coase propose that transactions using the market mechanism are not costless (Coase, 1937). Firms incur costs to search for information, negotiate contracts and monitor contract performance (Williamson, 1979, 1998). Based on Coase's original work, Williamson identifies two behavioral assumptions relating to the parties involved in transactions: "bounded

rationality" and "opportunism" (hoarding power). Williamson introduces three dimensions of a transaction—asset specificity (how invested parties are in providing goods or services), uncertainty (the likelihood that agreements will be fulfilled), and transaction frequency (how often similar transactions occur) —and contends that these dimensions are jointly determined by how best to govern a given transaction (i.e., via a market mechanism, hybrid agreement, or organizational merger) to minimize transaction costs. Williamson continues to note that governance structures should be contingent on the complexity of the transactions being executed. Complexity will lead to excess costs if complex governance is utilized to execute simple transactions and increased risk and strain will be present when simple governance is utilized to execute complex transactions. Recent writers (Ketokivi & Mahoney, 2020) propose that TCE extends to the field of SCM as an efficient governance theory.

The Resource-Based View (RBV) provides a unique and complementary viewpoint to external facing theories, such as Transaction Cost Economics, by specifically focusing on internal resources and a firm's ability to perform activities rather than the costs of an exchange externally Barney (1991) extended prior research into a theoretical framework suggesting that sustainable competitive advantage could be developed when a business has resources that are valuable, rare, unique, and cannot be replaced by anything else. There are two categories of resources: tangible resources (e.g., logistics infrastructure, technology, or supply chain facilities) and intangible resources (e.g., management skills, innovation, and long-term supplier relationships) (Grant, 1991). The resource-based view states that firms have different resources and, therefore, have different performances even when they compete within the same environment (Peteraf, 1993). With regard to supply chain management, research using the resource-based view has shown how unique resources such as advanced information systems, flexible logistics networks, and trust can improve resilience and efficiency (Lima et al., 2025). More recently, research has continued to demonstrate the resource-based view's ability to explain sustainable

competitive advantage by showing how it incorporates strategic and sustainability perspectives (Guan et al., 2025). However, RBV has been critiqued for its static orientation, emphasizing resource possession over reconfiguration in dynamic environments (Priem & Butler, 2001). To combat limitations concerning capability set limits, early academics developed the Dynamic Capabilities View (DCV) which builds upon the Resource-Based View (RBV), with a focus on how firms are able to modify and evolve their set of resources as necessary to continue being competitive as the market continues to shift and change (Teece et al., 1997). On the other hand, The Expectation–Disconfirmation Theory (EDT) that also arose as an extension from Consumer Behavior, specifically existed to understand how customers come to determine whether they are satisfied/unsatisfied with the service they received, and how that determination comes from a customer's expectations of a service and the actual performance of that service. When a customer experiences a service that fulfills or exceeds their predetermined expectation, they experience positive disconfirmation and satisfaction; conversely, when a customer experiences a service that performs below their expectation (and therefore does not fulfill their expectations), they experience negative disconfirmation and dissatisfaction with that service (Oliver, 1980).. In logistics and service environments, small delays or variances in expectations may affect customer perceptions of quality and reliability. EDT looks beyond performance metrics to demonstrate the psychosocial processes that lead to satisfaction and how those can be easily affected by temporary operational gaps or failures in communications about expected service delivery (Mentzer et al., 2001). Recent research demonstrates that EDT is a framework for understanding customer satisfaction and its relation to the overall service experience and business domains and holds relevance in service and digital service contexts, where customer expectations change and evolve continuously over time (Seo et al., 2026). EDT also illustrates how failures or gaps in operations as well as failure to understand expectations can influence future buying intentions and future loyalty, especially in the online

realm and service markets (Khalek et al., 2025). Recent findings indicate that EDT continues to provide a strong conceptual basis for linking service delivery, customer satisfaction, and loyalty (Schiebler et al., 2025).

Together, the theoretical frameworks of TCE, RBV and EDT provide an overall basis for understanding the impact of supply chain disruptions on both firm performance and customer satisfaction. TCE describes how disruptions lead to transaction uncertainty and increased transaction costs in logistics, resulting in logistic inefficiencies. RBV provides an internal perspective, suggesting that firms that possess unique, valuable, and inimitable resources will be able to reduce the impact of logistical inefficiencies, thus maintaining their stability. In addition, EDT applies these concepts based on how the logistical inefficiencies create service gaps and ultimately affect the level of customer satisfaction and perception. The integration of TCE, RBV, and EDT allows for a multi-dimensional understanding of disruption impacts within a single conceptual framework, as disruption affects firms' external environments, their internal resources/capabilities, and their customers.

Conceptual Framework and Proposition Development

Global Trade Disruption and Transaction Cost

Increased uncertainty and complexity in inter-firm transactions resulting from global trade disruptions lead to increased transaction costs (Fan, 2024). Within Transaction Cost Economics theory, it has been identified that both uncertainty and opportunism are the primary drivers behind increasing transaction costs (Williamson, 1979, 1998). When a transaction becomes uncertain, an organization will invest additional resources into the activities of monitoring, negotiating and governing transactions (Grover & Malhotra, 2003).

There are many types of actions/activities that create disruption in a firm's operations, including but not limited to: port shutdowns, trade sanctions, shifts in tariffs, and shocks to the supply chain; as a result, many firms need to renegotiate contracts with existing suppliers, identify alternative suppliers, or

increase the amount of coordination required to perform the operation (Ivanov, 2024; Touat, 2024). Additionally, disruptions create the opportunity for opportunistic behaviour between suppliers and customers; for instance, examples of opportunistic behaviours could include suppliers increasing prices, favouring certain customers over others, or taking advantage of delays in delivery to extract rents (Moradlou, 2021).

As a result of the increase in risk created by global trade disruptions, firms will increase the use of governance mechanisms including but not limited to audits, real-time tracking, redundancy strategies, and partnership agreements with third-party logistics providers; as a result, these governance mechanisms increase the transaction costs associated with performing the transaction (Gereffi, 2021). Therefore, when global trade disruptions occur, they negatively impact both physical and relational flows of goods and services resulting in increased costs associated with the coordination and safeguarding of transactions.

P1: Global trade disruption positively affects transaction cost

Transaction Cost and Logistics Process Performance

Global disruptions to trade throughout the world due to events such as pandemics, wars and blockades, as well as various regulations and climate disruptions all add considerable delays, inefficiencies and increased costs throughout supply chains (Chen et al., 2020; Golgeci et al., 2025; Jarašūnienė & Gelžinis, 2025). For example, COVID-19 resulted in significant port closures, major container shortages and freight rate increases; all of which limited the ability of logistics firms to operate (Ginn & Saadaoui, 2025). The Russia-Ukraine war and Suez Canal blockage caused further shipment delay and higher transportation costs (Islam, 2025; Yap & Yang, 2024).

Disruptions increase both operational and transaction costs for both firms and customers while decreasing the effectiveness of logistics (Xiong et al., 2025). When faced with increasing uncertainty, businesses increase the number of safeguards in

place by adding tightened controls to the amount and types of monitoring done, verifying if shipments have been received and renegotiating shrinking contracts (Ivanov, 2024). While increased safeguards provide more protection from risk brought about through instability, they also mean that businesses will be taking money that would have been spent on creating efficiencies and putting it into safeguards instead (Panwar et al., 2022).

From the Transaction Cost Economics perspective (Williamson, 1979), businesses are essentially faced with the trade-off of providing protection from uncertainty or providing higher levels of efficiency. When businesses increase their level of governance, they provide better protection from the uncertainty of their supply chain, but it also makes their supply chain processes less flexible and slower. As a result of having higher transaction costs associated with supply chain management, the performance of these logistics processes is affected by the increased complexity, longer response time and increased burden of having to coordinate (Dirzka & Acciaro, 2022; Golgeci et al., 2025).

P2: Transaction cost negatively affects logistics process performance.

Logistics Process Performance and Logistics Performance Gap.

The effectiveness of logistics is a critical element in how customers see service quality (Zhang & Huang, 2025). Logistics effectiveness leads to on-time delivery, predictable costs, and reliability all of which connect to customer expectations (Ta et al., 2025). When there is a disruption in logistics process performance, customers face observable service failures either arriving late, getting an incomplete order, or receiving a damaged order (Ivanov, 2025). Such observable problems create a logistics performance gap between customer expectations and performance (Moder & Hoberg, 2025).

Logistics Performance gaps become more consequential the longer a disruption unfolds. A customer may not mind one or two delays; however, the more times a service fails, the more dissatisfied customers become (Gurler & Ertugut, 2024). Even when disruptions such as a pandemic or canal

blockage are beyond the firm's control, customers evaluate logistics service failures based on how effectively the firm responds and maintains service (Hohenstein, 2022). When logistics performance gaps happens, customers assume the firm was either not prepared or capable of delivery service (Li et al., 2025). It represents the point of operation inefficiencies, viewed by the customer as logistics failures, that lead to the level of dissatisfaction and trust in the firm decreasing (Gurler & Ertugut, 2024).

P3:Logistics process performance significantly influences logistics performance gaps.

Logistics Performance Gap and Customer Satisfaction

The Expectation-Disconfirmation Theory states that customer satisfaction is a function of expectations, and where performance does not meets there are performance gaps, customers feel negatively disconfirmed (Oliver, 1980). In logistics, this will be in the form of dissatisfaction from missed deliveries, unexpected charges, and variability in communication. There is a perception by customers that the firm has not delivered on its promises, and customers will express disappointment stemming from those circumstances(Cui et al., 2024).

Negative disconfirmation has a cumulative effect. One misstep may be forgiven, however, repeated inefficiencies will lead to a perception of long-lasting reliability issues. Over time, customers will begin to believe the firm cannot provide reliable service even loyal customers may start to limit their use of that firm, or seek out other (more) reliable firms(Harter et al., 2025).

This places customer satisfaction is in a position of high risk due to reduced logistics process performance. logistics performance gaps leads to breakdown of trust and loyalty which further lowers consumer satisfaction .

P4:Logistics performance gaps negatively influence customer satisfaction.

Global Trade Disruption and Customer Satisfaction

The world's supply chains are severely impacted by disruptions in international trade(Longo et al., 2026). These disruptions have caused extensive delays, created uncertainty, and resulted in inconsistency of service to customers all of which have affected customers' perceptions of the level of reliability, responsiveness and quality service offered by businesses(Gao et al., 2026) .When a companies' delivery schedules become unpredictable or when products are not consistently available because of trade restrictions, geopolitical conflicts, or supply chain disruptions caused by transportation blockages, customers believe less in the dependability of that company's service(Gallino et al., 2023). When customers' believe less in the dependability of a company's service, that affects their trust in that company and, therefore, decreases their overall satisfaction.

Due to ongoing instability in the global trading environment, customer expectations about reliability and fulfillment are changing as well. Therefore, when customers form a general evaluation of service based on environmental uncertainty, they are less satisfied with a company's performance than they would have otherwise. Global trade disruptions can, therefore, have an immediate and negative impact on customer satisfaction.

P5: Global trade disruption negatively affects customer satisfaction.

6. Sequential Transmission Mechanism

The impact of global trade disruption on customer satisfaction unfolds sequentially rather than instantaneously. Trade disruptions first elevate transaction costs through increased monitoring, coordination, and governance requirements. Rising transaction costs then constrain logistics process performance by reducing efficiency and agility. Declining logistics performance produces observable service failures, generating a logistics performance gap between expectations and actual delivery outcomes. This gap ultimately diminishes customer satisfaction.

Thus, transaction cost and logistics process mechanisms jointly transmit the impact of global trade disruption to customer satisfaction.

P6: Transaction cost, logistics process performance, and logistics performance gap sequentially mediate the relationship between global trade disruption and customer satisfaction.

Moderating Role of AI-VRIN-based logistics resources

The Resource-Based View posits that firms possessing valuable, rare, inimitable, and non-substitutable (VRIN) resources achieve sustained competitive advantage, particularly under uncertainty (Schleifenheimer & Ivanov, 2024). In logistics contexts, AI-enabled digital capabilities—such as predictive demand forecasting, machine learning-based risk analytics, intelligent transportation systems, real-time visibility platforms, automated inventory optimization, and integrated decision dashboards—enhance resilience (Wu et al., 2025).

When developed through proprietary data, firm-specific algorithms, and cumulative organizational learning, these technologies evolve into AI-VRIN-based logistics resources (Tanveer et al., 2025). Such resources create value through operational accuracy and responsiveness; they are rare due to embedded knowledge; difficult to imitate because of path dependency and system complexity; and non-substitutable due to deep integration within governance and logistics systems (Jackson et al., 2024).

By implementing AI-VRIN-based logistics resources can alleviate the negative outcomes of disruptions through early detection, restructuring of their supply chain, controlling costs adaptively and by communicating proactively with their customers

(Ma & Chang, 2025) (Qi et al, 2023). Firms that have strong Logistic resource based on AI-VRIN help to limit their transactional costs, maintain logistics efficiency, and reduce the gaps in their performance through adversity (Belhadi et al., 2024). When environment conditions are turbulent, heterogeneity of resources become very important. Resource-rich firms with strong VRIN capabilities are better able to adapt quickly and maintain stability whereas resource constrained firms will suffer larger losses than their counterparts and therefore experience less satisfaction with their customers (Zhou et al.,2025). In this sense, AI-VRIN-based logistics resources function as buffering mechanisms that moderate the relationship between transaction cost and logistics process performance, weakening the negative impact of rising transaction costs on operational efficiency (Chatterjee et al., 2025).

P7: AI-VRIN-based logistics resources moderate the relationship between transaction cost and logistics process performance, such that the negative effect is weaker when VRIN capability is high.

Although prior studies have examined global trade disruption, transaction cost, logistics process performance, logistics performance gap, and customer satisfaction separately, limited research integrates these variables within a unified framework. In particular, the sequential mechanism linking global trade disruption to customer satisfaction through cost and performance dynamics remains underexplored. To address this gap, this study proposes a comprehensive conceptual model incorporating transaction cost, logistics process performance, and logistics performance gap as sequential mediators, with AI-VRIN-based logistics resources as a moderator. The proposed framework is presented in Figure 1.

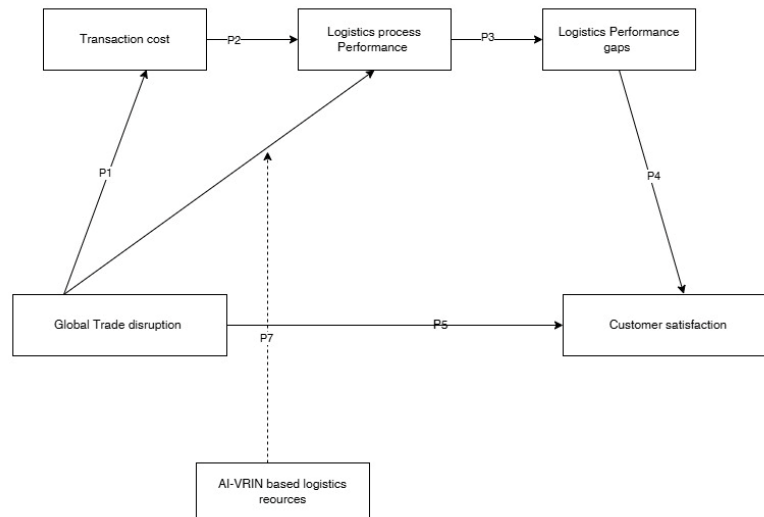


Figure 1. A moderated serial mediation framework explaining the impact of global trade disruption on customer satisfaction.

AI-VRIN-based logistics resources influence how global trade disruption affects logistics process performance. When global trade disruption increases, logistics process performance is likely to decline. However, firms possessing strong AI-VRIN-based logistics resources are better able to maintain coordination, operational stability, and responsiveness during disruption. As a result, the negative impact of global trade disruption on logistics process performance becomes weaker when AI-VRIN-based logistics resources are high. By strengthening logistics process performance under disruption, AI-VRIN-based logistics resources also help limit the expansion of the logistics performance gap and protect customer satisfaction.

Methodology:

This research utilizes a content analysis to validate the framework that connects global trade

disruptions, logistics process performance, and customer satisfaction. This research utilizes a multi-stage, iterative design of research consisting of systematic theory development and validation through the real-world. The research begins with a review of literature to derive theoretical foundations so that the three lenses of theory can then be incorporated into a convergent multi-theory framework. In order to triangulate the convergent multi-theory framework to real-world evidence on disruptions to global trade, various resources were utilized including WTO monitoring and statistical data, UNCTAD Maritime Transport Reviews, World Bank Logistics Studies, IMF World Economic Outlook and industry analysis (for example, DHL Global Connectedness Reports). Consequently, the framework has been developed on a foundation of rigorous theoretical development, as well as on evidence of disruption in global trade that is extensive, reliable and represents a diversity of resources, as demonstrated in figure 1.

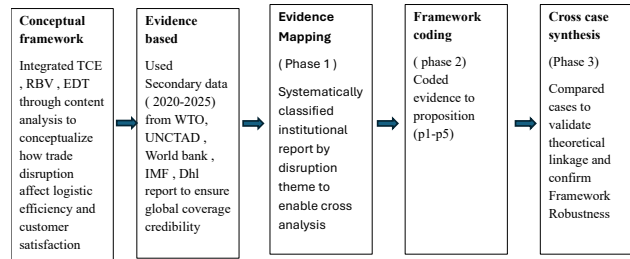


Figure 2: Research Methodology Framework of the Study

Step-by-Step Development of the Framework

An integrated approach is being used to create the proposed framework by combining theory and as well as secondary data sources. The first step in developing the framework was to determine what are the main mechanisms used to know what are the impacts of global trade disruptions on supply chains; these mechanisms are: Governance Costs, Firm-Level Capabilities and Customer Satisfaction Outcomes. When considering TCE, disruptions were viewed as contributing to uncertainty, opportunism, and the lack of contract completeness leading to increased transaction costs. from RBV perspective, AI-VRIN-based logistics resources within firms, such as flexible logistics networks, digital platforms, and trust-based supplier relationships, were used as moderators to lessen or buffer the impact of disruption. With respect to EDT, logistics processes falling below standards of performance generated logistics performance gaps, which ultimately result in negative disconfirmation and decreased customer satisfaction. The development of the framework relied upon an iterative process to strengthen theoretical integration throughout the research, while the empirical validation of the framework was based on a comprehensive range of secondary data sources, including monitoring reports compiled by the WTO (2020 to 2025), the UNCTAD Review of Maritime Transport, and logistics indicators reported by the World Bank. These diverse data sources provide evidence of how the COVID-19 pandemic, the Russia-Ukraine conflict, and the Red Sea incident caused significant disruptions to global supply chains, offering triangulated data to support the applicability and validity of the proposed framework..

Case-Based Validation

To validate the proposed TCE–RBV–EDT framework, a case-based method was used to assess the utility and reliability of the TCE–RBV Framework. Desk-based analysis of global trade disruptions had done using sources including WTO monitoring reports, UNCTAD's Review of Maritime Transport, World Bank Strongest Coastline Ports, and industry studies are used for the validation of the framework's proposed structure. Desk validation was selected based on the systematic documentation of each disruption's impacts by all of the sources listed above; therefore, structured comparisons of cases can be achieved without having to gather primary data sources that require resource allocation. Therefore, this research is consistent with the design of previously established methods of validating frameworks based on secondary sources of data. Although there were many different types of disruptions during this period representing a large number of shocks, this paper has focused on five representative categories of disruption:

- (1) Pandemic/sectoral crises;
 - (2) Geopolitical conflicts;
 - (3) Maritime chokepoints/infrastructure;
 - (4) Climate/environmental;
 - (5) Trade policy/regulation.
- All five categories represent a fundamental principle of disruption based on their impact on logistics performance and customer satisfaction.

Selection of Cases

Two main criteria were used to select disruption types. Each disruption must have a unique and repeatable type of global trade disruption that significantly impacted logistics process performance in order to qualify as representative. In

addition, we wanted to ensure that each disruption was documented comprehensively (breadth and depth) to allow systematic comparison. To fulfill these quality controls, the categories used to perform the synthesis were taken from WTO trade-monitoring reports and were cross-validated against evidence from UNCTAD, the World Bank, and premier industry reports. Comprehensive secondary

data were critical for linking each disruption to the propositions of the integrated conceptual framework. Categories with fragmented or inadequately detailed documentation were excluded to maintain methodological rigour and to ensure that subsequent coding and synthesis rested on a robust theoretical foundation.

Table 1. Key information and selection rationale for case-based validation categories

Disruption Category	Overview	Mechanism / Approach	Representative Reports	Rationale for Selection
Pandemic & Sectoral Crises	Large health shocks and sector-specific shortages that produced abrupt, global trade and logistics disruptions (e.g., COVID-19 trade collapse and subsequent uneven recovery).	Port closures; labour shortages; air-freight capacity fall when passenger flights were grounded; container shortages and high freight/insurance premiums; inventory front-loading and later payback; export restrictions on medical/food items.	WTO World Trade Report 2021; WTO World Trade Statistical Review 2022; UNCTAD Review of Maritime Transport (2024/2025); World Bank Trade Logistics in the Global Economy (2023); DHL Global Connectedness Report 2024.	These reports document direct, quantifiable impacts (e.g., trade volume collapses and freight-rate spikes) and are essential for logistics managers designing contingency plans, inventory and capacity strategies.
Geopolitical Conflicts	Wars, sanctions and tariff disputes that fragment trade, raise risk premia and alter sourcing patterns (e.g., Russia–Ukraine war; US–China tariff actions; Middle-East incidents affecting oil premiums).	Tariffs and trade restrictions; export bans and sanctions; rerouting of flows; selective decoupling; higher insurance and bunker costs; trade policy uncertainty prompting front-loading or investment shifts.	IMF World Economic Outlook Update (Jul 2025); WTO Annual Report 2025; WTO Report on G20 Trade Measures (2023–24); DHL Global Connectedness Report 2024; World Bank trade briefs.	Well-documented across macro and trade monitors — shows how political shocks raise logistics costs, force re-routing and require managers to reassess supplier diversification and contract terms.
Maritime Chokepoints & Infrastructure	Disruptions at strategic sea routes and infrastructure (Suez, Red Sea, Panama, Cape detours, port congestion) that produce longer transit times, capacity stress and schedule unreliability.	Canal blockages and reduced transits (e.g., Suez incidents); Red Sea attacks → rerouting via Cape of Good Hope (longer voyages, more bunker use); Panama drought → draft restrictions and fewer transits; port-call reshuffling and increased dwell times.	UNCTAD Review of Maritime Transport 2024/2025; WTO Global Trade Outlook & Statistics (Apr 2024); DHL Global Connectedness Report 2024; World Bank Trade Logistics in the Global Economy (2023).	Incident reports and indices in these sources quantify route/time/cost effects — directly relevant for route planning, schedule buffers, routing cost trade-offs and contingency routing decisions by logistics managers.
Climate & Environmental Shocks	Extreme weather and long-term climate trends that damage or degrade transport infrastructure and restrict capacity.	Droughts reducing canal draft/capacity; floods, cyclones and storms damaging ports/rail links; sea-level rise and chronic erosion affecting terminal operations; weather-related	UNCTAD Review of Maritime Transport (2024/25); WTO World Trade Report 2021; World Bank Trade Logistics in	These reports identify climate-driven interruptions as increasing in frequency/severity — important for investment decisions

		shipment delays and commodity supply shocks.	the Global Economy (2023); DHL Global Connectedness Report 2024.	(resilience, insurance, alternative routings) and long-term infrastructure planning.
Trade Policy & Regulatory Shocks	Trade policy and sustainability regulations that change incentives, create compliance costs, and can restrict or reroute trade flows.	Tariff increases and new trade-restrictive measures; export restrictions and trade remedies; new decarbonization/monitoring mandates (e.g., FuelEU, EU ETS implications for shipping); digital reporting/safety rules raising administrative burdens.	WTO Annual Report 2025; WTO Report on G20 Trade Measures; WTO/OECD Aid for Trade at a Glance 2024; UNCTAD Review of Maritime Transport; IMF WEO Update (Jul 2025).	Policy changes are non-physical but immediately affect cost, route choice, and supplier selection; these sources document the scale and pace of regulatory/tariff changes — vital for compliance planning, contract clauses and total landed-cost calculations.

4.3 Validation

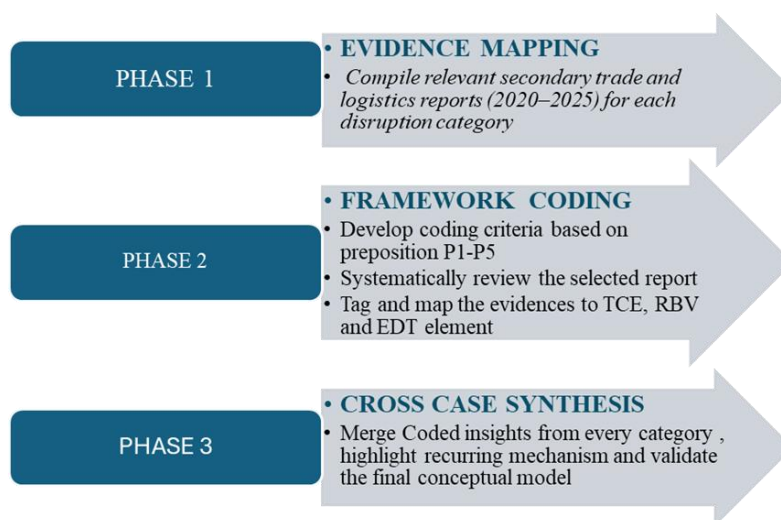


Figure 3 : Validation Process (Evidence Mapping, Framework Coding, Cross-Case Synthesis)

Phase 1. Evidence Mapping

The evidence mapping process involved systematically reviewing a select set of reports to identify and connect trends among five categories of trade-related disruptions. A detail-oriented review of all reports allowed relevant insights to be extracted from each report and ultimately linked to predetermined analytical categories through the selection process of reports. Reports were selected based on three criteria: (i) they were relevant to at least one of the disruption categories; (ii) they had systematically documented the influence of logistics process performance on consumer satisfaction; and (iii) they contained rigorously documented cases that offered either predictive statistical generalizability or theoretical generalization from heterogeneous settings. This allowed for deductive coding and cross-case synthesis.

Table 2 below lists the evidence set compiled in Phase 1 and summarizes key disruptions documented in the identified multi-lateral and industry reports.

Report (Source / Name / Year)	Pandemic & Sectoral Crises	Geopolitical Conflicts & Trade Tensions	Maritime Chokepoints & Infrastructure	Climate & Environmental Shocks	Trade Policy & Regulatory Shocks
UNCTAD-Review of Maritime Transport 2025	Residual COVID labour & equipment shortage kept freight rates high; irregular demand spikes.	Russia-Ukraine war & Red Sea crisis leads to rerouting, higher bunker & insurance costs.	Cape diversions & port reshuffle extended voyages Shanghai Containerized Freight Index averaged about 2,500 points in 2024 (≈150 % higher than 2023) and peaked near 3,600 amid global rerouting.	EU-ETS, FuelEU add ~€60 per forty-foot container on Far-East–Europe routes by 2025—and require investment in low-sulphur fuels, alternative propulsion, and emissions-monitoring systems.	IMO net-zero & digital reporting ,Tighter safety rules & documentation ↑ contractual complexity.
UNCTAD-Review of Maritime Transport 2024	Trade +2.4% but pandemic vulnerabilities remain.	Ukraine war, Red Sea attacks; risk in Turkish Straits & Hormuz.	Suez & Panama transits –50% vs 2021–23; Cape diversions ↑ demand 12%, speed 25%, bunker use 3×.	Panama drought limits capacity; long-term climate threats to ports/shipping.	Decarbonization rules, stricter registry checks, climate-risk clauses, heavy port digitalization.
WTO-Annual Report 2025	COVID lessons for rapid-response; lingering health-crisis risk.	High policy uncertainty; 2025 merchandise trade forecast – 0.2%.	—	—	new trade restrictions; MC13 keeps moratorium on digital customs duties; dispute-settlement reforms ↑ compliance.
WTO-Global Trade Outlook & Statistics April 2024	Post-COVID “poly-crisis”; trade –1.2% in 2023.	Ukraine war & Middle-East conflict fragment trade.	Red Sea attacks forced Cape rerouting adding ~10 days to Asia–EU journeys; Panama drought limits transit.	High commodity volatility; EU gas +84% vs 2019.	Rising protectionism; interest hikes ↑ financial risk.
WTO-G20 Trade Measures 2024	Many pandemic measures rolled back.	Geopolitical tensions; frequent climate crises add uncertainty.	—	—	91 new restrictive goods measures (~\$829B trade); total G20 import restrictions \$2.3T.
WTO/OECD-Aid for Trade 2024	Developing economies face post-COVID debt & supply-chain strain.	Shifting geopolitics pressure supply-chain resilience.	—	Aid for Trade transport/storage ↑28% to \$27.9B (rail +118% vs 2020); 77% partners prioritize climate mitigation.	Digital/green trade reforms demand high financing & institutional change.



WTO-World Trade Statistical Review 2022	2020 merchandise trade -5.2%, 2021 +9.7%; port congestion & high freight rates persist.	Early Ukraine war caused energy & grain shocks.	Container throughput record Aug 2022 but China outbreaks disrupted schedules.	EU gas price +118% Year on year by Sept 2022; food security risk.	Widespread export restrictions on food/fertilizers ↑ costs & uncertainty.
WTO-World Trade Report 2021	COVID cut goods/services trade -9.6% in 2020; global value chains transmitted shocks.	Political uncertainty raises risk of amplified shocks.	—	Climate change ↑ droughts, floods, cyclones (\$3.6T losses 1980–2020).	High ICT tariffs & export bans slowed digital adoption.
World Bank-Connecting to Compete 2023	COVID logistics disruptions; air-freight capacity decreases .	Russia-Ukraine war leads to increase in energy & food prices; disrupted Europe–Asia rail/air.	Long port dwell times delay shipping.	Extreme weather interrupts transport networks.	Complex customs procedures increase transit & compliance time.
DHL / NYU Stern-Global Connectedness 2024	During COVID, travel stopped; digital flows surged.	U.S.–China flows -25% since 2016; Russia shifted trade away from Europe after the Ukraine invasion	Red Sea attacks, Suez blockage, Panama drought show supply resilience.	Panama drought is a climate risk example.	Global “re-globalisation” agenda; limited subsidies for strategic supply chain relocation.
IMF-World Economic Outlook Update July 2025	Residual COVID trade shifts; uneven recovery.	US–China tariff disputes; Iran–Israel strikes briefly increase oil premiums.	—	Energy/climate shocks influence inflation.	Sectoral tariffs (electronics, pharma) increase costs; fiscal packages support demand.

Phase 2. Framework Coding

In this phase, the selected institutional reports chosen for analysis were thoroughly coded according to the five propositions of the integrated conceptual framework (P1-P5). Each report was carefully read, and the portions of text that were relevant were coded by propositions. The coding rules were determined a priori for uniformity of coding (e.g., fuel surcharges or compliance costs were coded as P1 [transaction costs], congestion and delays due to rerouting were coded as P2 [logistics process performance], delivery unreliability was coded as P3 [logistics performance gaps], customer

satisfaction was coded as P4 [consumer satisfaction], and adaptive strategies such as digital visibility and flexible were coded as P5 [AI-VRIN-based logistics resources]. This coding procedure assured that the evidence was experienced and coded consistently across institutional reports, while also assuring that the evidence related back to a theoretical framework. With synthesized evidence in this organized structure and constructed level of intent, the coding table also provides transparency between evidence in practice and the conceptual propositions, as the foundation for synthesis for the next phase.

Table 3 condenses this coding table by synthesis and demonstrates how the institutional reports align with propositions.

Report (Source / Name / Year)	P1	P2	P3	P4-P5	P7
UNCTAD-Review of	Higher transaction	Reduced logistics	Clear service-performance	Negative customer	Strong resource endowments—

Maritime Transport 2025	costs arising from fuel surcharges, war-risk insurance premiums, and carbon-compliance requirements.	efficiency caused by longer voyage times, capacity constraints, and port congestion.	gaps created by delivery delays and unexpected freight surcharges.	disconfirmation resulting from late deliveries and elevated prices.	alliances, flexible routing, digital visibility systems, and low-emission fleets—mitigated disruption impacts.
UNCTAD-Review of Maritime Transport 2024	Red Sea attacks and Panama Canal drought forced rerouting around the Cape of Good Hope, adding crew, charter, insurance and fuel costs; EU Emissions Trading System charges and Panama Canal tolls further raised transport costs.	Rerouting increased average voyage distance and ton-mile demand (container-ship demand up 12%, sailing speeds up ~25%), creating congestion and capacity strain.	Disruptions in Suez and Panama cut transits by over 50 % from recent peaks, causing delivery delays, volatile freight and charter rates, and schedule unreliability.	Shippers—especially SIDS and LDCs—faced sharply higher freight bills (Shanghai Containerized Freight Index near 9 000 by July 2024) and food-price impacts, producing unmet service expectations and inflationary pressure.	Governments and industry pursued resilience through port digitalization, diversified routing, dry-port and corridor investments, collaborative chokepoint management, fleet greening/renewal initiatives, and stronger ship-registry verification to counter the “dark fleet.”
WTO World Trade Report 2021: Economic Resilience and Trade; World Trade Statistical Review 2022; Aid for Trade at a Glance 2024; Report on G20 Trade Measures (Mid-Oct 2023–Mid-Oct 2024); Global Trade Outlook and Statistics – April 2024; Annual Report 2025 (2021–2025)	COVID-19 triggered a 5.2 percent drop in merchandise trade in 2020, followed by a 9.7 percent rebound in 2021. Successive export bans, high tariffs, and 91 new G20 trade-restrictive measures (covering USD 828.9 billion) raised compliance and transaction costs; the stock of G20 import restrictions climbed to USD 2.3 trillion (~12.7 percent of G20 imports).	WTO reports explicitly note global supply-chain disruptions and logistics bottlenecks, including port congestion, container shortages and rerouting, which slowed the movement of goods and reduced logistics efficiency.	These documented conditions—congestion, volatile freight rates and sudden restrictions—produced delays and reliability problems in shipment schedules, even though the reports do not provide shipment-level timing data.	The resulting cost spikes and unpredictable delivery times meant importers and consumers faced higher prices and uncertain arrivals, undermining service expectations and satisfaction.	Aid for Trade 2024 highlights increased funding for transport and storage infrastructure (up 28 percent to USD 27.9 billion in 2022) and support for digital and climate-resilient projects, illustrating how countries strengthened trade capacity to cope with repeated shocks.
World Bank-Connecting to Compete 2023	Pandemic-era shocks drove surging freight rates and	The report states that global supply chains were	Describes how congestion and variability in port and	Notes that these delays and unpredictable transit times left	Highlights that countries investing in digital trade systems, upgraded



	higher operating costs during 2020–22 as container shortages and transport interruptions strained supply chains.	disrupted, with long port dwell times—often several days—and added delays for land-locked and small-island economies dependent on trans-shipment hubs, reducing overall logistics efficiency.	border processes produced unreliable transit times and schedule variability, signalling service-performance gaps.	shippers and importers facing longer lead times and difficulty meeting customer delivery expectations, creating dissatisfaction.	infrastructure, and coordinated border management achieved stronger performance and were better able to maintain reliability during shocks.
DHL / NYU Stern-Global Connectedness 2024	Temporary freight-rate spikes during Covid-19 and again after Red Sea attacks increased coordination and shipping costs.	Suez blockage, Panama low water, Red Sea attacks lengthened voyages, but global flows “remained near record highs,” showing strong overall efficiency.	Route disruptions created short-term delivery delays and higher surcharges, yet most trade lanes stayed open.	Public “negativity bias” led customers to expect worse service than actually occurred; most goods moved smoothly, limiting negative disconfirmation.	Firms and governments adapted by dual-sourcing, holding more inventory, and investing in digital supply-chain visibility, sustaining resilience despite shocks.
IMF-World Economic Outlook Update Jul 2025	Effective U.S. tariff rate assumed at 17.3% (vs 24.4% in April forecast); pauses are temporary and letters threaten higher tariffs—keeping trade-policy uncertainty elevated. Front-loading of trade and risks of sectoral tariffs (electronics, pharma) imply added coordination and contracting costs.	Many companies are shipping goods earlier than usual (“front-loading”) to avoid possible new tariffs. This gives a short boost to trade in 2025 but may cause a slowdown in 2026 when orders even out.. Risks note that shipping routes and supply chains may be disrupted if infrastructure is damaged.	Tariff pass-through raises some U.S. consumer and intermediate input costs; possible inventory overhang could cut import orders more than projected—creating short-term service/cost mismatches.	Despite shocks, activity has been “so far, so resilient”; global growth 3.0% (2025), 3.1% (2026). Still, higher tariffs or renewed measures would dampen growth and confidence (negative disconfirmation risk).	IMF advises predictable trade frameworks, cooperation to reduce barriers, and scenario/contingency planning; such steps enhance resilience to external shocks and support investment in trade linkages.

Phase 3. Cross-Case Synthesis

The coding results are the foundation of the cross-case synthesis; the cross-case synthesis provides

consistent support for Propositions P1 through P5 and P7. Across UNCTAD (2024; 2025), WTO (2021–2025), World Bank (2023), DHL/NYU Stern (2024), and IMF (2025) reports, global trade disruptions—including Red Sea attacks, Panama Canal drought, tariff escalations, export restrictions, and front-loading behaviour—systematically increased uncertainty, coordination burdens, insurance premiums, fuel surcharges, and compliance costs. The IMF (2025) further highlights elevated tariff rates and persistent policy uncertainty, reinforcing rising contracting and transaction costs (P1). These higher costs were repeatedly associated with port congestion, container shortages, longer voyage distances, and rerouting pressures, demonstrating reduced logistics process performance (P2). In turn, delays, volatile freight rates, and schedule unreliability created observable logistics performance gaps (P3), which translated into higher prices, longer lead times, and unmet service expectations, thereby weakening customer satisfaction (P4–P5).

The synthesis also reveals systematic variation in impact severity across cases. Reports consistently show that systems equipped with digital visibility platforms, diversified routing strategies, infrastructure upgrades, coordinated border management, and resilient supply-chain capabilities were better able to stabilize operations under disruption (UNCTAD, 2024; 2025; WTO, 2024; World Bank, 2023; DHL/NYU Stern, 2024; IMF, 2025). These recurring patterns support Proposition P7 by demonstrating that AI-VRIN-based logistics resources mitigate the negative effect of disruption-induced transaction cost pressures on downstream logistics performance and customer outcomes. Collectively, the repeated presence of these mechanisms across independent sources reinforces the analytical validity of the proposed moderated mediation framework.

Discussion and Implications

This paper discusses the impact of global trade disruptions on logistics process performance and consumer satisfaction. The conceptual framework shows that disruptions to global trade increase firms' operational complexity and uncertainty due to

increased transaction costs associated with the increased effort required for monitoring, negotiating and coordinating. These increased transaction costs have negative effects on logistics process performance, create logistics performance gaps and ultimately impact consumers satisfaction. The framework uses Transaction Cost Economics (TCE), Expectation Disconfirmation Theory (EDT), and the Resource-Based View (RBV).

Previous research on global trade disruption has primarily focused on the effect of a global supply chain on logistics efficiency, supply chain resilience and network reconfiguration. A significant amount of literature examines how businesses respond to trade wars, geopolitical tensions and pandemics by engaging in reshoring, nearshoring or decoupling activities. Therefore, TCE has also been widely used to demonstrate that businesses have the ability to change their governance structures as a result of or in response to the increased uncertainty associated with the disruption. Prior studies have found that transaction costs rise in response to trade disruptions; however, most studies do not examine these transaction costs to explain the effect on logistic process performance. This study goes beyond existing research by showing that increased complexity and uncertainty raise transaction costs, which directly reduce logistics process performance and create logistics performance gaps. These gaps represent observable service failures that arise when reduced logistics process performance prevents firms from delivering reliable, timely, and consistent services to consumers under disrupted trade conditions. While logistics problems are widely discussed in terms of cost increases or coordination challenges, their impact on consumer satisfaction has largely been ignored. By applying Expectation Disconfirmation Theory, this study explains that logistics performance gaps lead to negative expectation disconfirmation when delivery speed, reliability, or cost stability fail to meet consumer expectations. When these performance gaps continue to exist, consumers (as well as firms) become dissatisfied regardless of the formal change in management's approach towards cost reduction or redesigning supply chains.

Also, the study found that not all firms were affected equally by global trade disruptions; firms that use valuable, rare, inimitable, and non-substitutable (VRIN) resources were able to manage uncertainty in their logistics processes and control transaction costs through improved logistics process performance and, thereby, close their logistics performance gaps; these VRIN resources allowed the firms to maximize flexibility, coordination and responsiveness so that they could preserve the consumer's level of satisfaction during periods of global trade disruption. Conversely, for firms lacking AI-VRIN-based logistics resources and having greater size and persistence in their logistics performance gaps, the potential for consumer dissatisfaction is increased.

Ultimately, the study shows that in order to understand how global trade disruption impacts logistics performance, it is necessary to consider more than supply chain design/effectiveness. Global trade disruption influences logistics process performance, creates logistics process performance gaps and ultimately leads to affecting the consumer's level of satisfaction. By integrating transaction cost economics (TCE), the environmental dynamic theory (EDT), and the resource-based view (RBV), this research provides a comprehensive explanation of why logistics performance gaps arise and the crucial role that VRIN resources play in moderating the negative impact of global trade disruption on consumers during periods of high uncertainty.

Theoretical Implications

Through the creation and validation of an integrated theoretical framework, this research contributes to our theoretical understanding of global disruptions in trade. By integrating three complementary approaches, we present a multidimensional view of how logistics process performance and customer satisfaction are impacted by disruptions. The Transaction Cost Economics (TCE) perspective suggests that uncertainty and opportunistic behaviour will increase governance costs and reduce the efficiency of coordination. The Resource-based View (RBV) provides an internal explanation of the ways in which a firm's internal capabilities can help

mitigate governance costs and sustain performance after disruption. Expectation Disconfirmation Theory (EDT), gives us the customer perspective of how operating and performance deficiencies can produce negative disconfirmation and ultimately reduce customer satisfaction. Through TCE, RBV, and EDT, this integrated framework will help to provide an overall systematic and comprehensive understanding of the impact of disruptions in globalisation on trade and contribute to the current knowledge base within both supply chain and marketing literature.

Managerial Implications

The present study contributes practical recommendations for international supply chain managers, logistics practitioners and decision makers interested in bolstering their resilience in a volatile worldwide environment. The research establishes a compelling rationale for firms to invest in AI-VRIN-based logistics resources, which can support the potential to anticipate and absorb shocks with their disruption, allowing for efficiency in logistics operations in a disrupted situation. In order to determine what to do, managers need an investment strategy focusing on implementing digital visibility systems (real-time tracking technology, predictive analytics dashboards, and advanced demand planning using AI) that allow managers to proactively detect potential bottlenecks, reroute products as necessary, and reduce uncertainty across their logistics network. Firms should also develop their operational flexibility through using adaptive routing infrastructure (multimodal transportation options, backup carriers, and different geographic distribution points). This allows firms to respond with greater flexibility to port closures or interruptions due to political events or other external disruptions. In addition, through establishing trust-based relationships with suppliers through long-term contracts, shared risk agreements, and collaborative communication, companies can minimize both the potential for opportunistic behaviour during disruptions and increase transaction costs.

Improving governance systems and coordination mechanisms for managing risk has to take place as

well. This includes being able to develop proactive contingency plans, developing trade disruption early warning systems, and creating cross-organizational response teams that can mobilize quickly when you have a disruption. Equally important is institutionalizing transparent compliance practices, as these can all help reduce time lost in negotiations, documentation errors, and compliance bottlenecks in regulatory processes - all of which can increase transaction costs in uncertain environments.

Managers should invest in infrastructure that can withstand long-term climate impacts. Floods, droughts, and even the temporary closure of port cities are becoming more frequent and can severely impede or shut down logistics and transportation. Businesses need to take measures to make warehouses more resilient, use vehicles for transportation not easily shut down by extreme weather, and collaborate with infrastructure organization to keep transportation moving regardless of the situation or weather. By adopting such strategies, companies provide their operations with the capability to continue during product supply disruptions associated with disasters while potential gaining a competitive advantage amidst mounting global regulatory pressures on sustainability and carbon emissions.

The research also aims to include some emphasis on international collaboration and policy involvement. Companies can eliminate the series of problems faced during crisis episodes by working with global regulators, global trade associations, and cross border agencies. Aligning documentation requirements, stabilizing trade policy, and enhancing the border processes will help maintain smooth operations. Alignment to improve collaboration by joint participation in open conversations, cross platform/common platform discussions and participation in scenario planning can prepare companies for regulatory changes and potentially reduce any long term uncertainty created as a result of crisis in a connected world.

By employing these solid governance strategies, creating strategic resources, working on climate-relevant risks, and increasing global collaboration, companies can design opportunities out of

disruption-led challenges. This approach enhances resilience, enables operational continuity, and creates updated confidence with customers even in highly tumultuous trade environments.

Conclusion

This study aimed to demonstrate that persistent global trade disruptions such as pandemics, geopolitical friction, port blockages, and environmental events collectively affect logistics efficiency and customer-related outcomes. While previous studies investigated individual disruptions or examined disruptions related to logistical contexts circumscribed to specific industries, this study considered the larger and cumulative impact of global instability on logistics operations. Leveraging Transaction Cost Economics, the Resource-Based View, and Expectation–Disconfirmation Theory, the analysis shows how governance dilemmas, resource constraints, and gaps in customer expectations play out during disruptions. Utilizing institutional evidence from WTO, UNCTAD, World Bank, IMF, and DHL, the analysis developed a multi-theory framework that elucidated how global shocks shape logistics performance at the firm level, while also shaping customer satisfaction . and the findings shows that that improving resilience does not merely require addressing operational inefficiency, but also requires strengthened governance choices, increased capabilities at the firm level.

References :

1. Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
2. Belhadi, A., Mani, V., Kamble, S. S., Khan, S. A. R., & Verma, S. (2024). Artificial intelligence-driven innovation for enhancing supply chain resilience and performance under the effect of supply chain dynamism: An empirical investigation. *Annals of Operations Research*, 333(2–3), 627–652. <https://doi.org/10.1007/s10479-021-03956-x>
3. Chatterjee, S., Chaudhuri, R., Vrontis, D., & Thrassou, A. (2025). Revisiting the resource-based view (RBV) theory: From cross-functional capabilities perspective in post COVID-19 period. *Journal of Strategic Marketing*, 33(6), 822–837.

- <https://doi.org/10.1080/0965254X.2023.2182447>
4. Chen, Y., Liu, L., Shi, V., Zhang, Y., & Zhu, J. (2020). The Optimization of a Virtual Dual Production-Inventory System under Dynamic Supply Disruption Risk. *Complexity*, 2020, 1–12. <https://doi.org/10.1155/2020/7067502>
 5. Coase, R. H. (1937). The Nature of the Firm. *Economica*, 4(16), 386–405. <https://doi.org/10.1111/j.1468-0335.1937.tb00002.x>
 6. Cui, R., Lu, Z., Sun, T., & Golden, J. M. (2024). Sooner or Later? Promising Delivery Speed in Online Retail. *Manufacturing & Service Operations Management*, 26(1), 233–251. <https://doi.org/10.1287/msom.2021.0174>
 7. DHL & NYU Stern. (2024). *DHL Global Connectedness Report 2024*. <https://www.dhl.com/global-en/microsites/core/global-connectedness/report.html>
 8. Dirzka, C., & Acciaro, M. (2022). Global shipping network dynamics during the COVID-19 pandemic's initial phases. *Journal of Transport Geography*, 99, 103265. <https://doi.org/10.1016/j.jtrangeo.2021.103265>
 9. Fan, D., Ma, P., Cui, L., & Yiu, D. W. (2024). Locking in overseas buyers amid geopolitical conflicts. *Journal of Operations Management*, 70(5), 756–792. <https://doi.org/10.1002/joom.1316>
 10. Gallino, S., Karacaoglu, N., & Moreno, A. (2023). Need for Speed: The Impact of In-Process Delays on Customer Behavior in Online Retail. *Operations Research*, 71(3), 876–894. <https://doi.org/10.1287/opre.2022.2262>
 11. Gao, C., Peinkofer, S. T., & Griffis, S. E. (2026). Are We Delivering What Customers Want? Charting Logistics Service Quality Research—A Process View. *Journal of Business Logistics*, 47(1), e70050. <https://doi.org/10.1111/jbl.70050>
 12. Gereffi, G., Posthuma, A. C., & Rossi, A. (2021). Introduction: Disruptions in global value chains – Continuity or change for labour governance? *International Labour Review*, 160(4), 501–517. <https://doi.org/10.1111/ilr.12333>
 13. Ginn, W., & Saadaoui, J. (2025). Do Supply Chain Disruptions Matter for Global Economic Conditions? *The World Economy*, 48(7), 1534–1551. <https://doi.org/10.1111/twec.13713>
 14. Golgeci, I., Roscoe, S., Gligor, D. M., & Oh, C. H. (2025). Advancing the sociopolitical view of supply chain management. *International Journal of Operations & Production Management*, 45(5), 955–984. <https://doi.org/10.1108/IJOPM-03-2025-0175>
 15. Golgeci, I., Roscoe, S., Gligor, D. M., & Oh, C. H. (2025). Advancing the sociopolitical view of supply chain management. *International Journal of Operations & Production Management*, 45(5), 955–984. <https://doi.org/10.1108/IJOPM-03-2025-0175>
 16. Grant, R. M. (1991). The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation. *California Management Review*, 33(3), 114–135. <https://doi.org/10.2307/41166664>
 17. Grover, V., & Malhotra, M. K. (2003). Transaction cost framework in operations and supply chain management research: Theory and measurement. *Journal of Operations Management*, 21(4), 457–473. [https://doi.org/10.1016/S0272-6963\(03\)00040-8](https://doi.org/10.1016/S0272-6963(03)00040-8)
 18. Guan, M., Lim, A.-F., & Keoy, K.-H. (2025). Metaverse dynamics: Enhancing trust, information sharing, and sustainable supply chain resilience. *Supply Chain Management: An International Journal*, 1–17. <https://doi.org/10.1108/SCM-02-2025-0122>
 19. Guo, X., & Li, R. (2025). Climate physical risks and corporate supply chain resilience: How do investor sentiment and risk-taking behaviors influence supply chain operations? *Finance Research Letters*, 85, 107903. <https://doi.org/10.1016/j.frl.2025.107903>
 20. Gurler, H. E., & Ertugut, R. (2024). Logistics service failures and recovery strategies: Is the response time or the discount amount more important? *Marketing Intelligence & Planning*, 42(7), 1299–1329. <https://doi.org/10.1108/MIP-07-2023-0372>
 21. Harter, A., Stich, L., & Spann, M. (2025). The Effect of Delivery Time on Repurchase Behavior in Quick Commerce. *Journal of Service Research*, 28(2), 211–227. <https://doi.org/10.1177/10946705241236961>
 22. Hohenstein, N.-O. (2022). Supply chain risk management in the COVID-19 pandemic: Strategies and empirical lessons for improving global logistics service providers' performance. *The International Journal of Logistics Management*, 33(4), 1336–1365. <https://doi.org/10.1108/IJLM-02-2021-0109>
 23. International Monetary Fund. (2025). *World economic outlook update, July 2025: Global economy – Tenuous resilience amid persistent*

- uncertainty.
<https://www.imf.org/en/Publications/WEO/Issues/2025/07/29/world-economic-outlook-update-july-2025>
24. Islam, Md. M. (2025). US-China bi-lateral mineral trade and energy transition in the landscape of global value chain pressures, geo-economic fragmentation and US-China geopolitical risks. *Applied Energy*, 399, 126506.
<https://doi.org/10.1016/j.apenergy.2025.126506>
 25. Ivanov, D. (2024). Transformation of supply chain resilience research through the COVID-19 pandemic. *International Journal of Production Research*, 62(23), 8217–8238.
<https://doi.org/10.1080/00207543.2024.2334420>
 26. Ivanov, D. (2024). Transformation of supply chain resilience research through the COVID-19 pandemic. *International Journal of Production Research*, 62(23), 8217–8238.
<https://doi.org/10.1080/00207543.2024.2334420>
 27. Ivanov, D. (2025). When is the supply chain resilient? Customer and operational perspectives. *International Journal of Production Research*, 63(15), 5512–5527.
<https://doi.org/10.1080/00207543.2025.2454331>
 28. Jackson, I., Ivanov, D., Dolgui, A., & Namdar, J. (2024). Generative artificial intelligence in supply chain and operations management: A capability-based framework for analysis and implementation. *International Journal of Production Research*, 62(17), 6120–6145.
<https://doi.org/10.1080/00207543.2024.2309309>
 29. Jarašūnienė, A., & Gelžinis, M. (2025). Risk and Crisis Management Strategies in the Logistics Sector: Theoretical Approaches and Practical Models. *Future Transportation*, 5(2), 74.
<https://doi.org/10.3390/futuretransp5020074>
 30. Jeong, Y., Kim, G., & Moon, I. (2025). Reliable container supply chain under disruption. *Annals of Operations Research*, 349(2), 1345–1378.
<https://doi.org/10.1007/s10479-022-05068-6>
 31. Kawa, A., & Zdrenka, W. (2024). Logistics value in e-commerce and its impact on customer satisfaction, loyalty and online retailers' performance. *The International Journal of Logistics Management*, 35(2), 577–600.
<https://doi.org/10.1108/IJLM-02-2023-0078>
 32. Ketokivi, M., & Mahoney, J. T. (2020). Transaction Cost Economics As a Theory of Supply Chain Efficiency. *Production and Operations Management*, 29(4), 1011–1031.
<https://doi.org/10.1111/poms.13148>
 33. Khalek, S. A., Dey, D., Chakraborty, A., & Samanta, T. (2025). “From expectations to frustrations”: Dissecting negative experiences to understand negative word-of-mouth in online grocery services. *Journal of Retailing and Consumer Services*, 84, 104221.
<https://doi.org/10.1016/j.jretconser.2024.104221>
 34. Li, P., Chen, Y., & Guo, X. (2025). Digital transformation and supply chain resilience. *International Review of Economics & Finance*, 99, 104033.
<https://doi.org/10.1016/j.iref.2025.104033>
 35. Lima, B., Ganga, G. M. D., Godinho Filho, M., De Santa-Eulalia, L. A., Thüerer, M., Queiroz, M. M., & Moraes, K. K. (2025). Timing and interdependencies in blockchain capabilities development for supply chain management: A resource-based view perspective. *Industrial Management & Data Systems*, 125(5), 1645–1685. <https://doi.org/10.1108/IMDS-09-2024-0859>
 36. Longo, F., Mirabelli, G., & Solina, V. (2026). A simulation model for addressing supply chain disruptions under a multi-capital sustainability perspective: A case study in the agri-food sector. *Journal of Simulation*, 20(1), 1–18.
<https://doi.org/10.1080/17477778.2024.2341015>
 37. Ma, L., & Chang, R. (2025). How big data analytics and artificial intelligence facilitate digital supply chain transformation: The role of integration and agility. *Management Decision*, 63(10), 3557–3598.
<https://doi.org/10.1108/MD-10-2023-1822>
 38. Mentzer, J. T., Flint, D. J., & Hult, G. T. M. (2001). Logistics Service Quality as a Segment-Customized Process. *Journal of Marketing*, 65(4), 82–104.
<https://doi.org/10.1509/jmkg.65.4.82.18390>
 39. Moder, P., & Hoberg, K. (2025). Predicting complaints in semiconductor order fulfilment with machine learning. *International Journal of Production Research*, 63(13), 4776–4799.
<https://doi.org/10.1080/00207543.2024.2442548>
 40. Moradlou, H., Reefke, H., Skipworth, H., & Roscoe, S. (2021). Geopolitical disruptions and the manufacturing location decision in multinational company supply chains: A Delphi

- study on Brexit. *International Journal of Operations & Production Management*, 41(2), 102–130. <https://doi.org/10.1108/IJOPM-07-2020-0465>
41. Oliver, R. L. (1980). A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions. *Journal of Marketing Research*, 17(4), 460–469. <https://doi.org/10.1177/002224378001700405>
42. Oliver, R. L. (1980). A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions. *Journal of Marketing Research*, 17(4), 460–469. <https://doi.org/10.1177/002224378001700405>
43. Oliver, R. L. (1993). Cognitive, Affective, and Attribute Bases of the Satisfaction Response. *Journal of Consumer Research*, 20(3), 418. <https://doi.org/10.1086/209358>
44. Organisation for Economic Co-operation and Development & World Trade Organization. (2024). *Aid for trade at a glance 2024*. https://www.wto.org/english/res_e/publications_e/a4tatglance2024_e.htm
45. Panwar, R., Pinkse, J., & De Marchi, V. (2022). The Future of Global Supply Chains in a Post-COVID-19 World. *California Management Review*, 64(2), 5–23. <https://doi.org/10.1177/00081256211073355>
46. Penrose, E. (1995). *The Theory of the Growth of the Firm* (3rd ed.). Oxford University PressOxford. <https://doi.org/10.1093/0198289774.001.0001>
47. Peteraf, M. A. (1993). The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal*, 14(3), 179–191. <https://doi.org/10.1002/smj.4250140303>
48. Priem, R. L., & Butler, J. E. (2001). Is the Resource-Based “View” a Useful Perspective for Strategic Management Research? *Academy of Management Review*, 26(1), 22–40. <https://doi.org/10.5465/amr.2001.4011928>
49. Qi, B., Shen, Y., & Xu, T. (2023). An artificial-intelligence-enabled sustainable supply chain model for B2C E-commerce business in the international trade. *Technological Forecasting and Social Change*, 191, 122491. <https://doi.org/10.1016/j.techfore.2023.122491>
50. Schiebler, T., Lee, N., & Brodbeck, F. C. (2025). Expectancy-disconfirmation and consumer satisfaction: A meta-analysis. *Journal of the Academy of Marketing Science*. <https://doi.org/10.1007/s11747-024-01078-x>
51. Schleifenheimer, M., & Ivanov, D. (2024). Pharmaceutical retail supply chain responses to the COVID-19 pandemic. *Annals of Operations Research*. <https://doi.org/10.1007/s10479-024-05866-0>
52. Seo, S., Su, J., & Hodges, N. (Nelson). (2026). Measuring Consumer Perceived Values: Development and Validation of a Scale to Investigate Self-Gifting and Consumer Satisfaction. *Journal of Consumer Behaviour*, 25(1), 85–101. <https://doi.org/10.1002/cb.70059>
53. Singh, S., Kumar, R., Panchal, R., & Tiwari, M. K. (2021). Impact of COVID-19 on logistics systems and disruptions in food supply chain. *International Journal of Production Research*, 59(7), 1993–2008. <https://doi.org/10.1080/00207543.2020.1792000>
54. Suson, R., Rivero, D. M., Arnejo, A., Atibing, N. M., Aro, J. L., Burdeos, A., Yamagishi, K., & Ocampo, L. (2023). Customer Loyalty during Disasters: The Case of Internet Service Providers Amidst Typhoon Odette in Central Philippine Urban Districts. *Urban Science*, 7(2), 55. <https://doi.org/10.3390/urbansci7020055>
55. Tanveer, U., Hoang, T. G., & Ishaq, S. (2025). Exploring the strategic role of digital technologies in supporting circular practices within service-based firms. *Production Planning & Control*, 1–17. <https://doi.org/10.1080/09537287.2025.2577182>
56. Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533. [https://doi.org/10.1002/\(SICI\)1097-0266\(199708\)18:7<509::AID-SMJ882>3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z)
57. Touat, O. (2024). Global Supply Chain Disruptions: Lessons From the COVID-19 Pandemic Crisis. In A. Mishrif (Ed.), *Business Resilience and Market Adaptability* (pp. 117–135). Springer Nature Singapore. https://doi.org/10.1007/978-981-97-2962-3_7
58. Touat, O. (2024). Global Supply Chain Disruptions: Lessons From the COVID-19 Pandemic Crisis. In A. Mishrif (Ed.), *Business Resilience and Market Adaptability* (pp. 117–135). Springer Nature Singapore. https://doi.org/10.1007/978-981-97-2962-3_7
59. United Nations Conference on Trade and Development. (2024). *Review of maritime transport 2024*. <https://unctad.org/publication/review-maritime-transport-2024>

60. United Nations Conference on Trade and Development. (2025). *Review of maritime transport 2025: Staying the course in turbulent waters*. <https://unctad.org/publication/review-maritime-transport-2025>
61. Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171–180.
<https://doi.org/10.1002/smj.4250050207>
62. Williamson, O. E. (1979). Transaction-Cost Economics: The Governance of Contractual Relations. *The Journal of Law and Economics*, 22(2), 233–261. <https://doi.org/10.1086/466942>
63. Williamson, O. E. (1998). Transaction Cost Economics: How It Works; Where It is Headed. *De Economist*, 146(1), 23–58.
<https://doi.org/10.1023/A:1003263908567>
64. World Bank. (2023). *Connecting to compete 2023: Trade logistics in an uncertain global economy – The logistics performance index and its indicators*.
<https://openknowledge.worldbank.org/handle/10986/39760>
65. World Trade Organization. (2021). *World trade report 2021: Economic resilience and trade*.
https://www.wto.org/english/res_e/booksp_e/wtr21_e/01_b_wtr21_e.pdf
66. World Trade Organization. (2022). *World trade statistical review 2022*.
https://www.wto.org/english/res_e/publications_e/wtsr_2022_e.htm
67. World Trade Organization. (2024). *Global trade outlook and statistics: April 2024*.
https://www.wto.org/english/res_e/publications_e/trade_outlook24_e.htm
68. World Trade Organization. (2024). *Report on G20 trade measures: Mid-October 2023 to mid-October 2024*.
https://www.wto.org/english/press/p/20241016_g20_trade_measures.htm
69. Wu, H., Li, G., & Zheng, H. (2025). How Does Digital Intelligence Technology Enhance Supply Chain Resilience? Sustainable Framework and Agenda. *Annals of Operations Research*, 355(1), 901–923.
<https://doi.org/10.1007/s10479-024-06104-3>
70. Xiong, D., & Sun, Y. (2025). The rising cost of turmoil: Geopolitical crises and supply chain risk. *Economics Letters*, 255, 112582.
<https://doi.org/10.1016/j.econlet.2025.112582>
71. Xiong, W., Wu, D. D., & Yeung, J. H. Y. (2025). Semiconductor supply chain resilience and disruption: Insights, mitigation, and future directions. *International Journal of Production Research*, 63(9), 3442–3465.
<https://doi.org/10.1080/00207543.2024.2387074>
72. Yap, W. Y., & Yang, D. (2024). Geopolitical tension and shipping network disruption: Analysis of the Red Sea crisis on container port calls. *Journal of Transport Geography*, 121, 104004.
<https://doi.org/10.1016/j.jtrangeo.2024.104004>
73. Zhang, Y., & Huang, H. (2025). Unraveling how poor logistics service quality of cross-border E-commerce influences customer complaints based on text mining and association analysis. *Journal of Retailing and Consumer Services*, 84, 104237.
<https://doi.org/10.1016/j.jretconser.2025.104237>
74. Zhou, N., Kang, J., & Park, S. H. (2025). Strategy for Sustained Profitable Growth: The Difference Between Growth- and Profit-Oriented Firms. *Management and Organization Review*, 21(3), 562–585.
<https://doi.org/10.1017/mor.2024.66>