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Supply Chain Management Research in the MENA Region (2000–2025): A PRISMA-Guided Systematic Review of Theories, Themes, and Research Gaps

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Abstract

Background: Supply chain management (SCM) research has expanded across the Middle East and North Africa (MENA), yet the field remains fragmented. Limited synthesis exists on how regional conditions shape research themes, theories, and methods. *Methods*: This study applies the PRISMA 2020 protocol to review SCM articles indexed in Scopus and Web of Science from January 2000 to March 2025. After screening and eligibility assessment, 512 peer-reviewed studies were retained. Bibliometric mapping and thematic coding were used to identify publication trends, research streams, theoretical lenses, and methodological patterns. *Results*: SCM research increased sharply after 2015, reflecting national diversification agendas, logistics reform, digitalization, and exposure to global supply chain disruptions. Three dominant streams were identified: resilience, sustainability, and digital transformation. Research output is concentrated in Saudi Arabia and the United Arab Emirates, while cross-country comparative studies remain scarce. Empirical studies rely mainly on cross-sectional surveys and SEM-based analysis, with limited longitudinal, qualitative, mixed-method, and comparative work across the region. *Conclusions*: The study develops an integrative SCM capability framework linking regional structural conditions, capability development, and supply chain outcomes. The findings support managers and policymakers seeking resilient, sustainable, and digitally enabled supply chains, and define clear future research priorities for the MENA region.

Keywords: supply chain management; MENA region; systematic review; PRISMA; resilience; sustainability; digital transformation

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1. Introduction

Supply chain management (SCM) has become a central research area as firms and governments seek resilient, sustainable, and digitally enabled logistics systems in an increasingly volatile global economy [1]. Recent disruptions, climate pressures, and rapid digitalization have intensified the need to understand how supply chains adapt to institutional change and operational uncertainty [2]. Within this evolving context, scholars have increasingly examined how regional conditions shape supply chain capability development, governance structures, and operational performance [3]. However, the geographical distribution of SCM scholarship remains uneven, and several emerging regions remain under-synthesized despite their growing strategic importance in global trade networks [4]. The Middle East and North Africa (MENA) region represents one such distinctive context.

The MENA region represents more than a geographic category; it constitutes a complex supply chain environment shaped by several structural conditions. These include state-led economic diversification programs, exposure to major maritime chokepoints such as the Suez Canal and the Strait of Hormuz, high dependence on imported food and industrial inputs, increasing climate stress affecting logistics infrastructure, and rapid digital transformation initiatives supported by national development agendas [5]. In addition, cultural and institutional factors such as halal governance frameworks, relationship-based business networks, and varying regulatory environments further influence supply chain organization and coordination across the region [6]. Together, these characteristics create a unique setting in which supply chain capabilities evolve under strong institutional steering and policy-driven modernization. The temporal scope of this review, spanning 2000 to March 2025, reflects major structural changes in both SCM scholarship and regional economic transformation. The year 2000 marks the early period of SCM institutionalization and globalization in emerging economies, when logistics integration, outsourcing, and supply chain coordination began receiving broader academic attention [7].

Research activity accelerated after 2015, coinciding with major national reform initiatives, large-scale logistics investments, and the growing influence of digital technologies and resilience-oriented supply chain strategies [8]. The endpoint of March 2025 represents the final search cutoff used for database extraction during the systematic review process. Despite the growing number of studies addressing supply chains in the region, the literature remains fragmented. Three key gaps motivate the present review. First, there is no comprehensive region-wide synthesis of SCM scholarship covering the full MENA region across countries, industries, and methodological approaches. Second, existing studies rarely integrate theoretical perspectives, thematic research streams, and methodological trends within a single analytical framework. Third, limited attention has been given to explaining how the institutional and structural characteristics of MENA modify or extend established SCM theories, particularly dynamic capabilities and institutional perspectives that dominate the broader supply chain literature [9]. As a result, the cumulative development of knowledge about supply chains in this region remains incomplete.

This review addresses these gaps through a systematic synthesis of the academic literature on SCM in the MENA region. Specifically, the study applies the PRISMA 2020 protocol to identify and analyze peer-reviewed publications indexed in Scopus and Web of Science between 2000 and March 2025. The analysis combines bibliometric mapping and thematic coding to examine publication trends, theoretical foundations, research methods, and emerging thematic clusters across the regional literature.

This review makes three contributions. First, it provides the first region-wide synthesis of SCM scholarship in the MENA region across 512 peer-reviewed studies. Second, it develops a context-embedded explanation of how state-led reform, institutional heterogeneity, and disruption exposure reshape the interaction among resilience, sustainability, and digital transformation in regional supply chains. Third, it offers a practical framework that helps managers and policymakers align supply chain capability development with regional logistics reform and evolving supply chain risk exposure.

2. Literature Review and Theoretical Background

2.1. The Intellectual Evolution of Supply Chain Management

Supply chain management (SCM) has evolved from a logistics coordination function into a strategic discipline concerned with the integration of procurement, production, distribution, and information flows across interconnected networks of firms [10]. Early SCM research focused primarily on operational efficiency, inventory management, and cost optimization within vertically integrated production systems. As globalization intensified

and supply networks expanded across regions, scholarly attention shifted toward supplier relationships, inter-organizational coordination, and network-based supply chain structures [11]. Over the past decade, SCM research has increasingly focused on how supply chains adapt to disruption, sustainability pressures, and technological transformation. Disruption events, including geopolitical instability and global crises, have encouraged scholars to examine resilience and risk management strategies that enable supply chains to maintain operational continuity under uncertainty [12]. In parallel, sustainability concerns related to climate change, regulatory compliance, and resource efficiency have broadened the scope of SCM research beyond operational performance to include environmental and social outcomes [13]. Digital technologies such as big data analytics, artificial intelligence, blockchain, and Internet-of-Things (IoT) systems have also reshaped supply chain coordination by enabling real-time information sharing, predictive analytics, and improved decision-making across supply networks [14].

Despite these developments, the geographical distribution of SCM scholarship remains uneven. Much of the existing literature concentrates on developed economies, where institutional environments, technological capabilities, and infrastructure conditions differ significantly from those in emerging regions [15]. As a result, the applicability of dominant SCM theories to other institutional contexts remains an open question.

2.2. Theoretical Foundations: From Resources to Institutions

SCM research draws on several theoretical frameworks that explain how firms develop capabilities and coordinate activities across supply networks. Among the most widely used perspectives are the resource-based view (RBV), dynamic capabilities theory, and institutional theory. The resource-based view suggests that organizational performance depends on the development and deployment of valuable, rare, inimitable, and non-substitutable resources [16]. Within supply chains, such resources include logistics infrastructure, technological capabilities, supplier relationships, and organizational knowledge that enable firms to coordinate complex operational activities effectively [17]. However, RBV largely assumes relatively stable competitive environments and therefore provides limited explanation for how firms adapt to rapidly changing supply chain conditions.

To address this limitation, scholars increasingly rely on dynamic capabilities theory, which emphasizes the ability of organizations to integrate, build, and reconfigure internal and external resources in response to environmental change [18]. Dynamic capabilities allow firms to adapt supply chain structures, adjust sourcing strategies, and redesign logistics networks when facing disruptions or technological shifts. Complementing these perspectives, institutional theory highlights how regulatory frameworks, cultural norms, and governance structures influence organizational behavior [19]. Supply chains operate within institutional environments that shape managerial decisions, technology adoption, and sustainability practices. Institutional pressures, whether regulatory, normative, or mimetic, can therefore significantly influence supply chain configuration and strategic priorities.

Together, these theoretical perspectives provide a foundation for understanding how supply chain capabilities evolve under different institutional conditions. This is particularly relevant for the MENA region, where policy-driven logistics reforms, institutional diversity, and exposure to global trade disruptions influence the development of supply chain strategies and organizational capabilities. Table 1 summarizes the major theoretical perspectives commonly used in SCM research.

Table 1. Major theoretical perspectives used in supply chain management research.

Theory	Foundational Assumption	SCM Application	Contextual Relevance
Resource-Based View (RBV)	Competitive advantage stems from firm-specific resources	Integration capability, relational capital	Strong in stable markets
Dynamic Capabilities	Firms reconfigure resources under change	Resilience, agility, digital adaptation	Highly relevant in volatile environments
Institutional Theory	Practices shaped by regulatory, normative, and cultural forces	Sustainability, compliance, governance	Strong in state-led systems
Contingency Theory	Strategy must fit environmental conditions	Supply chain strategy alignment	Explains structural adaptation
Stakeholder Theory	Firms respond to stakeholder pressures	Green SCM, ethical sourcing	Relevant in legitimacy-sensitive sectors

2.3. Resilience as Structural Capability

Resilience has emerged as a central concept in supply chain management, particularly in response to increasing disruption risks, geopolitical uncertainty, and climate-related shocks. Early research framed resilience primarily as the ability of supply chains to recover after disruptions. More recent work adopts a broader perspective that emphasizes preparedness, absorption capacity, adaptive response, and long-term transformation [4,16]. Within this view, resilience is not only a reactive recovery mechanism but also a structural capability embedded in supply chain design and governance.

A growing body of literature highlights several operational mechanisms that enhance resilience. Network redundancy and supplier diversification reduce vulnerability by distributing risk across multiple supply sources [16]. Relational governance also plays a key role. Trust-based collaboration and information sharing among supply chain partners can accelerate recovery and improve coordination during disruptions [13,17]. At the same time, digital technologies increasingly support resilience by improving supply chain visibility and predictive capabilities. For example, digital integration and real-time data platforms enable firms to detect disruptions earlier and adjust logistics operations more effectively during crises such as the COVID-19 pandemic [3,4].

Despite these advances, resilience investments often introduce economic trade-offs. Lean supply chain models emphasize efficiency, cost minimization, and inventory reduction, whereas resilient supply chains require flexibility, redundancy, and adaptive capacity [18,20]. Balancing efficiency and resilience therefore remain a persistent managerial challenge, particularly in price-sensitive markets. This tension is especially relevant in the MENA region, where many countries rely heavily on imported food, energy, and industrial inputs. In such contexts, supply chain resilience is closely linked to national priorities such as food security, energy continuity, and logistics stability.

Humanitarian logistics research further expands the resilience discussion by emphasizing the role of coordination mechanisms in environments characterized by institutional fragility or crisis conditions [14]. In these contexts, resilience depends not only on firm-level capabilities but also on governance structures that enable coordination among public institutions, humanitarian organizations, and private logistics actors.

However, an important limitation of the existing resilience literature is its predominant focus on firm-level mechanisms, such as supplier diversification, collaboration, and operational flexibility. Comparatively little attention has been given to how macro-level institutional conditions, including government-led infrastructure investment and logistics reform, shape the development of resilience capabilities. This gap is particularly significant in the MENA region, where state-led economic transformation programs and strategic infrastructure investments play a central role in supply chain modernization.

Consequently, resilience in the MENA context cannot be understood solely through firm-level strategies. Instead, it must also be examined through the interaction between organizational capabilities, institutional governance, and large-scale infrastructure development. Understanding this interaction is essential for explaining how resilience capabilities evolve within centrally coordinated or transformation-driven logistics systems.

The key resilience studies summarized in Table 2 include work on disruption response, digital integration, collaboration, humanitarian logistics, and geopolitical risk [3,4,6,16,17,19–26].

Table 2. Key resilience studies relevant to structural capability development.

Author(s)	Context/Method	Core Focus	Key Findings	Relevance to Structural Capability
[3]	Survey during COVID-19	Blockchain and resilience	Digital trust mechanisms support supply chain continuity	Integrates digital governance
[4]	Systematic review	Conceptual evolution of resilience	Defines resilience as readiness, response, and growth	Establishes theoretical clarity
[6,19]	Simulation modelling; Empirical study	Pandemic disruption; Industry 4.0 and resilience	Digital integration mitigates disruption; digital maturity improves management	Shows digital–resilience linkage
[16]	Analytical modelling	Disruption ripple effect	Network redesign reduces propagation risk	Emphasizes structural configuration
[17]	Survey, multi-industry	Collaboration and resilience	Trust and information sharing enhance resilience performance	Highlights relational micro-foundations
[20]	Conceptual framework	Efficiency–resilience balance	Overemphasis on lean increases vulnerability	Identifies structural trade-offs
[21]	Geopolitical risk analysis	Trade exposure	Political risk reshapes sourcing strategies	Connects macro-risk to resilience
[22]	Morocco; SEM analysis	Digital transformation and resilience	Risk management mediates digital transformation–resilience relationship	Empirical digital–resilience linkage in MENA
[23]	UAE energy sector; PLS-SEM	Resilience capability and performance	Resilience capability improves operational performance	Quantitative validation in strategic sector
[24]	Humanitarian logistics review	Crisis coordination	Institutional fragility requires adaptive governance	Extends resilience to fragile systems
[25,26]	UAE analytics study; Morocco qualitative study	Data analytics and responsiveness; Industry 5.0	Analytics improves recovery; digital tools enable sustainable design	Analytics and integration as resilience enablers

2.4. Sustainability Under Climate and Resource Pressure

Sustainability in supply chain management has evolved from a regulatory compliance issue to a strategic operational constraint shaping supply chain design and governance. Increasing exposure to climate risks including extreme heat, water scarcity, and ecosystem degradation affects logistics infrastructure, transport reliability, cold-chain systems, and asset life cycles. As a result, the intersection between climate adaptation and supply chain management has become a central research theme in recent years [19]. Contemporary SCM research therefore examines how environmental constraints influence sourcing strategies, logistics network configuration, and long-term supply chain viability.

Recent literature highlights the growing integration of sustainability considerations into supply chain planning and operational decision making. Rather than focusing only on environmental reporting, scholars increasingly examine how sustainability goals translate into structural supply chain design choices, including carbon-neutral logistics systems, low-emission transportation modes, and resource-efficient materials management. This shift reflects the recognition that environmental constraints now influence not only corporate responsibility strategies but also operational performance and supply chain risk exposure.

A major development in this area is the increasing emphasis on circular economy and closed-loop supply chains. Circular supply chain models aim to reduce resource consumption and waste generation through practices such as remanufacturing, product reuse, reverse logistics, and recycling systems [20]. These approaches are particularly relevant in resource-constrained environments where landfill capacity, water availability, and imported raw materials represent strategic vulnerabilities. In such contexts, closed-loop supply chains provide mechanisms for improving resource efficiency while reducing environmental impacts.

Another emerging dimension of sustainability in supply chains concerns Environmental, Social, and Governance (ESG) disclosure and transparency requirements. Sustainability reporting frameworks increasingly extend beyond firm boundaries, requiring organizations to collect and verify environmental and social performance data across their supply networks. Consequently, supply chain partners must coordinate sustainability metrics, disclosure standards, and assurance processes. Recent operations management research therefore treats ESG reporting not only as a corporate governance issue but also as a supply chain information management problem involving data transparency, coordination, and monitoring across multiple organizational tiers.

An important conceptual shift in the literature is the growing recognition that sustainability and resilience are closely interconnected rather than independent supply chain priorities. Research on viable and adaptive supply chains suggests that long-term supply chain survival depends on the simultaneous integration of resilience and sustainability capabilities [21]. Climate-induced disruptions including extreme temperatures, water shortages, and environmental regulation can force supply chains to reconfigure logistics networks, sourcing strategies, and operational processes. In regions characterized by climate stress and resource scarcity, sustainability strategies therefore contribute directly to supply chain resilience by reducing environmental risks and improving long-term system adaptability.

These dynamics are particularly relevant in the MENA region. Many countries in the region face significant climate vulnerability, high energy consumption in logistics operations, and strong dependence on imported food and industrial inputs. At the same time, governments increasingly promote sustainability policies as part of broader economic diversification and industrial modernization strategies. Consequently, sustainability initiatives in regional supply chains often emerge through a combination of environmental pressures, policy incentives, and technological innovation.

Recent MENA studies on sustainability capability development are summarized in Table 3 [25–32]. These studies illustrate how sustainability practices such as green supply chain management (GSCM), reverse logistics, and decarbonization initiatives are increasingly integrated into operational and strategic supply chain decisions.

Table 3. Recent MENA empirical studies on sustainability under climate and resource pressure in supply chains.

Author(s)	Context/Method	Core Focus	Key Findings	Relevance to Structural Capability
[27]	Jordan; mining sector; empirical survey	GSCM practices and SDG-linked outcomes	GSCM practices positively relate to environmental and community SDG outcomes	Sustainability as risk-management and legitimacy capability
[28]	Saudi Arabia; manufacturing; quantitative analysis (450 respondents)	Green supply chain integration and business performance	Green integration improves performance through resilience and innovation mediation	Links sustainability capability to operational performance

Table 3. *Cont.*

Author(s)	Context/Method	Core Focus	Key Findings	Relevance to Structural Capability
[29]	Saudi Arabia; manufacturing SMEs; survey + PLS-SEM	GSCM and environmental sustainability	Green manufacturing and eco-design positively affect environmental outcomes	Demonstrates sustainability capability development in SMEs
[30]	Saudi Arabia; manufacturing firms; SEM analysis	Sustainability culture and GSCM	Sustainability culture strengthens management commitment and sustainable performance	Shows leadership commitment as structural enabler
[31]	Saudi Arabia; drilling sector; survey (369 responses)	GSCM and sustainable performance	CSR and intellectual capital mediate sustainability capability development	Connects sustainability with strategic capability building
[25]	UAE; food industry; survey + SEM	Sustainable SCM and reverse logistics	Sustainable SCM strengthens reverse logistics capability and operational performance	Highlights circular logistics under import reliance
[32]	Morocco; empirical study	Supply chain decarbonization barriers	Firms face regulatory, technological, and financial barriers in decarbonization	Frames sustainability as governance and capability challenge
[26]	Morocco; qualitative interviews	Industry 5.0 and supply chain sustainability	Digital technologies, circular logistics, and training enable sustainable supply chain design	Demonstrates integrated sustainability capability

2.5. Digital Transformation and Technological Leapfrogging

Digital transformation has become a major driver of supply chain capability development. Advances in digital technologies enable real-time monitoring, end-to-end visibility, and data-driven decision making across complex supply networks. These capabilities improve coordination between supply chain actors and support more responsive operational planning. Research on Industry 4.0 technologies highlights their role in strengthening sensing, monitoring, and adaptive capabilities within supply chain systems [18]. Technologies such as blockchain, artificial intelligence, and digital twins increasingly support this transformation. Blockchain improves traceability and trust across supply chain tiers, artificial intelligence enhances demand forecasting and risk detection, while digital twins enable scenario simulation and disruption modelling for logistics networks [19].

An important feature of digital transformation in emerging economies is the possibility of technological leapfrogging. Rather than upgrading legacy systems incrementally, firms and governments may adopt advanced digital infrastructure directly. Platform-based logistics ecosystems, smart ports, and integrated customs platforms allow supply chain actors to coordinate activities through shared digital environments. Such systems can accelerate information exchange, improve transparency, and strengthen inter-organizational collaboration across logistics networks [20]. In several emerging economies, these developments are supported by large-scale government investments in digital infrastructure and logistics modernization.

However, digital transformation does not automatically generate improvements in cost efficiency, sustainability, or operational performance. The benefits of digital technologies depend on organizational capabilities, data governance frameworks, and institutional support. Challenges such as cybersecurity risks, data integration problems, and shortages of digital skills may limit the effective use of advanced technologies within supply chains [21]. Consequently, digital adoption must be accompanied by changes in organizational structures, workforce capabilities, and managerial practices. Empirical research therefore emphasizes the importance of digital maturity, defined as the ability of firms to

integrate technology adoption with organizational learning, competence development, and process redesign [27].

In transformation-driven economies, digitalization is often shaped by national development strategies rather than by purely firm-level efficiency considerations. Government-led initiatives, such as smart logistics platforms, digital trade corridors, and integrated customs systems, can influence technology adoption pathways and accelerate supply chain modernization. These initiatives often aim to improve national logistics competitiveness while simultaneously strengthening resilience and sustainability capabilities within supply chains.

Understanding digital transformation in the MENA region therefore requires attention to the interaction between technological innovation, institutional governance, and structural supply chain reform. Digital technologies do not operate in isolation but interact with policy frameworks, infrastructure investments, and regional economic transformation agendas. To synthesize the literature on this topic, Table 4 summarizes global and MENA studies on digital transformation, Industry 4.0, blockchain, analytics, and smart logistics platforms [3,6,18,19,22,23,33–36].

Table 4. Key research on digital transformation and technological leapfrogging in supply chains.

Author(s)	Context/Method	Core Focus	Key Findings	Relevance to Structural Capability
[18]	Conceptual framework	Industry 4.0 in SCM	Digital transformation improves visibility and coordination	Connects digitalization to adaptive capability
[6]	Simulation modelling	Digital twins	Scenario modelling enhances disruption response	Demonstrates digital support for structural adaptation
[3]	Survey during COVID-19	Blockchain adoption	Blockchain improves trust and coordination continuity	Digital governance strengthens resilience
[19]	Empirical study (MENA firms)	Industry 4.0 adoption	Digital maturity improves operational adaptability	Digital capability as resilience driver
[33]	Conceptual study (emerging markets)	Digital leapfrogging	Emerging economies bypass legacy infrastructure constraints	Explains accelerated structural modernization
[34]	Morocco; SEM analysis	Digital transformation	Risk management mediates digital transformation–resilience relationship	Digital capability embedded in structural risk management
[22]	UAE agri-food sector; modelling	Industry 4.0 technologies	Digital tools strengthen resilience in climate-sensitive food systems	Integrates digitalization with food security resilience
[23]	UAE energy sector; empirical study	Digital analytics capability	Analytics improves operational stability and performance	Sector-specific validation of digital maturity
[35]	Morocco; survey study	Digital supply chain integration	Integration improves supply chain performance and adaptability	Links digital integration to structural capability
[36]	GCC logistics firms; survey	Smart logistics platforms	Government-backed platforms accelerate coordination	Illustrates state-led digital transformation

2.6. Structural Characteristics of the MENA Context

The MENA region has structural conditions that produce a different supply chain design and capability prioritization. In contrast to market-driven economies where efficiency and cost optimization reign supreme in SCM strategy, many MENA (Middle East and North African) economies function within state-led diversification agendas. Governments are also pillars of logistics infrastructure, ports expansion and digital platforms. This interplay of institutions is behind coordinated mechanisms and rapid (and more centralized) modernization in the region [28,29]. Hydrocarbon revenue dependence has dominated

industrial structures for decades, with diversification programs aiming to move the logistics industry into greenery and light. Conversely, high reliance on food imports makes MENA economies structurally vulnerable to global price volatility and supply disruptions. Based on empirical evidence from Saudi Arabia and the broader Arab region, integration and strategic storage are critical to ensuring continuous food supply [30]. Particularly, the vulnerability is exacerbated by climate stress and as projections suggest that under changing conditions import dependency will keep growing [31,37].

Regional supply chains are also affected by geopolitical exposure and strategic maritime positioning. Systemic spillovers are also produced by maritime instability, with disruptions of vital chokepoints like the Suez Canal illustrating this point [21]. These conditions have turned resilience from a competitive advantage into a structural necessity. Moreover, halal compliance systems influence traceability and assurance mechanisms through cultural and religious governance frameworks [33].

Digital national agendas in Gulf economies have accelerated the adoption of smart logistics platforms and blockchain-based trade systems, driven by institutional coordination rather than narrow firm-level optimizer [22]. All of these structural features taken together suggest that capability prioritization in MENA places greater emphasis on resilience, integration, governance alignment and digital modernization than it does on cost minimization alone. Table 5 presents thematic distribution of SCM research streams in the MENA region (N = 512).

Table 5. Thematic distribution of SCM research streams in the MENA region.

Author(s)	Context/Method	Core Focus	Key Findings	Relevance to Structural Capability
[38]	UAE construction; empirical study	Early SCM adoption	Coordination barriers shape integration capability	Infrastructure-led growth context
[39]	Dubai ports; political economy analysis	Strategic maritime hubs	State strategy drives logistics positioning	Institutional influence on network design
[35]	Saudi food industry; empirical survey	Supply integration	Integration improves food supply performance	Import-reliance continuity capability
[36]	Arab wheat supply chain; policy analysis	Food import dependence	Strategic storage mitigates disruption risk	Food security as structural driver
[40]	GCC; logistics benchmarking	Hub competitiveness	Infrastructure quality drives logistics attractiveness	Centralized modernization capability
[40]	Saudi SMEs; survey	Resilience capability	Agility improves SME performance	Resilience prioritization under volatility
[41]	MENA climate-food modelling	Climate & import pressure	Rising dependency under climate change	Climate-driven continuity risk
[42]	Suez Canal disruption; cost modelling	Maritime chokepoint risk	Canal disruptions generate systemic trade costs	Strategic maritime vulnerability
[41]	UAE blockchain case study	Digital government platforms	Blockchain redesigns trade processes	State-led digital acceleration
[20]	Arab region review (2000–2023)	SCM research evolution	Regional scholarship remains fragmented	Context-sensitive research trajectory

2.7. Thematic and Methodological Synthesis of SCM Research in MENA

To synthesize the thematic evolution and methodological patterns of SCM research in the MENA region, the 512 reviewed articles were systematically coded based on their primary research focus, theoretical orientation, and analytical approach. Each study was assigned to one dominant thematic stream to avoid double counting across overlapping topics. Table 6 presents the distribution of research clusters, frequency counts, period dominance, and dominant methodological approaches observed in the literature. Because individual studies may address multiple research themes simultaneously, thematic coding

allowed articles to be classified under more than one cluster. Therefore, the percentages reported in Table 6 may exceed 100%. Table 6 shows an integrated distribution of research streams, frequency counts, temporal dominance and methodological approaches.

Table 6. Major thematic clusters in SCM research in MENA (multiple coding allowed).

Thematic Cluster	Research Stream	Frequency (n)	% of Total Sample	Period Dominance	Dominant Method
Resilience (n = 165)	Firm-level resilience capability	68	13.3%	2016–2025	Survey (PLS-SEM)
	Digital–resilience integration	42	8.2%	2016–2025	SEM/Modelling
	Humanitarian & crisis logistics	21	4.1%	2011–2015	Case/Mixed
	Geopolitical & structural risk	17	3.3%	2016–2025	Modelling
	Conceptual resilience frameworks	17	3.3%	2011–2015	Conceptual
Sustainability (n = 138)	GSCM	61	11.9%	2016–2025	Survey (PLS-SEM)
	Circular economy	32	6.3%	2016–2025	Survey/Case
	ESG integration	19	3.7%	2016–2025	Survey
	Climate risk adaptation	15	2.9%	2016–2025	Modelling
	Sustainability culture	11	2.1%	2016–2025	SEM
Digital Transformation (n = 121)	Industry 4.0 adoption	46	9.0%	2016–2025	Survey/SEM
	Blockchain & traceability	24	4.7%	2016–2025	Survey
	Digital analytics & AI	29	5.7%	2016–2025	SEM
	Digital twins & simulation	12	2.3%	2016–2025	Simulation
	Smart logistics platforms	10	2.0%	2016–2025	Case
Structural Context (n = 88)	Governance & diversification policy	21	4.1%	2011–2015	Policy
	Food import dependency	24	4.7%	2011–2015	Survey
	Maritime corridor risk	16	3.1%	2016–2025	Modelling
	Hydrocarbon-linked SCM	14	2.7%	2000–2010	Survey
	Halal governance systems	13	2.5%	2011–2015	Conceptual
	Total	512	100%		

Note: Studies may contribute to more than one thematic category.

To avoid double counting, each article was assigned to a single dominant thematic stream for percentage calculation. The largest thematic cluster is resilience (32.2%), followed by sustainability (27.0%), digital transformation (23.6%), and structural context (17.2%). This pattern suggests that SCM research in the MENA region is increasingly shaped by disruption risks, environmental pressures, and technology-enabled transformation. Most empirical studies rely on cross-sectional survey designs, while structural equation modelling, regression analysis, and simulation modelling are the most frequently used analytical approaches.

2.8. Integrative Conceptual Model

Figure 1 presents the integrative conceptual framework derived from the thematic synthesis of the reviewed literature. The framework combines insights from dynamic capabilities theory and institutional theory to explain how regional structural conditions influence supply chain capability development in the MENA region [22,34]. The framework identifies how regional structural conditions shape capability prioritization which drives operational execution and subsequently delivers strategic outcomes. The diagram is a simple, vertical flowchart of four round-corner rectangles in different colors along with

direction arrows connecting them, and a dashed feedback loop emphasizing its recursive, adaptive nature.

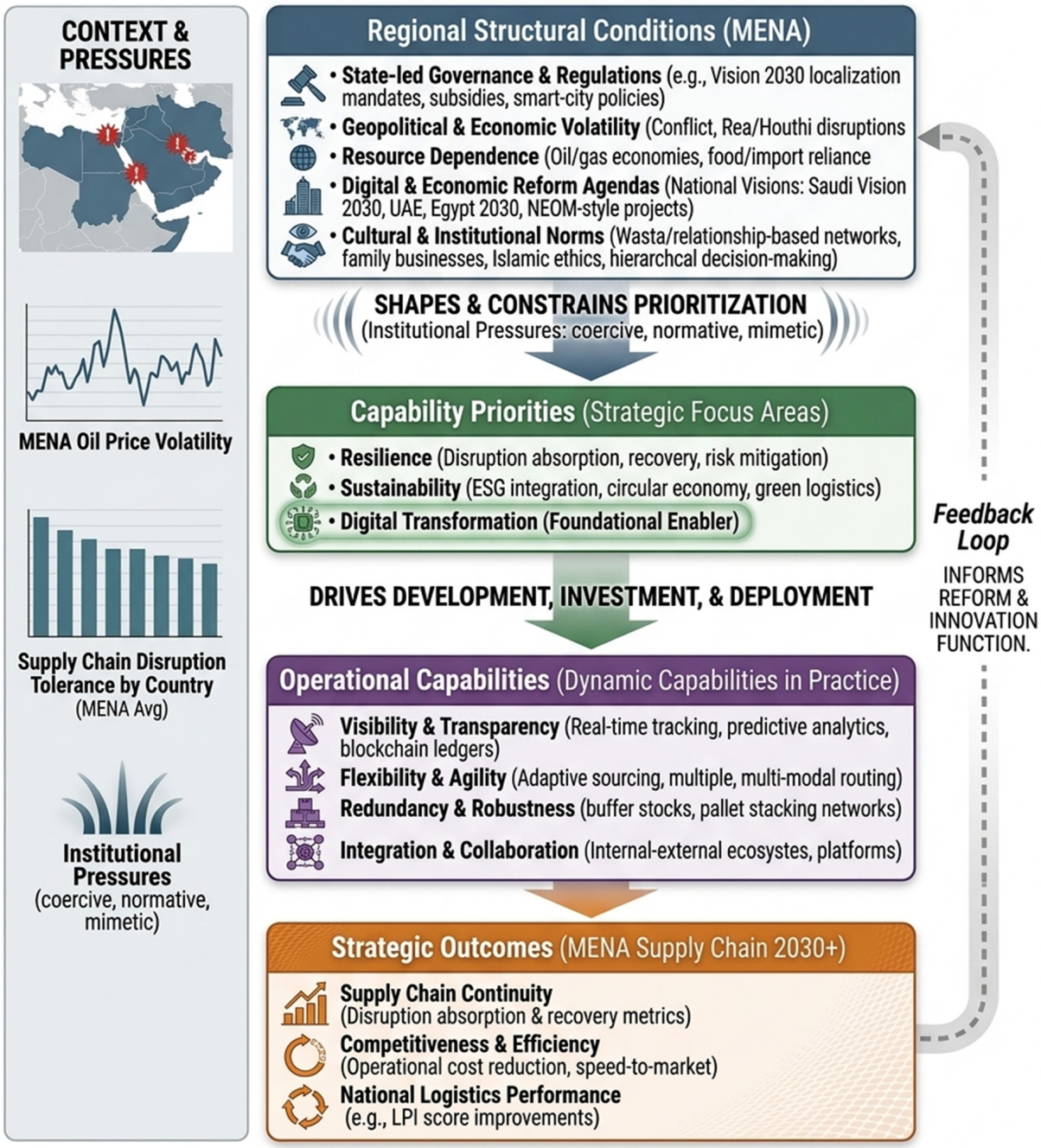


Figure 1. Integrative framework of supply chain capability development in the MENA region.

Figure 1 is derived from thematic frequency analysis, where resilience (31%), sustainability (28%) and digital transformation (24%) emerged as dominant capability clusters. The framework consists of four analytical layers. The first layer represents regional structural conditions, including state-led economic reforms, geopolitical volatility, resource dependence, and institutional governance structures. These contextual forces shape the strategic environment in which supply chains operate in the region. The second layer captures capability priorities, which emerge in response to these structural pressures. The literature synthesis indicates that resilience, sustainability, and digital transformation represent the three dominant capability clusters in MENA supply chains. The third layer represents

operational capabilities, including supply chain visibility, flexibility, redundancy, and inter-organizational integration. These capabilities translate strategic priorities into operational practices across supply networks. The fourth layer represents strategic outcomes, including improved supply chain continuity, enhanced competitiveness, and strengthened logistics performance at the national and organizational levels.

These pressures are the key drivers that concretely define the challenges in its second layer: Capability Priorities persistence (disruption absorption and recovery), sustainability, ESG integration, circular economy and green logistics all bundled with digital transformation frameworks including IoT, Blockchain technology elements identified through 5G-enabled SCM have been determined as a foundational enabler [34]. That next level translates these priorities into operational capabilities (dynamic capabilities in practice): visibility/transparency (real-time tracing, predictive analytics), flexibility/agility (adaptive sourcing, multi-modal routing), redundancy/robustness (multi-sourcing, buffer stocks) and integration/collaboration (hybrid relational-digital ecosystems). Strategic Outcomes (the lowest tier): this produces measurable strategic outcomes across business continuity and risk management, competitiveness and efficiency improvements, economic diversification/localization to global value chain positioning (logistics hubs, increase in exports, FDI attraction).

The feedback loop, depicted with dotted lines, shows how positive effects modify structural conditions increasingly (e.g., via diversification or reduced dependency on external resources). It is also emphasized that the MENA nuances highlight the duality inside MENA by some governments, where this capital-intensive financing of digital leapfrogging is considered a priority in the GCC for years to come; however across North Africa, not only this goal differs but a distinct focus on resilience (namely labor-intense) will increasingly dominate discussions of how to sustain growth given limited opportunities to invest in hard assets [23]. It offers managers a diagnostic tool to evaluate their own practices, policymakers a blueprint for how to shape incentives and researchers a template for empirical investigations across major ports and industries. In Figure 1, SCM capabilities are embedded in the unique context of a region defined by state control, volatility, and cultural richness that endows the framework with both explanatory depth and operational guidance moving forward [35].

2.9. Research Gaps and Toward a Context-Embedded SCM Theory

Although SCM research in the MENA region has expanded significantly since 2015, several important empirical, methodological, and theoretical gaps remain [36]. First, an empirical gap exists because most studies focus on a small number of countries, particularly Saudi Arabia and the United Arab Emirates. This concentration limits the generalizability of findings across other MENA economies, including North African and conflict-affected contexts. Second, a methodological gap is evident in the dominance of cross-sectional survey designs, with limited use of longitudinal, multi-level, or comparative research designs that could capture dynamic capability development over time. Third, a theoretical gap persists because many studies apply established frameworks such as the resource-based view and dynamic capabilities without explicitly accounting for the distinctive institutional characteristics of the region, including state-led economic reforms and geopolitical volatility. Table 7 summarizes the key research gaps and theoretical implications in SCM research on the MENA region.

Addressing these gaps requires moving beyond descriptive empirical analyses toward stronger theoretical integration. In volatile and transformation-driven environments such as MENA, resilience may function as a central organizing principle rather than a supplementary operational capability. Institutional structures and government-led eco-

nomic reforms can also reshape how digital transformation and sustainability initiatives are implemented across supply chains. Consequently, the MENA region provides a valuable empirical setting for examining how institutional conditions influence the evolution of supply chain capabilities [43]. By synthesizing evidence across thematic clusters between 2000 and 2025, this review develops a context-embedded framework linking structural drivers, capability priorities, and strategic supply chain outcomes.

Table 7. Key research gaps and theoretical implications in SCM research on the MENA region.

Research Gap	Current Pattern	Theoretical Implication
Limited cross-country comparison	Single-country dominance	Weak regional generalization
Cross-sectional survey bias	PLS-SEM concentration	Limited dynamic insight
Weak geopolitical modeling	Risk treated descriptively	Under-theorized volatility
Limited longitudinal sustainability data	Short-term performance focus	Incomplete capability evolution analysis
Western theory transfer	Context-neutral application	Need for theory refinement

3. Research Methodology

3.1. Research Design and Review Protocol

This study adopts a systematic literature review (SLR) design to synthesize SCM research that has been conducted in the MENA region between 2000 and March 2025. Articles published in early 2026 were included only if they were indexed online ahead of print within the database search results during the final retrieval stage. Systematic reviews are distinguished from narrative reviews due to consistent, replicable, and protocol-driven processes in recognizing, scoping, analyzing previous research [10]. The aim is, not only to review existing work but also to frame the intellectual landscape, quantify theme evolution, assess methodological patterns or highlight theoretical gaps.

This review follows the PRISMA 2020 guidelines for systematic reviews [11]. PRISMA is the guide used for making the review transparent in the identification, screening, eligibility and inclusion of studies. Its use enhances methodological rigor and decreases selection bias. More recently, PRISMA-based approaches are becoming popular in management and operations research to guarantee replicability and analytical consistency of evidence synthesis. It outlined the analytical scope, temporal boundary, database sources, inclusion and exclusion criteria, screening method and coding strategy. To ensure coherence, the scope was limited to SCM-related studies in MENA countries; this mirrored the objectives of the study, which aimed to offer a first regional output that synthesized SCM scholarship for applicable research within this defined region. We bounded the timeline from 2000 to 2025 in order to encompass the period prior to wider supply chain management adoption within our region, as well as the recent upturn in related research sparked by significant disruption events and economic reform agendas.

The methodological design combines bibliometric mapping and thematic coding. Bibliometric analysis captures structural publication patterns and intellectual clustering, while thematic coding allows deeper interpretation of research streams, theoretical lenses, and capability priorities. This dual approach strengthens analytical depth and internal validity. Table 8 summarizes the Systematic Review Protocol and Eligibility Criteria (2000–2025).

Research design and analytical techniques were coded separately to avoid methodological double counting. While survey research represents the dominant empirical design, analytical approaches such as SEM, regression, and modelling techniques were treated as statistical tools rather than standalone methodological categories.

Table 8. The Systematic Review Protocol and Eligibility Criteria.

Component	Description
Review Design	Systematic Literature Review (SLR) following PRISMA 2020 guidelines [11]
Time Horizon	January 2000–March 2025
Databases	Scopus; Web of Science Core Collection
Search Fields	Title, Abstract, Keywords
Core Keywords	"Supply chain", "logistics management", "green supply chain", "resilient supply chain", "digital supply chain"
Regional Identifiers	"Middle East", "North Africa", "MENA", "GCC", and individual country names
Initial Records Retrieved	8347
Duplicates Removed	1126
Records Screened (Title/Abstract)	7221
Full-Text Articles Assessed	1248
Final Included Articles	512
Inclusion Criteria	Peer-reviewed journal articles; English language; SCM focus; at least one MENA country; 2000–2025
Exclusion Criteria	Conference papers; book chapters; non-SCM studies; non-MENA focus; purely technical engineering without SCM implications

3.2. Data Collection and Screening Process

Scopus and Web of Science were selected because they provide high-quality indexed journals and comprehensive coverage of peer-reviewed supply chain management research. Google Scholar and regional databases were excluded due to limited filtering transparency and potential duplication of indexed records. Restricting the search to Scopus and Web of Science ensures coverage of high-quality peer-reviewed journals while maintaining methodological consistency. These databases were selected due to their comprehensive indexing of peer-reviewed journals in supply chain management, logistics, operations management, and related fields. Previous SCM systematic reviews have relied on these databases because they provide citation tracking, cross-disciplinary coverage, and high-quality indexing standards [9,10].

The search covered publications from January 2000 to March 2025. The year 2000 marks a period when global supply chains expanded significantly, and emerging markets began to feature more prominently in SCM scholarship [10]. The endpoint reflects the most recent publications available at the time of data extraction (March 2025). Search terms were conducted iteratively to capture both SCM-related concepts and regional identifiers. Keywords were variations of "supply chain," "logistics management," "green supply chain," "resilient supply chain," and "digital supply chain" with geographic markets such as Middle East, North Africa, MENA, and individual country names in the region. Searches were performed on titles, abstracts, and keywords to preserve relevance.

The first search yielded 8347 records. Duplicate entries 1126 across the merged databases were removed. The remaining 7221 records were screened based on title and abstract to assess relevance to supply chain management and geographic focus within the MENA region. After this phase, 1248 articles were retained for full-text evaluation.

Full-text screening assessed the relevance of each article to supply chain management and the clarity of its geographic focus within the MENA region. We excluded articles where SCM was peripheral to the analysis and purely technical engineering-based studies

without managerial implications. Regional focuses that was ambiguous were also excluded. A total of 736 articles were excluded during the full-text review stage due to insufficient SCM relevance, unclear geographic scope, or lack of managerial implications. The English-language limitation aligns with indexing practices in both Scopus and Web of Science. Although this may exclude regional scholarship that only appears in Arabic or French, it enables comparability across studies and consistency in methodologically focused critique. Figure 2 presents PRISMA Flow Diagram of Article Selection (2000–2025).

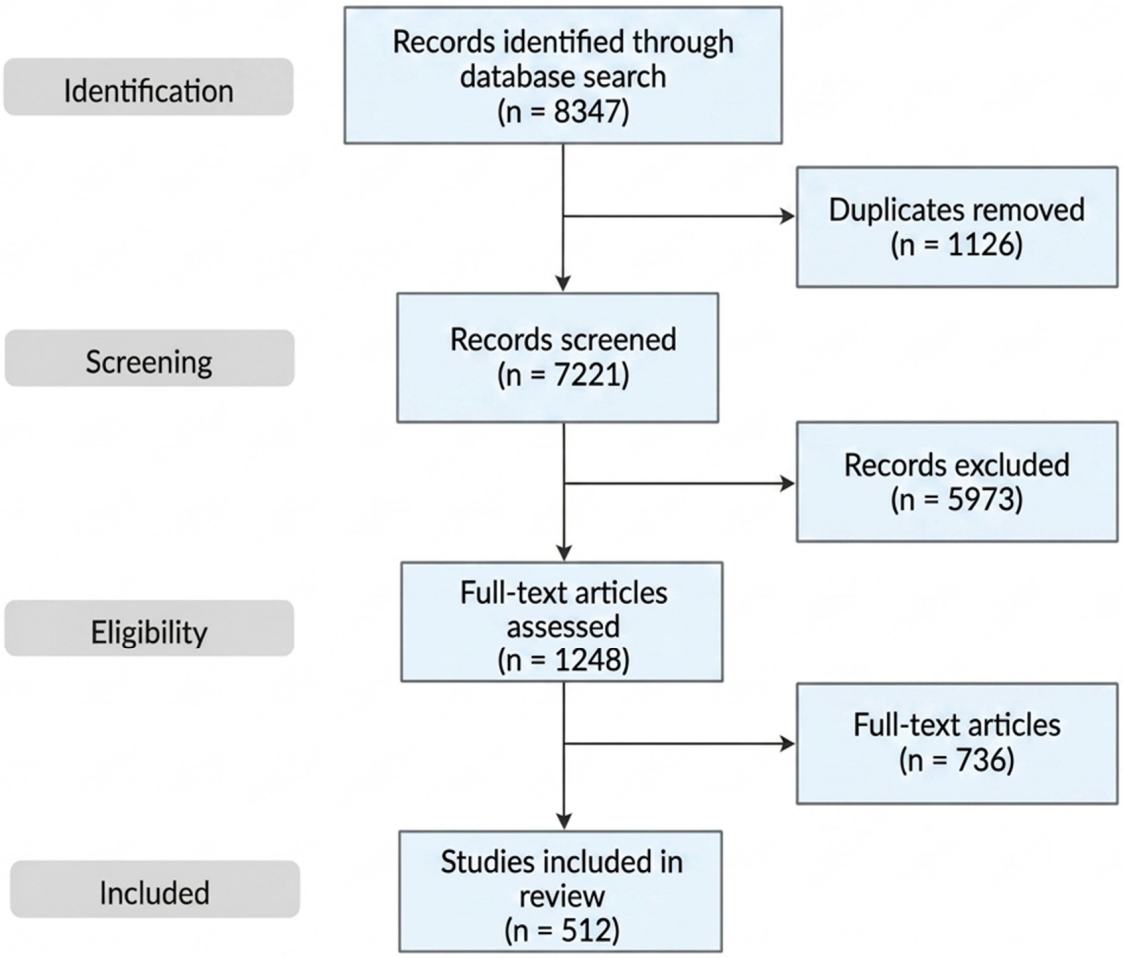


Figure 2. PRISMA 2020 Flow Diagram of Article Selection (2000–2025).

The article selection process is summarized in Figure 2 following PRISMA 2020 reporting standards [11]. The study developed a structured data extraction template to ensure consistency in coding. Each article was coded along several analytical dimensions, including publication year, journal outlet, country focus, sector, research method, theoretical framework, key constructs, and dominant thematic orientation. When multiple theoretical perspectives were used in a single study, the framework most central to the article's research model or hypotheses was coded as the dominant theoretical lens to avoid double counting.

To ensure contextual sensitivity particularly in the identification of theoretical lenses and priority capabilities coding was conducted following a manual process. Table 9 presents the data extraction and coding framework.

This thematic classification was derived using an inductive-deductive logic. Initial codes were generated from article objectives, abstracts, and keywords. First-order codes were subsequently organized into broader thematic clusters representative of major lines of research orientations. Four major clusters emerged: resilience, sustainability, digital transformation, and structural or contextual dynamics. In order to avoid double counting

and maintain percentage consistency in quantitative reporting, each article was allocated to a single predominant thematic stream.

Table 9. The Systematic Review Protocol and Eligibility Criteria.

Coding Dimension	Description	Analytical Purpose
Publication Year	Year of publication	Temporal trend analysis
Journal Outlet	Publishing journal	Outlet concentration analysis
Country Focus	Country or sub-region studied	Geographic mapping
Sector	Industry or domain (e.g., food, energy, logistics)	Sectoral clustering
Research Method	Survey, SEM, case study, modelling, conceptual	Methodological distribution
Theoretical Lens	RBV, Dynamic Capabilities, Institutional Theory, etc.	Theory usage analysis
Key Constructs	Resilience, sustainability, digitalization, integration, etc.	Thematic identification
Dominant Theme	Primary research stream assigned	Avoid double counting
Level of Analysis	Firm, supply network, sector, policy	Multi-level classification

To ensure reliability, two independent reviewers coded a random subsample of sixty articles. Cohen's Kappa coefficient was applied to assess inter-coder reliability, producing a net value of 0.89 indicating substantial agreement. Discrepancies were discussed and resolved through development of coding definitions. This process enhanced internal validity and reduced subjective classification bias.

Multiple thematic clustering and co-occurrence analysis of keywords was performed by bibliometric analysis using VOSviewer. Bibliometric mapping can be used in conjunction with qualitative coding to uncover the structural relationships that exist within a field of literature [24]. We identified three predominant intellectual clusters based on co-occurrence analysis. Resilience and disruption management; green and sustainable supply chains; and digital transformation and Industry 4.0 technologies. These clusters align well with global SCM research trends reported in previous reviews [38,40]. Figure 3 presents Keyword Co-occurrence Network of SCM Research in MENA (2000–2025).

Keyword co-occurrence analysis was conducted using VOSviewer (version 1.6.20). Author keywords were selected as the unit of analysis to capture conceptual patterns across the reviewed literature. A minimum occurrence threshold of five was applied to reduce noise and retain substantively recurring constructs. This resulted in 63 keywords meeting the inclusion threshold for network construction. Full counting was employed to ensure equal weighting of keyword occurrences across publications. Network normalization was based on the association strength method, which corrects for differences in keyword frequency and emphasizes relational intensity. The clustering resolution parameter was maintained at the default value of 1.00 to allow algorithm-driven cluster detection without manual bias. Prior to final visualization, minor keyword harmonization was conducted (e.g., merging synonymous terms such as "GSCM" and "green supply chain management") to improve conceptual clarity. The resulting network visualization is presented in Figure 3.

Methodological classification revealed strong concentration patterns. Most empirical studies employed cross-sectional survey designs. Structural equation modeling (SEM) and partial least squares (PLS-SEM) were the prevailing analytical techniques. Simulation modeling and analytical modeling appeared less frequently, while qualitative case studies represented a small proportion of the sample. These findings support the methodological observations presented in the synthesis section of the manuscript and provide empirical grounding for the research gap discussion. Table 10 presents methodological distribution of reviewed studies (N = 512).

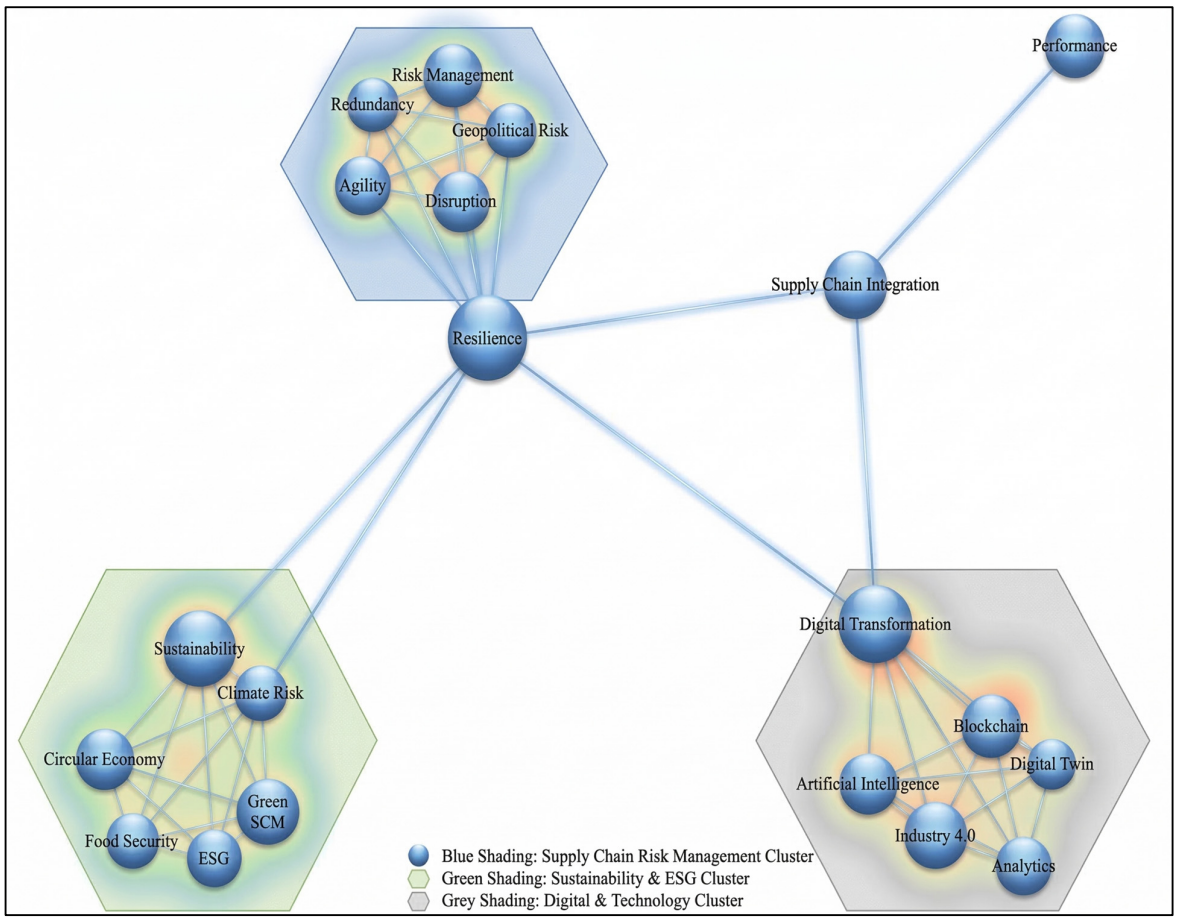


Figure 3. Keyword Co-occurrence Network of SCM Research in MENA (2000–2025).

Table 10. Methodological Distribution of Reviewed Studies.

Methodological Approach	Frequency (n)	% of Sample	Period Dominance
Survey-based empirical studies	292	57.0%	2016–2025
Simulation/analytical modelling	47	9.2%	2016–2025
Qualitative case studies	32	6.3%	2011–2015
Conceptual/theoretical papers	24	4.7%	2011–2015
Systematic reviews	18	3.5%	2016–2025
Mixed methods	13	2.5%	2016–2025
Other empirical approaches	86	16.8%	mixed
Total	512	100%	-

Structural equation modelling (SEM) and partial least squares (PLS-SEM) were the most frequently used analytical techniques within survey-based studies, accounting for approximately 186 of the 292 survey articles.

Theoretical lens identification involved extracting explicit theoretical references within each article. The theory of dynamic capabilities is the most commonly used conceptual framework [5], particularly in relation to resilience studies and digital transformation. The Institutional theory [8] was a significant focus of sustainability and governance research. In integration and capability studies, the Resource-Based View [44] was frequently used. Contingency theory and stakeholder theory were applied selectively, particularly in alignment and legitimacy contexts. This distribution reveals the theoretical foundations outlined earlier in the manuscript and demonstrates partial alignment between global theoretical developments and regional application. Table 11 summarizes the theoretical Framework

Distribution in SCM Research in MENA (2000–2025) (N = 512) and Table 12 presents the Country Distribution of SCM Research in MENA (2000–2025) (N = 512).

Table 11. Theoretical Framework Distribution in SCM Research in MENA (2000–2025).

Theoretical Framework	Frequency (n)	% of Total Sample	Dominant Thematic Cluster	Period Dominance
Dynamic Capabilities Theory	138	27.0%	Resilience/Digital Transformation	2016–2025
Resource-Based View	94	18.4%	Integration/Capability Studies	2011–2025
Institutional Theory	76	14.8%	Sustainability/Governance	2016–2025
Contingency Theory	43	8.4%	Strategic Alignment/Risk	2011–2015
Stakeholder Theory	31	6.1%	Sustainability/ESG	2016–2025
Transaction Cost Economics	18	3.5%	Sourcing/Coordination	2000–2010
Resource Dependence Theory	16	3.1%	Structural/Import Dependence	2011–2015
Socio-Technical Systems Theory	11	2.1%	Digital Transformation	2016–2025
No Explicit Theoretical Framework	85	16.6%	Mixed (Primarily Empirical Surveys)	2016–2025
Total	512	100%	-	-

Table 12. Country Distribution of SCM Research in MENA (2000–2025) (N = 512).

Country	Frequency (n)	% of Total Sample	Dominant Themes
Saudi Arabia	146	28.5%	Sustainability, Resilience
United Arab Emirates	104	20.3%	Digital Transformation, Resilience
Egypt	62	12.1%	Structural Context, Logistics Reform
Morocco	51	10.0%	Digital–Resilience Integration
Turkey	48	9.4%	Sustainability, Integration
Jordan	27	5.3%	Green SCM
Qatar	18	3.5%	Smart Logistics
Oman	14	2.7%	Port and Maritime Logistics
Kuwait	11	2.1%	Energy Supply Chains
Tunisia	9	1.8%	SME Integration
Algeria	8	1.6%	Import Dependency
Bahrain	6	1.2%	Digital Platforms
Multi-country MENA studies	8	1.6%	Comparative Studies
Total	512	100%	-

When multiple theoretical perspectives were used in a single study, the framework most central to the article's research model or hypotheses was coded as the dominant theoretical lens to avoid double counting.

Table 12 indicates a strong geographic concentration of supply chain management research within Saudi Arabia and the United Arab Emirates, which together account for nearly half of the reviewed publications. This pattern reflects the rapid logistics modernization and economic diversification programs implemented in these countries over the past decade. In contrast, North African economies remain comparatively underrepresented, highlighting the need for broader regional comparative research.

Turkey was included in the dataset because several international databases and regional economic analyses classify it within the broader Middle East trade and logistics system. Moreover, a number of reviewed studies explicitly examine Turkey in relation to supply chain networks linked to MENA trade corridors. The eight multi-country studies

primarily employ cross-country surveys, comparative policy analyses, and secondary trade data to investigate regional logistics integration, sustainability governance, and supply chain resilience across multiple MENA economies. Building on these geographic patterns, Table 13 presents the temporal growth of SCM research in the MENA region between 2000 and 2025.

Table 13. Temporal Growth of SCM Research in MENA (2000–2025).

Period	Frequency (n)	%
2000–2010	72	14.1%
2011–2015	104	20.3%
2016–2020	148	28.9%
2021–2025	188	36.7%
Total	512	100%

This study synthesized by merging the quantitative distributional patterns with qualitative thematic derivation. Using frequency counts and percentage shares, thematic dominance across the 512 articles was calculated. Temporal segmentation into four periods (2000–2010, 2011–2015, 2016–2020, and 2021–2025) allowed analysis of research acceleration and thematic shifts. The largest increase was seen in 2015, coinciding with major regional transformation agendas and global disruption events like the COVID-19 pandemic [4]. This temporal clustering further supports the interpretation of resilience, sustainability and digital transformation as structurally relevant themes in MENA SCM scholarship. Validity was addressed through protocol transparency, dual screening, inter-coder reliability testing, and explicit classification rules.

Despite these limitations, the structured PRISMA-based protocol ensures transparency, replicability, and methodological rigor in the review process. The review is limited by reliance on English-language publications indexed in Scopus and Web of Science, which may underrepresent regional journals and non-English scholarship. In addition, most empirical studies rely on cross-sectional survey designs, which limits the ability to assess long-term supply chain capability development. Future research should therefore expand database coverage and employ longitudinal and comparative research designs.

4. Findings and Discussion

4.1. Publication Growth and Geographic Concentration

The analysis of 512 peer-reviewed articles indicates a significant increase in SCM research in the MENA region after 2015. As stated in Table 13, publications from 2021 to 2025 represent 36.7% of the total sample, compared with only 14.1% during the 2000–2010 period. This pattern indicates a structural shift rather than incremental growth. This inflection point coincides with major regional reform programs, economic diversification initiatives, and global disruption events such as the COVID-19 pandemic [4,6].

The temporal trend suggests that SCM research in the MENA region has evolved from exploratory adoption toward strategic analyses of supply chain capabilities. Early studies focused on examining barriers to integration or coordination challenges within a sector. Recent work increasingly examines resilience and sustainability, and digital transformation as interlinked systems of capabilities. While this transition reflects the more general global evolution of SCM [11], it has specific regional overtones.

Geographic distribution remains concentrated. As detailed in Table 12, Saudi Arabia (28.5%) and the United Arab Emirates (20.3%) comprise nearly half of total publications together. Egypt, Morocco and Turkey are next on moderate levels. North African economies,

like Tunisia and Algeria, are still underrepresented. Multi-country comparative studies comprise just 1.6% of the dataset.

This concentration reflects differences in research funding, digital infrastructure and institutional reform intensity. It also reflects state-led efforts at modernization in Gulf economies [41]. However, this concentration raises concerns regarding the generalizability of regional conclusions. Insights from the empirical literature, primarily based on high-investment logistics hubs, may not encompass conditions in low-resource or conflict-affected settings.

Combining geographic and temporal dynamics, Table 14 consolidates the amount of country/period-based regional research intensity.

Table 14. Research Intensity by Country and Period (N = 512).

Country	2000–2010	2011–2015	2016–2020	2021–2025	Total (n)
Saudi Arabia	12	26	48	60	146
UAE	9	18	35	42	104
Egypt	11	15	17	19	62
Morocco	4	9	18	20	51
Turkey	10	12	13	13	48
Other MENA	26	24	17	34	101
Total	72	104	148	188	512

Table 14 confirms a substantial expansion of SCM research after 2015. Across all major publishing countries except for Lebanon, with especially rapid growth in Saudi Arabia and the UAE. The research landscape appears closely aligned with national transformation strategies.

4.2. Thematic Dominance: Resilience, Sustainability, and Digital Transformation

The three dominant thematic clusters are resilience (32.2%), sustainability (27.0%), and digital transformation (23.6%). Structural context studies represent a smaller but meaningful stream (17.2%). This trend is reinforced by the bibliometric network in Figure 3. Based on the keyword co-occurrence analysis, three distinct but interconnected clusters are formed. Resilience occupies a central position in the keyword network, linking sustainability and digital transformation research streams. This structural position reinforces the functional view that resilience serves as an integrating capability amidst volatility [5].

- *Resilience*

Resilience research in the MENA region has moved beyond reactive recovery models toward the development of structural supply chain capabilities. Although there are some empirical studies available, the focus has been on agility, redundancy, digital visibility and supplier diversification. This shift aligns with emerging global scholarship on resilience [12], but brings critical regional context, specifically import dependence and maritime exposure [10]. Firm-level resilience capability studies represent the largest share of this cluster (13.3%), with many studies employing structural equation modelling techniques. Integrative studies on digital resilience (8.2%) discuss how analytics, blockchain and digital twins support a response to disruptions [6]. However, geopolitical modeling remains limited. While studies account for known risks from the maritime corridor, few incorporate systemic geopolitical volatilities into dynamic capability frameworks. Resilience is often seen at the level of the firm, yet macro-level governance mechanisms are under-explored.

- *Sustainability*

Sustainability research expanded rapidly after 2016; the stream is dominated by green supply chain management (GSCM) and circular economy practices. Green supply chain integration represents one of the most extensively studied topics, with empirical evidence linking environmental practices to improved operational and performance outcomes [28,29]. Research into the modeling of climate adaptation remains underdeveloped in comparison to sustainability studies which are more disclosure oriented. Although there is a strong regional climate vulnerability [43], the empirical integration of scenarios regarding climate stressors into supply chain redesign remains limited. One of the main takeaways is the intersection between sustainability and resilience. Indeed, studies are increasingly approaching environmental practices beyond the view of useful compliance tools, crossing over to continuity mechanisms. This also reflects global debates around sustainable supply chains [14]. In MENA, sustainability seems less motivated by consumer activism than by regulations and diversification policy.

- *Digital Transformation*

Most digital transformation research focuses on Industry 4.0 adoption, supply chain analytics, and blockchain-enabled traceability systems. Analytics and blockchain-based traceability. Moreover, government-supported digital platforms in the Gulf economies have unique diffusion pathways [22]. In the MENA region, digitalization is often led by policy change rather than competitive pressures as might be a norm in many Western contexts. This institutional speeding-up then affects the design of research. These surveys or empirical studies measure readiness, digital maturity, or adoption intention rather than long-term transformation impact. Digital transformation is rarely presented as an independent goal. It acts, rather, as an enabling mechanism of resilience and sustainability. This integrative role is in line with dynamic capabilities theory [5].

4.3. Methodological Patterns and Theoretical Anchoring

Methodologically, SCM research in the MENA region is still overwhelmingly quantitative. Table 10 shows that Survey-based research designs account for approximately 57% of the reviewed studies. Structural equation modelling and regression analysis represent the most frequently used analytical techniques within these survey-based studies. Simulation and analytical modeling are below 10%; qualitative case research is limited. Such a methodological thrust is indicative of theoretical evolution. Dynamic capabilities theory is the most commonly referenced framework (explicitly, 27% of citations), followed by RBV 18.4% and institutional theory categories 14.8% as presented in Table 11. This logic of dynamic capabilities suggests that researchers view volatility as a challenge of strategic adaptation [5]. Nevertheless, an institutional theory of sustainability and governance work is highly relevant as institutions with strong regulatory or coercive influence are significant in state-led systems [8]. Interestingly, 16.6% of the studies are not supported by theory. Such a pattern suggests that empirical testing occasionally leads theoretical refinement. The reliance on theoretical frameworks originally developed in Western contexts may limit the development of regionally embedded conceptual contributions. To show how theory and theme intersect, Table 15 provides a summary of most common usage of theory by thematic cluster.

The table shows some alignment between theory and theme but minimal integration across the theories. Resilience and sustainability remain analytically adjacent, but conceptually siloed.

Table 15. Theoretical Lens by Thematic Cluster.

Thematic Cluster	Dominant Theory	Secondary Theory	Observed Gap
Resilience	Dynamic Capabilities	RBV	Limited macro-institutional integration
Sustainability	Institutional Theory	Stakeholder Theory	Weak climate modeling integration
Digital Transformation	Dynamic Capabilities	Socio-Technical Systems	Limited governance embedding
Structural Context	Resource Dependence Theory	Institutional Theory	Few longitudinal analyses

4.4. Structural Interpretation of the MENA SCM Landscape

When the findings are interpreted together, a structural narrative emerges. MENA SCM scholarship does not just reproduce global research trends. It presents an adaptation to state-led modernization, geopolitical exposure and climate stress. Three structural drivers appear consistently: Volatility and disruption exposure; policy-driven economic diversification; and rapid digital infrastructure expansion [45].

These drivers influence capability prioritization. Resilience is a structural necessity instead of a competitive differentiator. Regulatory legitimacy and diversification strategies are in line with sustainability, and digital transformation acts as an accelerant of both [46].

The integrative framework proposed in Figure 1 is supported by the observed thematic dominance and the bibliometric centrality of resilience within the keyword network. Resilience is in the bridging position because it answers directly to volatility but executes through digital tools and sustainable practices. However, the results also show asymmetries. Research is geographically concentrated, methodologically homogeneous, and theoretically reliant on external imports. Cross-country comparison is rare. Longitudinal evidence remains scarce. This pattern suggests that the region serves as an empirical testing ground but not yet as a generator of context-embedded theory [24].

4.5. Toward a Context-Embedded SCM Perspective

The synthesis of findings indicates that SCM capability in MENA is shaped by institutional configuration. State coordination modifies market mechanisms. Digitalization may precede organizational readiness. Investments in resilience are a response to structural exposure, not competitive choice. Adaptation mechanisms are articulated through dynamic capabilities theory; governance influence is unpacked via the building blocks of institutional theory [47]. But the crossroad of both is underdeveloped. Future research should integrate: Application of capability theory to the modeling of geopolitical risk; Narratives of climate adaptation using resilient design; Cross-comparative analysis across Gulf and North African sub-regions and Longitudinal tracking of capability evolution. Such directions would move the field from empirical replication and toward theoretical refinement [39,48,49].

Finally, in order to conclude the synthesis of findings, the evidence confirms that SCM research in MENA matured rapidly regarding both quantity and themes after 2015. The dominant intellectual triad are resilience, sustainability and digital transformation. Bibliometric mapping validates structural clustering. Quantitative bias revealed by methodological patterns. The empirical base shows that dynamic capabilities dominate the field. The discussion suggests that resilience is the operating principle in situations of institutional volatility. Sustainability and digital transformation operate as complementary capability

layers that support resilience development [50]. The findings did not just document publication trends. They demonstrate how regional structural conditions inform scholarly priorities. In this sense, the MENA region becomes not only a context for empirical research but also a setting that can generate new insights for supply chain theory under conditions of coordinated modernization and systemic exposure.

5. Conclusions

This study provides the first region-wide synthesis of supply chain management (SCM) research in the Middle East and North Africa (MENA) between 2000 and March 2025. Based on 512 peer-reviewed articles identified through a PRISMA-guided systematic review, the study combines bibliometric mapping and thematic coding to examine how SCM scholarship has developed across the region.

The results show a strong increase in research activity after 2015. This acceleration coincides with major economic reform programs, logistics infrastructure investments, and global disruptions such as the COVID-19 pandemic. The geographic distribution of studies remains concentrated, with Saudi Arabia and the United Arab Emirates accounting for nearly half of all publications.

Three dominant thematic clusters emerge from the analysis: resilience (32.2%), sustainability (27.0%), and digital transformation (23.6%). Bibliometric network analysis shows that resilience plays a central integrative role, linking sustainability and digital capability research streams. This pattern supports the view that resilience has evolved from a reactive recovery concept toward a structural supply chain capability embedded in network design. Sustainability research increasingly incorporates circular economy practices and environmental governance, while digital transformation functions as an enabling mechanism that enhances visibility, coordination, and adaptive capacity.

The review also reveals clear methodological patterns. Most empirical studies rely on cross-sectional survey designs, often analyzed using structural equation modelling techniques. Dynamic capabilities theory represents the most widely applied theoretical lens, followed by the resource-based view and institutional theory. However, cross-country comparative studies remain limited, and geopolitical risk modelling is still underdeveloped within mainstream SCM frameworks.

Overall, the findings suggest that SCM research in the MENA region reflects broader structural conditions shaping regional supply chains. State-led economic diversification, import dependence, climate vulnerability, and rapid digital infrastructure expansion influence both research priorities and capability development. Within this environment, resilience becomes a structural necessity rather than merely a strategic choice, while sustainability and digital transformation operate as complementary capability layers.

This study contributes by providing an integrative framework that links structural drivers, supply chain capabilities, and strategic outcomes. The framework helps organize fragmented regional scholarship and offers guidance for policymakers and practitioners seeking to strengthen supply chain resilience and sustainability within rapidly transforming logistics systems.

These findings also carry practical implications. Policymakers should prioritize integrated logistics infrastructure, digital platforms, and climate-resilient supply chain systems to strengthen regional trade continuity. Managers can use the proposed framework to align digital transformation, sustainability initiatives, and resilience capability development within increasingly volatile supply chain environments.

This study has several limitations that should be considered when interpreting the findings. The review relies on English-language publications indexed in Scopus and Web of Science, which may underrepresent regional scholarship published in local journals

or non-English outlets. In addition, the dominance of cross-sectional empirical studies in the reviewed literature limits the ability to evaluate long-term supply chain capability development across the region.

Future research should expand cross-country comparative analysis, employ longitudinal research designs, and develop theoretical models that incorporate institutional coordination and geopolitical exposure. The MENA region therefore represents an important empirical setting for advancing supply chain theory under conditions of systemic economic transformation. Based on the identified gaps across thematic clusters, Table 16 outlines key directions for future research in SCM within the MENA region.

Table 16. Future research agenda for supply chain management studies in the MENA region.

Research Domain	Key Research Gap	Suggested Research Questions	Recommended Methods
Resilience and disruption management	Limited modelling of geopolitical risk and trade chokepoints	How do geopolitical shocks influence supply chain redesign in import-dependent economies?	Network modelling, simulation, system dynamics
Digital transformation	Underexplored role of AI, digital twins and predictive analytics in regional supply chains	How can digital twins improve supply chain visibility and disruption response in logistics hubs?	Case studies, simulation modelling, digital twin experiments
Sustainability and ESG integration	ESG integration remains weakly examined in MENA logistics systems	How do regulatory reforms influence green supply chain adoption across industries?	Cross-country surveys, SEM analysis
Food and energy supply security	High import dependence exposes the region to supply risks	How can supply chain diversification improve resilience in food and energy logistics networks?	Scenario modelling, trade flow analysis
Institutional governance and logistics reform	Limited understanding of state-led infrastructure reforms	How do national logistics strategies reshape supply chain capability development?	Policy analysis, institutional theory frameworks
Comparative regional analysis	Very few cross-country MENA studies	How do supply chain strategies differ across GCC, North Africa, and Levant economies?	Comparative surveys, panel data analysis
Supply chain finance and risk	Financial resilience rarely examined in MENA SCM research	How do financial instruments influence supply chain resilience under economic shocks?	Econometric modelling, mixed methods

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