



Contemporary PERSPECTIVES OF KNOWLEDGE

INTERDISCIPLINARY
APPROACHES

Scientific Studies and Academic Reflections

Edited by

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Periodicos
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Graphic Design, Layout and Cover

Academic Publisher Periodicojs

Language

Portuguese and English

International Cataloging-in-Publication Data (CIP)

(Brazilian Book Chamber, SP, Brazil)

C761	Contemporary Perspectives of Knowledge: Interdisciplinary Approaches/ Flávia Moreno Alves de Souza (org) – João Pessoa: Periodicojs publisher, 2026. E-book: il. color. Includes bibliography ISBN: 978-65-6010-196-8 1. Free themes. I. Souza, Flávia Moreno Alves. II. Title
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CDD 370

Prepared by Dayse de França Barbosa CRB 15-553

Index for systematic catalog:

Indexes for systematic catalog:

1. Education: 370

Work without funding from public or private bodies.

The published works have been submitted to peer review and evaluation (double-blind), with respective acceptance letters in the publisher's system.

The work is the result of studies and research from the Interdisciplinary Studies in Human Sciences section of the Humanities in Perspective book collection.



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President and Senior Editor of Periodicojs

CNPJ: 39.865.437/0001-23

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Chapter

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**DECENTRALIZATION STRATEGIES AND
RESILIENCE IN NATIONAL LOGISTICS
INFRASTRUCTURE: DISTRIBUTED
DISTRIBUTION NETWORKS AS SECURITY
IMPERATIVES**



DECENTRALIZATION STRATEGIES AND RESILIENCE IN NATIONAL LOGISTICS INFRASTRUCTURE: DISTRIBUTED DISTRIBUTION NETWORKS AS SECURITY IMPERATIVES

Dielison Deyvison Oliveira Silva¹

Abstract: The growing global geopolitical instability, combined with the increasing frequency of natural disasters and health crises, has exposed severe vulnerabilities in excessively centralized supply chains dependent on single logistical corridors. This article presents a systematic literature review of studies published between 2020 and 2025, aiming to analyze logistics decentralization strategies as a fundamental mechanism for the resilience of national supply chains. The study discusses the original concept of the ‘Tri-Coastal Network’ — a distribution architecture based on the strategic positioning of logistics hubs in the national interior, disconnected from major coastal centers — arguing that such a configuration protects the flow of essential goods against geopolitical disruptions, natural disasters, and maritime transport crises. The systematic review methodology followed the PRISMA protocol, with searches conducted in Scopus and Web of Science databases. Results demonstrate that distributed networks with multiple regional hubs significantly reduce post-disruption recovery time, increase systemic robustness, and confer lasting competitive advantage. More than a business strategic differentiator, logistics decentralization emerges in this work as a national security imperative, capable of ensuring the continuity of essential goods supply to the population in adverse scenarios.

Keywords: logistics resilience; decentralization; distribution networks; Tri-Coastal Network; national security; supply chain; inland hubs.

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Introduction

The management of global supply chains enters the third decade of the 21st century profoundly transformed by an unprecedented sequence of systemic disruptions. The COVID-19 pandemic, which began in 2020, revealed with surgical clarity the fragility of logistical networks built under the logic of maximum efficiency and operational centralization. In the wake of the pandemic, the Russia-Ukraine war, which began in 2022, interrupted critical supply routes for grains, fertilizers, and energy. Houthi attacks on vessels in the Red Sea in 2023 and 2024 diverted up to 75% of container traffic from the Suez route, increasing average distances traveled by cargo ships by 10% and absorbing between 5% and 9% of global container transport capacity (UNCTAD, 2024). These episodes are not isolated anomalies: they are symptoms of a new era of interdependent polycrises, in which geopolitical, climatic, and sanitary risks mutually feed and amplify their consequences (Zheng et al., 2025).

In response to this scenario, researchers, managers, and public policy makers have focused on the concept of supply chain resilience — understood as the capacity to anticipate, resist, adapt to, and recover from disruptions (Christopher & Peck, 2004; Ponomarov & Holcomb, 2009). However, the literature until recently concentrated predominantly on resilience strategies applied at the level of the individual firm or supplier-customer pairs, relegating to the background the territorial and infrastructural dimension of logistics resilience (Habibi et al., 2025; Alikhani et al., 2024). The decentralization of logistics infrastructure, with the strategic positioning of distribution hubs in the national interior, remains underexplored as a lever of systemic resilience and national security.

Brazil offers a privileged laboratory for this discussion. Endowed with continental dimensions — 8.5 million km² distributed across five regions with radically distinct geographic, climatic, and socioeconomic characteristics — the country has historically concentrated its logistics infrastructure on the Southeast-South coastal axis, reproducing precisely the vulnerability that the international literature identifies as the main vector of collapse in crisis situations. In 2024, investments in transport and logistics in Brazil reached approximately R\$ 63 billion, with real growth of 15% across all



infrastructure sectors (IBL, 2025; ABDIB, 2024). However, this growth has not yet translated into a sufficient redistribution of logistics assets toward the interior and the North and Northeast regions.

It is in this context that this article proposes and articulates the concept of the ‘Tri-Coastal Network’ — a distributed logistics architecture that positions strategic hubs in the national interior, in regions equidistant from Brazil’s three major drainage frontiers: the Northern Atlantic coast (ports of Belém, São Luís, and Fortaleza), the Southern Atlantic coast (ports of Santos, Paranaguá, and Rio Grande), and the fluvial-Amazonian corridor (Tapajós, Madeira, and Tocantins-Araguaia waterways). This triangle of corridors, when integrated by a mesh of distributed interior hubs, creates conditions for the flow of essential goods to be maintained even in the event of simultaneous blockage of two of the three coastal perimeter corridors. Such a configuration, it is argued, elevates supply chain resilience from a competitive attribute to a national security imperative.

This article is structured as follows: Section 2 describes the systematic review methodology adopted; Section 3 presents the conceptual framework on logistics resilience; Section 4 analyzes contemporary vectors of geopolitical and environmental disruption; Section 5 discusses decentralization strategies and distributed network design; Section 6 articulates the concept of Tri-Coastal Network for the Brazilian context; Section 7 examines the role of digitalization in the resilience of decentralized networks; Section 8 positions logistics resilience as a national security imperative; and Section 9 presents conclusions and recommendations.

Methodology

This study is conducted as a Systematic Literature Review (SLR), following the guidelines of the PRISMA protocol (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). Searches were conducted in the Scopus and Web of Science databases, recognized for their scope and editorial quality of indexed journals, and widely adopted in recent systematic reviews on supply chain management (Alikhani et al., 2024; Fernández-Miguel et al., 2025).



The search strategy combined the following descriptors in English and Portuguese, using the Boolean operator AND: ‘supply chain resilience’, ‘logistics decentralization’, ‘hub location’, ‘distributed networks’, ‘geopolitical risk’, ‘natural disasters’, ‘supply chain disruption’, ‘national security’, ‘inland logistics’, ‘multi-hub network’. The temporal horizon covers January 2020 to March 2025, ensuring the incorporation of post-pandemic scientific production, which represents a qualitative inflection in the approach to logistics resilience.

Inclusion criteria were: articles published in peer-reviewed journals; full text availability; direct thematic adherence to at least two of the central descriptors; and publication within the defined period. Excluded were conference papers without rigorous editorial review, publications in languages other than English, Portuguese, and Spanish, and works whose scope was limited exclusively to financial or marketing aspects of supply chains. After applying inclusion and exclusion filters and removing duplicates, 87 articles were selected for full analysis, forming the foundation of the arguments developed in subsequent sections.

The analysis followed a thematic narrative synthesis approach, organizing findings into five analytical axes: (i) conceptualization and measurement of logistics resilience; (ii) contemporary disruption vectors; (iii) decentralized network design strategies; (iv) resilience-enabling technologies; and (v) the national security dimension of logistics.

Conceptual Framework: Resilience in Supply Chains and Logistics Infrastructure

The concept of supply chain resilience — referred to in the international literature as Supply Chain Resilience (SCR) — has evolved substantially over the past two decades. In its seminal formulation, Rice and Caniato (2003) defined resilience as the organizational capacity to react and recover from unexpected disruptions, with initial reference to terrorist attacks and natural disasters. Ponomarov and Holcomb (2009) broadened this definition by incorporating the dimension of proactive adaptation, while Christopher and Peck (2004) identified four essential properties of a resilient supply



chain: supply chain re-engineering, collaboration, agility, and the creation of a risk management culture.

The bibliometric review conducted by Alikhani et al. (2024), which analyzed 613 articles indexed in Web of Science between 2004 and 2023, identified an evolutionary trajectory in the field marked by three major inflections: the first, around 2009, with the incorporation of the dynamic capabilities perspective; the second, after 2016, with expanded focus on geopolitical and sustainability risks; and the third, accelerated from 2020, with the COVID-19 pandemic catalyzing a profound revision of efficiency-resilience paradigms. This conceptual evolution is corroborated by Chaoui Benabdellah et al. (2024), who analyzed 294 articles and identified three predominant research clusters: optimization for resilience, technological adoption, and disruption strategies.

At the logistics infrastructure level, resilience takes on a territorial dimension that transcends the individual management of companies. Distribution networks are complex systems composed of nodes (distribution centers, ports, rail terminals, warehouses) and edges (roads, railways, waterways, maritime routes), whose topology directly determines the capacity to absorb and recover from shocks (Liu et al., 2022; Yao et al., 2023). Alikhani et al. (2024) show that proactive network design strategies — such as multiplication of distribution centers, route redundancy, and geographic diversification of facilities — consistently outperform reactive strategies in terms of total recovery cost and time to return to operational normality.

The distinction between robustness and resilience is fundamental to this analysis. Robustness refers to the network's ability to maintain its performance without structural modification in the face of perturbations; resilience, in turn, implies the ability to adaptively transform to preserve essential functionality even under conditions that exceed robustness parameters (Choi et al., 2022; Sawik, 2023). Distributed networks with multiple hubs exhibit greater structural robustness — because the failure of any single node does not necessarily compromise the entire network — and greater resilience — because decentralization enables dynamic rerouting of flows when certain corridors are blocked (Habibi et al., 2025).



The concept of Supply Chain Viability (SCV), introduced by Ivanov and Dolgui (2021) and empirically deepened by Gruchmann et al. (2025), further expands the analytical horizon by questioning not only recovery capacity, but the long-term structural sustainability of the network. Viable networks are those that, when subjected to high-magnitude and long-duration disruptions — such as those characterizing prolonged geopolitical crises — can structurally reconfigure without losing their functional identity.

Contemporary Disruption Vectors: Geopolitics, Climate, and Systemic Complexity

Geopolitical Risks as Amplifiers of Logistics Vulnerability

Recent literature on geopolitical disruptions in supply chains evidences a qualitative transformation in the risk profile faced by global logistics networks. Fernández-Miguel et al. (2025) identified that geopolitical disruptions differ fundamentally from natural disasters and operational failures due to their systemic nature, unpredictable duration, and capacity to create cascade effects transcending sectors and national borders. While an earthquake or hurricane has limited geographic scope and measurable duration, a war or trade conflict can last for years and simultaneously affect multiple supply corridors.

The World Bank (2023), as cited by Zheng et al. (2025), quantitatively confirmed this risk escalation, reporting that geopolitical incidents increase by 47% the probability of disruption to corporate supply chains compared to the 2010-2020 average, extending the average recovery period to 8.3 months. This finding is corroborated by Caldara and Iacoviello (2022), whose Geopolitical Risk Index (GPR Index) documents a persistent and structural elevation of risk since 2016, with peaks corresponding to the 2018 China-US trade war, the 2022 Russia-Ukraine conflict, and tensions in the South China Sea.

The critical exposure of national economies to single strategic suppliers emerged as one of the most urgent themes in post-pandemic literature. Doan et al. (2025), using data from Japanese



multinationals operating in Asia between 2009 and 2022, demonstrated that firms exposed to elevated geopolitical risks do not opt for massive reshoring — an economically unviable strategy — but rather for geographic diversification of their supply networks, shifting production from China to ASEAN economies.

The UNCTAD (2024) documented that Houthi attacks on Red Sea maritime traffic in 2023-2024 resulted in an average 10% increase in cargo ship travel distances and absorbed between 5% and 9% of global container transport capacity, dramatically illustrating the fragility of networks dependent on single corridors.

Natural Disasters and Climate Change as Growing Disruption Vectors

The intensification of climate change introduces a second layer of structural vulnerability in logistics supply chains. Yang et al. (2025), based on 407 questionnaires applied to managers of industrial and logistics companies in 20 Chinese provinces, identified that flexibility, anticipation, visibility, cooperation, and government support are the main determinants of logistics resilience in contexts of recurrent natural disasters.

In the Brazilian context, this risk vector takes on particular specificity. The state of Rio Grande do Sul, responsible for approximately 6% of national GDP and a continental-scale industrial and agro-industrial hub, suffered in 2024 one of the greatest climate catastrophes in its history, with floods that interrupted roads, railways, and port operations for weeks. This episode demonstrated unequivocally that concentrating logistics infrastructure in a single regional hub creates vulnerabilities that exceed corporate response capacity and require long-term public policy responses.

The literature on resilient network design in the face of natural disasters converges on a set of proactive strategies that include deliberate geographic dispersal of facilities, capacity redundancy in alternative locations, and the creation of regional safety stocks (Alikhani et al., 2024; Yang et al., 2025). The growing interdependence between climatic and geopolitical risks adds another



layer of analytical complexity. A study published by Cambridge University, cited by the UNCTAD (2024) report, demonstrated that climate crises, pandemics, and geopolitical conflicts are causally interconnected, often intensifying each other's effects.

Logistics Decentralization and Distributed Network Design

Foundations of Resilient Network Design

The design of resilient logistics networks is one of the most fertile research fields in the operations and logistics literature of the past decade. Alikhani et al. (2024) identified three main categories of disruption mitigation strategies: proactive strategies — including facility protection, capacity redundancy, and supplier diversification —; reactive strategies — such as rerouting, emergency resource allocation, and backup capacity activation —; and network design quality strategies, referring to structural properties that confer intrinsic robustness to the network topology.

Regarding proactive strategies, the literature shows that protecting critical distribution centers (DCs) — whether through physical reinforcement, geographic redundancy, or reserved capacity contracts — is consistently the strategy with the greatest impact on system resilience (Alikhani et al., 2024; Hosseini et al., 2019). Multiple demand allocation — the ability for each demand point to be served by more than one alternative distribution center — emerges as the most robust design quality strategy identified in the literature, surpassing even the simple addition of backup capacity in terms of cost-effectiveness (Habibi et al., 2025).

Analysis of complex logistics network topology reveals that networks with distributed structures — characterized by multiple hubs of relatively equivalent importance — exhibit greater structural resilience than star or hub-and-spoke networks, in which a central node concentrates most of the flows (Liu et al., 2022). Habibi et al. (2025) demonstrated through simulation that networks with seven distributed layers exhibit lower disruption durability and lower impact on the end customer than networks with two or three centralized layers, provided alternative routing mechanisms are



adequately designed.

Decentralization as a Strategic Lever in Brazil

The Brazilian case offers a particularly revealing context for the application of distributed network design principles. Brazil's cargo transport matrix is marked by a profound modal imbalance: road transport accounts for approximately 61% of all cargo movement, rail for 20%, cabotage for 12%, pipelines for 4%, waterways for 2%, and air for 1% (CNT, apud G2L Logistics, 2024). In contrast, the United States distributes flows in a much more balanced manner: road 31%, rail 37%, waterway 10%, and others 22%. This modal asymmetry implies excessive dependence on a single modal vulnerable to localized interruptions.

The geographic concentration of logistics infrastructure reproduces and amplifies this modal fragility. Historically, the Southeast-South axis concentrates most distribution centers, rail terminals, and port activity in the country. However, the recent expansion of the logistics sector signals an ongoing structural change: the market for logistics and industrial condominiums closed 2025 with the delivery of 3.4 million square meters of new developments — a volume 43% higher than 2024 — with the Northeast growing at 9.3% per year versus 7.9% for the Southeast (Tribuna do Sertão, 2026).

The Federal Government's investment in transport infrastructure, totaling R\$ 13.74 billion in 2023 and reaching R\$ 24 billion in federal highways in 2024, with the Northeast receiving the largest allocation — R\$ 6.19 billion —, followed by the South — R\$ 4.59 billion —, North — R\$ 3.8 billion —, Midwest — R\$ 2.3 billion — and Southeast — R\$ 1.2 billion — indicates a strategic reorientation pointing, even if tentatively, toward decentralization (IBL, 2025; Ministério dos Transportes, 2024).



The Tri-Coastal Network Concept: Distribution Architecture for National Resilience

Conceptual Foundations and Strategic Justification

The concept of the ‘Tri-Coastal Network’, proposed in this article by Dielison Deyvison Oliveira Silva as an original contribution to the national logistics infrastructure literature, designates a distribution architecture that positions strategic logistics hubs in the Brazilian interior in regions equidistant from three major drainage frontiers: the Northern Atlantic coast (ports of Belém, São Luís, and Fortaleza), the Southern Atlantic coast (ports of Santos, Paranaguá, and Rio Grande), and the fluvial-Amazonian corridor (Tapajós, Madeira, and Tocantins-Araguaia waterways). This triangle of corridors, when integrated by a mesh of distributed interior hubs, creates conditions for the flow of essential goods to be maintained even under simultaneous blockage of two of the three perimeter corridors.

The strategic justification of the concept rests on four pillars identified in the international literature. The first is the principle of geodiversified distribution, according to which the resilience of a logistics network is directly proportional to the geographic diversity of its nodes, since climatic and geopolitical risks have a regional character. The second is the principle of active structural redundancy, which distinguishes the simple multiplication of facilities from the creation of functional redundancy: the hubs of the Tri-Coastal Network must be dimensioned to operate at expanded capacity when activated as substitutes for blocked corridors. The third is the principle of functional equidistance, which guides the positioning of interior hubs to maximize territorial coverage and minimize response time. The fourth is the principle of logistics sovereignty, which incorporates the national security dimension into the network architecture: interior hubs located in the heart of national territory are geographically less vulnerable to naval blockades and attacks on coastal infrastructure.



Comparison with International Experiences

The logic of the Tri-Coastal Network finds significant parallels in recent international experiences. Doan et al. (2025) demonstrated that regional diversification of productive installations reduced exposure to geopolitical risk without sacrificing essential economies of scale. The American experience with its National Strategy for Global Supply Chain Security, launched in 2012, established for the first time in the governmental plane an explicit connection between supply chain resilience and national security (Hong et al., 2025). China, in turn, has systematically emphasized the need to build a modern supply chain system endowed with resilience.

Germany's logistics platform system (Güterverkehrszentren — GVZ) comprises more than 30 multimodal centers distributed throughout the country's interior, integrated with high-capacity rail networks and major waterways, functioning as redistribution nodes that decongest coastal ports and increase the overall resilience of the national logistics system. Literature indicates that these GVZs were decisive in maintaining supply during the pandemic, precisely because the disruption at North Sea ports did not propagate unrestrictedly into the country's interior (Belhadi et al., 2024).

Implementation and Challenges of the Tri-Coastal Network in Brazil

The implementation of the Tri-Coastal Network in the Brazilian context faces structural challenges. The primary challenge is the deficit of interiorized multimodal connectivity: Brazil's rail network, reaching approximately 30,000 kilometers — insufficient for a country of continental dimensions — concentrates on agricultural and mineral commodity export axes, without forming an interconnected mesh (CNI, 2023). The Railways Law and the acceleration of private operation authorization grants represent windows of opportunity, provided that routes prioritize interiorized multimodal connectivity.

The second challenge is regulatory and tax adequacy. Brazil's tax system, through interstate



ICMS and complexities of the tax substitution regime, has historically created disincentives for geographic dispersal of distribution centers, favoring concentration in a few states. The ongoing tax reform, with the gradual implementation of IBS and CBS, represents a historic opportunity to eliminate these distortions.

The third challenge is the financiability of investments in interior hubs. The international literature is unanimous in pointing out that building resilient logistics networks implies additional costs relative to networks optimized exclusively for efficiency (Alikhani et al., 2024; Rice & Caniato, 2003). Public-private financing mechanisms, logistics concessions, and government guarantee instruments can play a fundamental role in enabling the necessary investments.

Enabling Technologies for Resilience in Decentralized Logistics Networks

The effectiveness of decentralized logistics networks critically depends on information infrastructures that guarantee real-time visibility of physical flows, predictive capacity to anticipate disruptions, and decisional agility to activate alternative routes and backup capacities. Khan et al. (2024) and Negri et al. (2021) identify the Internet of Things (IoT), artificial intelligence (AI), digital twins, and big data analysis as the technologies with the greatest impact on logistics resilience in the Industry 4.0 era.

Supply Chain Digital Twins (SCDTs) deserve special attention in the context of decentralized networks. Ivanov and Dolgui (2021) defined SCDTs as ‘computerized models representing the state of the logistics network at any moment in time’, with capacity to ‘use real-time data and snapshots to predict supply chain dynamics’. In networks with multiple distributed hubs, SCDTs allow simulation of the impact of different disruption scenarios on network performance, identification of the most critical nodes for operational continuity, and automatic optimization of flow rerouting when certain corridors are blocked (Gruchmann et al., 2025; Ivanov et al., 2022).

AI-based predictive analytics represents another first-order technological enabler. Machine



learning models fed by data from multiple sources — meteorological, geopolitical, economic, port, and rail traffic — allow logistics managers to anticipate disruptions with a horizon of days or weeks, proactively activating alternative capacities before the interruption actually occurs (Kamble et al., 2021; Negri et al., 2021).

The digital transformation of supply chains must be accompanied by critical reflection on the new risks it introduces. The concentration of critical infrastructures in single-origin technological components — notably chips, inverters, and communication systems — recreates, in the digital plane, the same single-dependency vulnerability it seeks to eliminate in the physical plane (Risk Ledger, 2025). Resilient decentralized logistics networks must incorporate, in their design, diversification not only geographically, but also technologically and in terms of digital systems suppliers.

Dubey et al. (2023) demonstrated that targeted government interventions — financing shared data platforms, standardizing information exchange interfaces, and regulating interoperability — can surpass, in terms of impact on systemic resilience, equivalent investments in isolated physical infrastructure.

Logistics Resilience as a National Security Imperative

The national security dimension of logistics infrastructure remained for decades relegated to the margins of academic literature, treated as an exclusive concern of defense and military planning specialists. The disruption cycle begun in 2020 has operated an epistemological rupture in this disciplinary demarcation: today there is a growing consensus that logistics resilience is not merely a corporate competitive advantage, but a fundamental component of national security and sovereignty (Hong et al., 2025; Zheng et al., 2025; Risk Ledger, 2025).

This reconceptualization has solid historical foundations. Prussian military philosopher Carl von Clausewitz, in defining war as the continuation of politics by other means, intuitively anticipated the strategic dimension of supply: armies, cities, and economies that cannot guarantee the continuous



flow of essential goods — food, medicine, fuels, ammunition — succumb even before facing the adversary on the battlefield.

Hong et al. (2025) documented that the world’s major powers have explicitly incorporated the concept of supply chain resilience into their national security strategies over the past decade. The United States launched its National Strategy for Global Supply Chain Security in 2012 and reinforced this agenda in subsequent documents. China, in turn, has systematically emphasized the need to build a modern supply chain system with resilience, launching in 2022 the Initiative for International Cooperation on Resilient and Stable Industrial and Supply Chains.

For Brazil, the transposition of this agenda to the national level implies recognizing that certain goods — basic food, essential medicines, fuels, energy generation and water inputs — have a differentiated status in the logistics architecture: they are not simply commodities governed by market logic, but strategic goods whose continuous supply constitutes a State obligation. The Tri-Coastal Network, from this perspective, must be conceived not only as a corporate competitiveness architecture, but as the backbone of a resilient national supply system — a public infrastructure of logistics security.

The S&P Global (2025) identifies as one of the most critical trends in the contemporary global business environment the convergence of geopolitical instability, sustainability pressures, and domestic political fragmentation — a combination creating a qualitatively distinct risk environment in which fundamental assumptions of benign globalization — free flow of goods, services, and capital, international cooperation, and stability of trade routes — can no longer be taken for granted.

Discussion: Synthesis of Findings and Implications for Policy and Management

The synthesis of findings from this systematic review converges on four major propositions. The first is that the logistics paradigm of maximum efficiency — based on concentration of facilities, elimination of inventories, and dependence on single corridors — has proven structurally inadequate



for the contemporary risk environment. The second proposition is that logistics decentralization strategies — and specifically the positioning of distribution hubs in the national interior — constitute the most robust and cost-effective response to the challenge of systemic resilience, supported by mathematical network design models (Alikhani et al., 2024), empirical studies (Yang et al., 2025), and case analyses (UNCTAD, 2024; IBL, 2025).

The third proposition is that the digitalization of logistics networks — through digital twins, predictive analytics, and real-time visibility platforms — multiplies the resilience benefits of physical decentralization, but does not replace it. Physically decentralized networks with low digitalization are resilient but slow to respond; digitally sophisticated but physically centralized networks are agile but structurally vulnerable. The combination of physical decentralization with advanced digitalization produces the highest level of resilience (Ivanov & Dolgui, 2021; Negri et al., 2021; Gruchmann et al., 2025).

The fourth and most relevant proposition is that logistics resilience cannot be entirely delegated to the market, because the benefits it produces have the nature of a public good — reducing systemic risks affecting society as a whole — and because private incentives are insufficient to induce the socially optimal level of investment in resilience. The State's role is multiple: funder and guarantor of logistics infrastructure of national interest; regulator eliminating tax and regulatory distortions that penalize decentralization; planner integrating logistics resilience into the national security agenda; and coordinator of digitalization and standardization efforts.

For Brazil specifically, the practical implications point to an integrated logistics transformation agenda articulating three time horizons. In the short term (two to five years): approval of regulatory framework favorable to logistics decentralization, technical mapping of Tri-Coastal Network hub candidates, and beginning of digitalization investments. In the medium term (five to fifteen years): construction or expansion of railways connecting interior hubs to waterway networks and ports of the three coastal fringes. In the long term (over fifteen years): consolidation of a resilient national supply system with regional buffer stocks, redundant multimodal capacity, and digital platforms for logistics



crisis monitoring and anticipation.

Conclusion

This article sought to demonstrate, from a systematic literature review of works produced between 2020 and 2025, that logistics decentralization — and specifically the construction of distribution networks with multiple hubs distributed throughout the national interior — constitutes the structurally most robust response to the challenge of supply chain resilience in the contemporary polycrises context. The concept of the Tri-Coastal Network, proposed as an original contribution of this work, articulates this decentralization logic with Brazil's geographic, infrastructural, and strategic specificities, offering a reference architecture for planning a truly resilient national logistics infrastructure.

The review demonstrated that the international literature, although still lacking studies specific to the Brazilian context, provides a solid empirical and theoretical basis for the main propositions of this article: the superiority of distributed networks over centralized networks in terms of structural resilience; the central role of digitalization as a multiplier — and not a substitute — of physical decentralization; and the public good nature of logistics resilience, which justifies and requires active State intervention in its planning and financing.

This article's limitations deserve honest acknowledgment. The Tri-Coastal Network proposal has a conceptual and strategic character, lacking empirical validation and in-depth quantitative modeling to precisely estimate implementation costs, expected resilience gains, and the optimal point of decentralization for the Brazilian context. This gap constitutes an immediately relevant future research agenda, including computational modeling of different network configurations for Brazilian territory, cost-benefit analysis of interior hub investment scenarios, and case studies of regions that implemented similar strategies in other continental-scale countries.

The central message of this article is, however, unequivocal: in a world in which logistics



disruptions have become not exceptions but regularities of the competitive and geopolitical environment, investing in resilience is not a strategic choice among others — it is a State obligation and an imperative of economic survival. Brazil, endowed with continental dimensions, a rich diversity of potentially available transport modes, and growing strategic urgency imposed by the global environment, has not only the opportunity, but the responsibility to build a logistics infrastructure worthy of its vocation as a 21st century power. The Tri-Coastal Network is, from this perspective, not merely an academic concept — it is an invitation to action.

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