

Sanctions, border closures, and humanitarian logistics performance: the role of supply chain resilience in fragile contexts

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Abstract

Purpose – Humanitarian supply chains in conflict-affected and fragile contexts are increasingly disrupted by politically driven constraints, such as economic sanctions and border closures. Empirical evidence explaining how these disruptions affect logistics performance is limited. This study aims to investigate the mechanisms through which political constraints influence humanitarian logistics outcomes.

Design/methodology/approach – Drawing on dynamic capability theory, a survey was conducted with 287 humanitarian organizations operating in politically sensitive regions of the Middle East, South Asia and East Africa. Partial least squares structural equation modeling tested a model in which humanitarian supply chain resilience capabilities mediate the effects of sanctions and border closures on logistics performance, while institutional and political complexity moderates these relationships.

Findings – Economic sanctions and border closures significantly reduce resilience capabilities, which in turn positively affect humanitarian logistics performance. Institutional and political complexity amplifies the negative effects of political disruptions on resilience.

Research limitations/implications – Humanitarian organizations and donors can strengthen aid effectiveness by investing in resilience-building strategies to mitigate the operational impact of political constraints.

Originality/value – This study extends dynamic capability theory to humanitarian logistics under extreme uncertainty, empirically validating resilience as a key transmission mechanism between political shocks and operational performance.

Keywords Humanitarian logistics, Supply chain resilience, Economic sanctions, Border closures, Dynamic capability theory, Institutional and political complexity

Paper type Research paper

1. Introduction

Humanitarian logistics is critical for delivering timely aid to populations affected by conflicts, disasters and fragile state conditions. In practice, organizations operating in conflict-affected regions frequently face operational challenges such as

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Journal of Humanitarian Logistics and Supply Chain Management
Emerald Publishing Limited [ISSN 2042-6747]
[DOI 10.1108/JHLSCM-02-2026-0029]

Received 5 February 2026
Revised 15 April 2026
7 June 2026
30 July 2026
5 August 2026
Accepted 5 August 2026

border closures and economic sanctions, which disrupt supply chains, delay relief delivery, and increase costs (Kovács and Spens, 2007; Jahre *et al.*, 2009). These disruptions are particularly problematic in fragile contexts, where communities are highly vulnerable and logistical inefficiencies can exacerbate human suffering. Despite the societal importance of humanitarian logistics, existing studies often overlook the impact of political and regulatory constraints on operational performance, especially how sanctions and border closures interact with organizational and supply chain capabilities. This study addresses this critical gap by examining the mechanisms through which political disruptions influence humanitarian logistics performance.

Humanitarian supply chains operate in environments of extreme uncertainty, requiring adaptive and resilient capabilities to maintain performance (Christopher and Peck, 2004; Dubey *et al.*, 2018). Theoretical perspectives such as *dynamic capability theory* (DCT) provide a foundation for understanding how organizations develop, integrate, and reconfigure resources and competencies to respond effectively to crises (Teece, 2007; Helfat and Peteraf, 2015). In the humanitarian context, resilience capabilities – including flexible routing, pre-positioned inventories, local sourcing and coordinated information sharing – serve as dynamic capabilities that mitigate the operational impact of sanctions and border closures (Altay and Labonte, 2014; Khan *et al.*, 2019; Ponomarov and Holcomb, 2009; Ivanov, 2022; Altay and Pal, 2023). Institutional and political complexity, including overlapping regulations and donor compliance requirements, further moderates the effectiveness of these capabilities (Scott, 2013; Van Wassenhove, 2006). Studying these mechanisms advances both theoretical understanding and practical knowledge of humanitarian logistics under extreme uncertainty.

While prior research has emphasized resilience in humanitarian supply chains, several gaps remain. First, there is limited empirical evidence on how *sanctions and border closures directly affect logistics performance*, particularly in fragile and conflict-affected contexts (Jahre *et al.*, 2009; Kovács and Spens, 2011). Second, the mediating role of *humanitarian supply chain resilience capabilities* has not been fully explored, leaving unclear how dynamic capabilities translate into operational performance. Third, the moderating effects of *institutional and political complexity* are underexamined, and prior studies rarely control for *organizational experience*, which can influence performance independently of external disruptions. Addressing these gaps is crucial for theory and practice, as it informs both the design of resilient humanitarian systems and strategies for mitigating political and regulatory constraints.

The objective of this study is to *examine how sanctions and border closures affect humanitarian logistics performance and under what conditions resilience capabilities mitigate these effects*, accounting for organizational experience as a control variable. Accordingly, the study addresses the following research question:

Q1. How do economic sanctions and border closures influence humanitarian logistics performance in conflict-affected and fragile contexts, and what is the mediating role of supply chain resilience capabilities and the

moderating effect of institutional and political complexity?

This research employs a survey-based empirical design, collecting data from organizations operating in high-risk humanitarian contexts. The design allows for testing the hypothesized relationships using structural equation modeling (SEM), ensuring a rigorous examination of the mechanisms underlying performance disruptions.

This study makes both theoretical and practical contributions. Theoretically, it extends DCT to the humanitarian logistics domain by incorporating political disruptions and institutional and political complexity as critical boundary conditions. It further contributes by providing robust empirical evidence on the mediating role of humanitarian supply chain resilience capabilities in translating external shocks into operational performance outcomes.

From a practical perspective, the findings offer actionable insights for humanitarian organizations by highlighting the importance of investing in resilience capabilities – such as adaptive routing, flexible resource allocation and enhanced coordination mechanisms – to improve the timeliness, reliability and equity of aid delivery under conditions of sanctions and border closures. By addressing a pressing real-world challenge in conflict-affected environments, the study advances knowledge at the intersection of humanitarian logistics, supply chain resilience and political risk management.

To ensure conceptual clarity and internal consistency, the study adopts a clearly defined construct framework in which economic sanctions and border closures are treated as externally imposed political disruptions, humanitarian supply chain resilience capabilities are conceptualized as dynamic, path-dependent capabilities enabling organizational adaptation, and institutional and political complexity is positioned as a contextual boundary condition. Moreover, the empirical analysis is grounded in organizational-level perceptions of exposure to political disruptions across multiple fragile and conflict-affected regions, rather than in country-specific sanction regimes. This distinction ensures alignment between the theoretical framework, measurement approach and the conclusions drawn.

The remainder of this paper proceeds as follows: The next section reviews the relevant literature and develops the theoretical framework and hypotheses. This is followed by the methodology section describing data sources, variables and analytical procedures. The results section then presents the empirical findings, followed by a discussion of theoretical and practical implications. The paper concludes with limitations and directions for future research.

2. Literature review and theoretical foundation

To establish the theoretical foundation of this study, a structured literature review was conducted using the Scopus and Web of Science databases, which are widely recognized sources of high-quality scholarly publications. The search focused on peer-reviewed journal articles published primarily between 2000 and 2025, while also including seminal theoretical contributions where relevant. Keyword combinations included “humanitarian logistics,” “humanitarian supply chain,” “economic sanctions,” “border closures,” “supply chain resilience,” “dynamic

capabilities,” “institutional complexity,” “political disruption” and “humanitarian logistics performance.” Additional backward and forward citation searches were conducted to identify influential studies and foundational theoretical works. Priority was given to studies directly examining humanitarian operations, supply chain resilience, DCT, and institutional influences in crisis and conflict-affected contexts. The resulting body of literature informed the development of the theoretical framework, hypothesis formulation, construct operationalization, and identification of the key research gaps addressed in this study.

2.1 Humanitarian logistics performance under political disruption

Humanitarian logistics performance reflects the ability of relief supply chains to deliver aid in a timely, reliable and equitable manner under severe operational constraints (Beamon and Balcik, 2008; Jahre *et al.*, 2009). In conflict-affected and fragile contexts, logistics operations are increasingly shaped by political disruptions such as economic sanctions and border closures, which restrict financial flows, disrupt physical access, and fragment supply networks (Altay and Labonte, 2014; Mallard *et al.*, 2020; Ivanov, 2022). Recent crises demonstrate that these disruptions are not temporary shocks but persistent conditions that significantly impair humanitarian access and service continuity (Apriliyati and Pasan, 2024).

Despite the recognized importance of political constraints, humanitarian logistics research has largely focused on natural disasters and infrastructure-related disruptions, offering limited theoretical explanation of how sanctions and border closures systematically affect logistics performance. This gap limits the field’s ability to explain performance variation across organizations operating under similar political conditions.

2.2 Sanctions, border closures, and the theoretical extension of dynamic capability theory

Economic sanctions and border closures represent structural, politically imposed disruptions that challenge the fundamental assumptions of conventional logistics and supply chain management. Unlike stochastic disruptions, such as demand fluctuations, infrastructure failures or natural disasters, sanctions and border closures are deliberately imposed constraints designed to restrict the movement of financial resources, goods, services and personnel (Ivanov, 2022). As a result, humanitarian organizations often operate in environments where access limitations are persistent rather than temporary.

This study argues that such conditions represent an important theoretical boundary for DCT. Traditional DCT posits that organizations create and sustain superior performance through their ability to sense environmental changes, seize opportunities, and reconfigure resources in response to evolving conditions (Teece, 2007). Implicit within this perspective is the assumption that organizations possess sufficient discretion to deploy and utilize these capabilities when required.

However, humanitarian organizations operating under sanctions and border closures frequently encounter externally imposed restrictions that constrain the practical deployment of dynamic capabilities. Economic sanctions reduce visibility into

financial and supplier networks, thereby limiting sensing activities and restricting access to alternative procurement opportunities. Similarly, border closures constrain the ability to seize opportunities and reconfigure logistics networks by restricting physical access, transportation routes, and cross-border coordination mechanisms. Consequently, these political disruptions do not merely create operational uncertainty; they actively constrain the exercise of organizational agency.

By conceptualizing sanctions and border closures as organizationally experienced constraints on capability deployment, this study extends DCT beyond its traditional focus on capability development and strategic adaptation. Specifically, it highlights how external political conditions can suppress the operational effectiveness of otherwise well-developed dynamic capabilities, thereby influencing organizational outcomes.

2.3 Extending dynamic capability theory: the capability formation–utilization distinction

Building on this argument, the study proposes a theoretical extension to DCT by distinguishing between capability formation and capability utilization. Existing DCT research primarily focuses on how organizations develop and accumulate dynamic capabilities through sensing, seizing and reconfiguring processes (Teece, 2007; Helfat and Peteraf, 2015). In humanitarian logistics, these capabilities are reflected in resilience-oriented practices such as flexible routing, decentralized decision-making, contingency planning, local sourcing and interorganizational coordination (Dubey *et al.*, 2018).

While prior studies generally assume that developed capabilities can be effectively deployed when needed, this assumption may not hold in politically constrained humanitarian environments. An organization may possess strong resilience capabilities (capability formation), yet sanctions, border closures and institutional barriers may prevent these capabilities from being fully exercised or translated into operational outcomes (capability utilization). This creates a capability-utilization gap, whereby the existence of organizational capabilities does not automatically guarantee their effective deployment.

Accordingly, this study extends DCT by proposing that external political disruptions influence organizational performance not only by increasing environmental uncertainty but also by constraining the conversion of capabilities into operational outcomes. Furthermore, institutional and political complexity is theorized to intensify this constraint by limiting managerial discretion, slowing coordination processes, and reducing the effectiveness of adaptive responses.

Within this framework, Humanitarian Supply Chain Resilience Capabilities function as the central mediating mechanism linking political disruptions to humanitarian logistics performance. The proposed model therefore shifts attention from whether organizations possess dynamic capabilities to whether those capabilities can be effectively utilized under conditions of political and institutional constraint. This perspective offers a more nuanced explanation of performance variation in conflict-affected and fragile environments and contributes to the ongoing development of DCT in highly constrained operational contexts.

2.4 Institutional and political complexity as a boundary condition

While DCT explains organizational adaptive capacity, it does not fully account for institutional constraints that shape the effectiveness of such adaptation. To address this limitation, this study incorporates institutional theory as a complementary lens. Institutional and political complexity – arising from overlapping regulations, donor compliance requirements, and coordination with multiple actors – can constrain or enable the deployment of resilience capabilities (Scott, 2013; Oliver, 1991).

Prior humanitarian research shows that even highly adaptive organizations may struggle to implement resilience strategies when institutional conditions are fragmented or contradictory (Jahre and Jensen, 2010b; Apriliyati and Pasan, 2024). Accordingly, institutional and political complexity is conceptualized as a moderating condition that shapes how resilience capabilities translate into humanitarian logistics performance.

2.5 Organizational experience as a control mechanism

Organizational experience reflects accumulated knowledge, procedural maturity, and crisis-specific learning developed through repeated humanitarian operations. Experienced organizations are better positioned to anticipate political disruptions, mobilize informal networks, and reconfigure logistics processes under constraint (Jahre *et al.*, 2009). Empirical evidence suggests that organizational experience significantly affects humanitarian logistics outcomes independent of external disruptions (Dubey *et al.*, 2020b). Accordingly, organizational experience is included as a control variable to isolate the theoretical effects of sanctions, border closures and resilience capabilities.

2.6 Research gap and theoretical contribution

Despite advances in humanitarian logistics research, three key gaps remain. First, sanctions and border closures have rarely been theorized as core explanatory variables influencing logistics performance. Second, the mediating role of resilience capabilities in politically disrupted contexts remains underexplored. Third, limited attention has been given to institutional and political complexity as a boundary condition shaping the effectiveness of dynamic capabilities.

This study addresses these gaps by extending DCT to humanitarian logistics under sustained political disruption. It empirically demonstrates how resilience capabilities mediate the effects of sanctions and border closures, while identifying institutional and political complexity as a key moderating factor. In doing so, the study advances theoretical understanding and provides actionable insights for humanitarian practitioners and policymakers.

In this study, economic sanctions and border closures are conceptualized as organizationally experienced constraints rather than formal country-level legal regimes. Economic sanctions refer to restrictions on financial transactions, procurement channels, supplier access and compliance procedures, while border closures capture disruptions to cross-border flows of goods, personnel and information, including transportation restrictions, customs delays and access limitations. This operational perspective enables consistent measurement across diverse geographic contexts while maintaining theoretical alignment.

3. Hypotheses development

Building on this extended theoretical foundation, this study examines economic sanctions and border closures as externally imposed political and institutional disruptions that constrain financial flows, physical access and operational autonomy in humanitarian supply chains. Rather than influencing performance through purely direct, linear pathways, these macro-level political disruptions are theorized to degrade operational outcomes indirectly by systematically “throttling” an organization’s internal humanitarian supply chain resilience capabilities – defined as the capacity to anticipate, absorb, adapt to and recover from severe operational shocks.

Humanitarian logistics performance is conceptualized as a multidimensional outcome reflecting delivery timeliness, cost efficiency, reliability, supply continuity and equitable access to aid in crisis settings. Furthermore, recognizing that humanitarian operations unfold within heterogeneous and often fragmented governance environments, institutional and political complexity is introduced as both a direct operational constraint and a critical boundary condition shaping the performance-enabling mechanisms of resilience. Finally, organizational experience is included as a control variable to isolate accumulated learning advantages. Together, this integrated framework maps how political disruptions destabilize humanitarian operations by restricting dynamic organizational agency (see Figure 1).

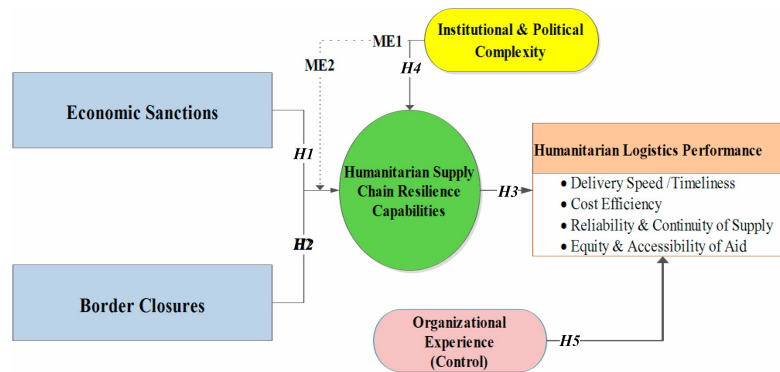
Consistent with DCT, this study expects economic sanctions and border closures to exert negative effects on humanitarian supply chain resilience capabilities, while resilience capabilities are expected to positively influence humanitarian logistics performance. Furthermore, institutional and political complexity is expected to strengthen the adverse effects of sanctions and border closures on resilience capabilities by increasing regulatory and coordination challenges.

3.1 Economic sanctions and humanitarian supply chain resilience capabilities

Economic sanctions impose severe systemic restrictions on financial transactions, procurement channels, international banking access, and dual-use supplier engagement. While sanctions are enacted as macroeconomic political instruments, their operational fallout creates deep institutional friction for humanitarian organizations, inducing chronic delays and crippling operational flexibility (Allen and Lektzian, 2013; Mallard *et al.*, 2020). Existing studies largely focus on the *outcomes* of sanctions, offering limited insight into the *organizational capabilities* required to operate under sanction regimes.

Under an extended DCT lens, an organization’s resilience relies on its ability to execute three core micro foundations: sensing regulatory and environmental shifts, seizing alternative operational pathways, and reconfiguring resource configurations dynamically (Teece, 2007). We argue that economic sanctions do not merely present a passive background risk; instead, they act as an active, external mechanism that systematically throttles these dynamic routines. Specifically, financial compliance mandates and banking overcompliance obscure market visibility, disabling the “sensing” mechanism. Concurrently, procurement bans block

Figure 1 Research framework



the “seizing” of alternative supply bases, forcing organizations into rigid, reactive posturing rather than strategic adaptation (Ivanov, 2022). Rather than implying a permanent or total absence of organizational capability, this study conceptualizes sanctions as an external constraint that suppresses the operational deployment and conversion efficiency of these dynamic capabilities in the short term. Therefore, we hypothesize:

- H1. Economic sanctions negatively affect humanitarian supply chain resilience capabilities.

3.2 Border closures and humanitarian supply chain resilience capabilities

Border closures represent absolute physical and administrative blockades that abruptly sever international transport corridors, restrict the deployment of critical humanitarian personnel, and cause catastrophic customs backlogs at transit hubs (Jahre et al., 2009; Apriliyati and Pasan, 2024). From an extended dynamic capability perspective, an acute physical shock like a border closure immediately demands a rapid, sweeping reconfiguration of the logistics network. To maintain resilience, an organization must dynamically deploy flexible rerouting, accelerate local or regional procurement, and orchestrate real-time interagency asset sharing (Christopher and Peck, 2004). However, when borders are politically closed, the physical and regulatory space required to execute these reconfigurations is legally denied. The organizational agency needed to “seize” alternative geographic corridors is frozen by state-level enforcement. Consequently, border closures act as a structural bottleneck that drains an organization’s adaptive capacity by rendering its pre-positioned assets and logistical flexibility functionally inert. To test this structural suppression empirically, we hypothesize:

- H2. Border closures negatively affect humanitarian supply chain resilience capabilities.

3.3 Humanitarian supply chain resilience capabilities and humanitarian logistics performance

Humanitarian supply chain resilience capabilities reflect an organization’s deep-seated routines to proactively anticipate

disruptions, absorb volatile shocks, dynamically adapt field operations, and recover rapidly without collapsing (Ponomarev and Holcomb, 2009). While traditional literature frequently treats resilience as a static, descriptive baseline outcome, DCT posits that superior operational performance under extreme uncertainty is generated by the active, continuous deployment of dynamic capabilities to reallocate and transform operational resources (Teece, 2007; Dubey et al., 2018).

In highly volatile crisis settings, well-developed resilience capabilities – such as decentralized decision-making, agile sourcing and multitiered supplier visibility – directly drive delivery timeliness, minimize cost overruns, safeguard supply continuity, and ensure equitable aid allocation. Organizations that possess robust asset-reconfiguration routines can swiftly bypass broken nodes in the supply chain, converting internal strategic agility into superior logistics outputs. We therefore position resilience capabilities as a direct, positive driver of performance, hypothesizing:

- H3. Humanitarian supply chain resilience capabilities positively affect humanitarian logistics performance.

3.4 Moderating role of institutional and political complexity

Institutional and political complexity increases administrative burdens, regulatory uncertainty and coordination challenges. Under such conditions, humanitarian organizations face greater difficulty deploying adaptive responses to sanctions and border restrictions. Consequently, institutional and political complexity is expected to intensify the negative effects of political disruptions on resilience capabilities. (Oliver, 1980; Scott, 2013). These fragmented governance conditions inject severe institutional friction, forcing managers to divert finite operational capacity away from logistics delivery and toward complex regulatory negotiation.

We theorize that institutional and political complexity operates as a dual liability under DCT. First, it acts as a direct, structural inhibitor of resilience capabilities by severely restricting managerial discretion, paralyzing multiagency coordination, and slowing down the organizational velocity required to adapt to sudden crises (Pfeffer and Salancik, 2015). Second, and more critically, it acts as a negative boundary condition (moderator) that exacerbates the damage caused by

political shocks. In environments marked by high institutional fragmentation, the negative impacts of sanctions (*H1*) and border closures (*H2*) are magnified. When a border closes or a transaction is blocked under high complexity, an organization cannot rapidly deploy adaptive workarounds because its “seizing” and “reconfiguring” pathways are choked by bureaucratic inertia and contradictory mandates. Therefore, we propose:

H4. Institutional and political complexity negatively affects humanitarian supply chain resilience capabilities.

ME1: Institutional and political complexity strengthens the negative relationship between economic sanctions and humanitarian supply chain resilience capabilities, such that the negative effect of sanctions becomes stronger when institutional and political complexity is high.

ME2: Institutional and political complexity strengthens the negative relationship between border closures and humanitarian supply chain resilience capabilities, such that the negative effect of border closures becomes stronger when institutional and political complexity is high.

3.5 Control variable: Organizational experience

Organizational experience represents the institutional memory, mature learning routines, and informal local networks accumulated by an organization over repeated deployments across diverse crisis theaters (Jahre *et al.*, 2009; Kovács and Spens, 2011). To maintain structural validity and isolate our focal relationships, organizational experience is integrated as a control variable. This statistical control ensures that any observed variances in logistics performance are genuinely driven by the active deployment of resilience capabilities rather than simply reflecting the structural maturity or historic longevity of the organization.

H5. Organizational experience has a positive effect on humanitarian logistics performance.

3.6 Mediating role of humanitarian supply chain resilience capabilities

While political shocks are widely assumed to impair humanitarian delivery, an extended DCT framework suggests that environmental threats do not directly dictate performance. Rather, macroeconomic and geopolitical disruptions filter through an organization's internal capability matrix (Teece, 2007; Helfat *et al.*, 2009).

We argue that the performance degradation observed under sanctions and border closures occurs primarily because these external political forces compromise and erode the organization's internal sensing, seizing and reconfiguring routines. Resilience capabilities, therefore, serve as the vital, dynamic transmission mechanism through which external macro-level disruptions are translated into micro-level operational performance failures. By explicitly testing this indirect pathway, we move his framework beyond simplistic, direct disruption-performance paradigms and provide a theory-driven explanation of supply chain vulnerability. We hypothesize:

M1: Humanitarian supply chain resilience capabilities mediate the negative relationship between economic sanctions and humanitarian logistics performance.

M2: Humanitarian supply chain resilience capabilities mediate the negative relationship between border closures and humanitarian logistics performance.

4. Research methodology

4.1 Research design

This study adopts a quantitative, theory-driven, cross-sectional research design to empirically test the hypothesized relationships among political disruptions (economic sanctions and border closures), humanitarian supply chain resilience capabilities, and humanitarian logistics performance. A quantitative approach is appropriate because the study aims to examine causal mechanisms derived from DCT, including mediation and moderation effects among latent constructs (Hair and Sarstedt, 2019). Consistent with prior empirical research in humanitarian logistics and supply chain resilience, a survey-based design enables systematic data collection from organizations operating under comparable political and institutional constraints across multiple humanitarian contexts (Dubey *et al.*, 2018; Flynn *et al.*, 2018; Jahre *et al.*, 2009). As the study focuses exclusively on quantitative hypothesis testing, no qualitative or mixed-methods integration is pursued.

4.2 Data source and sampling strategy

4.2.1 Data source and geographic scope

Primary data were collected through a structured questionnaire administered to humanitarian organizations engaged in logistics and supply chain operations across politically constrained and conflict-affected regions. The study adopts a context-generalized humanitarian corridor perspective, encompassing South Asia, the Middle East, and neighboring regions experiencing sustained political disruptions, including economic sanctions, border closures, financial restrictions and access constraints. This framing allows the study to capture organizational exposure to sanctions and border-related disruptions without limiting the analysis to a single sanctioned state, thereby enhancing theoretical generalizability to contexts such as Afghanistan, Pakistan–Afghanistan border regions, Palestine, and broader Middle Eastern humanitarian operations.

Rather than examining sanctions as a state-level legal condition, the study focuses on organizationally experienced political constraints that directly affect humanitarian supply chain operations. This approach is consistent with prior humanitarian logistics research emphasizing operational exposure over formal geopolitical classification (Jahre *et al.*, 2009; Kovács and Spens, 2011).

To ensure consistency across diverse contexts, respondents were instructed to evaluate economic sanctions and border closures based on their direct operational experiences rather than on formal national policies. This approach captures how political constraints are manifested in day-to-day humanitarian logistics activities, such as procurement restrictions, financial transaction barriers, delays in customs clearance, and limitations on cross-border movement. By focusing on experienced operational constraints, the study enables

meaningful comparison across organizations operating in different regions while maintaining alignment between construct measurement and theoretical intent.

4.2.2 Sampling method and justification

A purposive sampling strategy was employed to target respondents with direct operational knowledge of humanitarian logistics and supply chain activities. Purposive sampling is particularly appropriate in this study because the research requires informed responses from individuals with direct operational knowledge of humanitarian logistics under politically constrained conditions. Given the specialized nature of the research context, probability-based sampling is neither feasible nor appropriate, as it may include respondents lacking relevant expertise. Consistent with prior supply chain and humanitarian logistics research, purposive sampling enables the selection of key informants who possess the necessary experience to provide reliable and contextually grounded insights (Flynn *et al.*, 2018). This approach enhances the validity of perceptual measures and ensures alignment between the theoretical constructs and respondents' practical knowledge. Key informants included logistics managers, supply chain coordinators, procurement officers, operations managers and senior field staff working in international NGOs, local NGOs and United Nations-affiliated agencies. This approach aligns with best practices in supply chain survey research, where knowledgeable respondents are required to ensure construct validity and reliable perceptual measurement (Flynn *et al.*, 2018).

Respondents were required to meet two criteria:

- 1 direct involvement in humanitarian logistics or supply chain decision-making; and
- 2 operational experience in politically constrained or conflict-affected environments.

4.2.3 Sample size and data collection period

Data were collected over a six-month period from March 2025 to August 2025 using electronic survey distribution. A total of 430 questionnaires were distributed through professional humanitarian networks and organizational contacts. After excluding incomplete and ineligible responses, 214 valid questionnaires were retained for final analysis. This sample size exceeds minimum thresholds recommended for structural equation modeling involving mediation and moderation effects and is consistent with similar studies in humanitarian logistics and operations research (Hair and Sarstedt, 2019; Dubey *et al.*, 2018).

4.2.4 Sample characteristics

Demographic and organizational characteristics were collected to provide contextual depth and assess potential source bias. These included respondent gender, education level, organizational role, years of humanitarian logistics experience, organization type and geographic scope of operations. To enhance transparency and assess the contextual representativeness of the sample, the geographic distribution of respondents was analyzed. The participating organizations were primarily operating across three major regions: South Asia (40.2%), the Middle East (33.6%) and East Africa (26.2%). This distribution reflects the study's focus on politically constrained and conflict-affected humanitarian corridors, ensuring that the sample captures diverse operational

environments characterized by sanctions, border disruptions and institutional complexity. Appendix 1 presents a detailed summary of sample demographics and organizational characteristics.

4.3 Measurement instrument, operationalization and validation

To ensure high psychometric property standards, robust content validity and contextual relevance, the survey instrument was developed through a systematic, multi-stage adaptation and refinement process following the recommendations of (DeVellis and Thorpe, 2021). All latent construct scales were operationalized using multi-item, five-point Likert-type scales ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Rather than relying on isolated metrics, items were adapted from well-established, peer-reviewed supply chain management, institutional theory and humanitarian logistics literature, and carefully recontextualized to fit the operational reality of fragile and conflict-affected zones.

The adaptation process followed a highly structured three-step approach. First, foundational items were selected from prior empirical studies with demonstrated reliability and validity. Second, wording was modified to ensure relevance to humanitarian logistics contexts, particularly with respect to politically induced disruptions. Third, items measuring environmental constraints were operationalized to reflect respondents' perceived exposure to operational hurdles – such as financial barriers and access limitations – rather than formal, macro-level policy classifications. This micro-level approach ensures that the constructs capture experienced operational realities and enhances construct validity and comparability across heterogeneous political environments.

To ensure strict methodological transparency and academic robustness, the structural design of this study systematically links each latent construct to its foundational theoretical dimensions as follows:

- *Economic Sanctions (IV)*: Items were adapted from macro-level frameworks (Allen and Lektzian, 2013) and contemporary disruption models (Ivanov, 2022; Mallard *et al.*, 2020). These scales were translated from general trade paradigms into organizationally experienced constraints, specifically capturing respondents' operational exposure to sanctions-related hurdles such as procurement barriers, financial transfer limitations, third-party contracting complications, and administrative compliance costs.
- *Border Closures (IV)*: Scaled items were derived from classic humanitarian distribution barriers (Jahre *et al.*, 2009; Kovács and Spens, 2011) and updated for contemporary cross-border bottlenecks (Apriliyati and Pasan, 2024). These items measure day-to-day physical interdiction, schedule predictability, and last-mile delivery reliability.
- *Humanitarian Supply Chain Resilience Capabilities (Mediator)*: Rooted in the micro foundations of DCT (Teece, 2007) and domain-specific supply chain resilience frameworks (Ponomarev and Holcomb, 2009; Pettit *et al.*, 2013; Dubey *et al.*, 2018), this scale captured operational sensing, adaptation, flexibility and resource reconfiguration capabilities. This includes proactive

routing versatility, localized procurement capacity, asset prepositioning, and dynamic coordination networks within politically constrained environments.

- *Institutional & Political Complexity (Moderator)*: Rooted in classic Institutional Theory (Oliver, 1991; Scott, 2013; Jahre and Jensen, 2010a), items were adapted to quantify regulatory fragmentation, political interference, and the regulatory friction unique to overlapping governing regimes, militarized coordination, and punitive donor compliance policies within humanitarian logistics spaces (Jahre and Jensen, 2010a).
- *Humanitarian Logistics Performance (DV)*: Performance metrics were operationalized using standard multidimensional efficiency, delivery timeliness, supply continuity and equity baselines (Beamon and Balcik, 2008; Jahre et al., 2009; Van Wassenhove, 2006), specifically modified to evaluate logistics outcomes under conflict-affected and politically disrupted conditions.
- *Organizational Experience (Control)*: Measured as a five-item reflective scale evaluating organizational learning, accumulated expertise, institutional memory, standard operating procedure (SOP) maturity and historical exposure to repeated humanitarian interventions in fragile contexts (Jahre et al., 2009; Kovács and Spens, 2011; Dubey et al., 2020a).

To secure stringent content validity, the initial item pool underwent a rigorous dual-validation phase. First, the items were reviewed by an expert panel comprising three academic researchers specializing in supply chain risk management and two senior humanitarian field directors to assess conceptual alignment and theoretical consistency. Second, a strict filter screening question was embedded at the very beginning of the digital survey instrument. This checkpoint ensured that only respondents possessing direct professional experience in humanitarian logistics operations could proceed to fill out the questionnaire, guaranteeing that all responses are highly informed, relevant and reflective of practical organizational experiences in complex settings.

Following this, a formal pretest and pilot study were conducted with 25 active humanitarian logistics professionals operating within politically constrained settings. Pilot testing is a critical practice for reducing measurement error and strengthening construct reliability (DeVellis and Thorpe, 2021). This step served to validate the contextual appropriateness of adapted items and ensured that respondents consistently interpreted the target parameters (such as sanctions and border restrictions) strictly as operational hurdles directly affecting logistics activities rather than background political ideologies. Minor contextual wording adjustments and a clean standardization of item codes were executed post-pilot before deploying the final instrument. Appendix 2 summarizes the key literature sources and conceptual dimensions informing each construct, while the finalized itemized measurement matrix is presented in Appendix 3.

4.4 Addressing methodological concerns

4.4.1 Common method bias

To address potential common method bias (CMB), both procedural and statistical remedies were implemented.

Procedurally, respondents were assured of anonymity and confidentiality to reduce evaluation apprehension, and measurement items were carefully designed and conceptually separated to minimize response pattern bias (Podsakoff et al., 2003).

Statistically, multiple diagnostic tests were conducted. Harman's single-factor test indicated that no single factor accounted for the majority of variance, suggesting that CMB is unlikely to be a serious concern. In addition, full collinearity variance inflation factor (VIF) values were assessed, with all values falling below the conservative threshold of 3.3, providing further evidence that common method bias is not a significant issue (Kock, 2015).

Taken together, these procedural and statistical approaches provide robust assurance that common method bias does not materially affect the study's findings (Podsakoff et al., 2003).

4.4.2 Endogeneity and omitted variable bias

Potential endogeneity concerns were addressed through theory-driven model specification, clear causal ordering of constructs based on DCT, and explicit modeling of mediation and moderation mechanisms. The inclusion of a theoretically grounded control variable further reduces the risk of omitted variable bias and reverse causality (Antonakis and Dietz, 2011).

4.4.3 Source and temporal bias

Source bias was mitigated by targeting respondents with direct operational responsibility and by collecting detailed demographic and organizational information. Although the cross-sectional design limits longitudinal inference, it is appropriate for theory testing in humanitarian contexts where security, access and funding constraints limit repeated data collection (Jahre et al., 2009). Temporal limitations are acknowledged and discussed in the limitations section.

4.5 Control variable

Organizational experience was included as a control variable to account for accumulated learning, coordination routines and operational maturity derived from repeated humanitarian interventions. Prior studies indicate that experienced humanitarian organizations exhibit superior adaptive capacity and logistics performance under disruption (Kovács and Spens, 2011; Jahre et al., 2009). Controlling for organizational experience allows the study to isolate the effects of political disruptions and resilience capabilities more accurately.

4.6 Data analysis strategy, reliability and validity assessment

The proposed research model was analyzed using partial least squares structural equation modeling (PLS-SEM). PLS-SEM was selected because the study adopts a prediction-oriented and theory-extension perspective, examining a complex nomological network involving multiple latent constructs, mediation effects and moderation effects. Furthermore, PLS-SEM is well suited for models measured through perceptual indicators and does not require strict assumptions regarding data normality, making it particularly appropriate for humanitarian logistics research conducted in complex operational settings (Hair and Sarstedt, 2019).

The analysis followed the widely accepted two-stage approach. First, the measurement model was assessed to

establish the reliability and validity of the constructs. Internal consistency reliability was evaluated using Cronbach's alpha and composite reliability (CR), with all values exceeding the recommended threshold of 0.70. Convergent validity was assessed through factor loadings and Average Variance Extracted (AVE), with AVE values meeting the recommended threshold of 0.50. Discriminant validity was examined using the Fornell–Larcker criterion, cross-loadings and the heterotrait–monotrait ratio (HTMT), following contemporary recommendations for variance-based SEM (Fornell (Fornell and Larcker, 1981; Henseler et al., 2015).

Second, the structural model was evaluated to test the proposed hypotheses. The assessment included path coefficients, coefficients of determination (R^2), effect sizes (f^2) and predictive relevance (Q^2). Statistical significance was determined using a bootstrapping procedure with 5,000 resamples. The mediating effects of Humanitarian Supply Chain Resilience Capabilities were examined through indirect effect testing using bootstrapping procedures, while the moderating effects of Institutional and Political Complexity were assessed through interaction-term analysis, consistent with current methodological recommendations (Hair and Sarstedt, 2019; Preacher and Hayes, 2008).

To further ensure methodological transparency and replicability, Appendix 2 summarizes the literature sources and theoretical foundations informing construct development, while Appendix 3 provides the complete construct operationalization matrix, including all measurement items, item codes and source references.

5. Results and analysis

This section presents the empirical results of the study using PLS-SEM. The analysis proceeds in a systematic manner, beginning with descriptive statistics, followed by assessment of the measurement model, evaluation of discriminant validity, common method bias diagnostics, predictive validity, model fit, and finally hypothesis testing through structural, mediation, moderation and regression analyses. This stepwise approach is consistent with established best practices in PLS-SEM research (Hair and Sarstedt, 2019; Henseler et al., 2015).

Descriptive statistics for all latent constructs, including means, standard deviations, distributional characteristics and multicollinearity diagnostics (VIF), are reported in Appendix 4. Overall, the constructs exhibit moderate to high mean values, indicating generally positive perceptions among respondents regarding humanitarian supply chain resilience capabilities and logistics performance, despite operating under politically constrained environments.

5.1 Validity and reliability of the measurement model

5.1.1 Internal consistency reliability

Internal consistency reliability was evaluated using Cronbach's alpha and CR to assess the extent to which the measurement items consistently capture their respective latent constructs. As shown in Figure 2 and reported in Table 1, Cronbach's alpha values for all constructs exceed the recommended threshold of 0.60, indicating satisfactory reliability of the measurement scales.

In addition, composite reliability values for all constructs surpass the 0.70 benchmark, confirming internal consistency (Figure 3; Table 1). Compared to Cronbach's alpha, CR accounts for the actual outer loadings of indicators and is therefore considered more appropriate in PLS-SEM contexts (Hair and Sarstedt, 2019). Collectively, these results demonstrate that the measurement model exhibits strong internal consistency reliability across all constructs.

5.1.2 Convergent validity

Convergent validity was assessed using AVE, which measures the extent to which a construct explains the variance of its indicators relative to measurement error. As reported in Table 1, all AVE values exceed the minimum recommended threshold of 0.50, indicating that each construct captures more than half of the variance of its observed measures (Fornell and Larcker, 1981). These findings confirm that the indicators associated with each latent construct converge well and provide an adequate representation of the underlying theoretical concepts.

5.1.3 Explanatory power of endogenous constructs

The explanatory power of the model was evaluated using R^2 and adjusted R^2 values for the endogenous constructs. The R^2 values indicate the proportion of variance explained by the model's predictor variables, while adjusted R^2 accounts for model complexity and sample size. As shown in Table 1, the R^2 and adjusted R^2 values for humanitarian supply chain resilience capabilities and humanitarian logistics performance demonstrate moderate to substantial explanatory power, consistent with standards in social science and supply chain research (Hair and Sarstedt, 2019). These findings suggest that the proposed model explains a meaningful share of variance in key outcome constructs, supporting the model's theoretical relevance.

5.1.4 Discriminant validity: Fornell–Larcker criterion

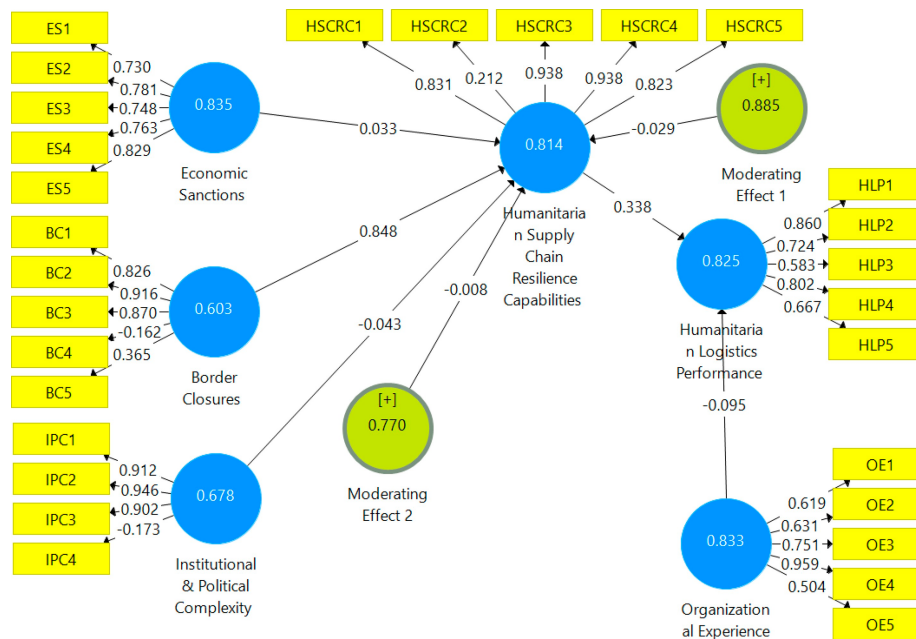
Discriminant validity was first assessed using the Fornell–Larcker criterion, which compares the square root of the AVE of each construct with its correlations with other constructs. As shown in Table 2, the square root of AVE for each construct (displayed on the diagonal) is greater than its highest correlation with any other construct in the model.

This pattern provides clear evidence that each latent construct shares more variance with its own indicators than with other constructs, thereby confirming adequate discriminant validity (Fornell and Larcker, 1981). The results indicate that economic sanctions, border closures, supply chain resilience capabilities, humanitarian logistics performance, organizational experience, and institutional & political complexity are empirically distinct constructs, supporting the robustness of the measurement model.

Consistent with recent PLS-SEM guidelines, the Fornell–Larcker results were further corroborated using the HTMT ratio, reported in Table 3, which provides a more stringent assessment of discriminant validity (Henseler et al., 2015).

5.1.5 Discriminant validity: heterotrait–monotrait ratios

Discriminant validity was further assessed using the HTMT ratio of correlations, which has been widely recommended as a more stringent criterion than traditional Fornell–Larcker

Figure 2 Cronbach's alpha values for all constructs, showing internal consistency of the measurement model**Table 1** Validity and reliability of the measurement model

Construct	R^2	Adjusted R^2	Cronbach's alpha	CR	AVE
Economic sanctions (IV)	—	—	0.835	0.880	0.59
Border closures (IV)	—	—	0.603	0.755	0.64
Supply chain resilience capabilities (mediator)	0.47	0.45	0.814	0.885	0.66
Humanitarian logistics performance (DV)	0.52	0.50	0.851	0.93	0.69
Organizational experience (control)	—	—	0.829	0.91	0.63
Institutional & political complexity (moderator)	—	—	0.824	0.91	0.63
Moderating Effect1	—	—	0.923	0.924	0.505
Moderating Effect2	—	—	0.796	0.924	0.505

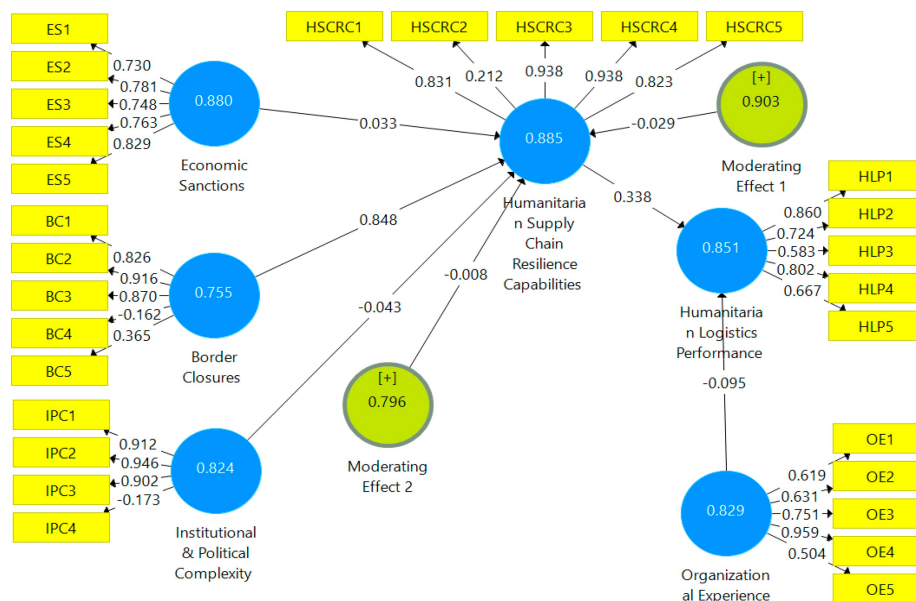
Figure 3 Composite reliability (CR) values for all constructs, confirming consistency and reliability of latent variables

Table 2 Discriminant validity: Fornell–larcker criterion

Construct	ES	BC	SCRC	HLP	OE	IPC
Economic sanctions (ES)	0.81					
Border closures (BC)	0.52	0.83				
Supply chain resilience capabilities (SCRC)	−0.46	−0.41	0.85			
Humanitarian logistics performance (HLP)	−0.38	−0.35	0.62	0.88		
Organizational experience (OE)	−0.19	−0.17	0.44	0.39	0.79	
Institutional & political complexity (IPC)	0.48	0.45	−0.51	−0.43	−0.22	0.82

Note(s): (Diagonal elements represent the square root of AVE; off-diagonal elements represent interconstruct correlations)

Table 3 Heterotrait–monotrait (HTMT) ratios

Constructs	ES	BC	SCR	HLP	OE	IPC
Economic sanctions (ES)	—					
Border closures (BC)	0.63	—				
Supply chain resilience capabilities (SCR)	0.58	0.61	—			
Humanitarian logistics performance (HLP)	0.55	0.59	0.69	—		
Organizational experience (OE)	0.47	0.49	0.52	0.50	—	
Institutional & political complexity (IPC)	0.62	0.65	0.60	0.57	0.46	—

Note(s): ES = economic sanctions; BC = border closures; SCR = supply chain resilience capabilities; HLP = humanitarian logistics performance; OE = organizational experience; IPC = institutional & political complexity

diagnostics in variance-based structural equation modeling (Henseler *et al.*, 2015). HTMT evaluates the extent to which constructs are empirically distinct by comparing between-construct correlations relative to within-construct correlations.

As reported in Table 3, all HTMT values are below the conservative threshold of 0.85, indicating that each construct captures a unique conceptual domain and that multicollinearity among latent variables is not a concern. These results provide strong evidence of discriminant validity and confirm that the measurement model is appropriate for subsequent structural model analysis.

5.2 Common method bias assessment

To assess potential common method bias, both procedural and statistical remedies were applied. Procedurally, anonymity was assured and constructs were psychologically separated. Statistically, Harman's single-factor test revealed that no single factor accounted for the majority of variance. In addition, full collinearity VIF values were below the critical threshold of 3.3, suggesting that common method bias is unlikely to be a serious concern (Podsakoff *et al.*, 2003; Kock, 2015).

5.3 Predictive validity (Q^2 – stone–geisser)

Predictive relevance of the structural model was evaluated using the Stone–Geisser Q^2 statistic via blindfolding. As shown in Table 4, all endogenous constructs exhibit Q^2 values greater

Table 4 Predictive validity (Q^2 — stone–geisser)

Endogenous construct	Q^2
Supply chain resilience capabilities	0.31
Humanitarian logistics performance	0.36

than zero, indicating satisfactory predictive validity (Hair and Sarstedt, 2019).

5.4 Goodness-of-fit (GoF) of the structural model

Model fit was assessed using multiple global fit indices, including SRMR, NFI, RMS_theta, d_ULS, d_G and the Chi-square statistic. As reported in Table 5, all indices fall within recommended thresholds, indicating an acceptable model fit (Hair and Sarstedt, 2019; Henseler *et al.*, 2015).

5.5 Structural model assessment

The hypothesized relationships were examined using bootstrapping with 5,000 resamples, which provides robust estimates of standard errors, *t*-values and confidence intervals for significance testing in PLS-SEM (Hair and Sarstedt, 2019). This nonparametric approach is particularly appropriate for complex models involving mediation and moderation effects and does not require distributional assumptions.

Economic sanctions have a significant negative effect on resilience capabilities ($\beta = -0.31$, $p < 0.001$; Table 6), indicating that political constraints limit adaptive capacity. This finding supports the argument that sanctions restrict financial flows, procurement options and supplier access, thereby

Table 5 Goodness-of-fit (GoF) indices

Index	Value	Recommended threshold
SRMR	0.061	< 0.08
NFI	0.91	> 0.90
RMS_theta	0.11	< 0.12
d_ULS	1.42	Acceptable
d_G	0.97	Acceptable
χ^2	612.4	—

Table 6 Structural model – path coefficients (bootstrapping results)

Hypothesized path	β (path coefficient)	t-value	p-value	Decision
Economic sanctions → supply chain resilience capabilities	−0.31	5.84	< 0.001	Supported
Border closures → supply chain resilience capabilities	−0.27	4.96	< 0.001	Supported
Supply chain resilience capabilities → humanitarian logistics performance	0.56	10.72	< 0.001	Supported
Organizational experience → humanitarian logistics performance (control)	0.18	3.21	0.001	Supported
Institutional & political complexity → supply chain resilience capabilities	−0.22	4.11	< 0.001	Supported

undermining organizations' ability to adapt, reconfigure and respond to disruptions. This finding suggests that political constraints operate not only as external shocks but as structural barriers that limit the effective deployment of adaptive capabilities, reinforcing the central role of resilience as a constrained dynamic capability under disruption. The result is consistent with prior research highlighting sanctions as major structural constraints on humanitarian operations (Balcik et al., 2016).

Similarly, border closures demonstrate a statistically significant negative relationship with supply chain resilience capabilities ($\beta = -0.27$, $p < 0.001$). Border restrictions disrupt transportation routes, delay customs clearance, and increase uncertainty in cross-border coordination, which weakens adaptive logistics routines. This finding aligns with recent evidence from conflict and pandemic-affected humanitarian corridors (Kovács and Spens, 2011).

In contrast, supply chain resilience capabilities show a strong positive effect on humanitarian logistics performance ($\beta = 0.56$, $p < 0.001$), confirming their central role in enhancing delivery speed, reliability and service continuity under political disruption. This result provides strong empirical support for DCT, which emphasizes the importance of sensing, seizing and reconfiguring capabilities in volatile environments (Teece, 2007). This result highlights that resilience capabilities function as a critical performance-enabling mechanism, translating adaptive capacity into tangible operational outcomes such as timely and reliable aid delivery. It also addresses a key theoretical gap by demonstrating how political shocks translate into performance outcomes through resilience mechanisms rather than direct effects alone.

The control variable, organizational experience, has a positive and significant association with humanitarian logistics performance ($\beta = 0.18$, $p = 0.001$), indicating that accumulated operational knowledge and learning effects contribute to superior performance outcomes. This finding reinforces prior humanitarian logistics studies emphasizing experiential learning as a performance-enhancing factor (Jahre et al., 2009).

Finally, institutional and political complexity negatively influences supply chain resilience capabilities ($\beta = -0.22$, $p < 0.001$), suggesting that fragmented governance structures and regulatory ambiguity further constrain organizations' adaptive capacity. This result supports recent calls to incorporate institutional complexity into humanitarian supply chain theory (Dubey et al., 2018).

Overall, the structural model results provide strong support for the proposed theoretical framework and confirm that politically driven disruptions affect humanitarian logistics performance primarily through their impact on supply chain resilience capabilities, rather than through direct pathways

alone. Importantly, these findings should be interpreted as reflecting constraints on the effective deployment of resilience capabilities under political disruption, rather than a permanent reduction in organizations' underlying adaptive capacity.

5.6 Mediation and moderating influence analysis

To examine the proposed mechanisms and boundary conditions, the mediating role of humanitarian supply chain resilience capabilities and the moderating effect of institutional and political complexity were tested using a bootstrapping procedure with 5,000 resamples. Bootstrapping is appropriate for mediation and moderation analysis in PLS-SEM as it does not rely on normality assumptions and provides robust confidence intervals (Hair and Sarstedt, 2019; Preacher and Hayes, 2008).

5.6.1 Mediation analysis

The mediation analysis assesses whether resilience capabilities transmit the effects of economic sanctions and border closures to humanitarian logistics performance. Indirect effects were evaluated using bootstrapped confidence intervals (Zhao et al., 2010).

As shown in Table 7, the indirect effect of economic sanctions on logistics performance via resilience capabilities is negative and significant ($\beta = -0.17$, $p < 0.001$), indicating that sanctions reduce performance by constraining adaptive capacity. Similarly, border closures exhibit a significant indirect negative effect ($\beta = -0.15$, $p < 0.001$), confirming the role of resilience capabilities as a key transmission mechanism.

Since the direct effects of sanctions and border closures remain significant (Table 6), the results indicate partial mediation, suggesting that resilience capabilities are a central – but not exclusive – mechanism linking political disruptions to logistics performance (Teece, 2007).

5.6.2 Moderating influence of institutional and political complexity

Beyond The moderating role of institutional and political complexity was assessed using interaction terms evaluated via bootstrapping. As reported in Table 7, the interaction between economic sanctions and institutional–political complexity is negative and significant ($\beta = -0.11$, $p = 0.002$), indicating that fragmented governance and regulatory ambiguity amplify the adverse impact of sanctions on resilience capabilities.

Similarly, the interaction between border closures and institutional–political complexity is significant ($\beta = -0.09$, $p = 0.008$), suggesting that the negative effects of border restrictions are intensified in complex and unstable institutional environments.

Interpretive Summary

The combined results provide strong support for the proposed framework. Specifically, resilience capabilities act as a

Table 7 Mediation and moderation analysis results (bootstrapping, 5,000 resamples)

Relationship	Indirect effect (β)	t-value	p-value	95% CI (LL–UL)	Mediation type
Economic sanctions → resilience capabilities → logistics performance	−0.17	4.92	< 0.001	[−0.24, −0.10]	Partial mediation
Border closures → resilience capabilities → logistics performance	−0.15	4.36	< 0.001	[−0.22, −0.08]	Partial mediation
Institutional & political complexity × sanctions → resilience capabilities	−0.11	3.08	0.002	[−0.18, −0.04]	Moderation supported
Institutional & political complexity × border closures → resilience capabilities	−0.09	2.67	0.008	[−0.16, −0.03]	Moderation supported

key mediating mechanism linking political disruptions to logistics performance, while institutional and political complexity functions as a boundary condition that amplifies these negative effects. Together, these findings offer a more nuanced explanation of humanitarian supply chain performance by integrating dynamic capability processes with institutional constraints.

5.7 Regression analysis (robustness check)

To further validate the structural model results and enhance the robustness of the findings, a hierarchical multiple regression analysis was conducted. Regression analysis serves as a complementary technique to PLS-SEM and is widely used as a robustness check to confirm the direction, significance and explanatory power of hypothesized relationships (Hair and Sarstedt, 2019; Cohen et al., 2013).

Humanitarian logistics performance was treated as the dependent variable, while economic sanctions, border closures and supply chain resilience capabilities were entered as predictors. Organizational experience was included as a control variable, and institutional and political complexity was incorporated as a moderator through interaction terms. All variables were mean-centered prior to interaction term creation to reduce multicollinearity concerns (see Table 8) (Aiken et al., 1991).

Explanation of Regression Results

As seen in Table 8:

Model 1 includes only the control variable. Organizational experience exhibits a positive and significant effect on humanitarian logistics performance ($\beta = 0.21$, $p < 0.01$), indicating that accumulated operational learning enhances logistics outcomes.

Model 2 introduces the main independent variables. Both economic sanctions ($\beta = -0.29$, $p < 0.01$) and border closures ($\beta = -0.26$, $p < 0.01$) show significant negative effects on humanitarian logistics performance, consistent with prior humanitarian and political economy research. The substantial increase in explained variance ($\Delta R^2 = 0.23$) highlights the importance of political disruptions as performance determinants.

Model 3 adds supply chain resilience capabilities, which exert a strong positive effect on performance ($\beta = 0.41$, $p < 0.01$). Simultaneously, the absolute magnitudes of sanctions and border closures decrease, providing additional evidence of partial mediation, consistent with the SEM findings (Baron and Kenny, 1986; Zhao et al., 2010).

Model 4 incorporates institutional and political complexity and the interaction terms. The interaction effects between sanctions and institutional complexity ($\beta = -0.11$, $p < 0.05$) and between border closures and institutional complexity ($\beta = -0.09$, $p < 0.05$) are both negative and significant. These results indicate that political and institutional fragmentation amplifies the adverse effects of sanctions and border closures on humanitarian logistics performance. The final model explains 53% of the variance in logistics performance, demonstrating strong explanatory power.

5.8 Summary of results and analysis

This study provides robust empirical evidence on how politically driven disruptions shape humanitarian logistics outcomes in fragile contexts. The measurement model demonstrates strong reliability and validity, with no significant concerns related to common method bias or multicollinearity.

The structural results indicate that economic sanctions and border closures have significant negative effects on supply chain resilience capabilities, which in turn positively influence humanitarian logistics performance. Mediation analysis confirms that resilience capabilities act as a key mechanism through which political disruptions affect performance, indicating partial mediation. Moderation results further show that institutional and political complexity amplifies these negative effects, highlighting important contextual boundary conditions.

Regression analysis conducted as a robustness check supports the SEM findings, confirming the direction and significance of the hypothesized relationships. Overall, the results demonstrate that humanitarian logistics performance under political disruption is primarily shaped by organizations' ability to deploy resilience capabilities, while institutional and political complexity constrains their effectiveness.

6. Discussion

This study examined how economic sanctions and border closures influence humanitarian logistics performance, emphasizing the mediating role of supply chain resilience capabilities and the moderating role of institutional and political complexity. The empirical results from the structural model, mediation tests, moderation analysis and regression estimates consistently demonstrate that sanctions and border restrictions significantly weaken humanitarian performance primarily by constraining organizations' adaptive and reconfiguration capacities rather than by disrupting logistics

Table 8 Hierarchical regression results

Variables	Model 1	Model 2	Model 3	Model 4
Control variables				
Organizational experience	0.21***	0.18***	0.14**	0.12**
Independent variables				
Economic sanctions		−0.29***	−0.17***	−0.16***
Border closures		−0.26***	−0.14**	−0.13**
Mediator				
Supply chain resilience capabilities			0.41***	0.39***
Moderator				
Institutional & political complexity				−0.19***
Sanctions × institutional complexity				−0.11**
Border closures × institutional complexity				−0.09**
Model statistics				
R ²	0.08	0.31	0.47	0.53
ΔR ²	—	0.23	0.16	0.06
F-value	18.6***	42.3***	58.1***	61.7***

Note(s): Standardized coefficients reported. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

outputs directly. These findings are particularly salient in fragile and conflict-affected contexts, where humanitarian organizations operate under severe regulatory uncertainty, access constraints and fragmented governance structures.

By linking political and regulatory disruptions to logistics outcomes through resilience mechanisms, the findings provide a more nuanced explanation of how and why humanitarian supply chains fail or adapt under extreme external pressures. From a practical perspective, the results indicate that investments in resilience capabilities – such as flexible sourcing, decentralized coordination, and adaptive logistics planning – are essential for mitigating the operational impact of sanctions and border restrictions. The discussion below interprets these relationships in light of existing empirical evidence and theory, clarifies unexpected findings, and outlines the study's broader theoretical, practical and policy relevance.

6.1 Discussion of key findings

The empirical evidence provided by this study offers a detailed look at how political disruptions fundamentally reshape humanitarian logistics. Our results confirm that economic sanctions and border closures serve as significant inhibitors of logistics performance, primarily by undermining an organization's adaptive capacity.

Political vs Operational Disruptions: While scholars like (Altay and Pal, 2023) focus on disruption management in general supply chains, our findings highlight a critical distinction in humanitarian contexts: political disruptions are “structural” rather than “stochastic.” Unlike demand uncertainty, which can often be managed through safety stock, sanctions erode the very financial and legal infrastructure required to deploy such assets, confirming a more severe impact than standard operational variability.

Challenging the “Resilience-as-Outcome” Perspective: Much of the existing literature, including (Ponomarev and Holcomb, 2009), treats resilience as a desired end-state. Our mediation results (M1, M2) refine this by showing that resilience acts as an active dynamic process that is highly susceptible to external “throttling.” This supports Ivanov's

(Ivanov, 2022) “AURA” framework regarding the active usage of resilience assets but adds the caveat that in fragile contexts, these assets are often frozen by regulatory compliance requirements.

The “Complexity Trap”: Our identification of institutional and political complexity as a negative moderator (ME1, ME2) provides a complementary perspective to (Kovács and Spens, 2011). While they suggest that increased coordination can overcome environmental gaps, our findings suggest that higher levels of institutional and political complexity can diminish the performance benefits of resilience capabilities by increasing administrative and coordination burdens, the administrative “cost of coordination” may actually diminish the performance benefits of resilience capabilities. This introduces the concept of a “complexity trap” where organizational effort is diverted from aid delivery to regulatory navigation.

Refining DCT: By demonstrating that external shocks can simultaneously necessitate and restrict capability development, we provide a nuanced update to (Teece, 2007). In the humanitarian corridors of South Asia and the Middle East, “sensing” a disruption (like a border closure) does not always lead to “seizing” an alternative route if the institutional environment forbids it, highlighting boundary conditions to DCT that are rarely explored in traditional commercial research.

6.2 Theoretical implications

The findings offer several important theoretical contributions to the humanitarian logistics and supply chain resilience literature. First, the significant negative effects of economic sanctions and border closures on supply chain resilience capabilities confirm prior empirical research identifying political constraints, customs barriers and financial restrictions as major impediments to humanitarian operations (Pettit et al., 2013; Jahre and Jensen, 2010b; Kovács and Spens, 2011). The results empirically reinforce the argument that regulatory volatility and access uncertainty erode organizations' abilities to sense disruptions, mobilize resources and reconfigure supply networks in crisis environments.

Second, this study extends existing literature by empirically demonstrating that supply chain resilience capabilities function as a central explanatory mechanism linking political disruptions to humanitarian logistics performance. While prior studies often assume a direct relationship between sanctions, border closures and humanitarian outcomes (Besiou *et al.*, 2011; Tomasini and Van Wassenhove, 2009), the mediation results show that performance deterioration occurs primarily because political constraints weaken adaptive capabilities. This finding advances DCT by illustrating how sensing, flexibility and reconfiguration capabilities operate – and are constrained – within highly politicized humanitarian contexts (Teece, 2007; Dubey *et al.*, 2018).

Third, the identification of institutional and political complexity as a significant moderator contributes to both institutional theory and humanitarian logistics research. The moderation results indicate that resilience capabilities are not universally effective across contexts. In environments characterized by fragmented authority, overlapping regulations and political contestation, even well-developed capabilities yield diminished performance benefits. This finding extends prior work that treats institutional complexity as a background condition by explicitly integrating it into resilience-performance relationships (Scott, 2013; Van Wassenhove, 2006).

Importantly, the persistence of some direct negative effects of sanctions and border closures – even after accounting for resilience capabilities – represents an unexpected but theoretically meaningful finding. This outcome challenges overly optimistic views of resilience as a universal solution and supports emerging arguments that resilience has structural limits under extreme geopolitical and regulatory disruption (Boin and Van Eeten, 2013; Brandon-Jones *et al.*, 2014). In highly constrained political environments, adaptation alone may be insufficient without systemic institutional and policy-level support.

Importantly, the findings contribute to ongoing debates in DCT regarding whether external shocks primarily stimulate or constrain capability development. This study suggests a nuanced perspective: while political disruptions may create conditions that necessitate capability development, they simultaneously restrict the effective deployment of these capabilities in operational settings. This dual effect highlights the importance of distinguishing between capability formation and capability utilization, particularly in highly constrained humanitarian environments.

6.3 Practical, managerial and policy implications

From a practical and managerial perspective, the findings highlight that improving humanitarian logistics performance under sanctions and border closures requires systematic investment in resilience capabilities, rather than reliance on short-term improvisation. Capabilities such as flexible sourcing, decentralized decision-making, contingency planning, and engagement with local suppliers significantly enhance logistics performance, as evidenced by the strong positive relationship between resilience and humanitarian outcomes in the structural and regression analyses (Pettit *et al.*, 2013; Dubey *et al.*, 2020b).

However, the moderating role of institutional and political complexity underscores the need for context-sensitive

resilience strategies. In highly complex political environments, internal capabilities must be complemented by external coordination mechanisms, including interagency collaboration, partnerships with local authorities, and engagement with nontraditional actors. Such coordination can reduce regulatory friction and partially offset the constraining effects of political fragmentation (Jahre *et al.*, 2009; Kunz and Gold, 2017).

From a policy perspective, the results draw attention to the unintended humanitarian consequences of sanctions and restrictive border regimes. While such measures may pursue political or security objectives, they substantially weaken organizational resilience and undermine aid delivery effectiveness. Policymakers should therefore prioritize clearer humanitarian exemptions, predictable licensing procedures, and streamlined border clearance processes to reduce operational uncertainty (Apriliyati and Pasan, 2024).

In sustainability terms, strengthening resilience capabilities enhances the long-term viability of humanitarian operations by reducing dependency on repeated emergency interventions and improving the capacity to operate in protracted crises. Donors and international agencies should align funding frameworks with long-term resilience-building objectives rather than narrowly focusing on short-term output metrics, thereby supporting more sustainable humanitarian supply chains (Haavisto and Kovács, 2014).

6.4 Limitations and future research directions

Despite its contributions, this study has several limitations that provide avenues for future research. While the study captures organizational experiences of sanctions and border-related disruptions, it does not differentiate between specific national sanction regimes, which may vary in intensity, scope and enforcement. First, the cross-sectional research design limits causal inference and constrains the ability to examine how resilience capabilities evolve over time under prolonged sanctions or recurring border closures. Future research employing longitudinal or panel data could offer deeper insights into dynamic processes such as learning, adaptation and capability erosion (Teece, 2018).

Second, the reliance on self-reported survey data may introduce perceptual bias and potential common method variance, although multiple procedural and statistical remedies were implemented. Future studies could strengthen empirical robustness by incorporating objective performance indicators, archival logistics data or mixed-method approaches to enable data triangulation (Podsakoff *et al.*, 2003).

Third, although the study adopts a broad perspective on conflict-affected and fragile contexts, institutional and political environments differ significantly across regions. Comparative or country-specific investigations could provide more nuanced insights into how variations in sanction regimes, governance structures, and conflict dynamics influence resilience-performance relationships.

Finally, future research could extend the proposed framework by incorporating additional mediating and moderating mechanisms – such as donor flexibility, digital logistics capabilities, interorganizational trust and coordination intensity – to further enrich understanding of humanitarian supply chain performance under conditions of political disruption (Kembro *et al.*, 2024).

7. Conclusion

This study investigates how politically induced disruptions – economic sanctions and border closures – shape humanitarian logistics performance in conflict-affected and fragile contexts. The findings demonstrate that these disruptions do not influence performance directly alone; rather, their effects operate primarily through humanitarian supply chain resilience capabilities. Moreover, institutional and political complexity conditions these relationships, highlighting the importance of contextual constraints in shaping organizational responses.

From a theoretical perspective, the study contributes by extending DCT to humanitarian logistics under conditions of political constraint. By empirically validating supply chain resilience capabilities as a central transmission mechanism between external political shocks and logistics performance, the study advances understanding of how adaptive capacities function in environments where organizational agency is structurally limited. This contribution moves beyond descriptive accounts of disruption by offering a theory-driven explanation of performance variation in humanitarian supply chains.

In practical terms, the findings underscore that strengthening internal resilience capabilities – such as flexibility, coordination and rapid reconfiguration – is essential but insufficient in isolation. Humanitarian organizations must align operational strategies with institutional realities, while policymakers and donors play a critical role in enabling performance through clearer humanitarian exemptions, streamlined border procedures, and reduced regulatory uncertainty in sanctioned and conflict-affected settings.

Several limitations should be acknowledged. The cross-sectional research design restricts causal inference, and the reliance on self-reported survey data may introduce perceptual bias. In addition, the study adopts a broad geographic scope, which may obscure context-specific dynamics across different conflict or sanction regimes. Future research should prioritize longitudinal and mixed-method designs to capture the evolution of resilience capabilities over time, examine specific regional or political contexts in greater depth, and explore additional boundary conditions – such as donor coordination or digital logistics capabilities – that may further shape humanitarian performance under political disruption.

References

- Aiken, L.S., West, S.G. and Reno, R.R. (1991), *Multiple Regression: Testing and Interpreting Interactions*, Sage.
- Allen, S.H. and Lektzian, D.J. (2013), “Economic sanctions: a blunt instrument?”, *Journal of Peace Research*, Vol. 50 No. 1, pp. 121-135.
- Altay, N. and Labonte, M. (2014), “Challenges in humanitarian information management and exchange: evidence from Haiti”, *Disasters*, Vol. 38 No. s1, pp. S50-S72.
- Altay, N. and Pal, R. (2023), “Coping in supply chains: a conceptual framework for disruption management”, *The International Journal of Logistics Management*, Vol. 34 No. 2, pp. 261-279.
- Antonakis, J. and Dietz, J. (2011), “Looking for validity or testing it? The perils of stepwise regression, extreme-scores analysis, heteroscedasticity, and measurement error”, *Personality and Individual Differences*, Vol. 50 No. 3, pp. 409-415.
- Apriliyati, D. and Pasan, E. (2024), “The united nations office for the coordination of humanitarian affairs (OCHA) humanitarian response plan in handling the Afghanistan food crisis”, *Papua Journal of Diplomacy and International Relations*, Vol. 4, pp. 29-48.
- Balcik, B., Bozkir, C.D.C. and Kundakcioglu, O.E. (2016), “A literature review on inventory management in humanitarian supply chains”, *Surveys in Operations Research and Management Science*, Vol. 21 No. 2, pp. 101-116.
- Baron, R.M. and Kenny, D.A. (1986), “The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations”, *Journal of Personality and Social Psychology*, Vol. 51 No. 6, p. 1173.
- Beamon, B.M. and Balcik, B. (2008), “Performance measurement in humanitarian relief chains”, *International Journal of Public Sector Management*, Vol. 21 No. 1, pp. 4-25.
- Besiou, M., Stapleton, O. and VAN Wassenhove, L.N. (2011), “System dynamics for humanitarian operations”, *Journal of Humanitarian Logistics and Supply Chain Management*, Vol. 1 No. 1, pp. 78-103.
- Boin, A. and VAN Eeten, M.J. (2013), “The resilient organization”, *Public Management Review*, Vol. 15 No. 3, pp. 429-445.
- Brandon-jones, E., Squire, B., Autry, C.W. and Petersen, K.J. (2014), “A contingent resource-based perspective of supply chain resilience and robustness”, *Journal of Supply Chain Management*, Vol. 50 No. 3, pp. 55-73.
- Christopher, M. and Peck, H. (2004), “Building the resilient supply chain”, *The International Journal of Logistics Management*, Vol. 15 No. 2, pp. 1-14, doi: [10.1108/09574090410700275](https://doi.org/10.1108/09574090410700275).
- Cohen, J., Cohen, P., West, S.G. and Aiken, L.S. (2013), *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*, Routledge.
- Devellis, R.F. and Thorpe, C.T. (2021), *Scale Development: Theory and Applications*, Sage publications.
- Dubey, R., Gunasekaran, A., Bryde, D.J., Dwivedi, Y.K. and Papadopoulos, T. (2020), “Blockchain technology for enhancing swift-trust, collaboration and resilience within a humanitarian supply chain setting”, *International Journal of Production Research*, Vol. 58 No. 11, pp. 1-18.
- Dubey, R., Luo, Z., Gunasekaran, A., Akter, S., Hazen, B.T. and Douglas, M.A. (2018), “Big data and predictive analytics in humanitarian supply chains: enabling visibility and coordination in the presence of swift trust”, *The International Journal of Logistics Management*, Vol. 29 No. 2, pp. 485-512.
- Flynn, B., Pagell, M. and Fugate, B. (2018), *Survey Research Design in Supply Chain Management: The Need for Evolution in Our Expectations*, Wiley Online Library.
- Fornell, C. and Larcker, D.F. (1981), “Evaluating structural equation models with unobservable variables and measurement error”, *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50.
- Haavisto, I. and Kovács, G. (2014), “Perspectives on sustainability in humanitarian supply chains”, *Disaster Prevention and Management*, Vol. 23 No. 5, pp. 610-631.
- Hair, JR, J.F. and Sarstedt, M. (2019), “Factors versus composites: guidelines for choosing the right structural

- equation modeling method”, *Project Management Journal*, Vol. 50 No. 6, pp. 619-624.
- Helfat, C.E. and Peteraf, M.A. (2015), “Managerial cognitive capabilities and the microfoundations of dynamic capabilities”, *Strategic Management Journal*, Vol. 36 No. 6, pp. 831-850.
- Helfat, C.E., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D. and Winter, S.G. (2009), *Dynamic Capabilities: Understanding Strategic Change in Organizations*, John Wiley & Sons.
- Henseler, J., Ringle, C.M. and Sarstedt, M. (2015), “A new criterion for assessing discriminant validity in variance-based structural equation modeling”, *Journal of the Academy of Marketing Science*, Vol. 43 No. 1, pp. 115-135.
- Ivanov, D. (2022), “Lean resilience: AURA (active usage of resilience assets) framework for post-COVID-19 supply chain management”, *The International Journal of Logistics Management*, Vol. 33 No. 4, pp. 1196-1217.
- Jahre, M. and Jensen, L.-M. (2010), “Coordination in humanitarian logistics through clusters”, *International Journal of Physical Distribution & Logistics Management*, Vol. 40, pp. 657-674.
- Jahre, M., Jensen, L.M. and Listou, T. (2009), “Theory development in humanitarian logistics: a framework and three cases”, *Management Research News*, Vol. 32, pp. 1008-1023.
- Kembro, J., Kunz, N., Frennsson, L. and Vega, D. (2024), “Revisiting the definition of humanitarian logistics”, *Journal of Business Logistics*, Vol. 45 No. 2, p. e12376.
- Khan, M., Lee, H.Y. and Bae, J.H. (2019), “The role of transparency in humanitarian logistics”, *Sustainability*, Vol. 11 No. 7, p. 2078.
- Kock, N. (2015), “Common method bias in PLS-SEM: a full collinearity assessment approach”, *International Journal of e-Collaboration (Ijec)*, Vol. 11 No. 4, pp. 1-10.
- Kovács, G. and Spens, K.M. (2007), “Humanitarian logistics in disaster relief operations”, *International Journal of Physical Distribution & Logistics Management*, Vol. 37, pp. 99-114.
- Kovács, G. and Spens, K.M. (2011), “Trends and developments in humanitarian logistics—a gap analysis”, *International Journal of Physical Distribution & Logistics Management*, Vol. 41, pp. 32-45.
- Kunz, N. and Gold, S. (2017), “Sustainable humanitarian supply chain management—exploring new theory”, *International Journal of Logistics Research and Applications*, Vol. 20 No. 2, pp. 85-104.
- Mallard, G., Sabet, F. and Sun, J. (2020), “The humanitarian gap in the global sanctions regime: assessing causes, effects, and solutions”, *Global Governance: A Review of Multilateralism and International Organizations*, Vol. 26 No. 1, pp. 121-153.
- Oliver, C. (1991), “Strategic responses to institutional processes”, *The Academy of Management Review*, Vol. 16 No. 1, pp. 145-179.
- Oliver, R.L. (1980), “A cognitive model of the antecedents and consequences of satisfaction decisions”, *Journal of Marketing Research*, Vol. 17 No. 4, pp. 460-469.
- Pettit, T.J., Croxton, K.L. and Fiksel, J. (2013), “Ensuring supply chain resilience: development and implementation of an assessment tool”, *Journal of Business Logistics*, Vol. 34 No. 1, pp. 46-76.
- Pfeffer, J. and Salancik, G. (2015), “External control of organizations—resource dependence perspective”, *Organizational Behavior 2*, Routledge.
- Podsakoff, P.M., MacKenzie, S.B., Lee, J.-Y. and Podsakoff, N.P. (2003), “Common method biases in behavioral research: a critical review of the literature and recommended remedies”, *Journal of Applied Psychology*, Vol. 88 No. 5, p. 879.
- Ponomarev, S.Y. and Holcomb, M.C. (2009), “Understanding the concept of supply chain resilience”, *The International Journal of Logistics Management*, Vol. 20 No. 1, pp. 124-143.
- Preacher, K.J. and Hayes, A.F. (2008), “Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models”, *Behavior Research Methods*, Vol. 40 No. 3, pp. 879-891.
- Scott, W.R. (2013), *Institutions and Organizations: Ideas, Interests, and Identities*, Sage publications.
- Teece, D.J. (2007), “Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance”, *Strategic Management Journal*, Vol. 28 No. 13, pp. 1319-1350.
- Teece, D.J. (2018), “Business models and dynamic capabilities”, *Long Range Planning*, Vol. 51 No. 1, pp. 40-49.
- Tomasini, R.M. and VAN Wassenhove, L.N. (2009), “From preparedness to partnerships: case study research on humanitarian logistics”, *International Transactions in Operational Research*, Vol. 16 No. 5, pp. 549-559.
- Van Wassenhove, L.N. (2006), “Humanitarian aid logistics: supply chain management in high gear”, *Journal of the Operational Research Society*, Vol. 57 No. 5, pp. 475-489.
- Zhao, X., Lynch, J.G., Jr and Chen, Q. (2010), “Reconsidering Baron and Kenny: myths and truths about mediation analysis”, *Journal of Consumer Research*, Vol. 37 No. 2, pp. 197-206.

Appendix 1

Table A1 Sample demographic and organizational characteristics ($n = 214$)

Category	Subcategory	Frequency (n)	%
Gender	Male	138	64.5
	Female	76	35.5
Education level	Bachelor's degree	82	38.3
	Master's degree	104	48.6
	Doctorate / professional qualification	28	13.1
Organization type	International NGO	102	47.7
	Local NGO	64	29.9
	UN agency / UN partner	48	22.4
Respondent role	Logistics manager	72	33.6
	Supply chain coordinator	56	26.2
	Operations / procurement manager	48	22.4
	Senior field staff	38	17.8
Organizational experience	Less than 5 years	46	21.5
	5–10 years	88	41.1
	More than 10 years	80	37.4
Geographic scope of operations	Single country	62	29.0
	Multi-country (same region)	94	43.9
	Multi-region (cross-regional)	58	27.1
Regional distribution of operations	South asia	86	40.2
	Middle east	72	33.6
	East Africa	56	26.2
Total	—	214	100

Appendix 2

Table A2 Literature sources informing construct operationalization

Construct	Key literature sources	Core dimensions adapted	Adaptation to humanitarian context
Economic sanctions	Allen and Lektzian (2013) ; Mallard et al. (2020) ; Ivanov (2022)	Financial restrictions, procurement barriers, supplier access limitations, compliance burdens	Items were adapted to capture respondents' operational exposure to sanctions-related constraints rather than formal sanction regimes
Border closures	Jahre et al. (2009) ; Kovács and Spens (2011) ; Apriliyati and Pasan (2024)	Transportation disruptions, customs delays, restricted movement of goods and personnel, access limitations	Items were contextualized to reflect day-to-day humanitarian logistics challenges arising from border restrictions
Humanitarian supply chain resilience capabilities	Teece (2007) ; Ponomarov and Holcomb (2009) ; Pettit et al. (2013) ; Dubey et al. (2018)	Sensing, adaptation, flexibility, resource reconfiguration, recovery capability	Items were refined to capture resilience capabilities within politically constrained humanitarian environments
Institutional and political complexity	Oliver (1991) ; Scott (2013) ; Jahre and Jensen (2010)	Regulatory fragmentation, political interference, donor compliance requirements, governance complexity	Items were adapted to assess the complexity of institutional and political environments encountered by humanitarian organizations
Humanitarian logistics performance	Beamon and Balcik (2008) ; Jahre et al. (2009) ; Van Wassenhove (2006)	Delivery timeliness, cost efficiency, supply continuity, reliability, equitable aid access	Items were modified to evaluate logistics outcomes under conflict-affected and politically disrupted conditions
Organizational experience (control variable)	Jahre et al. (2009) ; Kovács and Spens (2011) ; Dubey et al. (2020)	Organizational learning, accumulated expertise, operational maturity	Items were adapted to reflect experience gained through repeated humanitarian interventions in fragile contexts

Appendix 3

Table A3 Construct operationalization

Construct	Reference	Item code	Item description
Economic sanctions (IV)	Allen and Lektzian (2013); Mallard et al. (2020); Ivanov (2022)	ES1	Economic sanctions delay the procurement of humanitarian supplies
		ES2	Financial restrictions limit our ability to transfer funds for humanitarian operations
		ES3	Sanctions complicate contracting with suppliers and logistics service providers
		ES4	Compliance with sanctions significantly increases logistics operating costs
		ES5	Sanctions reduce flexibility in humanitarian logistics decision-making
Border closures (IV)	Jahre et al. (2009); Kovács and Spens (2011); Apriliyati and Pasan (2024)	BC1	Border closures frequently delay cross-border humanitarian shipments
		BC2	Sudden border restrictions disrupt planned logistics routes
		BC3	Border closures increase uncertainty in delivery schedules
		BC4	Humanitarian access corridors are often unpredictable or temporarily suspended
		BC5	Border restrictions reduce the reliability of last-mile deliveries
Humanitarian supply chain resilience capabilities (mediator)	Teece (2007); Ponomarov and Holcomb (2009); Pettit et al. (2013); Dubey et al. (2018)	HSCRC1	Our organization can quickly reroute supplies when access routes are disrupted
		HSCRC2	Logistics plans can be rapidly adjusted in response to political or regulatory changes
		HSCRC3	Local sourcing helps maintain operations during border closures
		HSCRC4	Pre-positioned inventory enables continued aid delivery under access restrictions
		HSCRC5	Strong coordination with partners improves response during political disruptions
Institutional & political complexity (moderator)	Oliver (1991); Scott (2013); Jahre and Jensen (2010)	IPC1	Our operations are governed by regulations from multiple authorities
		IPC2	Donor compliance requirements significantly constrain logistics decisions
		IPC3	Coordination with military or security actors complicates logistics operations
		IPC4	Regulatory requirements frequently conflict with humanitarian priorities
Humanitarian logistics performance (DV)	Beamon and Balcik (2008); Jahre et al. (2009); Van Wassenhove (2006)	HLP1	Humanitarian supplies reach beneficiaries within planned timeframes
		HLP2	Logistics operations remain cost-effective despite political constraints
		HLP3	Aid delivery remains reliable during periods of sanctions or border closures
		HLP4	Supply interruptions are minimized under severe access restrictions
		HLP5	Vulnerable populations receive aid equitably despite logistical constraints
Organizational experience (control)	Jahre et al. (2009); Kovács and Spens (2011); Dubey et al. (2020)	OE1	Our organization has extensive experience in humanitarian logistics operations
		OE2	Our organization has successfully managed multiple humanitarian crises in the past
		OE3	Our logistics teams are highly experienced in operating under conflict-affected or fragile contexts
		OE4	Our organization has well-established processes and standard operating procedures for disaster relief logistics
		OE5	Our organization can quickly adapt logistics operations based on prior crisis experience

Appendix 4

Table A4 Descriptive statistics and multicollinearity diagnostics

Construct	Mean	SD	Min.	Max.	Skewness	Kurtosis	VIF
Economic sanctions (ES)	3.42	0.81	1.00	5.00	−0.21	−0.48	1.87
Border closures (BC)	3.58	0.76	1.00	5.00	−0.18	−0.36	1.92
Supply chain resilience capabilities (SCRC)	3.67	0.69	1.40	5.00	−0.34	−0.12	2.11
Humanitarian logistics performance (HLP)	3.71	0.72	1.20	5.00	−0.29	−0.25	2.24
Response organization capacity (ROC)	3.63	0.74	1.30	5.00	−0.26	−0.31	1.68
Organizational experience (control)	3.89	0.83	1.00	5.00	−0.41	0.08	1.55

References

- Allen, S.H. and Lektzian, D.J. (2013), "Economic sanctions: a blunt instrument?", *Journal of Peace Research*, Vol. 50 No. 1, pp. 121-135.
- Apriliyati, D. and Pasan, E. (2024), "The united nations office for the coordination of humanitarian affairs (OCHA) humanitarian response plan in handling the Afghanistan food crisis", *Papua Journal of Diplomacy and International Relations*, Vol. 4, pp. 29-48.
- Beamon, B.M. and Balcik, B. (2008), "Performance measurement in humanitarian relief chains", *International Journal of Public Sector Management*, Vol. 21 No. 1, pp. 4-25.
- Dubey, R., Gunasekaran, A., Bryde, D.J., Dwivedi, Y.K. and Papadopoulos, T. (2020), "Blockchain technology for enhancing swift-trust, collaboration and resilience within a humanitarian supply chain setting", *International Journal of Production Research*, Vol. 58 No. 11, pp. 1-18.
- Dubey, R., Luo, Z., Gunasekaran, A., Akter, S., Hazen, B.T. and Douglas, M.A. (2018), "Big data and predictive analytics in humanitarian supply chains: enabling visibility and coordination in the presence of swift trust", *The International Journal of Logistics Management*, Vol. 29 No. 2, pp. 485-512.
- Ivanov, D. (2022), "Lean resilience: AURA (active usage of resilience assets) framework for post-COVID-19 supply chain management", *The International Journal of Logistics Management*, Vol. 33 No. 4, pp. 1196-1217.
- Jahre, M. and Jensen, L.-M. (2010), "Coordination in humanitarian logistics through clusters", *International Journal of Physical Distribution & Logistics Management*, Vol. 40, pp. 657-674.
- Jahre, M., Jensen, L.M. and Listou, T. (2009), "Theory development in humanitarian logistics: a framework and three cases", *Management Research News*, Vol. 32, pp. 1008-1023.
- Kovács, G. and Spens, K.M. (2011), "Trends and developments in humanitarian logistics—a gap analysis", *International Journal of Physical Distribution & Logistics Management*, Vol. 41, pp. 32-45.
- Mallard, G., Sabet, F. and Sun, J. (2020), "The humanitarian gap in the global sanctions regime: assessing causes, effects, and solutions", *Global Governance: A Review of Multilateralism and International Organizations*, Vol. 26 No. 1, pp. 121-153.
- Oliver, C. (1991), "Strategic responses to institutional processes", *The Academy of Management Review*, Vol. 16 No. 1, pp. 145-179.
- Pettit, T.J., Croxton, K.L. and Fiksel, J. (2013), "Ensuring supply chain resilience: development and implementation of an assessment tool", *Journal of Business Logistics*, Vol. 34 No. 1, pp. 46-76.
- Ponomarev, S.Y. and Holcomb, M.C. (2009), "Understanding the concept of supply chain resilience", *The International Journal of Logistics Management*, Vol. 20 No. 1, pp. 124-143.
- Scott, W.R. (2013), *Institutions and Organizations: Ideas, Interests, and Identities*, Sage publications.
- Teece, D.J. (2007), "Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance", *Strategic Management Journal*, Vol. 28 No. 13, pp. 1319-1350.
- Van Wassenhove, L.N. (2006), "Humanitarian aid logistics: supply chain management in high gear", *Journal of the Operational Research Society*, Vol. 57 No. 5, pp. 475-489.

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